UNIVERSITY OF SOUTHAMPTON

FACULTY OF HUMANITIES

Department of Archaeology

Rethinking Roman Perceptions of Coastal Landscapes:

A Case-Study of the Levant

by

Carmen Tânia Macleroy Obied

Thesis for the degree of Doctor of Philosophy

June 2016

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF HUMANITIES

Archaeology

Thesis for the degree of Doctor of Philosophy

RETHINKING ROMAN PERCEPTIONS OF COASTAL LANDSCAPES:

A CASE-STUDY OF THE LEVANT

Carmen Tânia Macleroy Obied

A recent resurgence of interest in the field of ancient geography and navigation has led to a need to re-evaluate the surviving corpus of ancient texts and archaeological evidence to seek alternative modes of perceiving space in the past. Links can be traced between ancient mariners' practical experience and geographers' conceptualisation of space, which present a complex 'jigsaw puzzle' of the *oikoumene* (known inhabited world). This research thus presents a case-study of the Levantine coast and explores alternative modes of perceiving space beyond the predominant linear approach. This is achieved through a comparative analysis of selected ancient sources, focusing on maritime archaeological evidence and geospatial analysis. The prime objective is to demonstrate the diverse nature and approaches of ancient authors' representation of the *oikoumene,* as a means of conceptualising spatial associations and navigating the seascape. This is investigated through two key themes that emerged in the data: (A) 'Static' and (B) 'Movement', within a multidisciplinary framework set in the Roman Levant. A "common sense geography" approach is adopted, in which themes are considered and explored through different conceptual models, particularly in the context of sailing practicalities and mariners' practical experience, as a means of providing insights into which authors experienced the described voyages or had a sense of seafaring. It raises questions on the nature of their sources, genres and purpose, underlining the relation between political and geographic knowledge. Understanding how these factors reflect on ancient notions of navigation can help to improve our knowledge of past perceptions of the maritime landscape and the dynamic relationship between people and the sea. The Levant region presents a high degree of variation, both physically and conceptually. Aspects linked to the nature and scale of navigation are examined in relation to regional maritime conditions, harbours, activities and routes. These themes are further contextualised via analogous cases in other regions of the Eastern Mediterranean. Emerging patterns offer insights into which authors actually experienced these voyages, as well as raising questions relating to the nature of their sources, genres and purpose. Results reflect a varied sense of spatial awareness of the known world amidst ancient authors, suggesting more multi-faceted ways of perceiving space in antiquity, and thus, improving our knowledge of past perceptions of the maritime landscape and the dynamic relationship between people and the sea, from both a mariner's and armchair geographer's perspective.

DECLARATION OF AUTHORSHIP

I, Carmen Tânia Macleroy Obied, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research. Rethinking Roman Perceptions of Coastal Landscapes: A Case-Study of the Levant.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission [or] Parts of this work have been published as:

Signed: ....

Date:..

Acknowledgements

I would like to sincerely thank Dr. Lucy Blue, who has been an incredible supervisor, friend and inspiration throughout my whole archaeological journey, from undergraduate all the way through my PhD. I would like to greatly thank my advisor Dr. Leif Isaksen for all his invaluable support, guidance and insights. I have learnt so much from both and am truly honoured to have worked alongside such inspiring people. I am also very grateful to the Arts and Humanities Research Council (AHRC) for believing in my research and funding this pursuit. My gratitude and appreciation further extends to my examiners Prof. Pascal Arnaud and Dr. Julian Whitewright for their important insights and guidance throughout the final stretch.

I would like to truly thank my incredible family and close friends who have inspired me and motivated me, and for their endless help and patience throughout all the hardships and setbacks along this journey, always encouraging me to be positive and keep powering through. I could not have achieved this without you. Thank you.

Definitions and Abbreviations

Maps (e.g. GIS, 3D), diagrams and tables presented throughout this thesis have been produced by the author, unless otherwise stated or referenced accordingly to the specific source used. Abbreviations for ancient sources used in this thesis are generally consistent with the Oxford Classical Dictionary, 3rd ed. (2003). Exceptions to these are distinguished within the text.

Key Abbreviations	**Ancient Authors**	**Works**
Ap. Rhod., *Argon.*	Apollonius	*Argonautica*
Ar., *Nub.*	Aristophanes	*The Clouds*
Arist., *Mete.*	Aristotle	*Meteorology*
Arr., *Anab.*	Arrian	*Anabasis of Alexander*
Av., *Ora Mar.*	Avienus	*Ora Maritima*
Caes., *Gall.War*	Julius Caesar	*Gallic War*
Cic., *Att.*	Cicero	*Letters to Atticus*
Diod., *Lib. Hist.*	Diodorus Siculus	*Library of History*
Erat., *Geog. Fr*	Eratosthenes	*Geography (Fragments)*
Hdt., *Hist.*	Herodotus	*Histories*
Hes., *Op.*	Hesiod	*Works and Day*
Hipp.	Hipparchus	*Commentary on the 'Phenomena' of Aratus and Eudoxus*
Hom., *Il.* / Hom., *Od.*	Homer	*Iliad / Odyssey*
Jos., *AJ*	Josephus	*Jewish Antiquities*
Jos., *BJ*	Josephus	*Jewish War*
Marc., *Peripl.Mar.Ext.*	Marcian of Heraclea	*Periplus Maris Externi*
Marc., *Epit. Peripl. Men.*	Marcian of Heraclea	*Epitome of Menippus of Pergamum's Periplus of the Inner Sea*
Mela	Pomponius Mela	*De Chorographia*
Paus.	Pausanias	*Description of Greece*
Phot., *Bibl.*	Photius	*Bibliotheca*
Pliny, *NH*	Pliny the Elder	*Naturalis Historiae*
Plut.	Plutarch	*Parallel Lives*
Polyb., *Hist.*	Polybius	*The Histories*
Ps.-Skylax	Pseudo-Skylax	*Periplous*
Ptol., *GH*	Claudius Ptolemy	*Geographike Hyphegesis (Geography)*
SMM	Anonymous	*Stadiasmus Maris Magni*
Strabo, *Geog.*	Strabo	*Geographia*
Thuc., *Hist.Pel.War*	Thucydides	*Histories of the Peloponnesian War*
Xen., *Anab. / Hell.*	Xenophon	*Anabasis / Hellenika*

BAtlas: *The Barrington Atlas of the Greek and Roman world*

CIL = *The Corpus Inscriptionum Latinarum*

FGrHist = *Die Fragmente der Griechischen Historiker*

G.Earth = *Google-Earth*

IG = *Inscriptiones Graecae*

LCL = *Loeb Classical Library.*

LSJ = Greek-English Lexicon (Liddel and Scott 1996)

PECS = *Princeton Encyclopedia of Classical Sites*

TIR = *Tabula Imperii Romani*

TLG = *Thesaurus Linguae Graece*

Table of Contents

List of Figures

List of Tables

Chapter 1: Rethinking Roman Perceptions of Coastal Landscapes: A Case-Study of the Levant

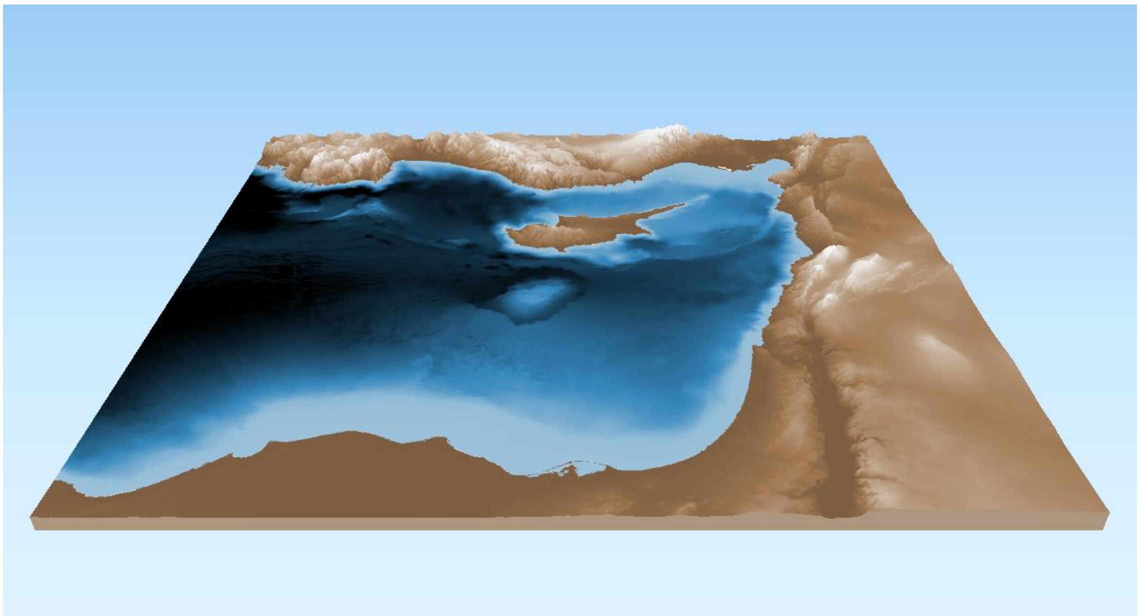


Figure 1.1. 3D Map of case-study region: The Levantine Coast (Produced by Author, using QGIS2.8.2).

1.1 Navigating in the *oikoumene*: A Fresh Appraisal

> "It is the sea more than anything else that defines the contours of the land and gives it its shape by forming gulfs, deep seas, straits and likewise isthmuses, peninsulas and promontories; but both the rivers and the mountains assists the sea herein" (Strabo, *Geog*. 2.5.17).

A recent resurgence of interest in the field of ancient geography and navigation has led to a need to re-evaluate the surviving corpus of ancient texts and archaeological evidence to seek alternative modes of perceiving space in the past. The level of complexity inherent in ancient geographic texts is often underestimated, and is particularly evident in the Roman Levant (case-study, Fig.1.1) - a highly chaotic region in terms of its textual tradition and representation. Links can be traced between ancient mariners' practical experience and geographers' conceptualisation of space, which present a complex 'jigsaw puzzle' of the *oikoumene* (known inhabited world). The geographic works should thus be approached as frameworks of knowledge in their own right, reflecting contemporary Roman cultural-political perceptions. The ancient sources under investigation offer one of the closest insights we have into how people perceived, understood, recorded and reported the world.

1.1.1 Research Question and Objectives

- **How was the Roman coastal landscape perceived by ancient authors dealing with geographic and navigational dynamics of the 'known world'?**
- **How did mariners navigate both physically and cognitively through this seascape?**

This research presents a case-study of the Levantine coast and explores alternative modes of perceiving space beyond the predominant linear approach. This is achieved through a comparative analysis of selected ancient sources, focusing on maritime archaeological evidence and geospatial analysis (1.2-3). The prime objective is to demonstrate the diverse nature and approaches of ancient authors' representation of the *oikoumene,* as a means of conceptualising spatial associations and navigating the seascape. [1]

This is investigated through two key themes: (A) 'Static' and (B) 'Movement', within a multidisciplinary framework set in the Roman Levant (Ch.7 and 8, respectively). A "common sense geography" [2] approach is adopted (discussed next: 1.1.2), in which themes are considered and tested through different conceptual models, particularly in the context of sailing practicalities and mariners' phenomenological experience (Arnaud 2014:40; Ingold 2000:242),[3] as a means of providing insights into which authors experienced the described voyages or had a sense of seafaring. It also raises questions on the nature of their sources, genres and purpose, underlining the relation between political and geographic knowledge. Understanding how these factors reflect on ancient notions of navigation can help to improve our knowledge of past perceptions of the maritime landscape and the dynamic relationship between people and the sea, from both a mariner's and armchair geographer's perspectives.

---

[1] See **Ch.3** for theoretical discussion on seascapes/maritime cultural landscapes and ancient mapping/navigation.
[2] The concept of 'Common Sense Geography' forms the foundation of a recent collaborative research initiated by a group of leading scholars: K. Geus, M. Thiering, P. Arnaud, A. Dan, K. Guckelsberger, T. Poiss, G.F. Chiai, S. Bianchetti and T. Bekker-Nielsen (2014). This approach draws on the implicit knowledge and mental-maps inherent in the ancient sources, in which "*Common* denotes a 'lower' geography, to be distinguished from 'professional' or 'higher' geography. *Sense* refers to a 'naïve' perception and description of space and the use of 'intuitive' arguments in geographical contexts. *Geography* refers to the aspect of historical geography concerned with implicit or tacit knowledge in ancient cultures." (Geus and Thiering 2014:5; see also Thiering 2012:11-14 and Arnaud 2014:39-68).
[3] For traditional navigation see:(Lewis 1994; Morton 2001; Davis 2009:219–309; Oleson 2008; McGrail 1993).

1.1.2 Navigating by "common sense geography": New Approaches and Debates

Prior to the 1980s, few researchers were investigating the field of perceptions of geography, space and travel in antiquity, the most notable examples being Dilke (1985) and Harley and Woodward (1987). A prevalent matter of current debate is just how far maps, seafaring guides (*periploi*), and itineraries, were used as a part of everyday life and as a means of navigation in the Roman period (cf. appendix iii for terminology). Though modern scholars often highlight the importance of such documents to ancient navigation, it is difficult to establish the role they actually played in Graeco-Roman seafaring and orientation (1.1.5. On this topic, see for example: Medas 2004a-b, 2011; Prontera 1992:36; Janni 1984; Davis 2009:158-197; Uggeri 1998). This largely stems from the fact that the number of surviving maps, and even the number of testimonies about use of maps, both seem very limited, particularly in the Latin geographical manuscripts (Talbert 2012 Ch.4.3.5). Moreover, seafaring communities relied on accumulated personal knowledge and cognitive maps of journeys to navigate, preserved through an oral culture (Thiering 2012:11-14; Arnaud 2014:40). On one side of the debate, Dilke (1984), in *Greek and Roman Maps,* considered that Romans were generally familiar with maps and used them widely for administrative and other purposes. In contrast, scholars such as Janni (1984) in *La Mappa e il Periplo: Cartografia Antica e Spazio Odologico*, questioned this view, arguing that Romans preferred to envisage "space", not two-dimensionally with maps, but instead one-dimensionally through lines, as "hodological space"[4] (using the many surviving examples of land and sea itineraries as evidence). This contrast of opinion is important, with notable implications to our knowledge of advances of cartography, geography and navigation. Ongoing debates and emerging multi-disciplinary research are progressively emphasising a need to re-evaluate our previous notions on ancient geography and navigation (see 1.1.5).

In light of this, the type of hodological notions developed since Janni (e.g. Brodersen 1995; Whittaker 2002, 2004; discussed further in Ch.4.4) that have prevailed in the scholarly sphere are brought into question in this research, emphasising the need for further exploration of the extensive corpus of available materials to identify additional models of perceiving space. Recently, with the resurgence of interest in the field, Talbert rightly stated that "the immense range and variety of surviving texts, images and material objects will repay fresh appraisal in a continued quest to achieve fuller, more nuanced understanding" (Talbert 2010:269). As a result, this research argues that, in antiquity, people did not only envision journeys and the landscape in simply linear routes, but were perceiving and navigating through space in more

[4] See Janni (1984:130) for the concept of "hodological space" (from the Greek word '*hodos*', meaning road or path).

multi-faceted ways. Thus, it seeks different forms of establishing spatial associations and orientation, building on implicit and explicit cues inherent in the maritime data, through the notion that "the mariners' experience has been the origin of a common sense geography, which, in turn, has been the origin of the classical tradition of geography" (Arnaud 2014:66).

- Are linear itineraries truly the sole means by which people in the Roman period developed their spatial awareness and worldviews? If not, how was the coastal landscape perceived by ancient authors dealing with geographic and navigational matters of the known world?
- How does this differ from on-board views of ancient mariners undertaking such journeys?
- How were these spaces represented and how do they tie in with the archaeological evidence and physical reality of the 'maritime cultural landscape' (defined in Ch.3.2)?
- What insights can these materials give us about the development of their worldviews?

Alternative modes of perceptions can be traced through a "bird's eye view", mariners' cognitive maps for orientation, linguistic topographies, administrative and legal texts (1.1.4). This investigation thus builds on current work by researchers challenging hodological models (e.g. Poiss, Dan, Geller in Geus and Thiering 2014) and adopts a "common sense geography" approach with the aim of highlighting the importance of rethinking the available data.

1.1.3 Research Scope: The Roman Levantine Coast

This study examines ancient perceptions of space and spatial associations, more specifically the views and use of the sea as represented, implicitly or explicitly, by ancient authors writing about geography and navigation in the Roman period (c.1st century BC to 3rd/4th century AD). This is explored in conjunction with the practical perspective of the mariner moving through the seascape, reliant on cognitive mental-maps and acquired, lived experience. The Graeco-Roman world shows evidence of unique levels of interregional connectivity at different spatial and temporal scales, with the Mediterranean landscape playing a key role in the shaping of practices and ideologies (Horden and Purcell 2000:123–172). The key study-sources selected for this research are set in the Roman period: (i) Claudius Ptolemy's *Geographike Hyphegesis;* (ii) Strabo of Amasia's *Geographia*; (iii) Pomponius Mela's *De Chorographia;* (iv) Pliny the Elder's *Naturalis Historia;* and (v) Anonymous *Stadiasmus Maris Magni* (Ch.3.1.2-1.6). Chronologically, this research is set in the Principate, starting with Augustus' reign, which

Nicolet (1991) considers as “the pivotal time for representations of space, as Rome attempts to grasp (cognitively and literally) the extent and limit of its power” (Nicolet 1991:2–8).

This investigation is approached from a maritime archaeological perspective, focusing on the Levantine coast, in the eastern Mediterranean (Roman Syria-Phoenicia and Palestina-Judaea) (Fig.1.2). The Levant is a region comprising of a series of micro-regions and is characterised by its diverse geography and geology, ranging from the forested mountainous coast in the north-west, to the arid coastal plain in the south-east. Hence, the case-study region is sub-divided in this research according to its two main morphological sections: 1) Northern Levant (from the Cilician Gates, northern border of Syria/Turkey, extending to Tyre, Lebanon); and 2) Southern Levant (from Tyre to Rafia, on the border of Israel/Palestine and Egypt). The Northern Levant has a predominantly rocky, indented coast, with mountains, promontories, bays and river mouths offering shelter. In contrast, the Southern Levant has an exposed, less sheltered coast, comprising mostly straight, flat sandy beaches (with the exception of bays, reefs, etc) (Ch.5.1).

This coastal stretch is set in a region possessing a high record of continuous human settlement and major political-cultural developments, which are manifested in the archaeological record. The distinctive physical geography of the Levantine coast (Ch.5.1) has played a key role in the development of its maritime cultural landscape (Ch.3.2), resulting in a strong relation with the sea and presence in maritime trade, as well as geo-political fragmentation with a tendency to small social-political units and networks in the region. This region served as a key crossroad of communication and trade throughout antiquity, linking the continents of Europe, Africa and Asia, partly due to its geographical location. Major trade routes connecting Mesopotamia, Egypt, Asia Minor and the Aegean ran directly through Canaan, Transjordan, Syria-Lebanon (Cline 2003:364), such as the *Via Maris,* a major coastal highway following the Levant coast from Egypt to Syria and Mesopotamia (Aharoni 1966:41–52; Hezser 2011:54; Stern 2000).[5] The Levant presents a high degree of variation, both physically and conceptually, and aspects of spatial associations and the nature of navigation are explored in relation to maritime conditions, harbours, activities and routes. Due to the varied character of the region (and the ancient authors' representation of it), as well as its strategic position and role throughout antiquity, this case-study provides a suitable framework for examining different aspects of directionality, modes and scale of travel, and shifting perceptions of the seascape.

[5] See Ch.2 for methodology and detailed reasoning for case-study choice and Ch.5.1 for context on region/period.

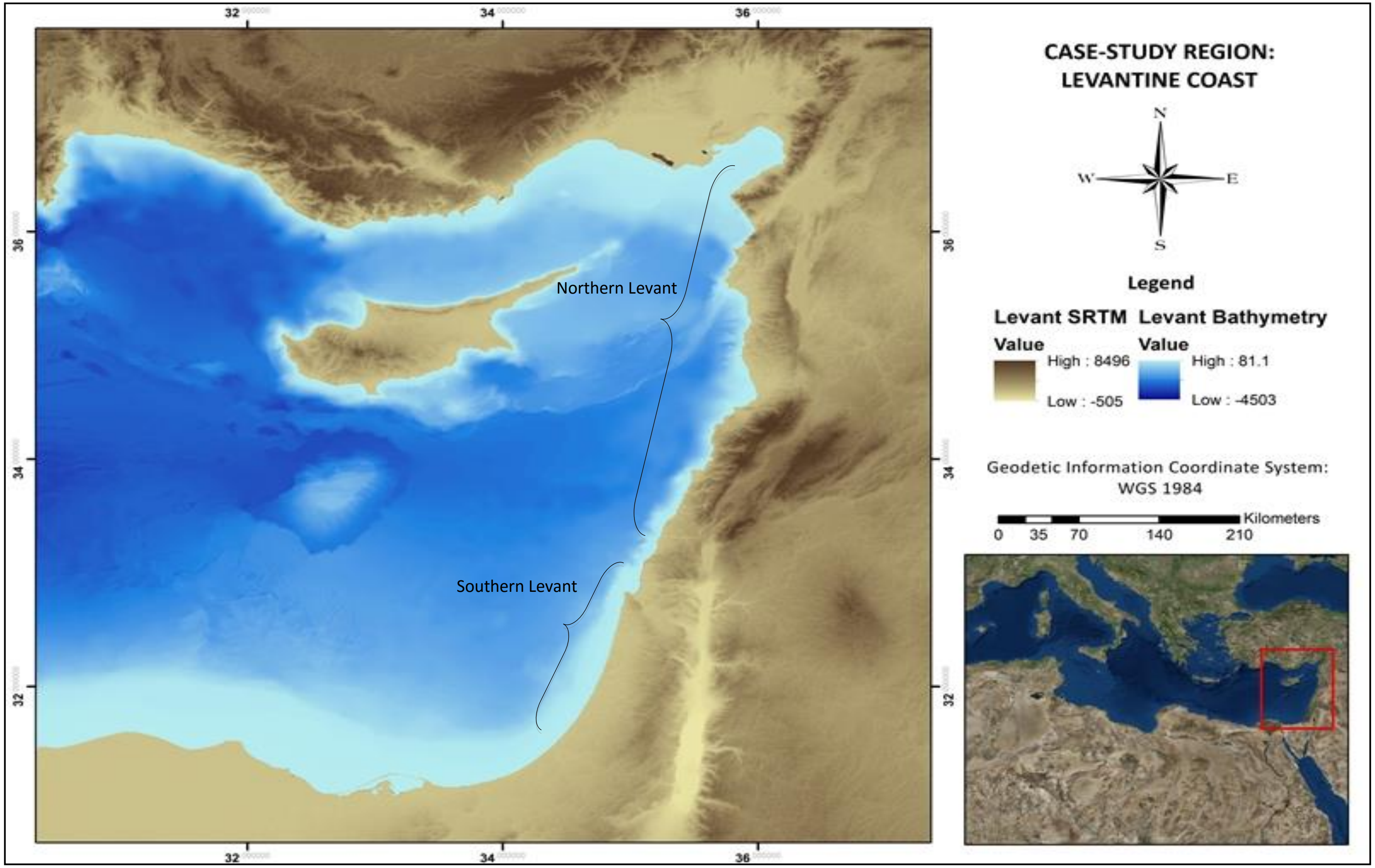


Figure 1.2 Case-study: The Levantine Coast, with its two main morphological subdivisions marked: 1) Northern Levant (Cilician Gates – Tyre); and 2) Southern Levant (Tyre – Rafia) (Map produced by author on ArcGIS10.2.2. DEM: SRTM_1km, Bathymetry: Emodnet).

Due to the interdisciplinary nature of this field of research, the best way to obtain a more holistic understanding of how our Roman predecessors perceived and used their landscape is to analyse the ancient sources within an archaeological and geospatial framework, exploring aspects of context and scale. This involves contextualising the data in relation to the modern maritime environment, and incorporating it within its economic and political-cultural context. It is important to consider the various socio-anthropological theories and debates addressing issues of landscape, space and cognitive geography, both past and present; and integrate the continually increasing archaeological and geoarchaeological data from coastal/offshore sites, with the valuable application of digital geospatial tools and social network analysis approaches.

1.1.4 Perceptions of the Landscape/Seascape

How was the Mediterranean landscape/seascape perceived? A recent topic of great interest has been the notion of the social and economic interconnectivity of the Mediterranean.[6] To understand ancient perceptions of the maritime cultural landscape (Ch.3.2), it is crucial to explore the dynamic connectivity between the sea and the maritime activities which took place in this environment. Sailing was the principal mode of travel and transportation in the Mediterranean. The coast, serving as a boundary zone for communication and interaction, played a crucial role in the geographic imagination of the Graeco-Roman world (Romm 1992:21). This is attested in ancient geographic accounts which tended to use the coastline as a reference for their descriptions (as stated by Strabo, *Geog.* 2.5.17). The Mediterranean Sea can be perceived as an "inverted continent", a zone of political-cultural interactions centred on the sea (Horden and Purcell 2000:11), and in relation to advances in Greco-Roman seafaring technologies and navigation "the wider socioeconomic context is becoming all the more central as we map maritime technology's influence in a nonlinear way" (Leidwanger 2013:117). This research explores how these perceptions and activities allowed both maritime and terrestrial cultures to coexist, and in turn shaped the worldviews of the Roman society. Through an evaluation of the maritime archaeological evidence of this region, in conjunction with literary sources and geospatial data, a less biased picture can be drawn on past views of geographers and mariners. As highlighted by Arnaud, representations of the coastal landscape in Greek and Roman accounts were principally "a ground view of the sea and perceived through the subjective viewpoint of the seaman" (Arnaud 2011:131). In this context, the sea served as a fundamental cognitive tool for creating "a measured representation of the world

[6] See Horden and Purcell 2000; Harris 2005; Malkin 2005. In parallel, the past few decades have witnessed a significant rise of general interest in concepts of networks in social sciences and application to archaeology.

and the gateway to a first geometric and mathematical approach to space" (*ibid*: 135).[7] Understanding the natural features can help interpret the messages being transferred through the landscape in relation to the people that inhabited and interacted with it in the past.

1.1.5 Debating Ancient Worldviews: maps, itineraries and *periploi*

Referring back to the "hodological" debate (1.1.1), scholars argue that the extremely limited evidence and references to spatial maps similar to our modern conceptions supports this linear, one-dimensional view, which is further attested by the number of surviving examples of land and sea itineraries. Whittaker, following Janni, is also sceptical of the application of maps and supports the belief that itineraries were the predominant form of perceiving and representing space in antiquity, and that **"**despite the technical skills of the land surveyors in constructing roads and bridges, despite the existence of travelling sundials, and despite the familiarity of sailors with wind roses and steering across the open sea by use of the stars and an azimuth, none of this experience transmitted itself from practice to cartographic theory or multi-dimensional perception" (Whittaker 2004:65–76). Brodersen (1995) has even proposed that the now lost "map" of Agrippa[8] was presented in the form of a list of places, rather than a graphic representation of the world, and argues for Roman's lack of abstract space when discussing everyday conceptions of space. In contrast, this latter view raises a valid counter-point by Clarke that, if Brodersen's claim is true, what should we make of "the explicit references to drawn maps in ancient sources?" (Clarke 1999:9), as we do possess clear references to visual cartographic forms in ancient sources (discussed further in Ch.4.3.1). Moreover, geographic sources tend to be misinterpreted out of their cultural-historical context, claiming heterogeneity of geographic writing in antiquity (Arnaud 1998). Hence, there is a need to explore this further. The claims made by Janni and others infer that this 'hodological' view affected Graeco-Roman mariners' capabilities of efficiently navigating across two-dimensional space, and instead limited themselves to linear, coastal navigation. According to Janni, open water navigation was not possible until the invention of the compass and nautical charts in the Medieval period (Janni 1984:58).

---

[7] (Thiering 2012:14). E.g. Micronesian cultures orient themselves without navigational instruments, relying instead on practical 'mental-models' based on both implicit and explicit knowledge cues (Lewis 1994).

[8] For an in-depth analysis of Agrippa's work, see Arnaud 2007-2008:73–126. Agrippa's Map (completed in AD 20) was originally commissioned to Marcus Vipsanius Agrippa (c. 63-12 BC), who was admiral under Octavian (later Augustus) during the battle of Actium and following the establishment of the principate became Augustus's right-hand man and son-in-law (Dilke 1985:207). However, after his death, the map is thought to have been completed by Augustus (and his sister) in the Portico Vipsania in Rome. It is a map of the whole known world based on the Roman road system, depicting Augustan Rome as the capital and focal point, accompanied by written commentaries (*comentarii*). It included cities, topographical details, and small towns on the borders of the empire.

However, we have substantial evidence showing this to not be the case (see Davis 2001:45–50, 160), particularly when approaching the range of available data within an archaeological framework. According to Arnaud, neither the practice of coastal tramping nor direct sailing dominated during the period in question, and we should imagine a large number of voyages as comprising a series of direct and directed routes between two locations, most frequently located only 4-5 days apart, for much of antiquity, or as being widespread (Ch.2.3 on navigation and routes). Arnaud explores ancient maritime trade routes by mariners and merchants as characterised by straight lines between sites, and points out that we must consider landscape changes, and look at issues of "permanency and changes in sailing and trading patterns" (Arnaud 2011:61; 2005). Within this context, recent studies on semantics, transport geography and 'node networks' of connections between spatially divided places reflect how perceptions of space are heterogeneous and vary regionally (Barker et al. 2016; Brodersen 2001:9-12; Isaksen 2008; Salway 2001:34; Scheidel 2014; Talbert 2010:252-272).

For certain scholars, the extent of the actual practical use of the surviving *periploi* remains questionable (see Arnaud 2005; Medas 2004a; Prontera 1992; Rougé 1966). As with maps, this stems largely from the lack of extant technical nautical handbooks from antiquity. Prontera has argued that the whole body of extant *periploi* documents, rather than serving as seafaring guides, instead fall under a subgenre of geography, written by geographers (1992:36–8). Within this debate, the more sceptical argument claims that such nautical accounts were not written to serve a practical function (Prontera 1992:36*;* Janni 1984:58,395-412). Other scholars (Medas 2011:14,117; Finley 1973) argue for the possibility of such practical texts that were subsequently lost or destroyed. Salway narrowed down two examples of *periploi* related explicitly with navigation: Menippus of Pergamum's *Periplus Maris Interni* and anonymous *Stadiasmus Maris Magni* (Salway 2004:67, 95). Likewise, by viewing the *Stadiasmus* as a more practical handbook, Medas convincingly argues that commercial organisations were potentially involved in collating these types of documents for training and logistics purposes (Medas 2011:76)[9]. In agreement with Medas, even though mariners' practical knowledge tended to be passed down through oral practices, we do find references in ancient texts that support the existence of these types of nautical technical texts (Medas 2004a:14f).

In light of this, an example of an alternative perspective is the "bird's eye view". Given the distinct topographical and geological nature of the Mediterranean, it is likely people in the past would take advantage of the naturally elevated features (e.g. high mountains and hills) as a

[9] E.g. A passage in Plutarch (1st century AD) attests for maritime technical treatises on the art of the commander. However, none of these types of documents survive.

means of viewing and perceiving the landscape. Sanctuaries and places of cultural or agricultural practices were also often located on the top of hills, which would have been ideal for obtaining a panoramic image and grasp of the surroundings. It is worth attempting to find evidence of such views in the context of the Graeco-Roman world. Accordingly, Poiss (2014), adopting the "common sense geography" approach, argues for the existence of alternative mental models based on two premises: "a) there are testimonies of alternative models coming from literary genres apart from geography and historiography, and b) there are other reasons for describing landscapes even in geographic description, e.g. strategic, political, economic, religious viewpoints" (Poiss 2014:10). Poiss tackles this through a bird's eye view, analysing ancient sources that give the impression of viewing the landscape from above, with examples in Homer and Strabo[10]. Another interesting example Poiss mentions is that when Strabo describes his visit to Corinth (*Geog.* 8.6.19), he does so almost like a modern visitor would, by climbing up to Acrocorinthus and describing the shape of the city, providing a full panorama view from above (*Geog.* 6.8.21; cf. Poiss 2014:82-5-4). This 'bird's eye view' can also be conceived in the context of cosmic mental maps, as depicted in the work of the Roman author Lucian of Samosata (2nd century AD). In light of the various debates, Talbert, who originally supported Janni's view, has recently become more sceptical and acknowledged the need for a re-appraisal of surviving texts and material objects (Talbert 2010:262–9). He recognises that the higher number of itineraries found does not necessarily represent the typical, or only way of conceiving space in the Roman period, mentioning that "the point has been overlooked that the itineraries themselves do take just such a basic spatial awareness for granted" (*ibid:* 263). As an alternative mode, he suggests the possibility of navigational instruments such as the surviving portable sundials representing a type of 'mental' world-map (*ibid:* 269).

Regarding ancient knowledge of navigation, extant evidence points towards a practical knowledge of seaborne travel and orientation which developed through 'mental-maps' based on experience and practice, and was likely predominantly transmitted orally (Medas 2004a; Taub 2011:136; McGrail 2008:630; Thiering 2012). A good example of an on-board perspective of seafaring travels and problems encountered in these conditions are attested in St. Paul's voyage to Rome. To obtain reliable data on one's position it was vital to find physical points of reference within the landscape. Although textual evidence on seafaring is limited, there would have also been maritime handbooks/*periploi* and treatises in circulation in antiquity offering information on travel distances between places along a journey, coastal topography and

[10] E.g. Strabo includes several descriptions using metaphors for the shape of the land or city as though looking from above, e.g. India is rhomboid (*Geog.* 2.1.22, 31) and the province of Narbonensis is a parallelogram (*Geog.* 4.1.3).

notable geographic features/landmarks en route, and safe harbours and natural anchorages (Casson 1995; Beresford 2013:184–191; Leidwanger 2013), as well as knowledge on sailing the open sea using navigation practices. Although many *periploi* and geographic accounts tend to suggest a prevailing linear spatial view, mariners would not have envisioned the landscape in a linear way, particularly based on the many variables involved on a journey (explored in Ch.7-8).

1.1.6 Inherent Issues

When approaching this subject, it is important to avoid assuming that these past societies perceived and approached the world in the same way as we do in the present day (Talbert 2010:3). Many of the conventions of maps seem "natural‟ but in reality reflect a particular worldview. That worldview – and therefore the map or itinerary - is politically and historically situated. In early Greek culture, maps and geographic treatises were produced to advance philosophical and geographical knowledge and investigations of the known inhabited world. They addressed an array of subjects relating to the world's division by continents, climates, and cultures that later influenced Roman notions (Cole 2010:197-214; Romm 2010:215-235; Talbert 2010:252-272), which appear to have been in some cases adopted for military means and matters of the state (e.g. Strabo, *Geog.*1.1.16, 31, 33; Dueck 2010:10-13). Other works focused on relationships between the earth and cosmology; while others possibly served as seafaring guides. A disadvantage of this type of research is that we do not possess the original maps, as only a scarce number of Roman maps survive, such as the well-known Peutinger Map, and the majority are later reconstructions from the medieval period (Harvey 1999; Ch.4.3.5). For this reason, the many surviving verbal accounts have so far provided the best means of evaluation, together with other supporting evidence (archaeological, environmental, geospatial). It is important to recognise that while we use modern geospatial tools reliant on a Cartesian view of the world, the people we study, who would have moved through these landscapes, potentially viewed space differently. Therefore, when addressing ancient mapping work, it is crucial to account for the fact that notions of maps, mapmaking and navigation in the past may differ greatly from that of today (Cronin 1905:429).

1.2 Research Framework

The research framework developed for this maritime-oriented research study combines several methodological approaches relating to the maritime cultural landscape (Westerdahl 1992; see Ch.3.2), namely textual, cartographic and archaeological (see 1.3). The core of this methodology is to investigate the theories and practices of ancient cartography as represented in geographic treatises, seafaring guides and the archaeological record (Ch.2.1.1-2), with the aim of gaining a clearer understanding of how ancient societies perceived and visualised their surrounding landscape and the world they inhabited. Throughout history the coast has served as a bridge connecting terrestrial and maritime communities as not only a natural physical boundary, but also a conceptual and cultural one (Ford 2011:763–4), with maritime archaeology serving as a link between the material culture of both landscapes and seascapes (Adams 2006:2; Ford 2011:771; Van der Noort and O'Sullivan 2006:147; Westerdahl 2006). Within this context, the principle focus for maritime archaeology in this study lies within the dynamic coastal zone where human activities, interactions and perceptions are shaped by the sea and include activities relating to seaborne trade, transportation, exchange of goods and development of coastal infrastructures and facilities. These aspects of social identity can be attested archaeologically, as for example in the relative abundance of trade goods found in coastal zones (Ford 2011:771), as well as from data derived from shipwrecks and harbours. The importance of ports and harbour sites in particular is reflected in their role in the development of cities and the transmission of goods and cultural ideologies (Walker 1990:279; Blackman 1982). Port and harbour archaeology has advanced in recent years, particularly with the adoption of multidisciplinary research projects (Ch.2.1.1.6; Ch.4.2). The methodology adopted (Ch.2) relates the maritime archaeological evidence of harbours (dating specifically to the Roman period), in order to contextualise the material record and fill in missing gaps in the ancient textual data, and, ultimately, integrate this material culture in its wider social context. The study incorporates recent archaeological reports from excavations and surveys of harbours and shipwrecks carried out at sites along the coast, offshore and hinterland regions in the eastern Mediterranean. Other maritime archaeological data includes remote wharves/landings, monuments, warehouses and breakwaters along coastal regions. Recent multi-disciplinary archaeological and geoarchaeological approaches to landscape studies in the Mediterranean have yielded invaluable evidence relating to sea-level and geomorphological configurations**,** important for understanding the level of changes impacting on the configuration of coastal landscapes over time and how people adapted to these changes.

The maritime conditions of the Levantine coast form a crucial aspect of this investigation. The integration of a comprehensive assessment of the physical geography of the Mediterranean with ancient perceptions and representations of these landscapes offers valuable insights into the subject. These representations are intertwined with socio-political aspects of ancient seafaring accounts, maps and geographic treatises that can yield insights into how they promoted power, influenced social identity and advanced geographic knowledge (Crampton and Krygier 2005:1). Landscape/seascape is to be perceived as physical and conceptual (Wylie 2007). The landscape undergoes continual change and these changes impact on the maritime activities of the inhabitants along with their notions, use and interaction with this landscape.

1.3 Chapter Outline (cf.Ch.2.1-2 on methodology):

- **Chapter 1 – Introduction and Research Aims:** The introductory chapter comprises the key research aims and questions, as well as their context and significance. It offers an overview of current debates and theories in the field considered in this investigation, seeking alternative views beyond the hodological by adopting a 'common sense geography' approach. Through a theoretical, archaeological and geospatial-based analysis of the complexity of the relationship between people and the sea, this study aims to understand perceptions of the coastal landscape through the eyes of ancient geographers and mariners.
- **Chapter 2 - Methodological Approach:** This chapter describes the methodology developed for this research and the reasoning behind it. It highlights the different approaches, step-by-step, and introduces some hypotheses which will be explored throughout the thesis. The approach involves developing a database and archaeological catalogue of selected coastal sites/topographic features and digitally mapping the sites/features for geospatial analysis to observe patterns and anomalies. It explores how maritime activities, navigation and use of landscape/seascape are represented in the literary (such as ancient maps, *periploi* and geographic treatises) and archaeological record. It relates the archaeology of anchorages and harbours to these findings, as well as with activities that took place in these landscapes.
- **Chapter 3 & 4 – Theoretical Discussion & Data Sources:** Ch.3 presents theories and debates addressing perceptions of the maritime cultural landscape, mapping, and navigation to offer context for the ancient study-sources (Ch.4.1.2-6) and modern resources used (Ch.4.2).
- **Chapter 5 - Levant Case-Study:** This chapter provides a contextual overview of the Levantine coastal region. It covers a range of aspects useful for analysing navigation as described in the ancient sources, including the physical description of its modern coastline (topography, landscape change and meteorological conditions) and its geopolitical boundaries/settings.

- **Chapter 6-7 – Comparative Analysis:** These chapters investigate regional differences in the descriptions and perspectives in the Levant context through the eyes of the study-sources, sub-divided into two key themes: Theme A 'Static' (Ch.6) and Theme B 'Movement' (Ch.7). Ancient geographers' works are explored from a maritime archaeological perspective, with a focus on coastal sites/features and types of ancient records, such as their genre and function, e.g. geographic treatises, chorographies, *periploi*, itineraries (for terminology definition and how it is applied in this thesis, see glossary in appendix iii). Emerging trends or discrepencies relate to inclusions/omission of places, their arrangement and the ways they are described in connection with the phenomenological elements implicit in the data. In this framework, genre is a focal aspect of this investigation due to the different sources and nature of their approaches and motives, drawn on multivalent views of armchair geographers and mariners.
- **Chapter 8:** The final chapter widens the scope to the entire Eastern Mediterranean region to seek parallels and tie them with points raised in the Levant to establish final conclusions.

1.4 Summary

There was certainly a degree of spatial awareness during the Roman period regarding the arrangement of major geographic and topographic features, such as landmasses, rivers and mountain ranges, and the dynamic relationship between people and the maritime cultural landscape, particularly in the the Mediterranean region. The ancient documents addressed in this investigation represent not only advances in seafaring technology and knowledge of navigation over-time, but also the social significance of the interaction between people and their landscape in the antiquity. The way these ancient documents and approaches are represented and used can in turn give us an insight into the geographers' sense of identity and worldviews. By recognising and exploring the individual importance of particular sites or features, and their relation with one another in conjunction with the wider role in the overall region, we can obtain a holistic perspective on how and why certain shifts occurred in some areas but not in adjacent areas, as attested in the ancient sources and archaeological evidence.

This investigation develops aims to identify and explore: (a) diverse approaches of ancient geographers/mariners and their works in the Roman period; (b) their perceptions and representations of the seascape from a maritime archaeological perspective; and (c) nature of their sources, intentions behind these works, and, ultimately, their wider social significance. In effect, it seeks to offer a more intimate link with the ancient authors and this coastal region.

Chapter 2: Methodological Approaches

The central tenet of this methodology is to compare the theories and practices of ancient geography and navigation as represented in geographic treatises, seafaring accounts and the archaeological record (described in Ch.3 and 4) with the aim of gaining a clearer understanding of how ancient societies perceived and visualised the maritime cultural landscape and the world they inhabited. There are still significant gaps in this field and as yet no attempt has been made from a maritime archaeological perspective to systematically examine and compare the ancient geographers' cartographic and navigational perceptions in this way. This chapter provides an overview of the methodological framework applied to gather and examine the data for this research to achieve the objectives presented at the outset (Ch.1.1.1).

2.1 Summary Outline of Methodology

Summary outline of main steps that underpin the methodology (discussed in detail next 2.1.1):

Step 1: Collect the data: Obtain the data (predominantly textual) and digitise it. The selected data includes: the chosen ancient geographers and their works, as well as the list of coastal sites and geographic features described within the texts (2.1.1.1-2.1.1.3).
Step 2: Create a database & catalogue: Create a database using the selected data. Develop categories to systematically record the presence/absence of place-names, presenting these ancient places/features along the coast of the case-study region according to each respective ancient author (2.1.1.4-2.1.1.6), through tables, maps, archaeology and written descriptions.
Step 3: Visual mapping & geospatial analysis: Create maps of specific regions, sites or features, using digital spatial platforms, e.g. ArcGIS, GEarth, QGIS, Pleiades, MedAtlas (2.1.1.5).
Step 4: Systematic analysis: Analyse and interpret the relationship between the selected sites and features along the coast of the case-study region according to each primary geographer and the regional maritime archaeology. This is done sequentially in chronological order to understand their approaches within the temporal context and how perceptions varied (2.1.2).
Step 5: Comparative analysis: Draw comparisons between the various ancient geographers/mariners' approaches to identify correlations within the data patterns (2.1.2.1-2).

2.1.1 Systematic Methodology

The methodological approach adopted is based on essentially desk-based research methods, combining a range of practices, namely archaeological, cartographic and geospatial. Due to its multi-disciplinary nature and the types of questions being asked, it applies both qualitative and quantitative research techniques. The qualitative information consists of primary and secondary documentary evidence, along with supplementary information drawn from a wide range of sources, such as written, visual and archaeological material. This information is supported by quantitative and statistical data, involving an analysis of patterns of geographic coordinates and measured distances. The first step was to identify the case-study and date range of the ancient geographers addressed: primary sources – Strabo, Mela, Pliny, Ptolemy, Stadiasmus; case-study region – Levant; period - Roman (Augustan-High Imperial) (Ch.1.1.1).

2.1.1.1 Case-Study Approach

This research implements an in-depth and systematic case-study approach which enables a detailed collection, presentation and contextualisation of the data. The case-study is predominantly categorised based on geographic parameters. This is due to the nature of the primary study-sources, comprising ancient treatises focused on geographic and navigational descriptions from the Roman period. Through a case-study approach of the maritime cultural landscape (Ch.3.2), large regions can be explored and understood in relation to temporal and spatial changes between sites, and integrated in the wider picture of human interaction with the past landscape. As stated at the onset (Ch.1.1.3, 1.2), the framework of this study focuses on the region of the Levantine coast (Roman Syria, including Phoenicia and Palestina-Judaea).

2.1.1.2 Familiarisation of the Data

At the outset of the investigation, it is crucial to become familiarised with the data paying specific attention to certain details highlighted by the authors or anomalies and omission of places/features. This iterative process of becoming familiar with the data and its various components enables patterns, clusters and anomalies to emerge based on the assumption that there is certain logic and order in the data, specific to each author, and potentially reveal parallels between authors and the sources used. The same process is applied to the quantitative data, as it is important to clearly understand the dataset to be able to present it comprehensively, particularly due to the various units of measurements and approaches provided in the ancient works. Contextual background research addressing the spatio-temporal factors of the region is essential to grasp their nature and function.

2.1.1.3 Shortlist of Ancient Study-Sources

In light of all the above, a list was devised of the relevant ancient sources dealing with aspects of geography and navigation within the Graeco-Roman world (only complete, or reasonably complete texts have been used, rather than references to fragments; appendix ii), to understand the context in which the varying notions of space and geography in the past developed and changed over time. This also served as a useful exercise for determining which sources would be most useful for comparison in the context of the Levantine coast. The next stage focused on narrowing down and rationalising the list of selected ancient geographers on the basis of comparable geographic scope across geographers and their work (and date ranges), keeping in mind cartographic theory and varying approaches/perceptions towards mapping and navigation. Which ancient geographers provide a more nuanced understanding of the coast? Determining factors included (Ch.4.1):

- Their geographic and chronological scope;
- Level of detail in the ancient texts (i.e. number of pages, books, length of descriptions);
- How comprehensive/perceptive they are and engagement with the maritime environment;
- First versus second-hand accounts;
- The type of source(s) they drew information from to develop their own perceptions.

The selected primary authors (Ch.4.1)[11] are located in the time period from the Principate (i.e. Augustus' reign) onwards, spanning until the Diocletian period. However, these ancient texts clearly contain both Greek and Roman roots, which influenced their varying perceptions. Strabo's *Geography* (c.64/3 BC-AD 23) and Pomponius Mela' *De Chorographia* (c.AD 43) were written across the reigns of Augustus, Tiberius and Claudius; while Pliny's *NH* (c.AD 23-79) was published under Vespasian**;** and Claudius Ptolemy's *GH* (mid-2nd century AD) and anonymous *Stadiasmus Maris Magni* (c.AD 200-300) fall within the High Imperial period (Ch.4.1.2-6). These chronological contexts are important to consider due to the geopolitical reconfigurations that would have influenced the authors writing during these periods of wide-spread expansion and transition (Scheidel 2013:2; Adkins and Adkins 1994; Morley 2010; Crawford 1992). There were different reasons and incentives for ancient authors to create their texts, which reflect the changing landscape, political status and advances in knowledge and ideologies.

[11] Presented in Ch.1.1.3 and systematically discussed in detail in Ch.4.1. See historic-political timeline: appendix vii.

2.1.1.4 The Database

Parallel with the selection of study sources was the process of extracting the relevant data from the study sources' texts. In order to derive information on the ancient coastal morphology, the first part of the database involved filtering these sites/features through documentary, cartographic and historical research using the primary sources (Chapter 4). The catalogued sites and features have essentially been filtered by (a) how 'maritime' they are, and (b) how closely they relate to the regions and time range of the study (Ch.4.1). Initial stages of the methodology involved collating the place-names of important coastal sites (i.e. cities/towns/ports/harbours/tels) and geographic features (landmarks/anchorages), such as islands, mountains, promontories and river mouths, derived from the available data for the Levant case-study region (ancient and modern/archaeological). Comparable columns were added for the five ancient study-sources, including the places/features they mention in their accounts, together with the reference for the passage in their work (appendix i). An extremely useful resource which supplemented much of this coastal data for the cataloguing of these points was De Graaw (2013)' 'Catalogue of Ancient Ports', which provides geographic coordinates of approximately 2850 coastal places (including ports and shelters), in conjunction with the Barrington Atlas, Pleiades, TIR and many other resources discussed in Chapter 4 (4.2). Key sites/features were systematically chosen and catalogued based on the following criteria:

1. Case-study: belonging to the territory along the Levantine coast, from the ancient Cilician Gates in the north down to Raphia in the south, on the border between Arabia and Egypt. This coastline comprises the ancient provinces of Syria, Phoenicia, and Palestina-Judaea.
2. Date Range: dating from the Roman period, more specifically from the Principate to the Diocletian period (based on the temporal scope of the selected study-sources).
3. Maritime context: being of a maritime nature (e.g. ports) or situated near the coast, also including sites within the coastal hinterland and by river mouths linking inland regions.
4. Notable geographical features: as distinguished by the ancient authors, such as natural havens, promontories, mountains, river mouths (to attempt to determine their significance and reason for inclusion, e.g. used as natural harbours or known landmarks for navigation).
5. Additional place-names: these were included on the basis of being notable sites or features not included by the ancient authors, but mentioned in modern sources such as Barrington Atlas, *Tabula Imperii Romani*, the archaeological record/site reports (Ch.4.2; appendix i). They were recorded in order to identify what is discussed (or omitted) by ancient authors.

The localities were recorded in a comprehensive database (appendix i), listed in the order they naturally follow the coast. By systematically going through the chosen regions it was possible to draw out notable sites/features to gain a clearer grasp of the material and its arrangement. This enabled to link the data to the regional physical topography and maritime archaeology (appendix viii). All ancient sources were integrated into the same database for comparison.

2.1.1.5 Geospatial Mapping

Visualisation techniques have proved useful in the analysis of trends in archaeological data. To further explore the correlations between the collated data and the landscape on a more visual level, digital mapping of the settlements and features was carried out using Google Earth, Google Maps, Geographic Information System (GIS) and Quantum GIS (QGIS) (Ch.4.2.2). A geospatial analysis illustrates bird's-eye-views of the Levant along with three-dimensional maps of each seascape. Textual and archaeological data was incorporated into these tools for a geodetic analysis, derived from the archaeological excavations/surveys, archival research and historical maps, in conjuction with relevant data on natural boundaries, hydrographic information and topographic features. This was achieved by processing and modelling the coordinates of known and probable locations of selected sites/features onto a modern map in a GIS framework (in ArcGIS10.2.2), as well as plotting them on Google-Earth. Three-dimensional maps were produced with QGIS2.8.2 software to clearly show elevations along the Levant coast, revealing how the landscape could be perceived as distinguishable navigational markers that likely aided ancient mariners' navigation during the Roman period. Points were integrated as a list and then mapped visually by positioning them on a topographic base map with key geographic features (e.g. mountains, rivers). Ptolemy's *GH* in particular is well-suited as it includes a list of place-names with their assumed coordinates, which have been digitised by Stückelberger and Grasshof (2006). The geospatial analysis also included modelling of wind speed and direction along the Levant to better understand the described ancient sailing journeys in relation to modern regional wind impact, accounting for differences according to region and the time of day (i.e. morning vs. afternoon) that may have affected the navigation, accessibility, location and role of key harbours en-route (e.g. see studies by Leidwanger 2013; Knappet et al. 2008). For this thesis, a series of wind models of the Levantine coast were created by C. Safadi (Ch.5.1.3.2:Fig.5.8-9; on methodology see Safadi 2015:349-53).

Geospatial platforms such as GIS, QGIS, G.Earth and Wind-Modelling thus serve as a useful platform for this type of comparative work as they allow different maps and features to be overlaid within their maritime enviroment, and trends to emerge.[12] In this way it is possible to carry out an in-depth study of the topography and geomorphology of the study-regions by analysing actual distances and topographic features, and creating high-resolution images to present the findings. Other cartographic tools were applied to cross-reference data regarding the sites/features, such as BAtlas, Pleiades, Pelagios and DARMC, combined with data from

[12] However, it is important to account for the fact that Ptolemy and Google-Earth evidently use considerably different longitudinal coordinate systems and Ptolemy's latitudinal data is systemically inaccurate in many places.

archaeological and geoarchaeological reports (Ch.4.2.1-2). This process allows a comparison of the landscape as described by ancient sources with the present-day landscape for the observation of altered (by natural and human influences) and unaltered features in the region.

2.1.1.6 Archaeological Framework

Supplementary to the database of selected place-names (2.1.1.4; see database in appendix i), an archaeological catalogue was created for this research (appendix viii), presenting a reference table for each coastal site with key archaeological information, including toponyms, foundation dates, physical geography and site reports (focused on the Roman maritime data). In this thesis, symbol #L and its assigned number cross-reference a site to its catalogue data.

The sea and human perceptions of the sea and coastal inhabited regions form a vital aspect of this investigation. Thus, a major focus of the methodology is analysing the relation between the archaeology of the chosen region and its maritime environment, by integrating the dataset and analytical approaches (textual, geospatial, statistical) in a maritime archaeological context. The methodology adopted relates the maritime archaeology of harbours and trade artefacts to the findings (dating to the Roman period), as well as drawing on experimental data from vessel replicas, e.g. *Kyrenia* (Whitewright 2012:11). This array of resources serves to contextualise the material evidence and fill in missing gaps in the textual data, and ultimately integrate this material culture within its wider social context. The study incorporates recent archaeological reports from excavations and surveys carried out at sites on the coast, offshore and hinterland regions in the eastern Mediterranean. Other maritime archaeological evidence includes submerged sites, remote wharves/landing sites and monuments/fortifications along the coast. Recent multi-disciplinary archaeological and geoarchaeological approaches to landscape studies in the Mediterranean have yielded invaluable information on sea-level and geomorphological changes. These are important for understanding the level of impacts on the configuration of the coastal landscape and how people adapted to the changes and navigated this seascape. This range of data is further supported with maritime evidence obtained from modern nautical admiralty pilots and charts, Hydrographic Office series, sailing and yachting guides, as well as meteorological data on the winds, currents and weather (Ch.4.2.1).

Evidence from maritime archaeology combined with landscape and geoarchaeological approaches offer invaluable geospatial data from a maritime perspective and insights into this “living edge” between land and sea (Walker 1990:271). These approaches are linked by a focus on human interactions with the sea, and how this relationship impacts the maritime cultural landscape (Ch.3.2) and the development of cultural identities, and, ultimately, how these practices and perceptions are represented in the material culture and literary evidence.

i. Archaeology of the Levant

The most generally accepted and adopted term used by archaeologists for this study-region of the Eastern Mediterranean is the Levant ('rising'). Another term used by archaeologists is 'Syria-Palestine', where Syria corresponds to the ancient northern section and Palestine to the ancient southern section. W.G. Dever brought back this term 'Syro-Palestinian' archaeology in the late 1970s by suggesting that 'Syro-Palestinian' archaeology included "ancient southern-central Syria and Palestine, both west and east of the river Jordan (i.e. modern Israel, Jordan, Lebanon, and parts of Syria), or more properly ancient 'Greater Canaan'" (Dever 2001:61–2). However, the majority of scholars, particularly in Europe, still show a preference towards the term Levant for this geo-cultural region (Braudel 1972; Burke 2010:84). The application of the term Levant encompasses a broader geographic scope, covering the region between the mountains of southern Turkey to the north, the Mediterranean Sea and Pelusiac Branch of the Nile to the west, the Red Sea to the south, and the Euphrates and the Arabian Desert to the east (Burke 2010). It takes into account areas of western Syria, the 'Amuq Valley and its river tributaries in southern Turkey. The connecting features of this area, and interactions between the different regions across different archaeological periods, provide a level of geographic and cultural continuity from north to south, which further encourages the use of a single term. With these factors in mind, in this study the term Levant is adopted to describe the study-region, more specifically from the border of Cilicia (Cilician Gates, near modern Sarıseki) in the north, to the Arabian-Egyptian border area to the south (i.e. Rafia, modern Rafiah).

ii. Recent fieldwork in the Levant (case-study region)

As aforesaid (2.1.1.6), an archaeological catalogue was created for this study (appendix viii). Thus, only a few coastal site examples are given here in the relevant context of the discussion. In the comparative analysis (Ch.6.2, Ch.7), detailed archaeological evidence will be drawn out for interpretation of the observations. In the Levant, access to the sea was vital and led to the establishment of numerous settlements on the coast, even directly on small offshore islands, such as Tyre, Arados and their *peraiai* (Ch.7.1.1.3, Ch.8.1.1.4). On harbour infrastructures, recent projects reveal advances in technology and facilities, as seen at sites Ras Ibn Hani, Tyre, Akko, Tel Nami, Dor, Aphek and Deir el-Balah. Due to recent political unrest there has been less archaeological work undertaken in Syria compared with Lebanon, with ongoing projects at various harbour sites (e.g. Carayon 2012, 2008; Carayon et al. 2011; Marriner 2009, 2007;

Marriner and Morhange 2006a-b; Marriner et al. 2006, 2008, Morhange et al. 2006, 2011). Excavations and surface surveys on the exposed coast of the Levant yielded and continue to yield vital data on numerous ancient sites, such as Tyre, Sidon and Caesarea. Survey work in the hinterland and ceramic analysis from sites along trade routes have strengthened our knowledge of the regional context (e.g. Rice 2011:81-92; Reynolds 2003), in conjunction with numismatic evidence which helps confirm when sites were active and their links to associated political events (e.g. Butcher 2004; Rey-Coquais 1970, 1978a; Seyrig 1964). Tel sites (settlement-mound) are distinctive archaeological features of the Levant (e.g. Tel Tweini/Gabala, Tel Akko, Tel Dor, Tel Aviv/Ioppe) often characterised by long occupation spans and offer evidence for early human activity and settlement systems (Menze et al. 2006:321).

Archaeological and geoarchaeological projects at major coastal sites of Lebanon (e.g. Beirut, Byblos, Sidon, Tyre) revealed more than 5000 years of interactions between humans and the environment and ground-breaking evidence towards the reconstruction of palaeolandscapes and ancient harbour sites (Carayon et al. 2011). Such sites have a rich cultural heritage and contribute to understanding changes and advances in technology, harbour infrastructures and the maritime landscape, from the Bronze Age to the Islamic period (Marriner et al. 2012; Galili et al. 2009, 2010; Raban 1991, 1995; Blue 1995; Blackman 1982; Flemming 1980; Frost 1972). Evidence has also shown that harbour settlements in antiquity often took advantage of more than one harbour, combining a natural anchorage or port on the coast with an inland riverine harbour on an estuary (Raban 1991:134; Blue 1997:31–32), with examples at Tel Tweini, Syria (Al-Maqdissi et al. 2008), and Sidon in Lebanon, with several harbours, including two coastal harbours, of which one was an island, as well as two natural bays, and a riverine harbour (Carayon et al. 2011:439–449). Sidon was one of the most active ports and urban centres on the Levantine coast (Carayon 2008). Harbours were also established on lagoons, as at Tel Dor, using its natural anchorage (Raban 1995:145). Recent multi-disciplinary geoarchaeological research in the Levant revealed a transition to mostly fine-grained sands and silts along the coast, good cases being those of Sidon (Saida) and Tyre (Sur) (Marriner and Morhange 2006a-b; Marriner et al. 2006, 2008, 2011-12). This type of archaeologicacl evidence from site reports provides important data for comparing and interpreting patterns, discrepencies, and gaps in the ancient authors' accounts of the Levant when conducting the systematic examination.

2.1.2 **Systematic and Comparative Analysis**:

Through a systematic examination of the internal evidence it is possible to establish potential sources of the accounts of individual regions and determine the extent of ancient geographers' grasp of mapping and moving through the landscape/seascape. This stage entailed describing the Levantine coast systematically according to the modern landscape, archaeological record and ancient sources (Ch.5-8). Once the dataset was recorded, focus shifted to a comparative analysis of the ancient authors' perceptions/representations of the geographic data to attempt to find links between the different works and how they vary with time, region and genre.

2.1.2.1 THEME A: 'STATIC' (Ch.6)

This in-depth analysis involved looking at particular points in time, place-name changes, physical geography and natural boundaries, unusual inclusions or omissions of places, and political status of the region (Ch.6.2). It is vital to take into account the context of the time and extent of knowledge. The methodology also explored whether and how inhabited places are treated differently from natural features in these works. Comparing the reality of the landscape with how it was represented and utilised in antiquity formed a central aspect of this investigation. The analysis also entailed recording latitudinal and longitudinal boundaries for each region (and each tribal region, where appropriate). It then looks at whether these divisions fit into the geographic descriptions of the different authors, and how this potentially relates to their original sources or whether areas described derived from different sources.

2.1.2.2 THEME B: 'MOVEMENT' (Ch.7)

From the collated data, key themes and questions arise relating to aspects of movement, navigation and interaction with the dynamic environment (Ch.7). In the context of the diverse nature of the regional topography and its role in framing ancient travel accounts:

- How were features of the landscape perceived and represented?
- Can the accounts give us an insight into ancient navigation and mariners' perceptions?
- Did 'navigational' sources tend to ignore this type of information, whereas 'top-down' views in geographic/cartographic sources captured this?

These patterns and questions can reveal the thinking-process involved in the development of these ancient works, as they reflect conscious decisions and intentions, potentially offering a clearer insight as to their function. Attempting to ascertain the authors' logic can help better understand the changing view and use of the sea from ancient geographers' perspectives.

(i) Conceptual Model: Hypothetical Journey

Described routes (and how they would have been navigated and perceived) were considered and tested through a conceptual model of an "actual sea journey" along the modern Levantine coast (Ch.7.2.2-3). Prior to this, it was crucial to establish key practical parameters that could influence this type of voyage based on the available data. Similarly, "many factors (physical, human, technical) were taken into account before the ancient mariners decided on coastal or open sea sailing" (Morton 2001:158). To represent this hypothetical journey, modern data from nautical pilots/charts[13] and the archaeological record[14] (Ch.4.2.1-2 for sources adopted) was referred to according to underlying environmental and technical sailing parameters set below, influenced by the interplay between natural/human factors and journey motives:

Specific Parameters:

(a) Winds & Changing Wind Patterns (including diurnal cycles; Ch.5.1.3.2 and Ch.7.2.2.1: a)

(b) Hypothetical Journey: Entering/Leaving Harbours (topography, shelter, hazards; Ch.7.2.2: b)

(c) Sailing Distances & Durations (discussed in Ch.7.2.1, 7.2.2: c, also in appendix v)

General parameters are considered throughout the discussion, but not covered systematically. These include: sailing vessel types and function (Ch.7.2.3.1); time and scale (chronological periods, geographic regions); and human responses to the dynamic variables. By accounting for the many variables faced on a voyage along this coast, the data can reveal inconsistencies and variations between values used by the ancient authors, as well as between ancient and modern depictions. Through an assessment of the parameters, a hypothetical 'optimum sailing journey' under 'favourable conditions' can be explored in its modern context to a reasonable level of reliability and measured against ancient written journeys. This approach can help in linking and reflecting on how mariners moved, navigated and perceived the landscape, and how these navigational elements can be traced within ancient geographers' representations.

2.1.3 Chapter Summary:

A multi-disciplinary metholodgy is adopted for this investigation, combinig archaeological evidence, literary sources and geospatial tools. Through this approach, it is possible to understand the Levantine coast in the context of this study, and aid the comparative interpretation of structural questions relating to spatial arrangements and misrepresentations in ancient authors' accounts, as well their representations of navigational markers and sailing journeys. How we approach, represent and understand maritime space bears directly on how we view the related material record, and in turn how we use that record to construct broader paradigms about seaborne communication and trade. The next chapter presents theories and debates on concepts of space, maritime cultural landscapes, mapping and navigation.

[13] Main pilots used: Mediterranean Pilot, Vol. V (MPV 2005); Sailing Directions (Enroute) for the Eastern Mediterranean (SDEEM 2005). Sailing guides/yauchting handbooks: e.g. Heikell 2012; Seidman 2001; Toghil 1994.

[14] Also including data from replica square-sail vessels (see Whitewright 2008:136, Table 2-3). See also appendix v.

Chapter 3: Theoretical Discussion

The study of ancient geographical representations has recently advanced significantly due to changing approaches through which geographical knowledge is perceived as being influenced by political and cultural factors, rather than simply an attempt to accurately represent the world. This study has aimed to approach ancient geographical texts by perceiving them as frameworks of knowledge in their own right which reflect the contemporary Graeco-Roman perceptions and views of the known world, rather than pointing out scientific mistakes within their works (see Nicolet 1991; Whittaker 1994). Geography of the maritime landscape is approached here as both a theoretical subject and a practical visual form of mental/verbal mapping of cultural Graeco-Roman perceptions. This thesis is concerned with geographic works beginning in the Principate until c. 3rd/4th century AD. However, it is also important to consider the earlier developments of these ancient works, formed from both Greek and Roman roots, reflected in both language and conceptualisation. The differing perspectives are further emphasised by the varied material evidence of the Graeco-Roman world in nature, style and purpose.[15] Thus, this chapter presents a detailed discussion on theoretical approaches to Graeco-Roman notions of space as a means of contextualising the setting in which the study-authors wrote and developed their ideas (Ch.4.1 on ancient sources used).[16]

3.1 Space and Landscape

While addressing the use of landscape, and the interplay between maritime and terrestrial communities, it is important to explore people's perception and cognition of space. Landscape, defined as spaces shaped by the imposition of boundaries and interactions, is influenced by human activity (Hirsch 1995:4). Space is a physical and conceptual medium for human activity and it is the human interaction and use of this space which turns it into a place of culture. Space is thus socially and culturally constructed, heavily influenced by politics and power (Wylie 2007).[17] Considerations of space and the landscape as a dynamic cultural

---

15 Later comparable works can be traced in medieval *mappaemundi* or portolan charts (Gaspar 2010:38; Pujades 2007:481). These traditions also reflect considerable diversity in geographic representation, both in text and image, e.g. T-O maps, itineraries, Beatus maps, regional maps, regional catalogues, travelogues, and geographic tables. However, it is still relatively unclear as to the extent to which any of their roots lie in antiquity.

16 According to Gould and White, "people's spatial behaviour is shaped by the hills and valleys of the invisible information and environmental stress surfaces over them" (1986:108). Dyke and Alcock (2003:5–6) presented an approach that "allows us to think about the ways in which landscapes and built forms were experienced, perceived, and represented by ancient subjects, working from the starting point of a contemporary body in the same space".

17 In-depth discussions on definitions/theories of space, geography and notions of socially-constructured space: Anschuetz et al. 2001; Harley 1988; Lefebvre 1991:1-27; Soja 2000; Van de Noort and O'Sullivan, 2007; Wylie 2007.

construct set the framework for this thesis and for the analysis of past perceptions.[18] Studies of socially constructed space, critical spatiality and social theory[19] in fields such as geography, cartography and philosophy have advanced our understanding of social space/spatial practice, and are crucial for interpreting ancient geographic works and their intentions (Flanagan 2001).

Cognitive geography in relation to people in the Roman period can be better understood through a combination of literary and geographical evidence, in conjunction with the relevant archaeological data and digital cartographic tools, as well as applying postmodern theories on critical spatiality and the socio-cultural aspect of landscape**.** The term 'cultural landscape' was first conceived by the geographer Carl Sauer (1925:49). This approach was expanded from the 1960s onwards by various geographers (e.g. Cosgrove 1998; Cosgrove and Daniels 1988), who applied social and cultural theories to their interpretation of landscapes as a way of exploring cultural and socio-political practices over space and time (see Anschuetz et al. 2001). Meinig (1979) made considerable advances when he explored the concept of diverse 'multivalent' views of the same landscape. Subsequently, the field of landscape archaeological studies underwent further developments through the use of spatial patterning of scattered sites in relation to their physical context to better understand cultural traditions and use of the landscape (Hodder and Orton 1976; Clarke 1977). By the 1990s, landscape archaeological studies began to adopt phenomenological and cognitive approaches to explore past social relationships (e.g. Ingold 1993, 2000; Tilley 1994b, 2004). In this context, landscape carries ontological meaning and is perceived as a living process, interpreted through the senses, in which archaeologists 'dwell' in the landscape to understand the material forms and social relations between them, as it is "lived in and through, mediated, worked on and altered, replete with cultural meanings and symbolism" (Tilley 1994b:26. See Richards 2008 and Lewis 1994 on sensory sailing; also this chapter: 3.4.1.1). Currently, archaeological landscape studies often include GIS, 3D modelling and geophysics in their methodologies (Ch.2.1.1.5). Understanding the interplay between changing physical environments and social organisation/activities can give us an insight into how space was perceived and used.

[18] On ancient works dealing with geography and travel, see: Adams and Laurence 2001; Clarke 1999; Dueck 2010; Nicolet 1991; Romer 1998; Romm 1992; Talbert 2010, 2012; Talbert and Brodersen 2004; Talbert and Unger 2008.
[19] For example: Harley 1992; Wood 1992; Foucault 1973; Lefebvre 1991; Soja 1989, 1996.

3.2 Maritime Cultural Landscapes & Seascapes

Recent approaches to studies of landscapes, seascapes and islandscapes have emphasised the dynamic and social nature of human interaction with the environment, and how change in the political, social and economic setting of a coastal town/port is closely linked to the topography (Bender 1993; Broodbank 2006; Cosgrove 1998; Farr 2006:85-99; Fitzpatrick and Erlandson 2006; Horden and Purcell 2000; Ingold 1993; Knapp and Blake 2005). It is thus crucial to consider these factors in their context to grasp the development of human seaborne activities and notions of maritime space. The concept of 'seascape', widely used in landscape studies in maritime archaeology, is based on specialised navigational knowledge and includes features such as islands, promontories, reefs, seamarks and harbours, as well as astronomical observations, meteorological conditions and factors influencing sea-state (McNiven 2003; Ford 2011:4). In this way seafarers were able to position themselves in a mental map (Farr 2006:92). With an emergence of innovative archaeological research addressing the distinction between landscape and seascape, the term 'maritime cultural landscapes' was coined by Westerdahl in 1978 and 1980. He advanced this term in his later publications as a means of encompassing the complex interaction between human maritime activity and natural features as observed in the material record. This broader notion, which is applied in this thesis, encompasses "the whole network of sailing routes, old as well as new, with ports and harbours along the coast, and its related constructions and remains of human activity, underwater as well as terrestrial…the entire range of maritime economies, that is, mariculture" (Westerdahl 1992:6). Landscape is perceived as cultural and cognitive, as well as physical, linked to understanding local traditions, toponyms and ways human minds observe and interact with its surroundings through maritime activities (Westerdahl 1992:5; Firth 1995:2). Studies of the maritime cultural landscape have applied multiple approaches, such as investigations of maritime culture (Westerdahl 1878-2003); heritage management (Bauer et al. 2001); riverine and estuarine archaeological sites (Graham-Campbell 1997; Aberg and Lewis 2000); geoarchaeology, GIS and spatial patterning (Gillings et al. 1999; Howitt-Marshall 2003:4). Studies have also examined the need to preserve and transform social-cultural identity between people, looking at maritime activities as representing technology, skill and knowledge (Sturt 2006; Farr 2006).

These observable connections are explored in this thesis through the perspectives of ancient geographers and mariners. By relating associated sites and navigational features with the maritime activities and identities of those involved, we can explore the way these relations are represented in the accounts of different authors and their implicit practical experience.

3.3 Ancient Mapping: Visual & Verbal Depictions

Geographic knowledge typically comprised a description of the known inhabited world, *oikoumene*, centred on the Mediterranean, surrounded by an outer sea (*ōkeanos*). These descriptions often mixed with ethnographic accounts, while also advancing scientifically by applying principles of astronomy and mathematics (Nicolet 1991:58). Earlier notions of the sea and sea travel can be traced in travelogues/*periploi* (e.g. Pseudo-Scylax' *Periplous*, *Stadiasmus Maris Magni*, *Periplous Maris Erythraeai*), as well as the geographic/cartographic and encyclopaedic treatises, notably those of Strabo, Pliny the Elder and Ptolemy (Dueck 2012; Talbert 2012). Moreover, maps often have direct links with texts, visually reflecting the ideas and knowledge of the past, and showing how time and space was perceived at different scales (Harley and Woodward 1987:1).[20] They act as a powerful tool to represent landscapes and space, designed in a way that the mapmaker/cartographer can influence the way maps are read (Harley 1992:6). Their function has changed in connection with advances in technology, economics and military-political strategies, within a changing socio-cultural landscape.

Therefore, to understand the perceptions of the maritime cultural landscape as represented by the ancient geographers, it is vital to know the history of advances of cartographic notions, theories and practices (3.3.1-5), as the development of these approaches of geographical thinking reflect a sense of spatial awareness and a scientific effort to categorise and record places and features in the landscape/seascape (for an overview, see Van Paassen (1957)'s *The Classical Tradition of Geographers*).[21] The key terminology applied in this research (i.e. *periploi,* itineraries, maps, 'chorography' vs 'geography') is defined in the glossary in appendix iii.

3.3.1 Greek Development of Geographic Knowledge

Geographical knowledge was reflected via earliest Greek literature in the form of catalogues integrated in poetry, such as the 'Catalogue of Ships' in Homer's *Iliad*, or in the form of written journeys, such as his *Odyssey*, describing a journey (c.8th century BC).[22] Similar to the Phoenicians and Egyptians, the earlier Greeks obtained geographical knowledge from their contacts with other nations by sea more than by land, which led to the development of the

---

[20] For overview of cartographic advances see J. Harley and D. Woodward (1987)'s *The History of Cartography,* with a focus on ideological contexts of geographical knowledge by reading "between the lines of the map" (Harley 1992).
[21] The earliest examples of "maps" are thought to originate in ancient Mesopotamia (Rochberg 2012:9). However, a recent article by S. Meece (2006) in *Anatolian Studies* 56:1–16) reinterpreted the wall-painting from Çatal Hüyük, which Rochberg claims to be a map (10–11), as instead depicting a leopard.
[22] It is worth noting that the Catalogue of Ships itself roughly follows the order of the coastline, although it is not a *periplous/*circumnavigation. Conversely, the Odyssey described a journey but does not follow a coastline.

Greek tradition of *periploi* around the 5th/4th century BC (Nicolet 1991:58; Beresford 2013:192; geographic terms such as '*periploi'* are defined in appendix iii: glossary). These derived from the custom of navigation routes along the coast, which formed the basis of this genre of written maritime travelogue(s). The earliest example of this genre dates to the sixth century BC, written by an anonymous Greek author from Massalia preserved in Avienus' fourth century AD work titled *Ora Maritima*. These types of documents continued to develop as geographical knowledge advanced. Other successive examples include the fourth century BC *Periplus of the Mediterranean and Black Sea* by Pseudo-Scylax, the anonymous mid-first century AD merchant's handbook *Periplus Maris Erythraeai*[23] ('of the Erythraean Sea') (Casson 1989), and the later *Stadiasmus Maris Magni* ('Periplus of the Great Sea'), dating from c.3rd century AD.

3.3.2 Conceptualising cartography in the Graeco-Roman world

Early cartography appears to have been particularly interested in philosophical and geographical discussions on the shape and extent of the known world and defining the continents (*ēpeiroi)*, as well as mountain heights and sea depths (Dueck 2005). In the 6th century BC, Ionian Greek philosophers and cosmologists (*physiologoi*) attempted to conceptualise the universe and create maps depicting the world (Cole 2010:204; Romm 2010:217; Pretzler 2009:62-3), driven by their interest to explore the notions and events that governed the external world. This was concurrent with a shift of focus towards cosmological research based on mathematical and geometrical principles and theories. Much of the early geographic work (e.g. Thales, Pythagoras and Anaximander; see Lloyd 1970) seems to have been driven predominantly by abstract cosmological concerns, rather than pragmatic ones.

The concept of mapmaking in the classical world is thought to have begun with the Ionian Anaximander of Miletos (c.600-545 BC)[24], followed by Hecateus of Miletus (c.520-490 BC) who wrote the first systematic textual description of the *inhabited world* in Greek titled *Periegesis,* apparently accompanied by a map, now lost. There is textual reference of a portable bronze map (*pinax*), commissioned by Aristagoras of Miletus and described by Herodotus (*Hist.* 5.49) in the late sixth/early fifth century BC,[25] who questioned earlier maps and advanced mapmaking by prioritising data sourced from empirical accounts/explorations (Irby 2012:93). This reflects how "maps could be engraved on portable bronze tablets, that general maps of

[23] See also Arrian's *Periplus Ponti Euxini* (Liddle 2003), and Pliny, *NH* 4.11.51-12.74)

[24] Anaximander is said (by Agathemerus) to have drawn the *oikoumene* on a *pinax,* a board or metal plate with a surface for writing/inscribing (Aujac 2010:132-5). According to Diogenes Laertius, 3rd century AD biographer, he was "the first to draw the outline of the sea and land", who "published the first geographical map" (*geographika pinaka*).

[25] It had an engraving of the circuit (*periodos*) of the earth with all the rivers and seas and Aristagoras carried it with him when he travelled to Greece searching for allies to fight against the Persians, c.500 BC (Hdt., *History* 5.49).

the inhabited world were frequently made in Ionia, and that they were more informative than the simple geometric plans such as the Babylonian clay tablet of the same era" (Aujac 1987:135). Following this, Parmenides (c.490-450 BC) appears to be the first to separate the world into five symmetrically balanced zones (*klimata)* (Strabo, *Geog.* 2.2.2; Fig.4.1). The flat-Earth theory was replaced by a spherical Earth organised into zones of latitude (building on Parmenides), which was proved and advanced by the Greek philosopher Artistotle (384-322 BC) based on evidence of lunar eclipses. Dicaearchus (340-290 BC), a Greek geographer and cartographer, introduced geographical coordinates into mapmaking, perceiving the *oikoumene* as crossed by an east-west axis (*diaphragma*) from the Pillars of Hercules to the Levant, following the line of the Taurus Mountains that stretched into the Caucasus and Himalayas.[26]

It is then from the third century BC onwards that we see the emergence of a genre of texts offering critical thoughts and descriptions on the order and content of a world map (Jones 2011). The polymath Eratosthenes (fl. 200 BC) used the word *geographos* referring to "he who describes/draws the earth" (Jacob 2006:19) and was the first to calculate the size of the Earth based on shadows (252,000 stades), developing a plane projection system with meridians and parallels to determine distances between places using spherical geometry. The astronomer Hipparchus (150 BC) adopted mesopotamian astronomical concepts (e.g. 360 degree circle) to establish latitudes for locations and developed ways of visualising the Earth by looking into the nature of projections. Strabo (c.9-5 BC) adopted earlier notions from scholars such as Eratosthenes and Hipparchus, giving discussions on how to create a world map (*Geog* 2.5.10).[27]

In Graeco-Roman thought, the Earth was generally perceived as spherical in shape and its surface divided into five climatic divisions (Geus 2003:233; Fig.4.1a), which comprised: two frigid zones (region above the Arctic Circle to the north, and below the Antarctic Circle to the south), two temperate hemispheres (northern and southern, which were habitable), and a torrid zone (between the tropics of Cancer and Capricorn), with the Ocean, commonly perceived as a river, encircling the Earth (e.g. Hdt., *Hist.* 4.8, Strabo, *Geog.* 10.7.4; Mela 3.5; Pliny, *NH* 2.66.2). In the two habitable zones, the northern temperate zone encompassed the *Oikoumene* ('known inhabited world') and the *Perioikoi* ('neighbours', at the rear of the northern zone), whilst the southern temperate zone was inhabited by the *Antoikoi* ('opposite dwellers') and the *Antipodes* ('those with the feet opposite') (Fig.4.1b).

[26] This is depicted on the surviving Peutinger Map (Salway 2012:197; see Talbert 2013)
[27] Hipparchus wrote the polemic treatise *Against the Geographica of Eratosthenes*, solely preserved in Strabo.

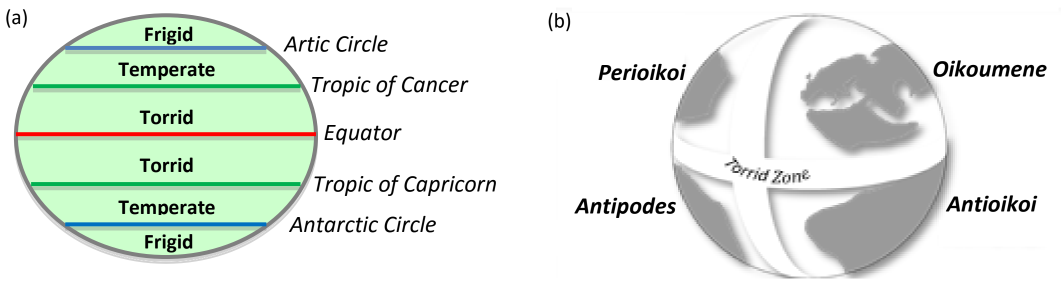


Figure 3.1 Diagrams showing climatic divisions of the Earth as described in antiquity (Produced by author).

3.3.3 Marinos' and Ptolemy's impact on cartography

The first century BC then saw the significant advance in political geography, as Julius Caesar instructed a formal survey of the *oikoumene,* reflecting interest from the political elite. Moreover, "geography in a political context seems more prominent in the literature and art of the first century BC as compared with previous periods" (Dueck 2003:212; also Arnaud 1998; Nicolet 1991). The reign of Augustus followed, coinciding with Roman expansion of territories and knowledge (see Nicolet 1991; Aujac 1966:213; Dilke 1985:173-5; Dueck 2002, 2012). By the late 1st/2nd century AD, notions on spatial understanding of the *oikoumene* were further influenced and advanced by Marinos of Tyre. Subsequently, the astronomer, mathematician and geographer Ptolemy (150 AD), whose complex treatise on cartography and geography played a pivotal role in the progress of cartography. In the Roman period, it seems geographic information was dominated by itineraries, commonly linked to military campaigns (3.3.4). Strabo hoped his geography could serve the state, while Pliny writes that it is not possible to know information about places not reached by the army (Mattern 1999:26-27). Ptolemy's *Geography* appears to have had little if any impact in the West and limited circulation in the East and Islamic world (where it was supplanted by the derivative work of al Khwarazmi).[28]

The Roman notion of the *oikoumene* (lat. *orbis terrarium*) was adopted from earlier concepts established by Greek geographers and astronomers, characterised by the belief that the *oikoumene* was broader in longitude than latitude and divided into the three continents, with a central civilised zone ruled by the Roman Empire, and including regions associated with uncivilised peoples/tribes (Salway 2012:211). Romans perceived the different regions under general geo-political entities: the Roman Empire; European *Barbaricum*; the Erythraean Sea; Scythia; and the country of *Seres*, i.e. Silk route (Dueck 2003). Culturally, Latin was the predominant language in Roman western provinces, whereas the Greek language dominated Roman eastern provinces. However, in the 1st and 2nd century AD, geographical perceptions

[28] It seems it was accessible to school of al Ma'mun in Baghdad (9th C AD); rediscovered in Byzantium (end of 13th C).

relating to the Roman world were relatively inconsistent. For example, *De Architectura* of Vitruvius (addressed to Augustus and centred on Italy and the Roman people), shifts between two extremes. On one hand, he places Rome and Roman people at the centre of the world map (*De Arch.* 6.1.11)[29]; while on the other, the world seems to have no centre, defined instead by the universal traveller, "a citizen in every country" (*De Arch*. 6.2).[30]

3.3.4 Itineraries (annotated and pictorial)

Another form of representing spatial associations is attested by the many surviving itineraries (e.g. *Itinerarium Antonini,* c.AD 280-290?), though these are particularly focused on terrestrial routes.[31] Following the Roman expansion at the end of the Republic, and the reign of Augustus particularly, the Romans developed an extensive road system, *cursus publicus* (Casson 1974a), which in turn formed the basis for this genre of Roman land itineraries (e.g. Antonine Itineraries and the Peutinger Map, c. 3rd/4th century AD). Itineraries were recorded in the form of inscriptions onto objects (e.g. Vicarello Goblets, 2nd century AD, in the shape of a milestone), or monuments (e.g. *Stadiasmus Patarensis,* AD 45/46, inscribed onto a Claudian monument) (Sillieres 1990:38-9; Salway 2001:56). Moreover, according to Vegetius (383-395 AD), a military civil servant, it was advised that military commanders had itineraries in not only written annotated form (*scripta/adnotata*) on distances, but also pictorial (*picta*) (Vegetii, *epit.rei milit.* III.6), so as to depict conditions of roads and geographic features to choose a suitable route:

> "…a commander ought to have itineraries of all the regions in which war is waged written out very fully, so that he may gain a firm grasp of the distances between places (and not only the mere number of miles but also the conditions of the routes), and may take into account shortcuts, byways, mountains, and rivers accurately recorded. …for those provinces where crises were occurring, we are assumed that the more able commanders had itineraries that were **<u>not just noted down but also in picture form</u>**. Thus when setting out he would choose a route not by a mental process but visually." (trans. in Talbert 2010:142).[32]

---

29 "Within the area of the entire earthly globe and all the regions at the center of the cosmos, the Roman People has its territories. The populations of Italy partake in equal measure of the qualities of both north and south, both with regard to their physiques and to the vigor of their minds, to produce their greatest strength…Thus the divine intelligence established the state of the Roman People as an outstanding and balanced region – so that it could take command over the earthly orb" (*De Arch*. 6.1.11, Rowland 1999:77). Strabo (*Geog.* 2.5.26) on centrality of Europe.

30 "An educated person is the only one who is never a stranger in a foreign land, nor at a loss for friends even when bereft of household and intimates. Rather, he is a citizen in every country" (*De Arch*. 6.2; trans. Rowland 1999:75).

31 However, the *Itinerarium Antoni,* for example, contains both terrestrial and maritime routes. In the maritime section, *Imperatoris Antonini Augusti Itinerarium Maritimum,* a number of maritime itineraries are included, with accounts of crossings and some short coastal stretches. It lists coastal towns, islands and distances in stades rather than miles, and is likely to have derived at least part of its sources in maritime accounts/*periploi* (Salway 2001:46).

32 Original Latin reference from Vegetius: "*Primum itineraria omnium regionum, in quibus bellum geritur, plenissime debet habere perscripta, ita ut locorum interualla non solum passuum numero sed etiam uiarum qualitate perdiscat,*

3.3.5 Surviving Roman maps

It is important to be aware of the limited evidence of Greek and Roman maps in comparison to the many surviving literary evidence to avoid biased interpretations. Nonetheless, examples of extant ancient maps include the Marble Plan of Rome (*Forma Urbis Romae*) and the Peutinger Map, as well as coastal maps known as Dura-Europos Shield and Madaba Mosaic (Fig.3.2-5).

The *Forma Urbis Romae* (c.200 AD) survives in fragmentary form and represents a giant detailed plan of the city of Rome (about 18m in width, 12m in height), carved onto an assemblage of 150 marble slabs placed onto an end wall of a great chamber in the Temple of Peace complex in central Rome (Talbert 2012:172; Fig.3.2). The second example is the Peutinger Map, preserved in the form of a single medieval copy, though the original map's left-hand end is lost (Fig.3.3). The extant copy comprises 11 pieces of parchment, each measuring c.60cm in length, and held together to create a long strip/roll, measuring 670cm in length/width, and 30-35 cm in height. The pictorial itinerary map depicts the world known to the Romans (including the Levant case-study area), with a North orientation, ending with India and Sri Lanka at the right, and likely starting from Britain and the Atlantic coast of mainland Europe and Africa at the left, the side which corresponds to the lost section of the extant map (the surviving far left shows SE England and SW France) (Talbert 2012:179).[33] Another example of an extant map (and pictorial itinerary) is the Dura-Europos Map (AD 260), a map of the Black Sea region depicted on a parchment found in 1923 at Dura-Europos, Syria (Cumont 1925, 1926), intended to decorate a military shield (Arnaud 1989:18–19; Salway 2012:196; Fig.3.4). It has been convincingly proposed the map represents a maritime route, rather than terrestrial, as it comprises only coastal cities and harbours (no roads/inland cities are included), and the sea and ships form a central position on the map (Salway 2001:42, 2004:94).[34] Moreover, it reflects elements of cities and their geographic relations.

Finally, an example of an extant map pertaining to the case-study region of the Levant is the Madaba Map (see Harvey 1980:9-10), a mid-6th century (c.AD 542-565) mosaic map portraying the 'Holy Land', covering the floor of the Greek Orthodox Church of St George, NW of the city centre, in Madaba, Jordan (Fig.3.5). The mosaic panel originally measured approximately 15.6 X 6m, 94 square meters; a quarter survives. It is the only detailed extant map from the Eastern Empire prior to the 13th century. It comprises coastal and inland place-names inscribed in

---

conpendia deuerticula montes flumina ad fidem descripta consideret, usque eo, ut sollertiores duces ***itineraria*** *prouinciarum, in quibus necessitas gerebatur,* ***non tantum adnotata sed etiam picta*** *habuisse firmentur, ut non solum consilio mentis uerum aspectu oculorum uiam profecturus eligeret.*" (*Vegetii epitome rei militaris* III, 6).

[33] Talbert suggests the many labels of gulfs/inlets/islands reveal a concern with the coastal geography (2007:225-6).

[34] Researchers proposing a land route include: Brodersen (2001:15); Cumont (1925:10–11); and Dilke (1985:120-2).

Greek (including the study-area of Palestina-Judaea), with Jerusalem depicted at a larger scale than the rest, and reflects a changing approach in cartography during the Byzantine period.

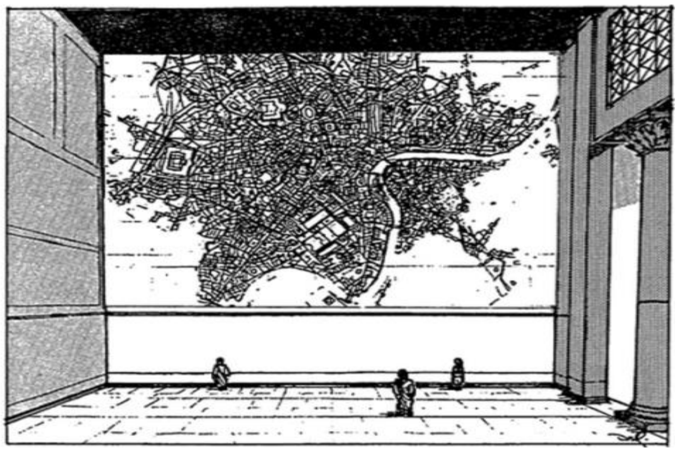


Figure 3.2 Forma Urbis Romae, to show scale (reconstructed by D.W. Reynolds (1996), cf. Johnson 2012:571).

Figure 3.3 The Peutinger Map (Talber 2010).

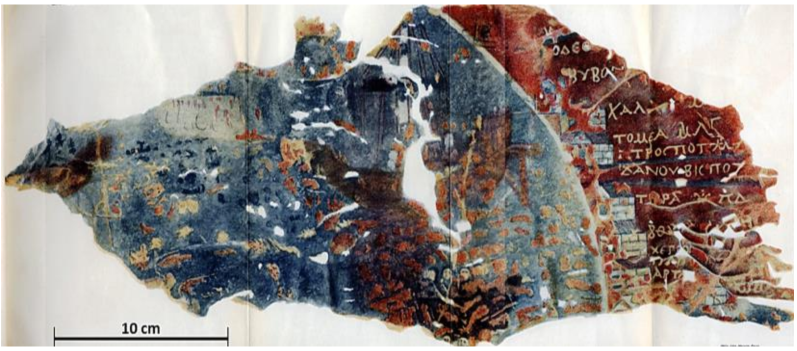


Figure 3.4 Dura-Europos parchment depicting the Black Sea coastline (www.ancientports.com)

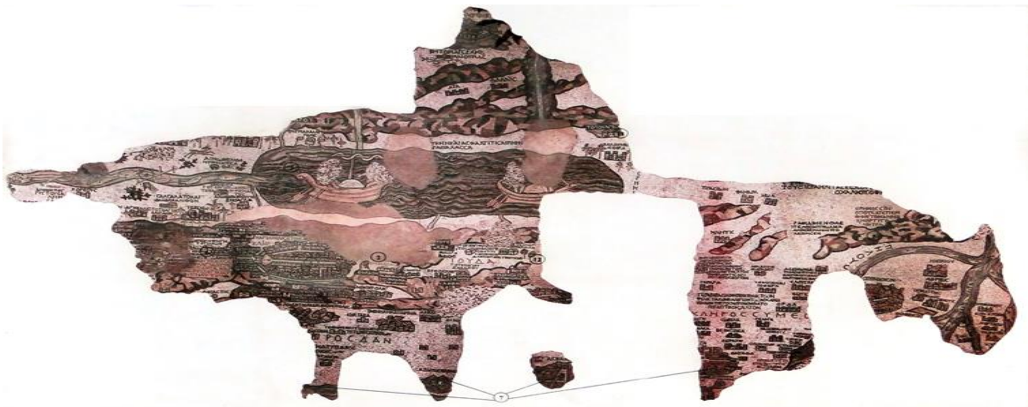


Figure 3.5 Madaba Mosaic Map, showing Palestina.(http://basementgeographer.com/megamaps-in-peril-part-iv-paradise-lost-madaba-found/)

3.3.6 Summary on Advances in Ancient Mapping

Early notions of mapmaking developed amongst Ionians from the 6th century BC onwards (e.g. Anaximander, Hecataeaus, Aristagoras). Cosmology, mathematics and politics played a central role in advancing geographic concepts and spatial associations (Dueck 2012:2–5, 35–40). According to ancient authors such as Strabo, a key purpose of geography was to serve the needs of the states and the empire, while the expanding empire led to improved geographic knowledge and extended geographic borders (*Geog*. 1.1.16; Dilke 1985:62–64; Nicolet 1991:2). During earlier expeditions of Alexander the Great (334-323 BC), distances between stopping places and topographic information were recorded by a group of land-surveyors, "bematists" (Dilke1985:29), who accompanied him and "whose task it was to measure the routes taken and the distances covered by the armies" (Fraser 1996:78).[35] Alexander's campaigns motivated later Roman emperors and generals to continue these geographic expansions and advances, namely Pompey, Julius Caesar, Augustus, and Claudius (Dueck 2012:14; Nicolet 1991:2-8).

Overall, there was an emphasis on knowing where one was and the ability to navigate and orientate oneself, as a lack of geographic knowledge could be dangerous. This notion is also reflected in Strabo's work, particularly regarding military events (Ch.5.1.2).[36] Moreover, "to set boundaries to their empire and to claim to have reached those that were marked out, the Romans needed a certain perception of geographical space, of its dimensions and of the area they occupied" (Nicolet 1991:2; Whittaker 2004:63-87). These genres dealt with a range of subjects, such as lists of towns, their distances, topographic/ethnographic accounts en-route, merchants' journey reports and the integration of astronomical principles into world-mapping.

[35] Examples of such surveyors, known to us through citations in later authors such as Pliny, include: Baiton, Diognetos, Philonides, Amyntas, and Archelaos (see Jacob 1999:34-35; Fraser 1996; Engels 1978:157-158).

[36] "The barbarians…made the ignorant Romans believe to be far away what was really near at hand, and kept them in ignorance of the roads and of the facilities for procuring provisions" (Strabo, *Geog.* 1.1.17).

3.4 Ancient Navigation in the Mediterranean

> "Throughout the world…from the earliest times that there is evidence until well into the medieval period, seamen used non-instrumental navigational techniques, based on inherited traditions, personal experience, and detailed observation of natural phenomena" (McGrail 2004:101).

3.4.1 Early Navigation

The Mediterranean Sea is practically tideless and in summer benefits from relatively moderate winds and frequently clear skies. Such conditions facilitated navigation, particularly along the coast by using visible landmarks (Lewis 1994:78; McGrail 1987:280-2, 1991:86-87, 2004:82; Wachsmann 1998:300). One of the simplest forms of navigation, without the use of navigational instruments, is known as dead reckoning, whereby "the navigator steers a course specified at some angle to some (relatively) fixed datum for a given time (measured in units of a 'day's sail'); as the voyage progresses he adjusts the course and his estimate of the time of sighting the next landfall, to compensate for the effects of currents, tidal flows, leeway, and changes in wind velocity, and to allow for any speed differences from the norm which his boat may achieve on a particular voyage" (McGrail 2004:83, also 1987:280–2). The main orientation techniques in the past were pilotage (coastal/inshore) and celestial navigation (Lewis 1994:45, 79-83). Celestial navigation involved fixing one's position on Earth using measured angles in relation to astronomical objects. During rainfall and cloudy weather, which restricted visibility, sailors relied upon current sets, water temperatures and knowledge of prevailing and local winds. Sailors also navigated by pilotage (McGrail 2004:101), relying on observations of shore-sighting, landmarks, clouds and migratory/land-nesting birds to guide them on the shore's direction or nearest island up to c.32 km offshore (Wachsmann 1998:300).

Natural and man-made landmarks served as key navigational aids for ancient seafarers (Morton 2001:185-214; Parker 2001:35; Phillips 1993), and often featured in ancient *periploi* and geographic treatises describing harbours or maritime journeys along a given coast (e.g. *Periplus Maris Erythrai*; see 3.4.1.1; Ch.7.1). Natural landmarks consisted of prominent and easily visible geographical coastal features, such as mountains, capes, headlands, islands (e.g. Mount Carmel, Levantine coast). Man-made structures included shrines, temples, towers and lighthouses. Seamarks, such as stakes, pillars or pilings, though relatively rare, were sometimes used to warn off seafarers of unsuspected shallows or submerged reefs (Herodotus 7.183).

3.4.1.1 Navigational Markers and "Sensory Navigation"

Navigational indicators and signs based on sensory perceptions and experience were likely used by ancient mariners at sea along familiar journeys, serving as useful features/landmarks aiding navigation through the seascape and understanding spatial associations between places and routes (discussed in the context of the Levantine coast: Ch.7.1.1, and other regions of the Eastern Mediterranean: Ch.8.1.2.1). Such markers ancient mariners referred to include: distinguishing elevated points, chromatic features or lighted structures on the shore; sighting species of migratory birds or birds that tend to fly close to the shore (e.g. cranes); observing clouds that form over islands (serving as a warning sign for detecting less easily recognisable changes in the sea-state); hearing the break of surf or observing alterations in the shape and direction of swells and waves; and recognising smells of land, particularly in night sailing, as well as knowledge of stars and constellations (as described above).[37]

Ancient seafarers perceiving the coastline (from the sea) relied on elevated or chromatic geographic features visible from a distance. These were vital for identifying features on the mainland, such as familiar natural and artificial landmarks (Arnaud 2014:58; Ch.7.1, 7.2.2). However, geographical features such as promontories and gulfs are less distinguishable from a distance, and, thus, in the case of Strabo (and other authors) "the perception of gulfs and capes as geographical features could be Strabo's theoretical view as a map-maker. It was not, by nature, the kind of perception and representation a mariner would have" (Arnaud 2014:59-60; explored in Ch.7.1.1). Though extant navigational instruments are rare, sounding-weights are extensively-documented archaeologically[38] and were used for navigation and determining the position and depth of the sea-bed.[39] It was particularly valuable for anchoring a vessel, as it was restricted to shallower waters. Sediment samples recovered from the seabed could also provide valuable information of a more sensory nature, such as the smell, taste, colour and texture of the local topography (Oleson 2000, 2006, 2008 (Mediterranean); and Galili and Rosen 2009:344; Waters 1958:18-20; Morton 2001:207).[40] Ancient mariners also used familiar, distinguishable chromatic features as navigational reference points along sea routes (see Dini et al. 2007:236, focusing on the *Argonauts*). These characteristic topographical markers are also reflected in the naming of harbours after such chromatic distinctions, e.g. *Leukos Limen* ('White Harbour'). As 'white' capes, coasts or harbours were easily visible at a distance from

---

[37] For traditional navigation markers: Lewis 1994; Morton 2001; Davis 2002:219-309; Oleson 2008; McGrail 1993.

[38] See, in particular, work by Oleson 2000, 2006, 2008 (Mediterranean); and Galili et al. 2009:344 (Southern Levant). Samples could also be of subsistence nature, i.e. helping to locate corals, sponges and fishing-grounds (ibid).

[39] E.g. of early written source, Herodotus (c. 440 BC), describes them used for sounding and sampling (Hdt. 2.5.28).

[40] E.g. *Antikythera Mechanism*: complex mechanical navigational device (1st century BC) with possible astronomical connotations (Price 1974), sheds light on the advance of cosmology and navigation during this transitional period.

the shore, such markers feature abundantly along key sea routes, as well as in ancient written accounts of such journeys (see Ch.7.2.2 for specific cases). Moreover, the various navigational and sensory markers of orientation (e.g. landmarks, distances, celestial navigation, sailing patterns) can be traced in the practices of Micronesian/Polynesian navigators, as well as ancient accounts using distinctive landmarks and toponyms as a means of constructing a 'memory' database of places and geographic features in the seascape (Thiering 2012:33)**.**

3.4.2 Sailing Patterns

Knowledge of sailing routes and landmarks is believed to have been passed down from generation to generation, and predictable seasonal weather conditions greatly influenced the development of practices and patterns of sailing periods, and routes chosen by mariners (Whitewright 2008:47; Farr 2006:91-3; McGrail 2004:100, 438). Ancient navigators relied on their knowledge of the favourable geographical conditions, predominant currents and seasonal wind patterns to navigate in optimum conditions (Ch.5.1.3). Yet, the available ship technology and navigational skills allowed navigators to be flexible in deciding their routes. The combined evidence of shipwreck cargoes and documentary records for sailing practices and voyages implies a range of sailing patterns in the Roman period (Robinson and Wilson 2011:4; Arnaud 2011:59–78; Schörle 2011). Arnaud (2005)'s '*Les routes de la navigation antique: itinéraires en Méditerranée'* is a valuable source for systematic evidence on ancient Mediterranean maritime routes and practices (Fig.3.6). He points out how recent scholarship has presented two divided models of long-distance sailing and trade patterns in antiquity (Arnaud 2013:61, 2005; also Hordel and Purcell 2000:142; Schörle 2011; Tchernia 1997, 2011; Wilson 2011). The first model (Rougé 1966; Casson 1971; McCormick 2001) suggests a predominant practice of direct sailing between ports with specific cargoes across open seas in antiquity, followed by a transition to a slower sailing practice in the medieval period, primarily in the form of coastal *cabotage* and tramping. The second model (Pryor 1987; Duncan-Jones 1990; Reynolds 1995) suggests that in both periods the common practice was coastal tramping.

These views have recently been challenged, arguing there may not have been a clear discontinuity between the two forms of sailing and trade patterns (Arnaud 2011:61; Robinson and Wilson 2011:4) based on a combination of archaeological (e.g. shipwrecks, anchors) and literary evidence (e.g. ancient sources and maritime trade contracts). According to Arnaud, neither practice dominated and we should imagine most voyages as being formed of a series of direct and directed routes between two locations, most frequently located 4-5 days apart, for much of antiquity. He also points out that we must consider alterations of the maritime landscape and look at issues of "permanency and changes in sailing and trading patterns" (Arnaud 2011:61). Focusing on human contexts that shaped ancient seafaring trade, Arnaud shows that documentary sources (cf.Parker 1992; Wilson 2011:33-60) "provide evidence pertaining to both continuity and change in sailing patterns during the Classical period, down to the fourth century AD, when the growing lack of shipwrecks clearly marks an important change in the maritime history of the Mediterranean" (Arnaud 2011:61). Thus, it is possible to advance our knowledge of Graeco-Roman navigation and seafaring by "identifying the nature of the navigational problems, many of which are not specific to region, culture, or time, and integrating the meagre documentary evidence…it is possible to make reasoned suggestions about early navigational and pilotage techniques by studying how recent pre-industrialised maritime cultures have tackled analogous problems" (McGrail 1987:275; explored in Ch.7.2).

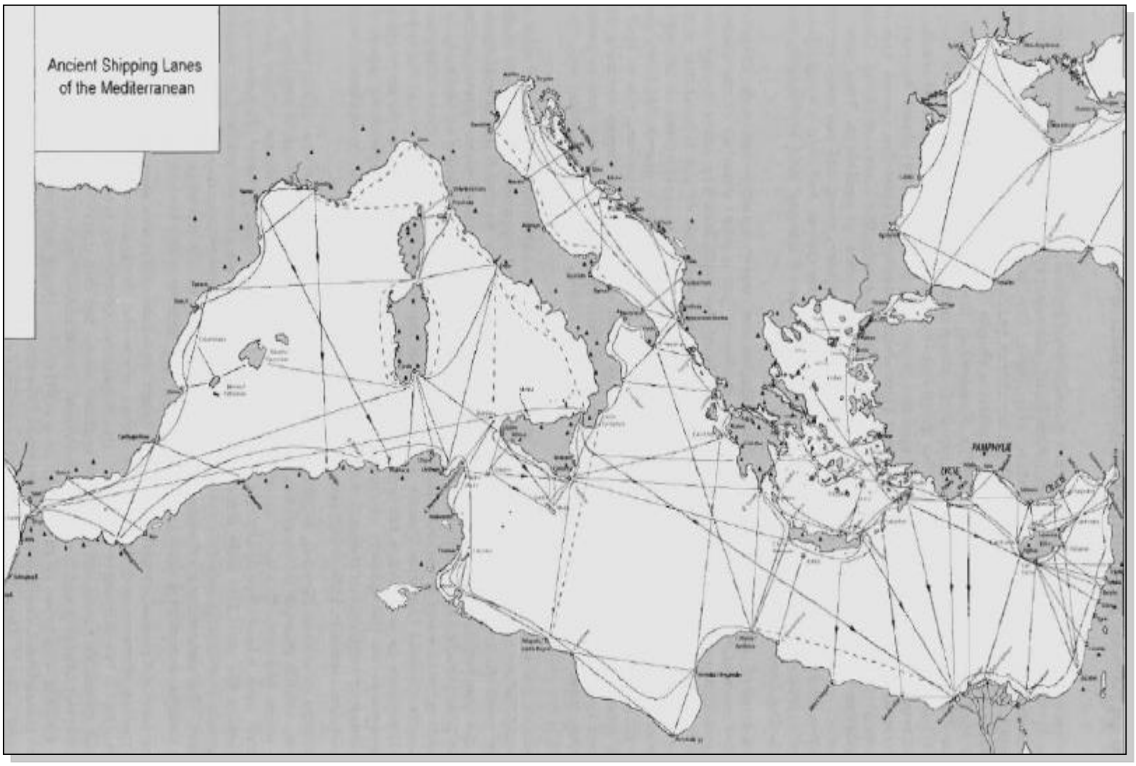


Figure 3.6 Map showing general shipping lanes in Mediterranean (after Arnaud 2005:fig.2).

3.4.2.1 *Mare Clausum*

The long-held traditional view regarding patterns of ancient sailing seasonality was described as a sailing season open solely between spring and autumn, followed by a period of no sailing during winter, referred to as a closed sea, '*mare clausum'*. A majority of scholars have embraced this view based on an over-reliance on limited ancient literary sources, namely Hesiod, Vegetius and Gratian (Beresford 2013:9-31).[41] Yet, once these commonly relied upon sources are critically re-evaluated in their appropriate context,[42] new perspectives emerge.

In light of this, although navigation along coasts and open oceans generally ran throughout the seasons of spring, summer and early autumn,[43] it has recently been challenged that winter sailing in the Mediterranean did in fact take place (Arnaud 2012; Beresford 2013:6; Tammuz 2005:145; Whitewright 2008:48). Moreover, there was considerable regional variation to the sailing and overall weather in the winter season. However, this practice was more infrequent and the routes that remained opened would have been dependent on the individual (merchant, sailor, or bureaucrat) responsible for shipping a cargo from A to B, based on their navigational skills and personal assessment of the hazards involved (Whitewright 2008:48). Additionally, through an analysis of the Mediterranean's specific regional environmental changes, evidence has shown that certain parts of the Mediterranean were more favourable for sailing in winter than others, as "while certain maritime areas, most notably the Gulf of Lions, can usually expect to receive relatively high frequencies of powerful winds and high waves, mariners voyaging on a sea-region such as the Levantine seaboard would normally have had to face far less trying conditions" (Beresford 2013:267). Thus, the ancient sailing season would have been influenced by a combination of factors, relating to the purpose of the voyage, ship types used, and prevailing meteorological conditions present at the time (Ch.5.1.3; Ch.7.2).

[41] Hesiod (*Works and Days*, 618-684); Vegetius (*Epitoma rei militaris*, 4-39); Gratian (*Codex Theodosianus,* 13.9.3).
[42] For instance, though Hesiod seems to suggest the period of fifty days following the solstice was an ideal sailing period (Hesiod, *Works and Days,* 664-77), he also mentions sailing during other times of the year, and thus views based on Hesiod's text have often been interpreted out of context (Beresford 2013:9).
[43] Casson 1995:270-2; Arnaud 2011; Whitewright 2008:47; Wilson 2011:33-60.

3.5 Modern Perspectives: Cognitive Geography and Navigation

3.5.1 Theoretical Debates

Recently, researchers have explored how travel was represented and the ways in which geographic space was perceived and shaped during the Roman period (Talbert and Brodersen 2004; Romm 1992; and Clarke 1999), which has led to a large resurgence of interest in the field of ancient cartography, geography and navigation (Talbert 2008).[44] Following on from the debates presented in the outset of this research (Ch.1.1.5), contrary to Dilke's (1985) views that Romans produced maps and used them in similar ways as we do today, the historian Janni (1985), followed by scholars such as Brodersen (1995) and Whittaker (2004), argue that the Roman Empire developed an understanding of space based on a linear "hodological" way of thinking, rather than a two-dimensional way. These scholars argue that the extremely limited evidence and references to spatial maps similar to our modern conceptions supports this linear, one-dimensional view. However, as demonstrated, there is evidence of references (explicit and implicit) to drawn maps in Greek and Roman sources, as well as a few cases of surviving Roman maps (as illustrated earlier 4.3.5). Herodotus describes the bronze *pinax* of Aristagoras presented in 499 BC to the Spartans, onto which "a depiction of the entire world has been engraved, with the whole sea and all the rivers" (*Hist.* 5.49; see Irby 2012:92). Another example from the 5th century BC is the world map mentioned by Strepsiades in Aristophanes' *Clouds,* stating "here you have a depiction of the whole world. Do you <u>see</u>?" (Arist. *Clouds* 206, in Clarke 1999:9). Moreover, "again, the word used is περιοδος ('geographical representation'), nicely illustrating the fact that these geographic depictions were parallel to verbal descriptions of the Earth from Hecataeus onwards" (Clarke 1999:9).

Beyond literary references to drawn maps, evidence for geometrical abstract space is also presented in the theoretical treatises of Hipparchus and Polybius. The terminology used by Strabo for studying geography reflects a cartographic notion of space, as he not only describes the places that can be found en-route and, ultimately, the territory of the known world, but also alludes to the practice of mapping out places along parallels and meridians in the works of others (Clarke 1999:9). Ptolemy's notions of abstract space involved places described in relation to a grid which covered the entire known world, rather than in relation to their links to their neighbouring regions. However, his key innovation was the way he listed the places (with place being primitive and coordinates secondary, rather than along a parallel or meridian). In

[44] On perceptions/representations of space in geographic texts: Dear et al. 2011; Daniels et al. 2011; Cosgrove 2001.

contrast, abstract space within the *periploi* was largely influenced by the experienced nature of space, as places were primarily described in relation to each other (see appendix iii: glossary).

3.5.2 Perceptions of the Sea

A well-documented topic of scholarly interest has been the social-economic interconnectivity of the Mediterranean (e.g. Horden and Purcell 2000).[45] In antiquity, the landscape and meteorological conditions played a major role in maritime connectivity (Ch.5.1.3). Through current geomorphological studies, ancient landscapes and outlines of shorelines can be reconstructed and used for geospatial analyses (e.g. recent geoarchaeogical work in Lebanon for the island of Tyre and its harbour facilities, Marriner et al. 2008; Ch.2.1.1.6). The Mediterranean has often been the centre of focus and representation in ancient cartographic depictions, and should be understood as a cultural creation. The sea has played a key role in defining cultural regions, margins and continents (e.g. Pillars of Herakles and Hellespont). Fear of unknown and unchartered space is also reflected in ancient Graeco-Roman literature such as *periploi* (Hartog 2001:88), giving an insight into the views and attitudes of ancient travellers. Local knowledge and pilotage of the coast was vital in such regions (Morton 2001:136; 3.4.1).

In the past, large seas were separated into several smaller seas (Kowalski 2012:78-86). Before the Mediterranean became unified politically during the Roman imperial period, it was conceived as an open sea, or a group of seas (Abulafia 2003:11-30). The Greeks used terms such as 'inner sea' when referring to the Mediterranean, and 'outer sea' when referring to the ocean (e.g. Atlantic). The Mediterranean Sea was known as the "Western Sea" in the Old Testament, as it was on the western coast of the Holy Land (della Dora 2010:2). In contrast, Herodotus described the Mediterranean with names of smaller seas and gulfs; whereas Strabo and other ancient Greeks referred to it as "η ντός και καθ΄ ημάς λεγόμενη θάλασσα" (sea over by us). Originally, the Romans also conceived the Mediterranean as a chain of smaller connected seas, whose names were derived from neighbouring coasts or islands, such as *Mare Tyrrenum and Mare Balearicum* (della Dora 2010:2). They then generally referred to the Mediterranean as a whole as *Mare Nostrum* ('our sea'), or the plural 'our seas' to include various gulfs and extensions, as can be seen in Mela's *De Chorographia* in first century AD (Mela 1.6, 1.13), though regional water bodies were also still referred to (e.g. in Ptolemy). The geographer Solinus seems to have used the term *Mare Mediterraneum* around the second half of the 3rd century AD. In a recent publication, Kowalski determined more than a dozen divisions

[45] See also: Braudel 1972; Abulafia 2003, 2011; Harris 2005; Malkin 2005. In parallel, the past few decades have witnessed a significant rise of general interest in the concept of networks in both the exact and social sciences.

for the Mediterranean in the Graeco-Roman world, with each cultural region possessing its own smaller sea, enabling the major seas to be categorised into several cultural sectors (Kowalski 2012:78-86). The sense of identity of past people was influenced by their relationship with the sea and led them to develop a substantially nautically based vocabulary and tradition, even expressed in their cultural practices on land (Kowalski 2012:97-101). Moreover, della Dora describes the Mediterranean as being a metageographical object "carved out of the land and of the sea by human imagination" (2010:1), whereby 'metageographies' refer to the "set of spatial structures through which people order their knowledge of the world" (Lewis and Wigen 1997:ix, cf.della Dora 2010:1-2). Thus, people base their knowledge on what surrounds them, and how geographies are perceived and represented goes beyond the physical, including lived experiences shaped by power, culture and politics in a society.

3.5.3 Mapping Intentions, Scale and Perspectives

What is perceived as reality by map users can be subjective and problematic, as different people extracting data from the same space potentially select different sets of information or apply different significance upon it relating to their own biases, knowledge and work purpose. In effect, "every map is the product of someone who brings a personal perspective. As other texts do, maps disguise social contexts and impose their own hegemonies of power and privilege. Therefore, map making is governed by its own rules" (Flanagan 2001:1; Ch.1.1.6). Recently, Adams and Laurence (2001) explored Roman representation on large-scale geographical space, as opposed to smaller-scale, urban representations, by looking at Roman orator's 'house of memory' to understand relations between places in the city. The Roman, large-scale geographical space was often perceived as an itinerary. According to Salway, lists were compiled from milestones and other public displays of stages and distances, and were 'very much rooted in the experience of the travel rather than the theory of geography' (Salway 2001:58), while reflecting some of the realities of travelling around lands controlled by Rome (Ch.7.2.2-3 for discussion, derived from data analysis). Graham (2006) adopts such notions to explore to what extent itineraries tell us about the way geographic space was arranged and experienced in the Roman period, through social network analyses and agent-based modelling.

It is in fact difficult to establish the role that documents such as maps and *periploi* actually played in Graeco-Roman seafaring and orientation. There were different traditions and genres of spatial representation (e.g. *periploi,* itineraries, mathematical geography, navigation, etc). They are predominantly, but not exclusively used by each culture for particular purposes, as a means of enhancing knowledge on the size and shape of the *oikoumene* (and its regions). They could also include information regarding travel and trade routes, local and foreign goods, and ethnographic traits of different regions, which strengthened geographic orientation and improved military strategies (Dueck 2002; Dilke 1987:201). However, this is not to imply that every document covered all these topics or in such a standardised format, as the contents were diverse and dependent on the style, nature and motives of the particular work/author.

3.6 Chapter Summary

As illustrated (3.3), those engaged in developing ancient geographic treatises tended to offer complex representations of the *oikoumene*, commonly including descriptions of harbours, mountains, rivers, water bodies, settlements and islands. In certain cases, they also described aspects of culture, ethnicity, language, trade and politics (e.g. Strabo's *Geographia*, Pliny's *Naturalis Historiae*, *Periplus Maris Erythraeai*). An analysis of locations and their key features, as well as important routes and distances between places can reflect geographic perceptions and intentions (Ch.6-8). The rise of the Roman Empire brought a rise in new complex forms of geographic writing and notions, such as Strabo's *Geographia* and Ptolemy's *Geographike Hyphegesis.* By exploring notions of the Earth's shape and size, ancient geographers advanced the principles of cartography and topography. Space was further understood through non-geographical motivations, including military and political strategies and propagandistic motives (Irby 2010:85; Dueck 2012:10-13). This was particularly evident in the Roman Imperial period, where the known geographical space was at times manipulated or altered as a means of extending geo-political boundaries of the emperor's territory, further glorifying the impact and image of the emperor and his power (e.g. Strabo, *Geog.* 11.5.5, 17.1.43). Topographical and geographical approaches in the Graeco-Roman world were integrated in the mapping of sea routes, plotting/dividing lands, and promoting political expansion and power.

It seems that in antiquity, just as now, knowledge, space and power were intertwined, with politics and culture shaping geographic notions. This in turn impacted how the landscape/seascape was defined, ordered and used. In this sense, ancient perceptions of the maritime cultural landscape of the Levant may be traced through mariners' cultural constructs and navigational conceptualisations, which in turn likely influenced geographers' notions and representations of this coastal space. The *common sense geography* approach (Ch.1.1) will thus seek a more practical re-evaluation of these texts. Having contextualised past perceptions and use of the sea within a theoretical framework, the next chapter provides an in-depth overview of the selected ancient and modern sources used.

Chapter 4: Data Sources & Critical Reflections

This chapter presents comprehensive and critical descriptions of the nature of the prime data sources on which this archaeological research is based, as well as an insight into the ancient authors' perceptions of space as represented in their works, surviving in various media. As discussed (Ch.1-3), this research adopts an interdisciplinary approach building on concepts of 'common sense geography' and 'maritime cultural landscapes' within an archaeological and geospatial framework as a means of understanding the dynamic Levantine coast. A range of material was relied on to explore these concepts, including the following sources: ancient textual (4.1), maritime archaeological and meteorological (4.7.1), and cartographic/geospatial sources (4.7.2). Ultimately, this investigation emphasises the archaeological perspective of observing the way the maritime cultural landscape relates to human perceptions and activities.

4.1 Ancient Study-Sources

A shortlist of five primary ancient sources (Ch.2.1.3) was selected for the dataset: a) Strabo of Amasia's *Geographia;* b) Pomponius Mela's *De Chorographia*; c) Pliny the Elder's *Naturalis Historiae*; d) Claudius Ptolemy's *Geographike Hyphegesis* (commonly known as *Geography*); and e) anonymous *Stadiasmus Maris Magni* (Ch.4.1.2-4.6; complete list in appendix ii). These study-sources were used to create a database of the collated data, with a focus on its maritime nature (Ch.2.1.1.4). This research uses both modern translations of ancient works and original Greek/Latin texts where possible. Original texts are scarce; the majority of maps have not survived,[46] and only medieval or later modern copies exist. For the purpose of this research, modern translations of the ancient texts are consulted. These are supported by primary reference material in original Latin/Ancient Greek in specific cases (to examine terminology related to wind names, variations between towns/cities/harbours and such toponyms that may differ amidst forms within various manuscripts and ancient authors), in conjunction with secondary sources and commentaries to cross-reference and strengthen the data collected.

This shortlist was determined on the basis of the regions of focus they write about (i.e. Levant), time-period and geo-political context of their work (set in the Roman Imperial period), and the type of data and methodological approach. Their representations and perspectives are the main focus, and involve comparing and contrasting the authors' views, the directed audience, issues dealt with, features depicted and those omitted, and if there are any gaps or overlaps.

46 On Greek and Roman maps, see: Dilke 1985; Harley and Woodward 1987:130-76; Brodersen 2004.

In the selection of these authors, their different backgrounds of knowledge and specialisation have been considered. The types of records include genres of seafaring guidebooks (*periploi*), travel campaigns/expeditions and geographic/cartographic treatises (Ch.3.3; Davis 2009:161-181). The authors of these works appear to have obtained their data from various compilations of multiple sources, which include earlier historians, geographers, mathematicians and astronomers, as well as accounts by local travellers, merchants, and mariners. The authors of these texts show a tendency of using the sea to guide their accounts of the *oikoumene*, arranged according to coasts, including ports and physical features/landmarks. Such approaches are explored throughout to ascertain whether this is consistent with the majority of authors and their reasoning. Thus, these diverse, yet comparable compilations set a valuable platform for textual and geospatial examination of the data. This enables the observation of structural patterns and identifying gaps and omissions of places/features to see how closely they match the physical reality. The shortlist is below (Table 4.1 & 4.2), followed by a detailed presentation of the study-sources, their structure, style and nature (4.1.2-6):

Source	Date	Author	Region of Focus	Description	Document type	Available Texts
Geographia	c.64/3 BC - AD 23	Strabo of Amasia	*Oikumene* (known world)	17-book on geography.	geographical book	Roller 2014; Radt 2002/ 2005; Jones 1917-32 (LCL)
De Chorographia	c. AD 43	Pomponius Mela	*Oikoumene*	3-book geog. description	geographical book	Romer 1998; Parroni 1984; Silberman 1988.
Naturalis Historiae	AD 23-79	Pliny the Elder	*Oikoumene*	37-book encyclopaedia	encyclopaedic treatise	Rackham 1962 (LCL); Rackham et al. 1947-1969
Geographike Hyphegesis	Mid-2nd BC	Claudius Ptolemy	*Oikumene*	Treatise on world cartography & geography	treatise on drawing maps, projections, and theories	Breggren & Jones 2001; Stückelberger & Graßhof 2006; PtolemyMachine
Stadiasmus Maris Magni	c.AD 200-300	Anonymous	Mediterranean coastal regions	Distances to harbours in Eastern Med. & N. Africa	Periplous	Arnaud 2016; Kiesling & Isaksen 2014; Ermatinger & Helmer (forthcoming); Bauer 1905, 1929; Bauer and Helm 1955; Cuntz 1905; Helm 1955; *GGM*

Table 4.1 Table of Shortlist of Key Ancient Study-Sources.

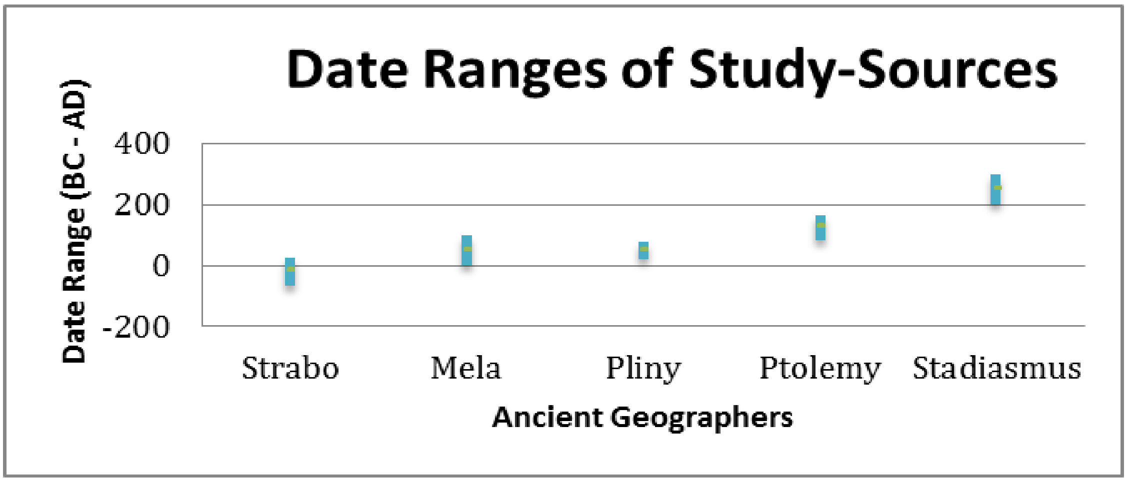


Table 4.2 Table/Chart showing the date ranges of the five selected ancient study-sources.

4.1.1 Complexities in Ancient Texts

The nature of the ancient descriptions of the selected case-study region is highly chaotic, which raises complex questions and issues regarding the textual tradition. It is thus important to consider these critical complexities to better understand and compare the internal structure and logic in each source, and the way this has emerged (for a more detailed presentation of the manuscript issues see: 4.6.4). Such structural questions can be misunderstood, and should thus be explored within their specific context for a more nuanced understanding. The level of complexity of these issues should not be underestimated for it poses significant implications in our interpretations of the representations and discrepancies inherent in these ancient works.

A critical consideration of the complexities inherent in the ancient study-authors' texts is essential to understand the genesis of their work and representation of the Levant coastscape. For critical studies on the ancient sources and their work, certain modern scholarly works serve as an essential reference for this field of research: W. Aly (1957); G. Aujac (1966); D. Marcotte (2000); F. Prontera (1984, 1992, 2013); and C. Van Paassen (1957). Marcotte (2000) offers a valuable general introduction on ancient Greek geographers and geographic genres, the corpus of *Geographes Greci Minores I (GGM),* and the nature of the manuscripts. According to Marcotte, much of *GGM*'s material was already found in two corpus manuscripts of the Byzantine period, referred to as corpus D – *Parisinus suppl. gr. 443* - and corpus A – *Palatinus Heidelbergensis gr.398* (Marcotte 2000: XIX; see also Diller (1952)'s *Tradition of the Minor Greek Geographers,* esp. pp.3-45, 177-179). A complementary work is Van Paassen (1957)'s *The classical tradition of geography,* in which he approaches ancient Greek geography as a literary tradition and attempts to determine the nature and purpose of 'geography' in the eyes of ancient Greek writers themselves, rather than the often un-representative definitions suggested by later writers (see also Clarke 1999: 141-44). Additionally, the early undertakings of Aly (1957), Aujac (1966) and Prontera (1984) are of notable scholarly contribution to the sphere of classical geography and notions of space, using Strabo in particular as a primary source for their discussions. In relation to ancient navigation, seafaring and *periploi*, Medas (2004a-b, 2008, 2011), Prontera (1992, 2013) and Casson (1991, 1994a-b, 1995) are leading authorities in the field.[47] More specifically, Medas (2009-10) provides critical research on the *Stadiasmus*, its structure, nature, and nautical terminology inherent in the treatise (see Ch.4.6).

Next, the ancient study-sources and their works are systematically presented (Ch.4.2-4.6). The passages for the Levant referenced throughout the text for each author are in appendix iv:A-E.

[47] Marcotte (2000: LXII-LXIV; also Prontera 1992) on geographic genres/itineraries: *periodos, periegese, periplous*.

4.1.2 STRABO OF AMASIA – *GEOGRAPHIA*

Author	Strabo of Amasia
Ancient Document(s)	*Geographia* / Geography
Language	Greek
Date	c. 64/ 3 BC - AD 23
Region of Focus	*Oikumene* (known world)
Data Source	Roller 2014; Radt 2002/2005; Jones 1917-1932 (LCL)

4.1.2.1 Strabo's Background

As with many ancient authors, not that much is known about Strabo (for his background, see Pothecary 1995:231; Clarke 1999:92-110).[48] He was a Greek philosopher, born in Amasia, in Pontus (*Geog.* 12.3.15, 12.3.39), around 64 BC. By the time he was born, Pontus had become a Roman province (before the Hellenistic and Roman period, Pontus had been a satrapy of the Persian Empire – Dueck 2002:3). He had an education in the Hellenistic tradition and was very much influenced by the Greek intellectual world. However, he was a subject of Rome and its extending empire, and by 44 BC he moved to Rome (Clarke 1999:334; Aujac 1966:11-12; Pothecary 1995:231). Then c.25 to 20 BC he resided in Alexandria and developed a friendship with Aelius Gallus, a Roman governor of Egypt, accompanying him on missions (Pothecary 1995). Rome and Alexandria played a significant role in shaping his worldview and works, as did his dual background. Soon after 20 BC, Strabo returned to Rome and resided there until at least 7 BC (Dueck 2010:236-51). Strabo composed two works, both in Greek. His first major work was Historical Sketches, *Historica Hypomnemata,* c.20 BC (though presumably written over a considerable period). It was written in Rome and comprised 47 books. The majority of the books are lost, apart from the 19 extant fragments.[49] His second and most well-known work is the *Geographia*, a 17-book geographic treatise of the *oikoumene.* Aujac (1966)'s earlier work '*Strabon et la science de son temps'* has provided valuable contributions to Strabo's work. More recently, Pothecary (1995) has been a leading scholar researching Strabo (see also Dueck et al. 2005). Diller (1975)'s *Textual Tradition* offers a detailed overview of the manuscripts of Strabo's *Geographia*. From the extant manuscripts available, all 17 books survive, except the end of book 7, with remains of a passage from book 7 preserved on a late 2nd/early 3rd century papyrus (*Papyrus Colon. Inv.* 5861 in Krebber 1972:204-21; Pothecary 1995:12-13). While Radt (2005)'s edition is the most up-to-date Greek critical edition, Jones' English translation (Loeb Classical Library) serves as a reliable resource (complemented by Radt's as a reference source).

[48] Studies addressing life and works of Strabo in his Graeco-Roman political contexts: Aujac 1966, 2005; Pothecary 1995; Clarke 1999; Dueck 2002, 2012; Dueck et al. 2005; Prontera 1984-86. See Pothecary's website: www.strabo.ca. On Strabo's family tree, see Pothecary (1999:691-704)'s *Strabo: his Name and its Meaning* in Mnemosyne 52.6.
[49] For extant fragments of Strabo's *Historical Sketches*: *FGrHist* 91 ('Fragments of the Greek Historians').

4.1.2.2 Strabo's *Geographia* and his sources of information

Strabo began his *Geographia,* or *Geography*, following the imperial transition under Augustus, and was written in the period AD 17/18 to 23, under Augustus' step-son and successor Tiberius, a period of continuing expansion of world power (Pothecary 1995:238, 1997, 2002:387-438;[50] Aujac 1966; Prontera 1984:189-256). Strabo experienced many of the critical changes to the Mediterranean world, influenced by earlier Roman conquests and affected greatly by Roman civil wars during the first century BC. Strabo's *Geographia* thus gives an impression of how the physical known world was perceived under cultural and geo-political influences of the period.

Strabo compiled his description of the known world by adopting a large set of sources, mostly derived from second-and third-hand information, including travellers' reports and earlier writings (Aujac 1966:2, 12; Pothecary 1995:31-40). It is probable the information for his *Geographia* was obtained from other treatises in the Great Library. He was a philosopher, historian, and geographer, and his contributions reflect the continuing significant role of the Greek intellectual heritage, as well as contemporary approaches to the development of cartography in the early Roman world (Aujac 1966:191). He adopts earlier notions from scholars such as Eratosthenes (his most cited ancient author), illustrating the continuous way later generations built on cartographic concepts originally clearly set out in the Hellenistic Age.

Of the vast readership, he names only a small number of authors, and thus this choice is significant (as highlighted by Aujac 1966:2), bearing in mind that those he chose to critically refute were those he considered worthy writers (*Geog.* 1.2.1). Strabo's key predecessors were: Eratosthenes, Hipparchos, Polybios and Poseidonios, as well as Artemidoros, Demetrios of Skepsis and Apollodoros of Athens, plus scholars/philosophers who contributed to updating Eratosthenes' work (Pothecary 1995:31-31-35; Aujac 1966:2). Homer, though the most often cited, was not a predecessor (Pothecary 1995:35). The texts of Poseidonios, Demetrios and Apollodoros are lost (Pothecary 1995:39-40), as is Artemidoros' work, although it is debated whether Artemidoros was in fact the main source as his style differs greatly (pers.comm.Arnaud 2016). Other potential influences include Marcian of Heraclea (who mentions Strabo) and Eratosthenes (whose source is Timosthenes).

[50] Pothecary explores Strabo's use of temporal markers and expressions in his *Geographia*, such as 'In our times', 'before our times', 'in the time of the kings' and 'up until the Romans' (1995:238; see also Clarke 1999:228-60).

Strabo's travels also contributed to his worldview, as he boasts about his extensive voyages (more than any other geographer in his opinion), traversing from Armenia to Tyrrhenia, and from the Euxine to the borders of Ethiopia (*Geog.* 2.5.11); although, like Pliny he bases the majority of his work on secondary data. Many descriptions were acquired from historians of Alexander the Great, Mark Antony and Augustus (Tomber 2008:22), as well as earlier writers, namely Agatharchides of Cnidus (*On The Erythraean Sea,* prior to 100 BC), whose work is preserved by Strabo, Diodorus and Photius (Cohen 2006:13). Strabo states that stade distances in the *oikoumene* derived from surveys or travel estimates (*Geog.* 2.5.4). In a passage on the journey from Rhodes to Alexandria with a favourable north wind, Strabo (*Geog.*, 2.5.24, also 1.1.21) seems to prefer the practical estimated distance (in stades) derived from sailors over that based on astronomical calculations of geographers (Medas 2009-10:349). Strabo adopts the average maritime estimate between a minimum of 4,000 and maximum 5,000 stades, while Eratosthenes' value (calculated by the difference between latitudes) is of 3,750 stades. Strabo's estimates thus seem to correspond more to the geographic principles on which ancient pilots were based linked to the perception of a maritime space derived from mariners' practical experience. Similarly, the distance in the *Stadiasmus* (*SMM* 272) for the Rhodes – Alexandria crossing is estimated at 4,500 stades (average reported by sailors) (Medas 2009-10: 349-50; Arnaud 1993:225). Furthermore, as a result of geographic borders being misrepresented for the glorification of the emperor (*Geog.* 11.5.5; Arr., *Anab.* 5.3.2-3; Ch2.1.1), Strabo tends to reject accounts by Alexandrian historians, who he criticises for the misrepresentation of certain regions (Dueck 2002:73).

4.1.2.3 Structure of the *Geographia* and Implicit Maritime Influences:

Description of the Oikoumene

The *Geographia* is divided into two sections: a general and theoretical introduction (Books 1-2), followed by a more in-depth description from one region to another (Books 3-17, with Europe: 3-10, Asia: 11-16, Africa: 17). In his discussion on creating a world map, he suggests the expected size to be a minimum of 7 feet, as it allows the inclusion of more features and detail:

> "But a world map requires a large globe, so that the aforementioned section of it containing the *oikoumene*, being such a small fraction of it, will be sufficient to hold the suitable parts of the *oikoumene* with clarity and give an appropriate display to the spectators. Now if one can fashion a globe this large it is better to do it in this way, and let it not have a diameter less than 10 feet. But if one cannot make a globe of this size or not much smaller one ought to draw the map on a planar surface of at least 7 feet" (*Geog.* 2.5.10).

For a cartographer, the greater the size of a world map, the greater the scale, and hence, the more details can be included. The Mediterranean coast served as an important geographical boundary, and Strabo adopts these earlier notions from Ephorus and Polybius, suggesting physical features as key points of reference when describing/making a map of the *oikoumene*:

> "…it is the sea more than anything else that defines the contours of the land and gives it its shape by forming gulfs, deep seas, straits and likewise isthmuses, peninsulas and promontories; but both the rivers and the mountains assists the sea herein" (*Geog.* 2.5.17).

Strabo shows a tendency to jump across topics, with a focus directed towards providing an overall view of the *oikoumene*, followed by more detailed descriptions of particular places, as including also historical accounts, myths and physical features. Towards the end of Book 2, Strabo provides a brief sketch of all the countries of the *oikoumene.* His descriptions follow the Europe-Asia-Africa order, in a clockwise direction (Salway 2004). His work begins in Spain, at the Pillars of Heracles on the European side, and moves along the coast through Europe to the Black Sea, turns south through Asia (including Syria and Judaea), then to Africa (including Egypt and Libya), and terminates on the west coast of Africa (*Geog.*2.5.26; Fig.4.1). In his coastal descriptions, he lists numerous places by their direction and distance from previous places.

According to Dueck (2002:40), following Clarke (1999:197-210)'s argument, "The marks of a survey based on *periploi* are apparent in Strabo's *Geographia* in the terminology and the method of descriptions. He sometimes specifies a voyage by boat or describes regions following the order of the coastline before going on to a description of the hinterland." References to *periploi* can be observed within Strabo's *Geographia,* both in terms of their terminology and their arrangement, particularly in the clockwise descriptions of the coastline and its features, as well as areas of navigable rivers. The sea, and also rivers were used as a reference for the geographic descriptions, as evident in his statement that "just as Ephorus, using the sea-coast as his measuring line…so it is proper that I too, following the natural character of the regions, should make the sea my counsellor" (*Geog.*8.1.3), as the coast serves as a useful guideline for the order of places (*Geog.*9.2.21). Similarly with rivers which, "being a kind of natural boundary for both size and shape of countries, are very convenient for the purposes of the whole of our present subject" (*Geog.*15.1.26). Though Strabo's region-by-region account of the *oikoumene* is arranged like a *periplous*, "it is a 'coastal voyage' set in the context of the *oikoumene* and ultimately the whole terrestrial sphere" (Pothecary 1995:146).[51]

[51] cf. Marcian, who credits Strabo (and Artemidoros) of merging geography with a *periplous* (*GMM* I 566.4-6).

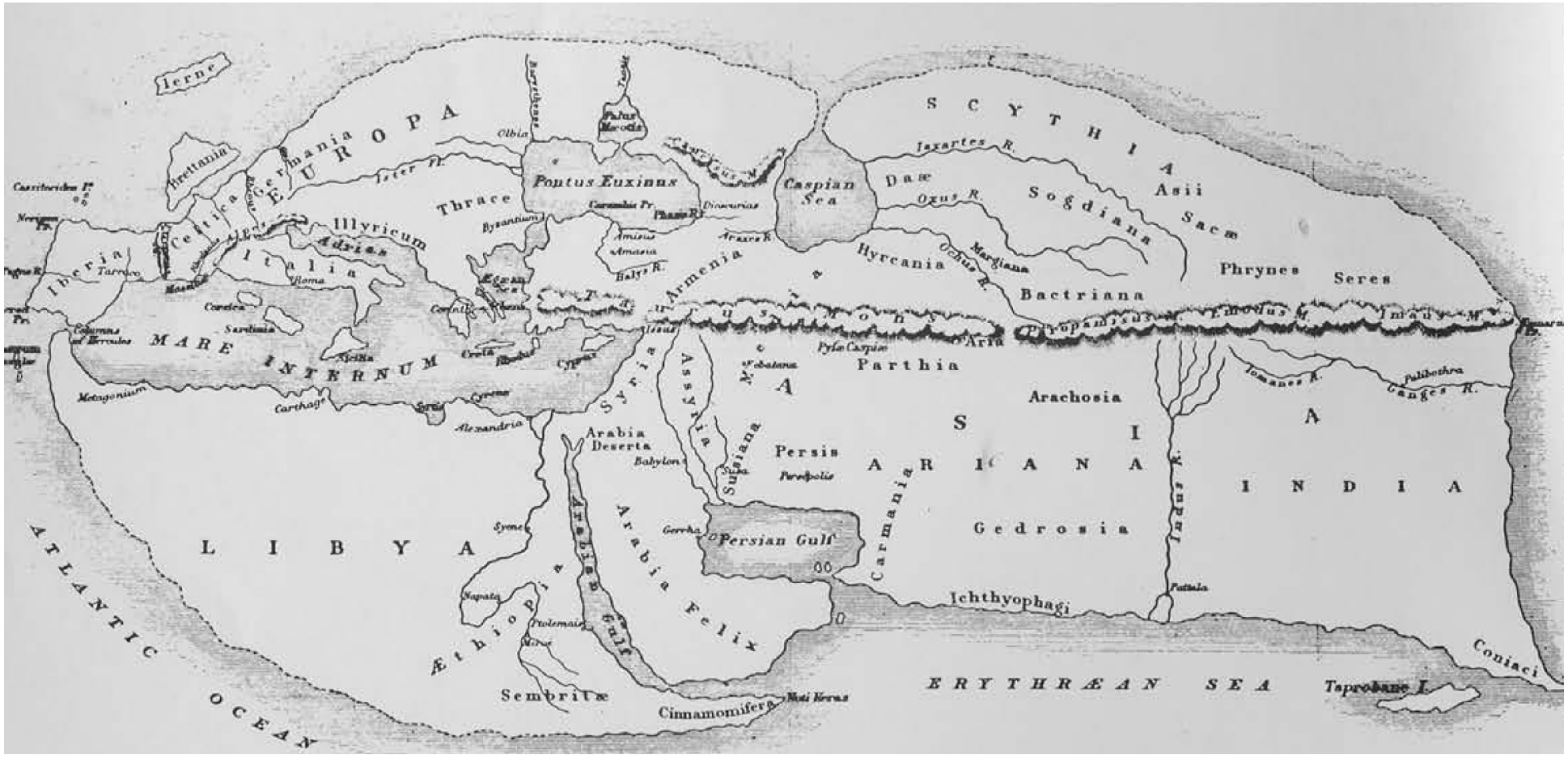
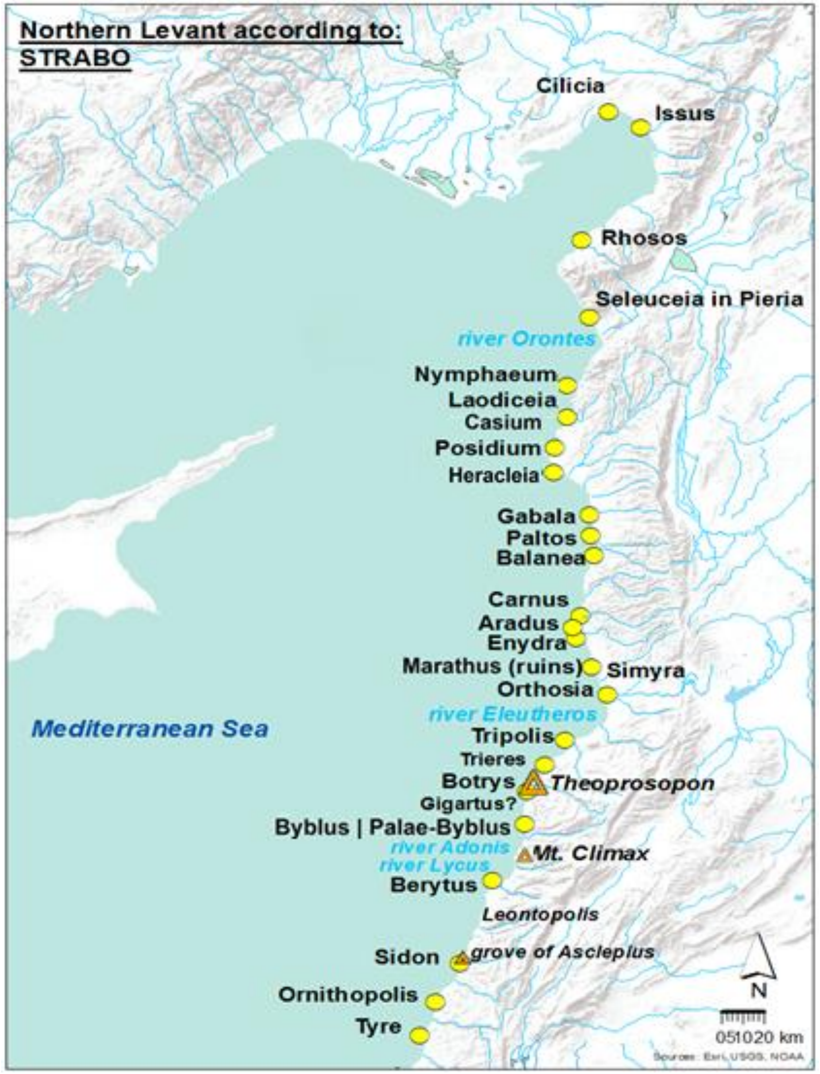


Figure 4.1 Modern reconstruction of the *oikoumene* according to Strabo (Brown 1949:56). As Strabo provides no map, the reconstruction is based on an interpretation of the text.

Description of the Levantine Coast **(appendix iv:A)**

Focusing on the Levantine coast, from *Geog.* 16.2.1*,* Strabo's description follows the coast in a clockwise direction from North to South through the regions of Syria, Phoenicia, Coele-Syria, and lastly reaches the region of Judaea at *Geog.* 16.2.34. Along this coast, Strabo enumerates places and features by their direction and distance in stades, providing additional detail in places of interest, such as historical/political events, myths and notable features. He delimits the province of Syria, starting at the Cilician Gates (16.2.1) (see text passages in appendix iv:A). The general account of Syria begins at Cilicia and Mount Amanus. He separates the province roughly into five major geographic units: 1) Commagene; 2) Seleucia; 3) Coele-Syria (whole coast as far as Berytus); 4) Phoenicia (on the coast, from Orthosia to Pelusium); and 5) Judaea (inland, including Galilee, Samaria and Idumea) (16.2.1-16.4.27; Safrai 2005:251). At *Geog.* 16.2.21, he elaborates on his distinction of the borders between Coele-Syria, Phoenicia and Judaea. It is worth noting that at times there are internal overlaps and contradictions in his definitions of natural boundaries. For example, Berytus and the area to the north is described as belonging to the region of Phoenicia, yet is also described in the inland Coele-Syria region.[52] This may reflect the fact his work is based on different sources, possibly of different periods. After his introduction, Strabo provides a more detailed account of Syria and begins to systematically enumerate the compiled list of towns and features from north to south (Fig.4.2), starting the journey with the fortified port-city of Seleucia in Pieria (made free by Pomey).[53] From Orthosia and Eleutheros River to Stratos' Tower[54], he describes the coast of Phoenicia (16.2.12,22-7). Near the end of his account of Phoenicia, it seems certain parts were misplaced and should belong to the section on Judaea, likely because "these places were located in historical Phoenicia but, in the first century BCE, were part of Judaea" (Safrai 2005:255). In Judaea the first town he describes is Joppe,[55] at a point where the coast "makes a remarkable bend towards the north" (16.2.28), adding the view of an observer/traveller: "It is sufficiently elevated; it is said to command a view of Jerusalem" (16.2.28, 30). He then lists the towns on the coast (Gadaris, Azotus, Ascalon, harbour of the Gazaei[56], Raphia, Rhinocolura, 16.28-31), including total distances from Joppa to Casium near Pelusium, and to Pelusium (16.2.29-32).

[52] He refers to Ptolemais as Ace, of Semitic origin, which hints to an earlier source. For overlaps/sources in Strabo in the Levant see Safrai (2005:251-3). Also, Strabo's account Phoenicia's coast is far more correct than of the interior.
[53] Seleucia (near Mount Pieria, attached to Amanus and Rhosus mountains) formed part of the Tetrapolis, with Antiochia, Apameia, Laodicea, 16.2.3-4, of which Antiochia is the largest of these and the metropolis of Syria, 16.2.5)
[54] Strabo refers to Samaria by Sebaste (appointed by King Herod), yet refers to Caesarea by its older name *Stratonos Pyrgos* Strato's Tower) and seems unaware of the new name appointed by Herod in honour of Augustus (16.2.34).
[55] He associates Joppe with its mythical story of Andromeda and the sea-monster, based on other writers (16.2.28).
[56] The harbour is associated with its inland city Gaza (*Geog.* 16.2.30), 7 stadia distance and claimed to be 'deserted' (Ch.6.2.3.4). Slightly further from Gaza, he mentions Jerusalem close to the coast and visible from Joppa (16.2.30).



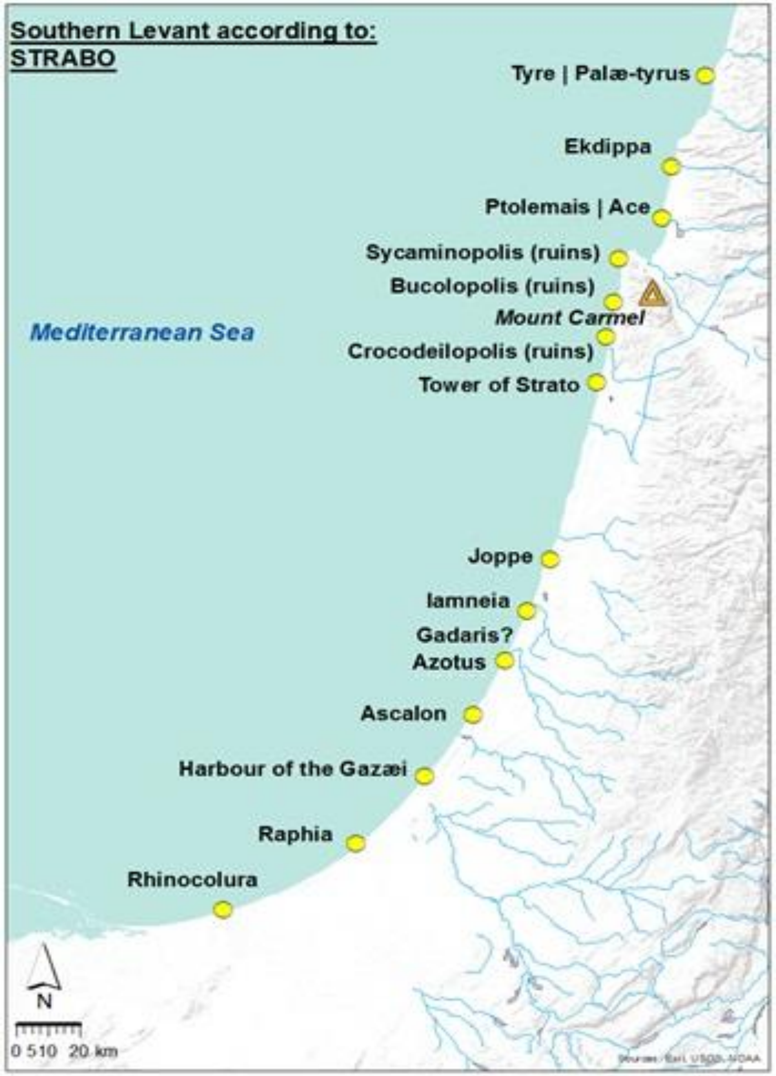


Figure 4.2 Coastline of Northern (left) and Southern (right) Levant according to Strabo's Geographia (Maps produced by author).
Legend: circle = sites, triangle = mountain/promontory

4.1.2.4 Purpose of the *Geographia*

Strabo was greatly influenced by his Greek heritage, yet was a subject of Rome interacting in a Roman context. He explains his purpose of writing the *Geographia* was due to the significant advances in geographical knowledge achieved through the Roman conquests and expansions, and so the world map had to be amended to take these new events into account. In this way, Strabo connects the borders of the *oikoumene* with the political developments and borders of the empire (Strabo, *Geog.* 1.2.1). Though Strabo arranged the *oikoumene* through meridians and parallels when establishing divisions for continents and coastalines, he did not intent to apply this or provide measurements to every site in his descriptions. Conversely, Ptolemy's approach regarded such data as crucial in his aim to instruct on how to create maps. Strabo's intentions were different and thus the rest of the arrangement refers to natural physical markers such as peninsulas, gulfs, sea/river-ways, mountains and promontories (Pothecary 1995:147), to create a conceptual line of reference along the described journey. Moreover, Strabo is not interested in places inaccessible for trade/social interaction, as his focus is on geography's link with human activity/communication (*Geog.* 2.5.34; Van Paassen 1975:14). As stated by Van Paassen (1957:2): "Strabo conceives geography as a human science which cannot be defined in an objective way; it is a sort of *anthroposhere* which reflects society and not necessarily the physical environment in which the human is" (also 1957:23, 1990:229-273).

Regarding his target audience, Strabo believed geographic works to be of military use and important to the states, rulers and generals, "the greater part of geography subserves the needs of states" (*Geog.* 1.1.16-18, 1.4.6). However, he states that his information regarding more distant places will be less accurate and detailed (even though such features would seem important to include for military strategies and tactics). Following this initial section, he then claims his treatise will be useful not only for the state, but will also address the broadly educated citizens and intelligent readers, "the cultured man of learning" (Clarke 1999:328), as a means to "drag the scholar away from the study and steer the citizen into it" (1957:2). Although writing in a Roman context, he writes his treatise in Greek and draws data primarily from Greek sources.[57] It is the dynamic context in which the *Geographia* is set and dual background of its author which makes it a valuable source of insight into the way the known world was perceived and structured, both spatially and temporally, during periods of numerous political disturbances and military expansions. Therefore, it acts as a reflection of conceptual changes and developments, and the political reality of his time.

[57] See Pothecary 1995; and Dueck 2005, esp. Dueck's discussion on whether Strabo provided a map with his treatise.

Strabo describes his *Geographia* as a '*kolossourgia*', comparing it to a statue of huge scale, "this work is also a colossus (κολοσσουργία), pointing out the state of great things and wholes, except if something small is able to arouse the man who both loves learning and is practical" (*Geog.* 1.1.23), but highlights that, like a colossus, it should not be judged on the detail. However, he also includes regional, chorographic content, referring to a section of his work as a chorography, χωρογραφία (*Geog.* 8.3.17; Van Paassen 1957:23; Prontera 2011:95-104). It thus serves as a valuable source of geographical, historical, political and ethnographic knowledge of the *oikoumene* as a whole, while examining its individual regions and their major characteristics, linking them to offer an overall image and grasp of the known inhabited world.

4.1.3 POMPONIUS MELA – *DE CHOROGRAPHIA*

Author	Pomponius Mela
Ancient Document(s)	*De Chorographia/ De situ orbis*
Theme	Latin
Date	Between AD 40-43
Region of Focus	Mediterranean/ *Oikoumene* (Known world)
Data Source	Romer 1998; Parroni 1984; Silberman 1988

4.1.3.1 Mela's Background

Pomponius Mela, who wrote the treatise entitled *De Chorographia*, provides us with only two insights about himself. Firstly, that he appears to originate from a coastal town on the bay of Algeciras, Southern Spain (Hispania Baetica), more specifically *Tingentera* or *Cingentera* (Mela 2.6.74), though the original text is considerably corrupt. Secondly, regarding the time setting, it seems likely he wrote at the peak of the Roman Empire, under the emperor Claudius (princeps 41-54 AD), as can be deduced by the reference in his work to "the current princeps and to the impending celebration of a formal Roman triumph over the British peoples" (Romer 1998; Parroni 1979:165).[58] He also reflects his knowledge of recent historical events, as he mentions ancient Jol, former royal residence of Juba, being renamed as Caesarea in honour of the emperor (Mela 1.6.5; 1.30); he also states that Carthage is now a Roman *colonia* (Mela 1.34).[59]

Mela was one of the earliest Roman authors to write a geographic treatise and is quoted by Pliny the Elder as an authority (Pliny, *NH* 3-6, 8, 13, 21, 22, cf. Romer 1998:27), although he was considered a 'minor geographer' rather than of higher, scientific level (Brodersen 1995:87-94). *De Chorographia* is one of the few surviving formal geographic treatises written in

[58] References suggest it was written in the political context of either Caligula's rule (princeps in AD 37-41) or Claudius' rule (princeps AD 41-54), with the latter most commonly accepted (see Parroni 1979:165; Romer 1998:2).
[59] At Carthage, a Roman colony was first established in 122 BC, but was short-lived. In 49-55 BC, a new colony was built by Julius Caesar, which under Augustus developed into a flourishing Roman city, titled *Colonia Julia Carthago*.

Classical Latin. Although his work is titled *De Chorographia* (regional cartography), he actually sets out to describe the entire known world (this could possibly reflect the lack of the generally accepted terminology for such works). Surviving manuscripts of Mela's *De Chorographia* descend from the tenth-century *Codex Vaticanus Latinus* 4929 (Dilke 1984:348). F. Romer (1998)'s re-appraisal of Mela's work is the most recent English translation since A. Golding (1585). However, for a more critical approach to the text, two valuable and reliable early Latin editions with commentaries are: Parroni (1984) and Silberman (1988), of which the latter also offers reconstructed maps based on Mela's data in relation to the modern geography (see also Silberman 1986, 1989; and Brodersen 1994's German translation and summary of key issues).

4.1.3.2 Mela's De Chorographia

Mela's *De chorographia* (first century AD) is a brief, written description of the regions of the entire known world. Mela begins with a short prelude declaring the significance and challenges of this treatise and then explains his approach. He identifies the fundamental goals and points of discussion, explaining his old division of the Earth into two hemispheres and five zones. The northern hemisphere consists of the known part of world, whereas the southern is unknown, referred to as *antichthon* ('counter-earth'). Once he has separated the Earth into five zones, he states the presence of the *Antichthones* occupying the southern Torrid Zone, which he deems impassable to those from the northern temperate regions due to its unbearably high temperatures (Mela 1.4). Mela's northern hemisphere, comprising the three attached continents (Asia, Africa, and Europe) is bounded by the ocean and contains the four great seas: the Caspian to the North; the Persian and the Arabian (Red Sea) to the South; and the Mediterranean to the west. There are two great rivers described: the Nile in Egypt and Tanais in Russia (modern Don, which flows into the Sea of Azov/ancient Lake Maeotis) (Fig.4.3).

4.1.3.3 Structure of *De Chorographia and* Implicit Maritime Influences

Description of the Oikoumene

Mela's descriptive structure of the known world is approached in the following framework:

(a) Overview of the *oikoumene* and its main divisions;

(b) Following the natural order of the Mediterranean coast, covering regions in more detail;

(c) Describes the outer fringes, following the coast along the Ocean's seaboard.

In this frame, firstly the general contours are described of the known world as a whole, in which he provides a brief general description of the three continents (Africa, Asia, Europe), and an enumeration of the chief tribes by which they are inhabited (Romer 1998; Salway 2012:215). Europe encompasses the regions to the north of the Mediterranean and west of the Tanais River. Africa consists of the regions to the south of the Mediterranean and west of the Nile River. Finally, Asia includes all the remaining area. In his descriptions, Mela follows the order of Africa-Asia-Europe, providing a complete circumnavigation of the known world (Salway 2012:215). Following this, he offers an in-depth regional description of individual details and features in the landscape (*chorography*) and also includes ethnographical accounts. His level of detail increases as he moves from Africa, to Asia and then Europe, both in relation to the regions and its peoples. This may infer Mela's closer familiarity and knowledge of Asiatic and European regions, or linked to elements of political/ethnographic status and perceptions.

Overall, his work is structured along the coast as a *periplous*, with his accounts first following an anticlockwise circumnavigation of the Mediterranean, starting at the Pillars of Hercules (Straits of Gibraltar) and covering the neighbouring countries bordering the southern Mediterranean coastline.[60] He also briefly follows the course of the Nile and Tanais Rivers. Secondly, following his circuit of the Mediterranean, he describes the Mediterranean islands. Subsequently, his accounts follow a clockwise circumnavigation of the outer ocean, from the western coast of Spain (*Hispania ora exterior*) and western coast of Gaul (*Gallia ora exterior*), including islands of the Northern Ocean, Germany, Sarmatia and Caspian coast. He moves onto the Eastern Ocean and India, Arabian (i.e. Red Sea) and Persian Gulf (Mela 3.73), Ethiopia, and back to Spain, terminating at the Pillars of Hercules (Romer 1998; Salway 2012:215; Fig.4.3-4).

[60] Silberman (1988:vii-liv) notes that rather than sequentially presenting countries as subdivisions of the three continents (as with Strabo), Mela begins at the Straits and follows in order countries on south of the Mediterranean.

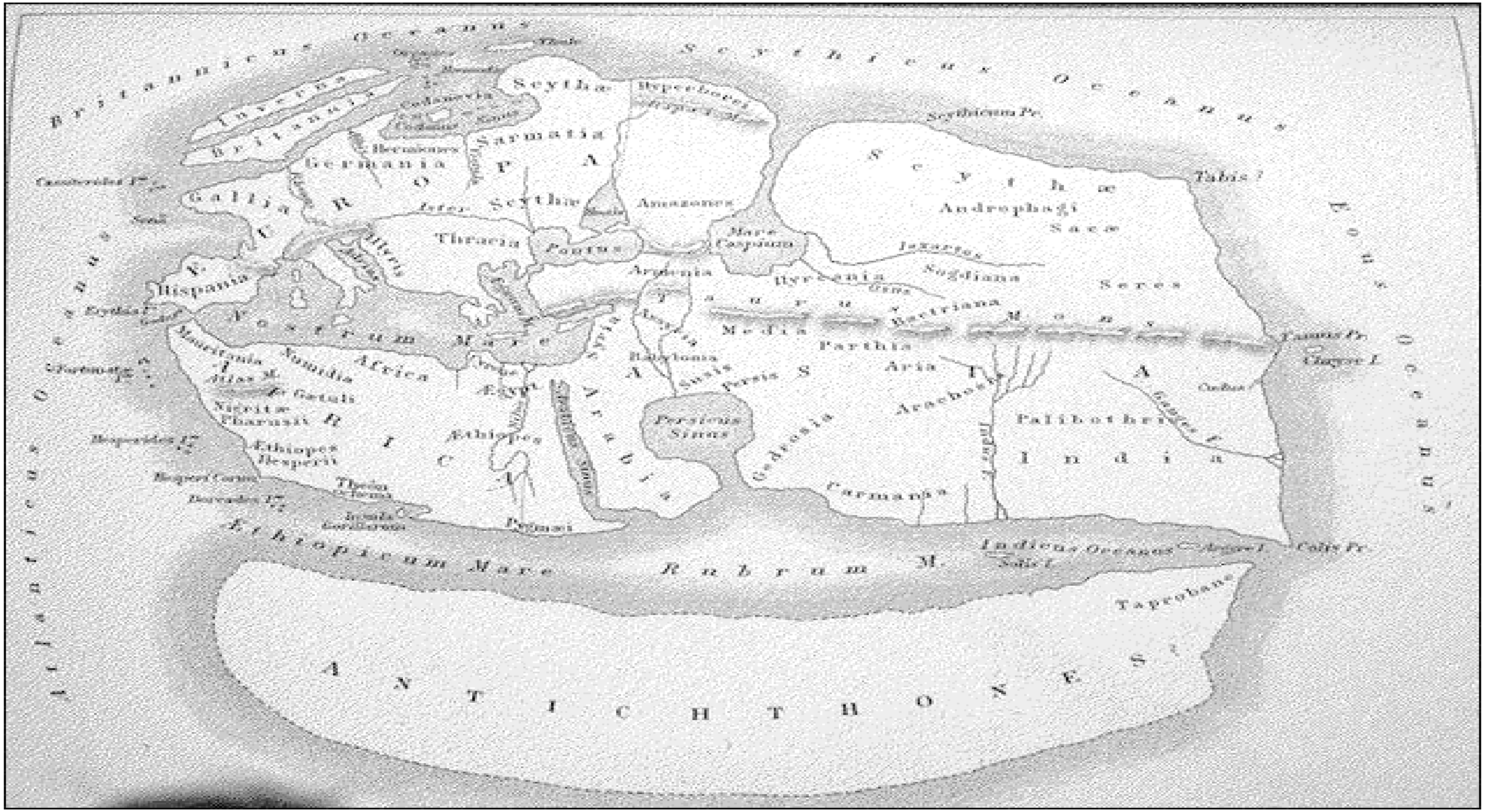


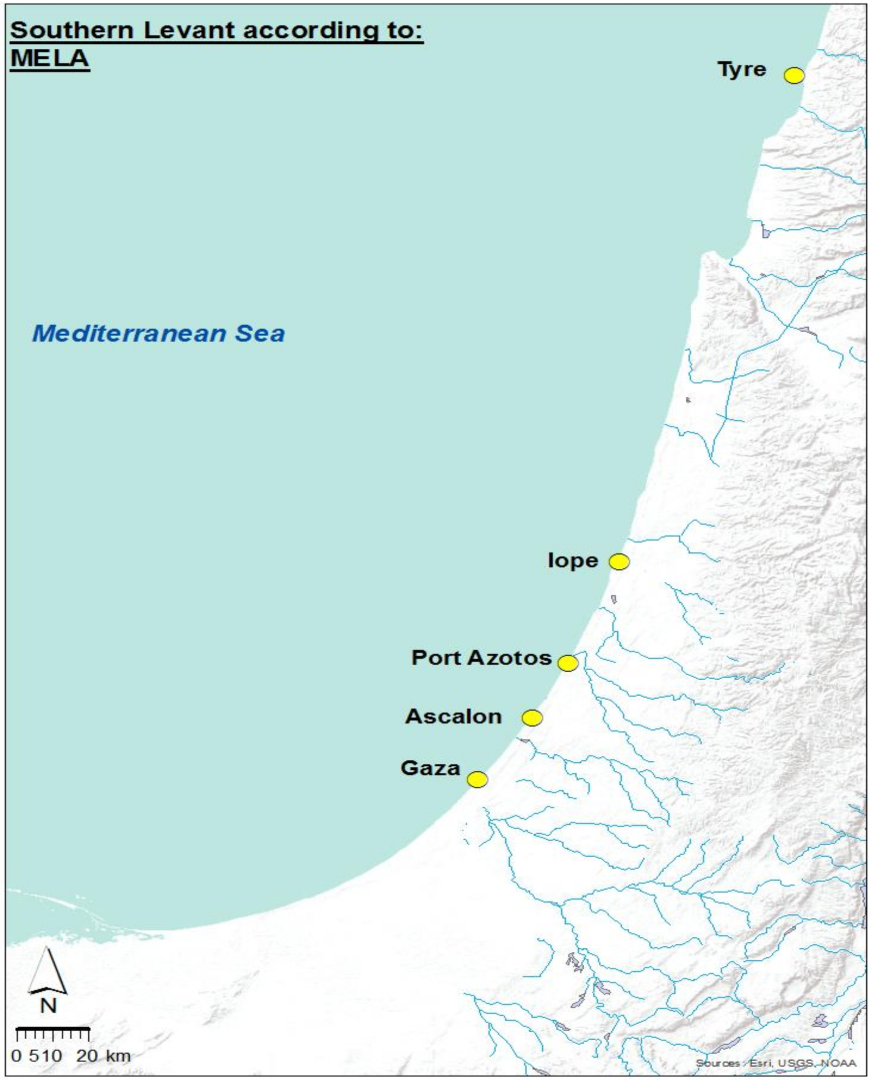
Figure 4.3 Reconstruction of the known world according to Pomponius Mela (Source: HenryDavis.com).

***Description of the Levantine Coast* (appendix iv:B)**

In the Levant, Mela's description moves anticlockwise (as with Pliny; see next 4.1.4) along the Mediterranean coast from Egypt via Syria and Asia Minor to the Black Sea, including Syria, Phoenicia and Cilicia. After describing Asia's delimitations (Mela 1:8-9), he describes the extent and shape of the Eastern Mediterranean coast, covering the Levant (1:10). In Asia, beyond the border of Egypt and the Gulf, is Arabia, then Syria and Cilicia up to Hellespont (1:14). In Mela's work, Arabia entails: 1) province of Syria, including Palestine, and 2) region of Phoenicia, including Antiochia, on the Cilician border (1:61).

For the province of Syria, Mela's viewpoint coincides with Herodotus' earlier account of Syria as a geographical territory formed of distinct parts/provinces (1:62).[61] In his account of Syria (1:62-9) he includes and delimits the region of Palestine/Judaea (1:64-5), Phoenice (1:66-8) and Antiochia, reaching Cilicia (1:69) (Fig.4.4). He places the port Azotus in Arabia, bordering the Syrian province Palestine (1:61), rather than Judaea, to which he dedicates little attention (1:63-4), listing only Gaza, Ascalon and Iope. Mela shows interest in Iope's mythical character linked to Andromeda, Perseus and the sea monster (cf.Strabo, *Geog.* 16.2.28; Pliny, *NH* 5.14), telling us his information is based on locals' knowledge and proof of old altars/inscriptions. In his account of Phoenicia (Tyre to Marathus), he introduces the Phoenicians as "a clever branch of the human race", speaking highly of them and their achievements (e.g. alphabet, literature, seafaring, art of battle) (1:66). Following the stretch that curves along the gulf of Antiocha (remainder of Syria), he lists maritime cities (and rivers) from Seleucia to Myriandros, reaching the Cilicians (1:69) (cf.passages in appendix iv:B).

[61] "…For example, it [Syria] is called Coele, Mesopotamia, Judaea, Commagene, Sophene" (Mela 1:62).



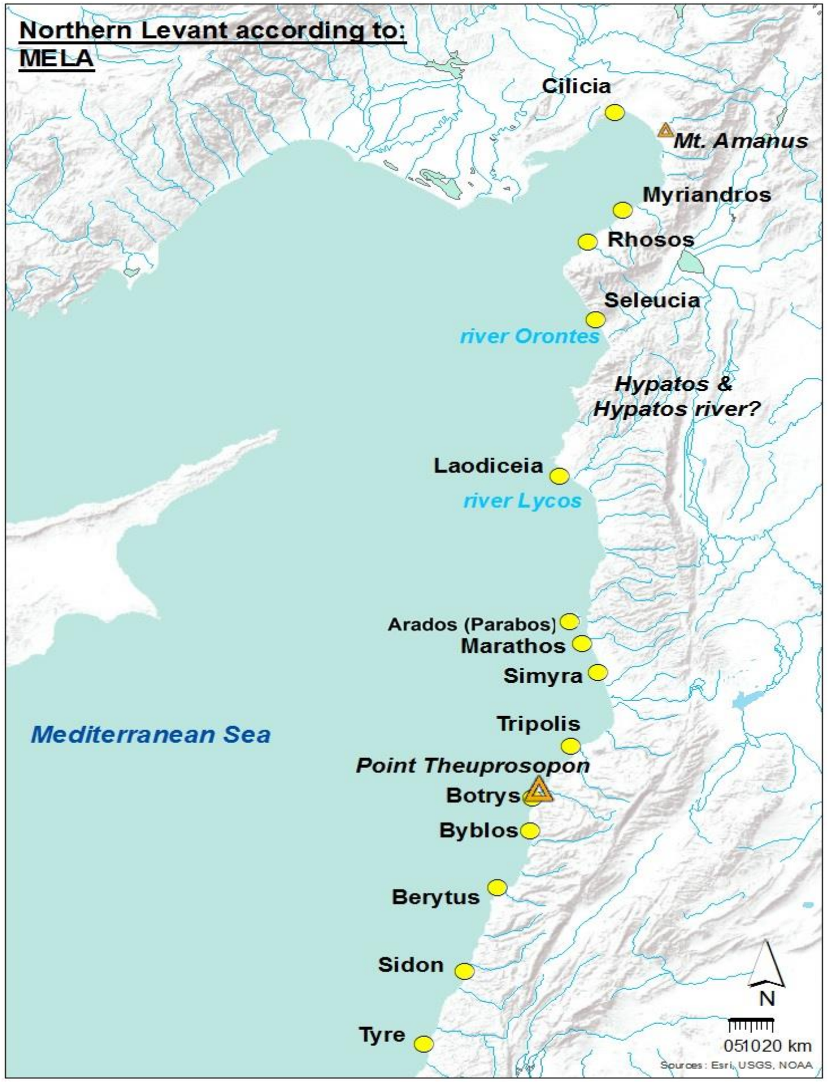


Figure 4.4 Coastline of Southern (left) and Northern (right) Levant according to Mela. Legend: circle = sites, triangle = mountain/promontory.

4.1.3.4 Sources and Purpose of *De Chorographia*

Mela's *De chorographia* was a popular text, designed for the ordinary reading public, engaging with the reader on a more direct and personal level and guiding them on a coastal journey.

Regarding the nature of his sources, citations of authors/sources are scarce. He mentions the Carthaginian sailor Hanno (Mela 3.90, 3.93) and Roman Quintus Metellus Celer (Mela 3.45), but gives no insight on how he obtained this information. The only direct citations he provides throughout the book are of: Ennius (Mela 2.66), Nepos (Mela 3.45, 3.90) and Homer (on Mela's attitude to Homer, see Batty 2009:72-75). Homer's presence infers the Greek influence on Mela's work. Mela's concepts are also believed to be influenced by Artemidorus, Poseidonius and Herodotus[62], though likely intermediary (Silberman 1988: xxxii-xxxiv). Additionally, Mela preserves several toponyms in their Greek form, implying they were directly copied from Greek writings (Silberman 1988: xxxii-xxxiii. For mentions of 'scholars' or 'Greek' sources used: Mela 1.60, 1.76, 2.83, 2.96, 2.100, 113, 3.56, 3.57, 3.60 – see Batty 2009:72). This type of information is useful in relation to sites described on the Levantine coast to understand Mela's representation of this coastscape and nature of the sources used (Ch.6-7). Parallels between Mela and Pliny, particularly in their account of the African coastal region, suggest Mela as a potential source for Pliny (Klotz 1906:11; Murphy 2004:120-121), but also to shared sources such as Nepos or Varro (Silberman 1986:188-90, 240-241; Nicolet 1991:174).[63] Similarities are also shared between Strabo and Mela, suggesting that Mela may have had access to his work or to an intermediary source (*ibid*).

De Chorographia is thought to have possessed no maps (Dilke 1987:242). Though Mela is known to have obtained his data from the works of others (e.g. Ennius, Nepos, Homer, Hanno), he at times in his descriptions creates visual depictions of geographic features, which could lead to the assumption that he himself had access to a map(s) (e.g. "The Codanus Gulf...is dotted with large and small islands…" - Mela 3.31. See Dilke 1987:255). However, Mela refers to the shape of the world as being confusing at the start of his text (Mela 1.1), which makes it unlikely that he would have had the help of a visual image of the landscape such as a map (alternatively it was several maps showing parts of the world, i.e. chorographic). The way the *De Chorographia* is presented as a coastal voyage implies he was aware of the *periploi,* which were probably used as a source, particularly as several place-names are referred to in their Greek form (Silberman 1988:xxxii-iii), which is explored in this thesis in the case-study context.

[62] Similarities with Herodotus in Mela: 1.39, 1.43-7, 1.50, 1.55-60, 1.105, 1.116, 1.117, 2.1; 2.4-7, 2.11, 2.14; 2.15, 2.19, 2.20; 3.35, 3.62, 3.64, 3.65, 3.82-88.

[63] See Klotz (1906) on a supposed common source of Mela and Pliny; and Murphy (2004) on Pliny reading Mela.

Overall, Mela produced *De Chorographia* with the main intention of surveying the whole known world, with its divisions and coastal regions (Mela 1.2, 1.24), and highlighting interesting or peculiar aspects of its countries and peoples. The style of his narrative is simple, comprehensive, and engaging to the reader. It is written in pure Classical Latin and it seems Mela did attentively consult the authorities of his time, and he himself was quoted by Pliny the Elder as an authority. It is worth noting that his work does not provide measurements or scientific data. Moreover, due to structuring his work as a *periplous*, inland areas are omitted. Despite certain omissions and errors (e.g. Mela 2.57), he also provides information on sites/traditions unique to his work (e.g. Mela 3.19 on Druids; Mela 3.48 on the island of Sena). As well as politics, myth was sometimes combined with geography, as can be seen in certain descriptions in Mela's *De Chorographia*, where he mentioned for example that the northern edge of the world was uninhabitable due to the presence of gold-guarding griffins (Mela 2.1). Mela shows a particular interest towards describing such peculiarities and unusual phenomena, which are characteristic of his work.

4.1.4 PLINY THE ELDER – *NATURALIS HISTORIAE*

Author	Pliny the Elder (or Gaius Plinius Secundus)
Ancient Document(s)	*Naturalis Historiae,* or Natural History
Theme	Latin
Date	AD 23-79
Region of Focus	*Oikumene* (known world)
Data Source	Rackham 1962; Rackham et al. 1947-1969 (LCL)

4.1.4.1 Pliny's Background and *Naturalis Historiae:*

Pliny the Elder, or *Gaius Plinius Secundus* (AD 23-79), was a Roman officer and historian, and most of what is known of his personal background and working habits derives from letters of his nephew Pliny the Younger (*Ep.* 6.16, 6.20, and 3.5; see Murphy 2004:3; and Reynolds 1986). He was renowned for his encyclopaedic treatise entitled *Natural History*, or *Naturalis Historiae*, comprising a 37-book encyclopaedia, written in Latin in the late 1st century AD and dedicated to Emperor Titus in 77. Alhough published in the reign of Vespasian (77-79 AD), his research and writing phases likely took place prior to this period, thus also reflecting Flavian or pre-Flavian notions (Naas 2002:69).

Pliny's treatise presents a variety of data critically, providing detailed and perceptive accounts on various sources, politics, trade and the importance and complexity of nature and culture. His work is a combination of a statistical document (Detlefsen 1908:63sq.) and multiple sources (presented in 4.1.4.3), including periplographic sources, likely of a second-hand nature. Pliny's *NH* is particularly relevant for this thesis as parallels and links run through his work comparable to accounts of Strabo, Ptolemy and others. The text of the *NH* is preserved in a complex manuscript tradition (see Reynolds 1986: 307-16), from which many copies survive, the oldest dating to 9th/8th century AD (Rackham 1942: xii).

4.1.4.2 Structure of *Naturalis HistoriaeI* and Implicit Maritime Influences:

Description of the Oikoumene

Like Mela's *Chorographia*, much of *NH* consists of lists with occasional expansion and detail. Also like Mela, Pliny separates his account among Europe, Africa and Asia. Again, Africa is given least range in social consideration and Asia the most. Though organised as an encyclopaedia, it is also generally characterised by "digression, antithesis and swift transitions from one classificatory mode to another" (Schultze 2011:167). The regions covered include: western and eastern Mediterranean, Black Sea, continental and northern Europe, Africa, Middle East, Turkey, and Asia. His style of writing uses the coast as a reference for his accounts, as clearly seen in a section on Italy where he describes provinces in relation to landmarks:

> "…describe its extent and its different cities…we shall follow the arrangement of the late Emperor Augustus, and adopt the division which he made of the whole of Italy into eleven districts; taking them, however, **according to their order on the sea-line**…" (*NH* 3.6)

In *NH* 2.46-2.48, Pliny's concept of winds and their nature appears generally derived from Greek writers (namely, Aristotle, *Meteor.* 2.4, 558–560, 2.6, 563–565), rather than his own notions. He describes the number of winds as determined by the various generations (4 vs 12):

> "Ancients reckoned only four winds (nor indeed does Homer mention more)…next generation added eight…moderns have taken a middle course, and, out of this great number, have added four to the original set…therefore, two in each of the four quarters of the heavens" (*NH* 2.46)

Pliny adopts the number agreed upon by the "moderns" of eight winds, and proceeds to describe their Latin nomenclature, followed by the original Greek term (by doing so, he is representing the compass points determined by the point where the sun rises/sets at different seasonal periods). He adds a subdivision of four winds: Thrascias, Cæcias, Phœnices, Libonotos (making it a total of twelve, stating that some have added more, e.g. *Meses* and *Euronotos*). He also mentions particular winds for specific journeys and routes in the *oikoumene* (Ch.8.1.2.2).

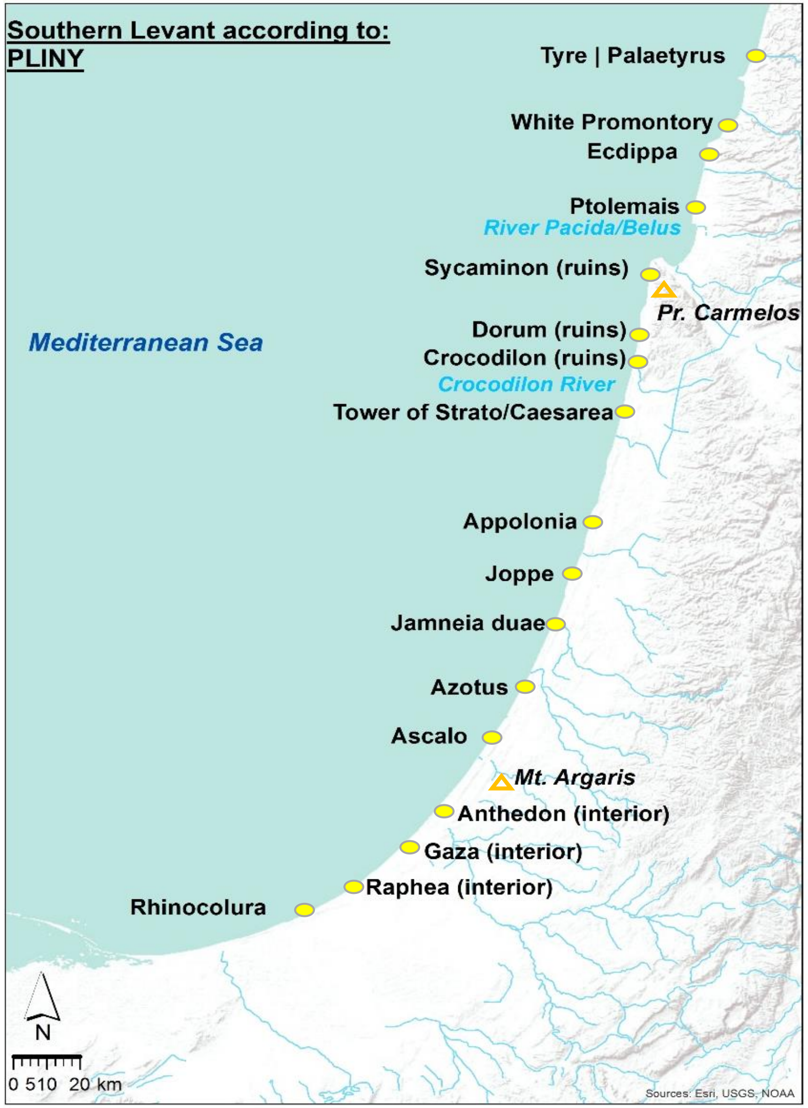
Description of the Levant **(appendix iv:C)**

For the Levant, Pliny's account follows the coastline in an anti-clockwise direction, south to north (as with Mela). He begins by delineating Syria's limits, alternative names[64] and geopolitical subdivisions within the wider region (5.13-4). He introduces the Levant region, starting with Palestina, moving up the coast of Samaria towards Phoenice (5.14) (see text passages in appendix iv:C). Along this stretch, Pliny adds the perspective of a local or traveller observing the landscape at the Phoenician city Joppe[65] "on the slope of a hill, and in front of it lies a rock, upon which they point out the vestiges of the chains by which Andromeda was bound", 5.14; cf.Mela 1:63; Strabo, *Geog.*16.2.28). He considers the Tower of Strato/Caesarea a colony and the border of Palestina and Phoenice (5.14).

After diverging from the coast to delineate inland districts (e.g. Decapolis and its Tetrarchies; Coele-Syria), he returns to the coast and continues the journey north through Phoenice; marking Phoenice's boundary at the island Aradus, north of the Eleutheros River (5.17). Finally, Pliny covers the account of Syria Antiochia with places and natural features enumerated along the coast as far as Cilicia (5.18), before moving inland to Coele-Syria (5.19) (Fig.4.5).

[64] "Syria…for the part which joins up to Arabia was formerly called Palaestina, Judæa, Cœle, and Phoenice" (5.13).

[65] He says Iope was active "before the deluge of the earth" (cf.Mela 1:63), though the great flood is part of the Jewish religion, not Phoenician or Roman (and too early for Christian). This may imply something about the source(s)



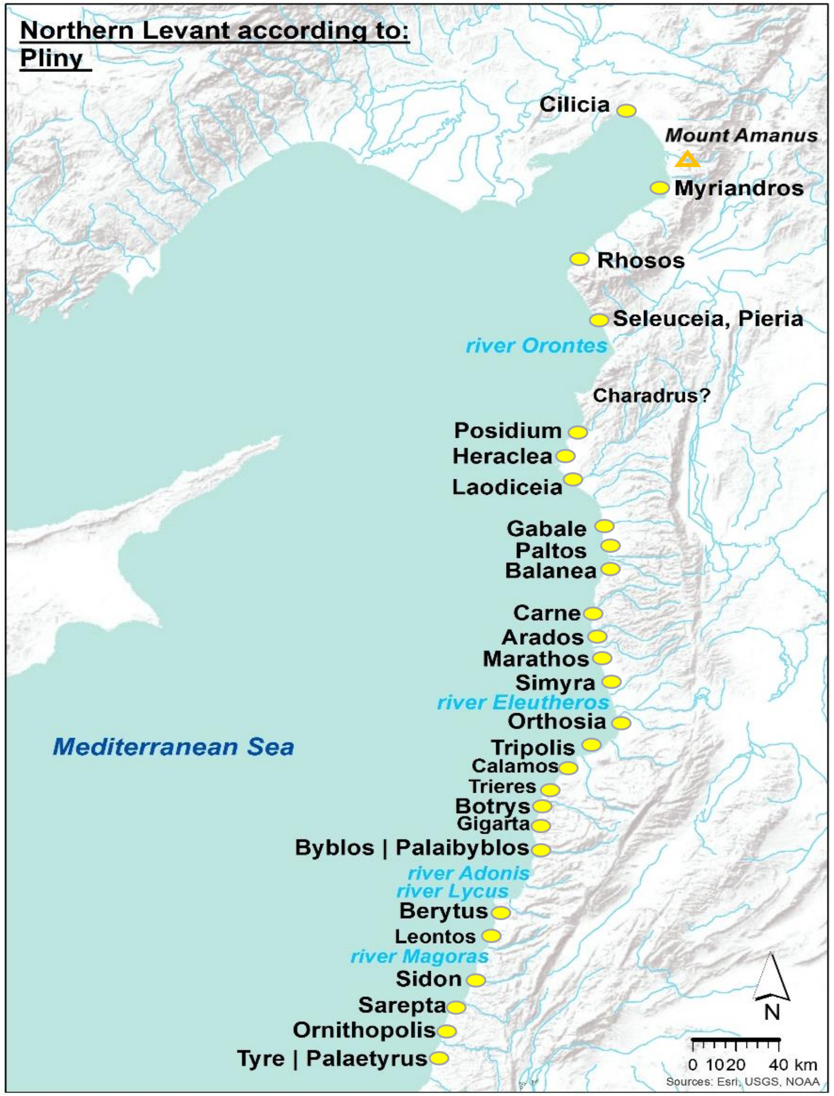


Figure 4.5 Coastline of the Southern (left) and Northern (right) Levant according to Pliny's *NH*. Legend: circle = sites, triangle = mountain/promontory.

4.1.4.3 Sources and purpose of the *Naturalis Historiae*:

Pliny's *Naturalis Historiae* is a second-hand account, based on other historians, early writers and periplographic sources, but he also drew on autopsy. Pliny travelled extensively during his military and political works, which would have offered him first-hand knowledge for certain sections of his *NH* (Syme 1969:202; see 'Pliny's Sources' in Healy 1999:42-62).

In his preface, Pliny boasts that he had derived his multitude of facts from thousands of books and hundreds of selected authors. In Book 1, which acts as a *summarium* and list of contents/sources for each section of his *NH*, Pliny uniquely lists the authorities he referred to (directly and indirectly), subdivided into Roman and *externi* sources ('foreign', mainly Greek), although their work's titles are rarely mentioned. The listed authorities for Book 6, ranging from geographers, historians, mathematicians, Roman officials, locals and *periploi,* included: Marcus Agrippa (*NH* 3.16, 3.17); Marcus Varro (*NH* 14.96, 18.348), Cornelius Nepos (*NH* 4.77), Cato Censorius (*NH* 14.48, 16.193, 25.4), Pomponius Mela (*NH* Books 3-6, 8, 12, 13, 21, 22), Artemidoros (*NH* 2.242, Titus Livius junior (*NH* 3.4); Artistotle (*NH* 4.65), Pytheas (*NH* 4.95), Eratosthenes (*NH* 5.39-41), Ephorus of Cyme (*NH* 6.198, 6.199), Eudoxus of Cnidus (*NH* 6.198), Megasthenes (*NH* 6.58-59), Patrocles (*NH* 6.58), Onesicritus and Nearchus (*NH* 6.26, 6.81, 6.100, 6.109), King Juba II (*NH* 2.170), Theophrastus (*NH* 3.57-58, 15.1, 26.99), and Xenophon of Lampsacus (*NH* 7.155).[66]

It is worth noting that the text of the *NH* has undergone alterations from its original composition through the Middle Ages up to present (Doody 2001:2). His five most cited authors (each of a different genre) are: agriculturalist writer Cato Censorius and polymath encyclopaedist Marcus Varro (Roman); epic poet Homer and zoologist Theophrastus (Greek); and travel-writer King Juba II of Mauretania (African, writing in Greek and Latin). Moreover, it is also likely that several of the listed authorities were not derived from their original texts, instead making use of intermediary sources (similarities of this style of 'listing sources' can also be traced, though in less detail, in Varro's *De re rustica* - Varro was considered an authority and greatly influenced Pliny's work). Of the listed authorities, certain 'minor authors' are not later mentioned by name in the *NH*. Pliny's research habits also entailed making extensive notes, extracts and excerpts of all he read or had read to him (Locher 1986:25-26; also Pliny the Younger's letters, *Ep.* 3.5.10-12).

[66] Pliny's work is referenced and epitamised in later works, that can be traced in, for example, Solinus' *Collectanea.*

Though the data in Pliny's *NH* is likely predominantly derived from secondary sources and other literary authors, along with information from travellers and merchants (Murphy 2004:4; Naas 2011), his own travels would have provided him with empirical evidence on the various places, people and phenomena discussed in his work. He served as a procurator and advisor in the provinces, which would have placed him in an ideal position to observe the way Roman imperial power structures operated beyond the centre of the empire (Murphy 2004:5).

Its wide coverage of subjects deals with places, people and events, with the intention of covering knowledge of the known world. In his *NH*, Pliny discusses a number of topographic regions, along with their tribes (McQuiggan 2006-7:80), with the primary aim of presenting to the reader what he himself found at these particular locations and any interesting or useful associated information on local phenomena. His work emphasises a connection with nature (and knowledge of nature) as a powerful entity *(NH* 2.162, 164), and thus provides important insights into a range of critical Roman perspectives of the landscape. Furthermore, as a result of the Empire's conquests and expansions "… and Augustus set a new cultural tone, geographic and ethnographic writings began to reflect this change and show Rome at the centre of a new world." (McQuiggan 2006-7:82). Pliny's work represents geographic-political transitions over-time in the empire and a change in purpose and interest.

4.1.5 PTOLEMY – *GEOGRAPHIKE HYPHEGESIS*

Author	Claudius Ptolemy
Ancient Document(s)	*Γεωγραφική Ὑφήγησις*/ *Geographike Hyphegesis (GH),* also referred to as *Geography*
Theme	Greek
Date	Mid-2nd century AD (c. AD 100-170)
Region of Focus	*Oikumene* (known world)
Data	Berggren and Jones 2000; Stückelberger and Graßhof 2006; PtolemyMachine

4.1.5.1 Ptolemy's Background and Works

Claudius Ptolemy, an Alexandrian Greek mathematician, astronomer and geographer, contributed to the systemisation of spherical trigonometry and incorporated it into astronomical and terrestrial observations (Berggren and Jones 2000; Aujac 1993). He played a key role in advancing cosmology, geography, astrology, harmonics and optics. Though there is a tendency to characterise him as a polymath, he likely considered himself as a cosmographer (Isaksen 2012:236-239), envisioning the universe as a holistic, deeply interconnected entity. All his work was likely linked with that notion, as he believed the celestial sphere was connected to phenomena on Earth (*GH* 1.1). Ptolemy accepted the Earth was spherical and presented his arguments in the *Almagest* (1.4),[67] a 13-book astronomical treatise on mathematical theory of the motions of celestial bodies (sun, moon, planets, fixed stars). It is generally accepted as his first major treatise (completed after AD 147, including astronomical observations made since AD 127, and many from other astronomers, such as Hipparchus - Berggren and Jones 2000:17).

In the 2nd century AD, through his astronomical work Ptolemy began his mapping of the known world in his *Geographike Hyphegesis* (and, collectively, his works positioned terrestrial localities in their wider cosmological context). His Earth-centred method involved dividing a sphere into 360° by parallels of latitude and meridians of longitude measured in degrees (a Mesopotamian innovation, introduced to Greek geography through Hipparchus), creating a grid system on which he positioned an extensive number of locations. Parallels of latitude refer to the series of decreasing circles at intervals between the equator and poles (North-South), whereas meridians of longitude comprise the series of Great Circles that pass through the poles, subdividing the parallels into equidistant degrees of arc. In his system, as a practical way of facilitating his projection mathematically and aligning the globe with celestial spheres, orientation was North (natural orientation for terrestrial or celestial globes as the *oikoumene* is in the northern hemisphere) and projections aimed to keep approximate distances and directions correct for all places (Edney 1997; Turnbull 1989; Berggren and Jones 2000:10-11).

4.1.5.2 Ptolemy's Geographike Hyphegesis (*GH*):

Ptolemy's *Γεωγραφικὴ Ὑφήγησις (Geographike Hyphegesis),* or 'guide to drawing a world map', is a complex compilation of multiple sources (4.1.5.4), with the goal of providing a full practical and theoretical guide on how to produce a map of the known world (Jones 2012:109-10). It is divided into eight books, with the first book containing detailed theoretical instructions on drawing a map and projections (*GH* 1.1-1.24). Books 2-7 are composed of an extensive catalogue of approximately 8,000 locations on the Earth's surface, of which about 6,300 have calculated spherical longitudes and latitudes assigned to them, and approximately 1,400 peoples and 200 names of regions and seas lacking coordinates (Berggren and Jones 2000:97). Numerous locations are also distinguished by Ptolemy as 'noteworthy cities' (*poleis episemoi*). The final section (Books 7.5-8.30) contains more theoretical instructions, with a reconstructed map of the *oikoumene* and 26 medieval regional tables and maps (Berggren and Jones 2000:97;

[67] The *Almagest* (originally *Mathematical Syntaxis*) deals with apparent motions of celestial bodies and proposes theories on how to account for them quantitatively through models of circular motions ('epicycles'), as well as methods for calculating exact positions of celestial bodies and other phenomena via tables based on these models (Berggren and Jones 2000:17). He also composed the *Tetrabiblos,* a treatise addressing principles of astrology and its effects on the cosmos and celestial bodies. He then published his *GH*, followed by the *Handy Tables*, a revision of the *Almagest,* with a 'Table of Important Cities', i.e. noteworthy cities in Book 8 of *GH* (*ibid*: 19). Other works include: *Harmonics* on mathematical relations between musical pitches; and *Optics* on theory of visual perception.

Dilke 1987:177–200); although there is still a debate as to whether the original work contained maps or just the instructions for producing them. Ptolemy distinguishes between two cartographic practices: chorography and geography (defined in the glossary: appendix iii). In Book 1, he implies his treatise is only concerned with matters of world geography, although in Book 8 he explores regional geography and mapping (without explicitly calling it chorography).

4.1.5.3 Structure of *GH* and Implicit Maritime Influences:

Description of the Oikoumene

In the *GH*, the *oikoumene* was represented in textual form. In his second book, the list of locations is organised into tables, referring to specific regions of the three continents of Africa, Asia and Europe. He categorises the *oikoumene* into separate regions (approximately 80 districts),[68] grouped into three continents (Europe, Libye, Asia), roughly ordered north-west to south-east (Berggren and Jones 2000:40) (Fig.4.6). Each district (called 'provinces' or 'satrapies' by Ptolemy) contained the lists of geographic points. Natural borders, such as coastlines, major rivers and mountain ranges were presented as curvilinear objects shaped by linked points of allocated coordinates (in fractions of arc, up to 1/12 of a degree) (Berggren and Jones 2000:41; Dilke 1985, Livieratos et al. 2008:23-25; Tsorlini 2009:249). Places and geographic features, such as towns, islands, mountains and river mouths were presented as point-like objects.

It is useful to note that Ptolemy's order of coordinates in the catalogue appears to be non-random and divided by region, with a tendency of following N-W to S-E direction to facilitate map drawing, according to Ptolemy (Isaksen 2011). It follows a specific logic: a) Natural boundaries (coasts and frontiers, including large islands/major river mouths); b) Physical geography (e.g. mountains and mountain ranges); c) Interior cities; d) Offshore islands. Harbours and 'noteworthy cities' are included in each section, but their order depends on their natural positioning in that frame. In the more central regions, coastal and interior towns are generally affiliated to specific tribes or sub-regions, whereas for marginal areas, descriptions tend to become vaguer, with no tribal affiliations. Understanding the logic between the chosen orders and their distribution could potentially give an insight into the intentions of his work.

[68] Berggren and Jones (2000:40): "It is not always obvious whether Ptolemy considers certain groupings of districts to belong together or not, so that the chapter divisions and the total number of districts are not definitely fixed."

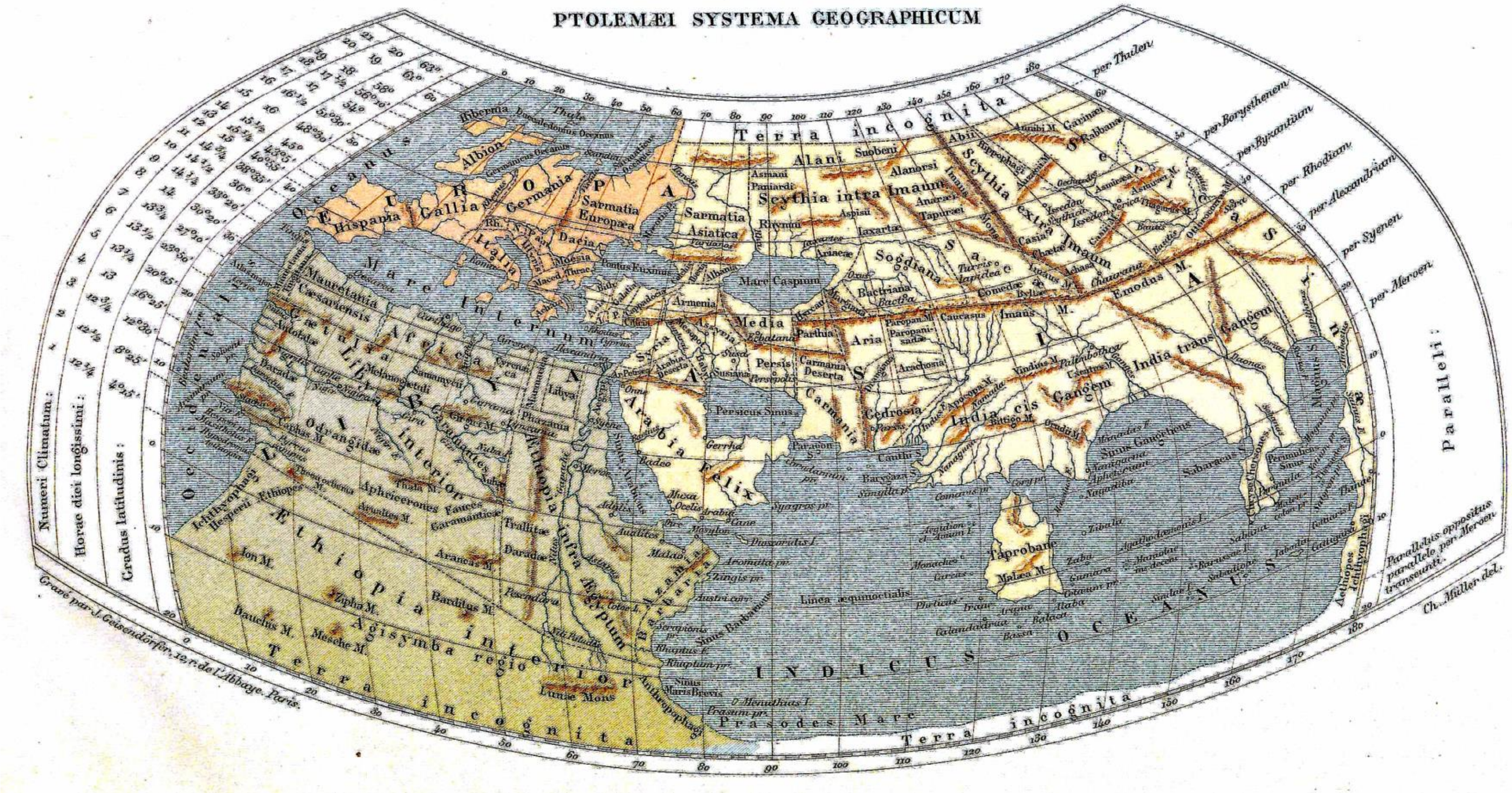


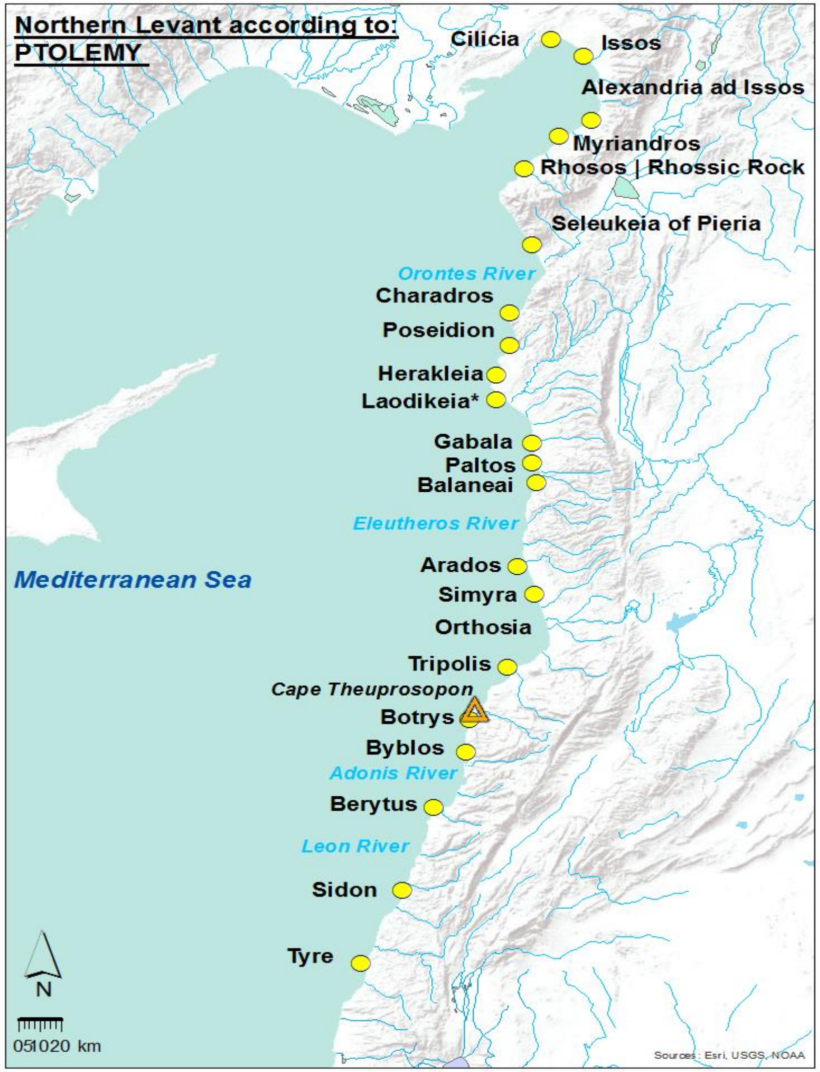
Figure 4.6 Reconstruction of the known world according to Ptolemy (In: Mulero, A.C. Claudii Ptolemaei – Geographia. Tabulae XXXVI. Parisiis. Asia. Tab IV. Cyprus, Syria, Judaea, Arabia Deserta, Petraea, Babylonia, Mesopotamia).

***Description of the Levantine Coast* (*GH* 5.15; appendix iv:D)**

Ptolemy subdivides the Syria region (Fig.4.7) into boundaries of: Cilicia to the north; Syrian Sea to the west; Judaea to the south; Arabian desert as far as the ford of the Euphrates to the east; and River Euphrates as far as Cappadocia, where it ends (*GH* 5.15.1-8).[69] Districts, features and towns, coastal and inland, are ordered into distinct units: boundaries (5.15.1); coast (5.15.2-3), including Phoenicia (5.15.4-5); further boundaries (5.15.6.7); notable mountains (5.15.8); and regional rivers (5.15.9). He then lists inland towns in subdivisions (north-south): Commagene (5.15.10); on the Euphrates (5.15.11, 14, 17, 25); Pieria (5.15.12); Cyrrhestica (5.15.13); Seleucis (5.15.15); Casiotis (5.15.16); Chalybonitis and on the Euphrates (5.15.17); Chalcidica (5.15.18); Apamene and east of Orontes (5.15.19); Laodicene (5.15.20); Phoenicia inland towns (5.15.21); Coele Syria and Decapolis (5.15.22-23); Palmyrene (5.15.24); and Batania (5.15.26). The list ends with offshore islands (Arados, and Tyros near the mainland: 5.15.27).

On Syria's coast, towns/features are listed from Cilician Gates and Issus as far as the Eleutheros mouth (Syria-Phoenicia border), thence to the Chorseos mouth (Phoenicia-Palestina border) (Ch.7.1.1). Most places occur in Strabo and Pliny, and further distances (plus extra towns and features) are in *SMM*. Next, Ptolemy introduces the province of Palestina, also named Judea, and its borders (5.16.1). He outlines the coast and its towns after the Chorseas mouth (5.16.2), briefly lists rivers (5.16.3), then moves to inland subdivisions and their towns/features (5.16.4-10) (Ch.6.2, Ch.7.1). It is worth noting that he distinguishes 'noteworthy cities' in the Levant: Laodikeia and Antiochia in Syria; and Caesarea Stratonis and Askalon in Palestina-Judaea.

[69] According to Bowerock (1983:91), Ptolemy's *GH* "is clearly based on regional geographical concepts rather than those of the Roman administration." For example, certain cities "are assigned to Coele Syria, which did not become the name of a Roman province until after the composition of Ptolemy's geography." (*ibid*: 92; and Ptol. *Geog.* 5.15).



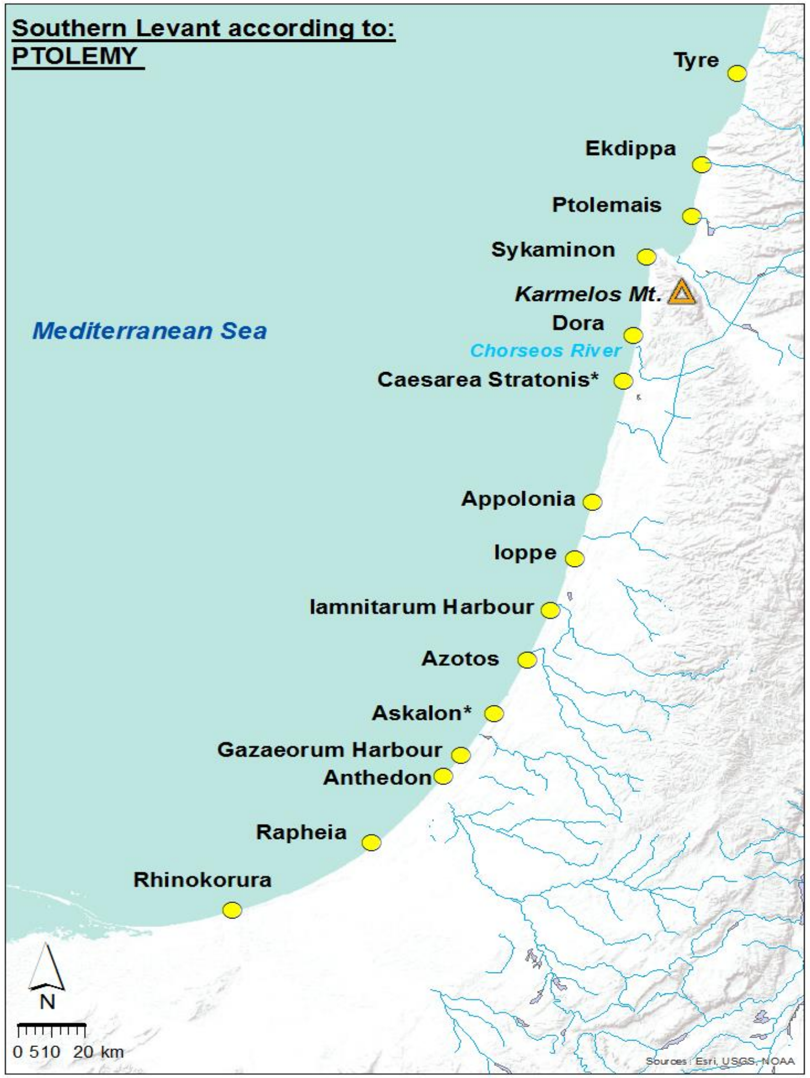


Figure 4.7 (left) Coastline according to Ptolemy of the: (left) Northern Levant, and (right) Southern Levant.
Legend: circle = sites, triangle = mountain/promontory, asterisk (*) = 'noteworthy city' (according to Ptolemy).

4.1.5.4 Sources, Manuscripts and Purpose of *GH:*

The sources for *GH* are believed to be largely based on Marinos of Tyre's previous work, which we do not possess. Most of what we know of Marinos derives from Ptolemy (Berggren and Jones 2000:23; Isaksen 2011:258; Ptol. *GH* 1.6-17), who introduces Marinos as "the latest [author] in our time to have undertaken this subject" (*GH* 1.6, 1.19). What Ptolemy has to say on Marinos thus give us an insight into the nature of Greek geography in the Roman period.[70] Overall, there is a large use of second-hand land itineraries and maritime *periploi* through a collection made by Marinos, though articulation between both is very poor. Ptolemy begins his *GH* by acknowledging Marinos' contributions (*GH* 1.6), then criticising aspects of his work. Using Marinos' framework, Ptolemy develops his own original treatise, and adopts a set of coordinates based on time (length of day) to create grids. There are several debates on the reliability of his dataset due to numerous errors in latitudinal and longitudinal values and calculations (see Carmody 1976:601-9; Shcheglov 2014:1-12). This was largely a result of his erroneous estimation of the Earth's circumference of c.180,000 stades (*GH* 7.15),[71] about 71% of its actual measurement, adopted from Poseidonius (or specifically from Marinos, who likely adopted it from Posidonius), rather than the more reliable 252,000 stades by Eratosthenes (Berggren and Jones 2000:20-2). Statistical analyses of the coordinates demonstrate how levels of precision differ significantly by region and are locally heterogeneous (Marx 2011:29-37).

Ptolemy's chapters concerning the *oikoumene's* latitudinal and longitudinal extent provide insights into the range of informants on whom he and Marinos based their data on for the less known parts, such as merchants, mariners, travellers and soldiers (Berggren and Jones 2000:25). Through Ptolemy (*GH* 1.6-17) we know of the following authors and reports of supposed first-hand experiences that Marinos referred to: the sailing accounts of Diodoros of Samos (*GH* 1.7), as well as those of Alexandros and Dioskoros (*GH* 1.14); the African expeditions of Roman generals Julius Maternus and Septimius Flaccus (*GH* 1.8-11; Berggren and Jones 2000: esp. appendix A); the merchant sailors Diogenes and Theophilos (*GH* 1.9); and the Macedonian merchant Maes (also named Titianus, *GH* 1.11). Whether Marinos also referred to literary sources is unclear, as those specifically mentioned by Ptolemy "are named because Ptolemy disagrees with the use Marinos made of their material" (Pothecary 1995:49),

[70] Scholars have highlighted that *GH* contains toponyms linked to Trajan's Dacian campaigns, which ended in AD 107, but none linked to Parthian campaigns, that started in AD 114. Similarly, Ptolemy's account of North Africa seems to suggest an ending date of c.AD 110. Based on such observations, Marinos' work appears to be set around the years of AD 100 (Berggren and Jones 2000:23-8). See also: Honigmann 1930:1767-96, and Dilke 1985:72-75.
[71] Greek *stadia*: of measurement where 1 degree corresponds to 500 stadia. In antiquity, various *stadia* were used, each of a different length. The generally accepted value for 1 stade is approximately 185m (see appendix v).

who is inclined towards more scientific approaches and data. Less is known on sources of the better known regions of the Roman Empire, as for these Ptolemy adopts Marinos' data.

Ptolemy's *GH* is linked to a complex manuscript tradition, with more than 50 extant Greek manuscripts, all dating from after the end of the 13th century.[72] The *GH* contained both accidents from copying and deliberate attempts to correct or improve it (Berggren and Jones 2000:42). Although there are debates relating to these manuscripts, there are two accepted main branches (Stuckelberger and Grasshoff 2006:27): the Byzantine Ω recension (AD 1300, with a series of maps and revisions); and the single X manuscript from the Ξ recension. The X manuscript, of which only one copy is known, is the only manuscript free from these revisions (see Berggren and Jones 2000:43-45). This paper codex comprises a large corpus of mathematical and scientific texts, which have been copied by several hands and collated c. AD 1296. By dividing geographic data from its representation in the form of tables of coordinates, Ptolemy's *GH* allowed different reconstructions and interpretations to be made according to the particular needs of a geographer or audience. Another possibility is that the subsequent maps were simply copies of one another, rather than developed from the coordinates. These types of complexities are taken into account throughout the thesis, particularly when exploring toponyms/geographical features and identifying inconsistencies. No original maps are known to have survived and it is possible maps never accompanied Ptolemy's original work, as his aim was to provide a method for drawing maps, not to actually create them (Berggren and Jones 2000:43); though we do possess several Byzantine and Medieval copies and reconstructions (Mittenhuber 2010:95). Ptolemy's purpose does not seem to be of a political nature, in fact his map "makes little attempt to represent political geography, so that one cannot even tell from his map which districts belonged to the Roman Empire" (Berggren and Jones 2000:41). We are also informed that he derived some of his latitudes, directly or indirectly, from Hipparchus (*GH* 1.4), which is significant as there seems to have been no other source, apart from Marinos (Ch.8.3.3.4). Additional data was obtained from:

> "…a few of those who came after him have transmitted some of the localities that are "oppositely situated"…Most intervals, however, and especially those to the east or west, have been reported in a cruder manner..." (*GH* 1.4)

Ptolemy was aware of his own limitations and designed his *GH* with the intention of it being added to, amended and improved by others as knowledge advanced (*GH* 2.1).

---

[72] Diller (1966)'s selective manuscript list/comments are mostly consistent with conventions of Cuntz, Müller, etc. Cuntz (1923:esp.1–37) gives a valuable contribution to the ordering of *GH's* manuscript tradition.

4.1.6 ANONYMOUS – *STADIASMUS MARIS MAGNI*

Author	Anonymous
Ancient Document(s)	*Stadiasmus Maris Magni* (*SMM),* 'Measurement in stades of the Great Sea'. Original title is ΑΝΩΝΥΜΟΥ ΣΤΑΔΙΑΣΜΟΣ ΗΤΟΙ ΠΕΡΙΠΛΟΥΣ ΤΗΣ ΜΕΓΑΛΗΣ ΘΑΛΑΣΣΗΣ.
Theme	Greek
Date	3rd/4th century AD (c. AD 250-300 - preserved in 9th century manuscript)
Region of Focus	Mediterranean Sea region - coastline from Alexandria to Pillars of Hercules; then Alexandria anti-clockwise to Hellespont; then westward to the Pillars.
Data	Bauer 1905, 1929; Bauer and Helm 1955; Cuntz 1905; Helm 1955; *GGM I* (Müller 1985); Arnaud 2016 (forthcoming); Kiesling & Isaksen 2014; Ermatinger and Robert (forthcoming)

4.1.6.1 Stadiasmus Background

Substantial fragments survive of the *Stadiasmus Maris Magni* (*SMM*), a Greek *periplous* of the Mediterranean by an anonymous author. The descriptions consist of distances (in stades) between harbours and watering facilities around the eastern Mediterranean and North African coast as far west as Utica (Utique, Tunisia). The *SMM* has often been neglected, until recently with the emergence of new English translations.[73] The text is thought to date to c. AD 250-300, though this is under debate, and is preserved in a single 10th century manuscript, the codex *Matritensis Graecus* 4701 (formerly 121), now in Madrid, where was integrated into the *Chronicle of Hippolytus* of AD 234/5 and first published by Iriarte in 1769 (Marcotte 2000:XLIX-LIII; see critical edition by Bauer (1905) and his commentaries (1929), along with added commentaries by Cuntz 1905, and Helm 1955:43-69).[74] The most reliable *terminus post quem* has been established on the basis of the author's inclusion of the port-town *Caesarea Stratonis* in Palestina (*SMM* 272), which was only ennobled with this name by King Herod between 22 and 10/9 BC (Salway 2004; Uggeri 1996:277-279).[75] Until recently, the most complete Greek text for the *SMM* was that of Müller (1855:427-514) in *GGM* I*,* which included a Latin translation. Cuntz (1905), in a re-publication, provided additional comments and corrections to Müller's *GGM I* work, in Bauer (1905:343-276).[76] Regarding previous English translations, these have been very limited, with Nordenskiöld (1967:11-14)'s efforts including only parts relating to Africa, Cyprus and Crete; and Ball (1942)'s translations focusing simply on the Egyptian segment. Diller (1952) also provided useful, yet brief commentaries on the *SMM* in his work. Thus, a more recent re-analysis of the Stadiasmus' text has been long overdue.

[73] E.g. Arnaud 2016 (forthcoming); Kiesling and Isaksen 2014; Ermatinger and Helmer (forthcoming).
[74] See Medas (2009) for recent in-depth appraisal of *SMM* and its nautical nature, structure, terminology, purpose.
[75] Attested in excavation reports e.g. Oleson, J.P. (eds.) 1989/1994. *The Harbours of Caesarea Maritima, I-II.* Oxford.
[76] Cuntz (1905:243-279)'s *Der Stadiasmus maris magni,* in: Bauer, A. 1905. *Die Chronik des Hippolytos im Matritensis Graecus 121* (Texte und Untersuchungen zur Geschichte der altchristlichen Literatur 29 = n.s. 14/1). Leipzig.

4.1.6.2 Structure of the *Stadiasmus* & Maritime Influences

Description of the Oikoumene

The author introduces his work with the main objective of describing the coastline from Alexandria to the Pillars of Hercules, then from Alexandria anti-clockwise to Hellespont, and then westward from Hellespont, returning to the Pillars of Hercules. In his prologue, he introduces an outline of what he aims to describe (trans. Kiesling and Isaksen 2014):

> "Beginning from the Pharos (lighthouse) of Alexandria, [I will narrate the Libyan coast up to the pillars of Hercules, then Asia, again beginning from the Pharos of Alexandria] up to the Dioscuris in the Pontus, and then Europe from Hieron by Chalcedon until the Pillars of Hercules and Gades, wishing to benefit all people. I will reveal the transverses from Asia to Europe, I will write about the distances between the islands, how many they are and how they appear when sailing and how big they are and what winds are used and show you truly what the voyage is."

Following the introduction and a heading 'Stadiasmus of the Great Sea', the main body of the text employs the '*from X to Y, stades Z*' formula and subdivides the coastal itinerary into sections summed up by a subtotal of the distances. In the single extant manuscript, this data is presented in two separate columns, with each place entry and respective distances in the column beside it, including the sum totals (see Cuntz in Bauer 1905:255; Arnaud 1993:225).

The *Stadiasmus'* text survives in a fragmentary state and can be divided into four sections: (1) North African coast from Alexandria to Utica (*SMM* 1-127); (2) Coasts of Syria & Asia Minor: Arados to Caria, in area of Halicarnassus and Miletus (*SMM* 128-296); (3) Circumnavigation of Cyprus (*SMM* 297-317); (4) Circumnavigation of Crete (*SMM* 318-355), including crossings (*peleggi*) to/from the islands (particularly those linked to Rhodes), as well as long distance routes (e.g. Rhodes to Alexandria, Rhodes Sidon, Myndo to Attica). The nature of these subdivisions suggests that the *Stadiasmus* was compiled in sections (Medas 2004a:118). The account of the coastal journey starts by describing the sailing routes from Alexandria following a westward direction along the North African coastline. However, at this point, after mentioning Utica (*SMM* 127), there appears to be a lacuna in the text where the text from Africa breaks off, then jumps to the Levant, starting from Aradus (*SMM* 128), and follows the coastline northward (further gaps include the omission of most of the Black Sea and northern Mediterranean region). From Aradus, on the coast of Syria, the journey then moves in a northward direction around Asia Minor, and follows the coastline towards the islands of the Aegean, Cyprus and Crete (including several crossings), before terminating.

Furthermore, the author does not tend to mention *emporia* (except at Antiochia*, SMM* 156)*,* and prefers to focus on locating fresh water supplies en-route. It has been argued the author uses topographical terms in a consistent and technical manner, such as variations of *hormos* (*hyphormos* and *panormos),* i.e. natural bay (terms discussed in Ch.6.2.5). The author offers detailed accounts of Africa and places such as Crete and Rhodes, with distances for twenty-seven harbours of the Eastern Mediterranean and Aegean. These levels of detail are not maintained in the other surviving portions, as accounts for regions such as the Levant and Asia Minor are scantily recorded and show gaps in the data (Ch.7.1-2 vs Ch.8.1.1.1-2).

***Description of the Levantine Coast* (appendix iv:E)**

From the surviving text, there appear to be two journeys: 1) starting from Alexandria and terminating at the Straits of Gibraltar in a clockwise direction; and 2) the same point of departure, but in an anticlockwise direction. For the section relevant to the Levantine coast (*SMM* 128-153; Fig.4.8), it is worth re-iterating there is a lacuna after Utica (*SMM* 127) that may have included the section for Southern Levant (see text passages in appendix iv:E).

The voyage re-starts in the Levant at Aradus (128), following the coast northward as far as the Cilician Gates (128-153), including 'Syria-Coele' (encompassing the route between Paltos and the Cilician Gates: 133-153). The author enumerates harbours, anchorages and features en-route, including distances or sum totals (Ch.7.1, 7.2.1.5). Along the journey, the author provides useful details on aspects of navigation, such as sailing direction and winds, often addressing the reader directly for giving directions or advice (e.g. "sail past this place keeping 20 stades from land", 145-6). After describing coastal stretches and what a mariner passes en-route, the author often advises the reader/mariner to take the *euthyploïa/*'straight-line sail' routes (Levantine cases of *euthyploïa* are explored in Ch.7.2.2-3 through a hypothetical journey - cf.2.1.2.2; Ch.8.1.2.2 for parallel cases in other regions/authors). The author includes certain places unique to the *Stadiasmus* that do not appear in other classical geographic writings: Sidonia, Macra Island, Nymphaeum and Georgia[77] (see Ch.7.2; Ch.8.3.1), likely a result of transmission errors by the copyist/compiler (see 4.1.6.3, 4.1.7, cf.4.1.1). A protruding headland acts as a natural border dividing the gulfs of Iskenderun and Antiochia.[78] Alexandria at Issus is the last coastal city listed before reaching the border at the Cilician Gates (152-3).

[77] Strabo does mention "the Nymphaeum", but as "a kind of sacred cave", after the Orontes mouth (*Geog.* 16.2.8).
[78] I.e. Rhossic Rock: southern extremity of Rhosos promontory, well-known coastal feature (cf.Strabo, *Geog.*15.5.19, 16.2.8). On this coast, *SMM* includes Georgia; Nymphaeum, Macra Longa (island); Chaladrus; Sidonia; Throne Mt. Though Issus (*SMM* 155) and Fano (*SMM* 154) are in the *Stadiasmus,* they are listed in the Cilicia region (153, 156).

It is important to emphasise that the section covering the region of the Levantine coast is one of the most corrupt parts of the surviving text of the *Stadiasmus,* due to the large gap (missing the whole Palestinian coast up until Arados - although Paltos, further south, is mentioned in the surviving segment in relation to total coastal distances). This section also contains numerous orthographical errors and confusions in relation to various toponyms (of unidentified places) on the Syrian coast, which are likely a result of transmission errors by the compiler/scribe (cf.4.1.1; see next section 4.1.6 discussing this topic). Therefore, these types of issues are considered and further explored throughout this thesis, and are tackled with caution and using the supporting archaeological evidence to strengthen the data.

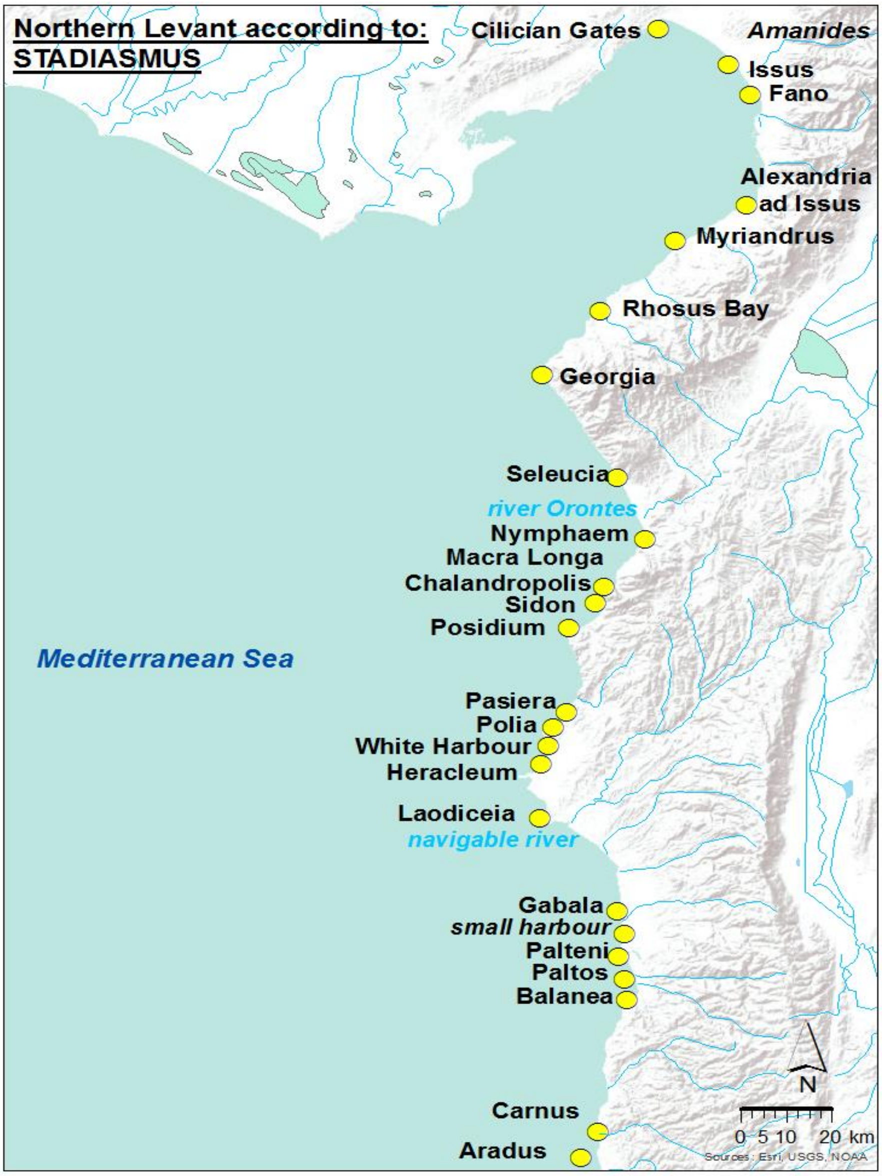


Figure 4.8 Coast of Northern Levant according to *SMM* (gap in this section – no description southward beyond this point (i.e. Arados) in the extant

4.1.6.3 Sources, Manuscripts and Purpose of the *Stadiasmus*

Sources

Regarding the sources of the *Stadiasmus*, it is possible it derives from first-hand information, as well as perhaps second-hand data (e.g. Timosthenes, poets, etc) (see Medas 2009-10:349). However, the text of the *Stadiasmus* is extremely complex, particularly in terms of its chronology and sources, which is likely the result of a composite work based on a compilation of sources. This is also indicated by the subdivisions of the four key journey sections described above, with the difference in the quality and level of detail for each section suggestive of different sources of data for the various regional accounts (e.g. the detailed African section vs the less detailed Levant/Asia Minor account). Although it is difficult to ascertain the explicit sources of this anonymous work, it is evident that there was a large reliance on sources of a maritime nature (likely obtained from a combination of oral reports from sailors/merchants and written nautical instructions/pilots/*periploi* of different regions in the Mediterranean - see Medas 2009-10:351, 339). Another influence may have been the lost work of Timosthene of Rhodes, '*On Harbors (Peri Limenōn)',* c.270 BC (Medas 2009-10:351; Uggeri 1998:38, 46). Maritime data on the dynamic conditions of harbours/ anchorages, their facilities, and other local features were likely updated and revised as these types of coastal features and structures would have adapted and changed over-time (*ibid*). It is important to identify such morphological characteristics in the Levantine coast to grasp the extent to which the *SMM's* account reflects the reality of the coastscape. Tracing parallels in later sources, the style of the *Stadiasmus* has been compared, to an extent, to medieval *portolans* (Medas 2009-10:351-2, 2011; Gautier Dalché 1992, 1995:81, 66-7).

Manuscripts

It is important to continually emphasise the complexity of the copy of the text of the *Stadiasmus*, which contains several lacunae, doublets and confusions (4.17; Arnaud 2009:175), possibly due to lost folios during the drafting or transmission process. According to Marcotte (2000: XLIX), the original form of the manuscript (based on the preface) would have contained a more complete circumnavigation of the Mediterranean coasts. However, as commented earlier, the extant manuscript in Madrid contains a gap in the text between the two first fragments, which could have been the result of a missing page falling out of the *Matrinensis* (Marcotte 2000:XLIX; Fig.4.9). This lacuna could have potentially contained the missing descriptions of the North African coast from Utica to the Pillars of Hercules, as well as the first section of the route from Alexandria counter-clockwise northward along the coast of Palestine (see Salway 2004:48). An additional explanation is provided by Ermatinger and Helmer (forthcoming) regarding the lacuna between Utica (*SMM* 127) and Arados (*SMM* 128), who suggest that in the manuscript itself "this beginning and following lines are connected as if one line. It is probable that the manuscript compiler/copyist lost their place in the process and skipped over a section or folio and acted as if the line here was really a continuation of the earlier African line". This is also probably due to Arados being an island, as there was a tendency for islands to be added to the periplus and often misplaced. Furthermore, the copyist of the *Stadiasmus* was of the type who never corrected (nor tried to correct) the text. The Levant region thus echoes the bad state of origin of the copy of the *Stadiasmus*, while the presence/transmission of this gap in the text reflects the lack of awareness by the copyist of this jump (pers.comm.Arnaud 2016).

Purpose

Overall, the *Stadiasmus* is a unique maritime document (that may have served as a handy short-reference guide on navigating the coastal region in question, though this is debatable). The text provides nautical instructions, advice and warnings through the eyes of a mariner, such as distances in stades, summarised descriptions of the coastal morphology, details on the type and quality of harbour facilities, the prevailing winds, and on the manoeuvres to perform. All such features are characteristics similar to a modern Mediterranean pilot (although directions are not given in association with distance - Marcotte 2000:XLIX).

The author of the *SMM* engaged directly with the reader in his descriptions, addressing them as a potential navigator travelling on the journey. He irregularly uses the personal pronoun 'you' and second-person imperative verbs, as well as offering personal advice, which creates a sense of familiarity between the author and reader. Generally, the author does not show an interest in the ethnography and geography of the hinterland regions. It is worth also noting that the text of the *Stadiasmus* has come down to us as part of '*The Chronicle of Hippolytus',* which is a theological treatise contributing to early Christian literary/historic writings (Bauer 1905), though probably did not have a very wide circulation. The comprehensive style of the work, employment of second person and level of practical detail of the coastline for the navigator, all seem to generaly point towards an intended individual(s) "that is envisaged as actually commanding and navigating ships themselves" (Medas 2004a:95).[79] They would require the knowledge of locations of dangerous rocks and

[79] Similary, Rougé (1966:24–25) defines the *Stadiasmus* as a: "description des côtes au point de vue de la possibilité d'accostage et de ravitaillement en eau des navires".

fresh water sources, without the need of cultural and historical digressions. However, this is most valid as far as Africa (Alexandria to Utica), Cyprus and Crete are concerned, as the level of practical and technical detail is not consistent throughout the *Stadiasmus,* which will be explored and clearly demonstrated in the case-study of the Levant (Ch.7.1, and Ch.8.1.2.1).

In light of all this, this research investigates various patterns related to the type of data, level of detail and arrangement of the coastal descriptions in the *Stadiasmus*, which are essential for understanding the intention and nature of the author's work, and whether it was aimed to serve as a guide for ship captains or was simply directed at armchair geographers.

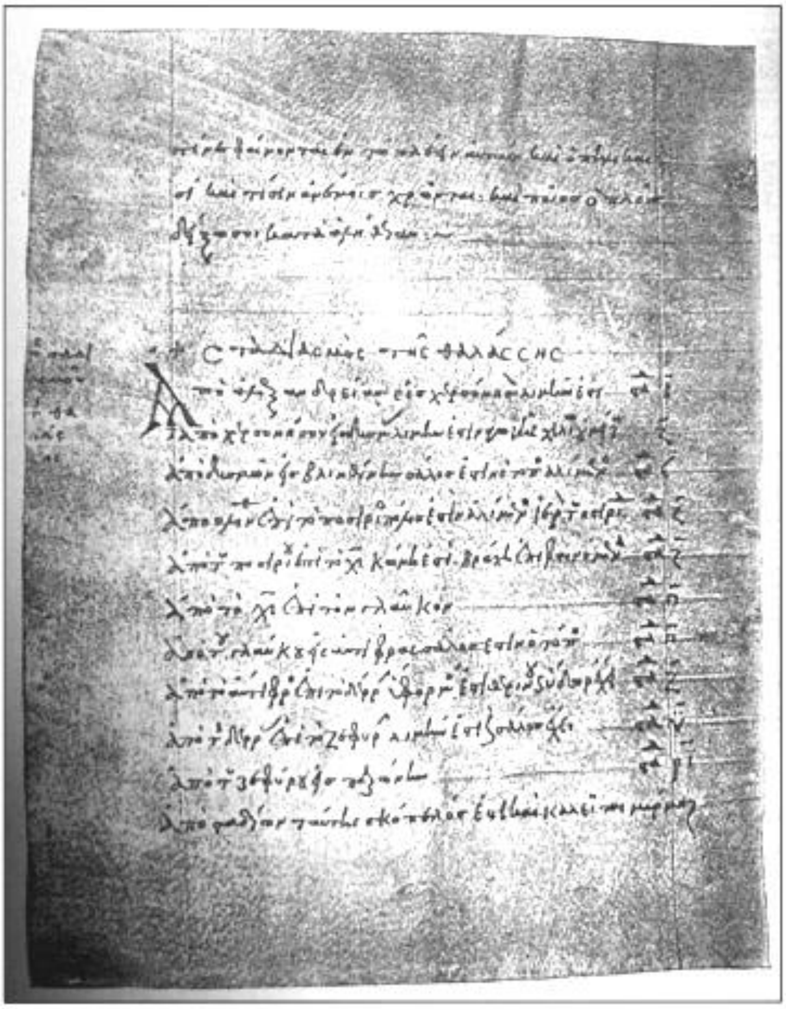


Figure 4.9 Initial page of the *Stadiasmus Maris Magni*: Matritensis Graecus 121, Fol.63 (Cuntz 1905 cf.Medas 2009-10:363).

4.1.7 Concluding Issues and Context in Ancient Texts

Issues in Manuscript Transmissions

A significant issue to recognise in the various manuscripts and editions of the ancient treatises relates to the common transmission of scribal errors throughout antiquity due to miscopying, whether deliberate or accidental (see Reynolds and Wilson (1991)'s *Scribes & Scholars: A Guide to the Transmission of Greek & Latin Literature,* esp. pp.25-34, 44-48, 207-239). There were two main ways to transmit/copy ancient texts: 1) the same copyist reads and writes (and may transform a letter into another similar one), 2) one person dictates while the other writes. Dictations were prone to more errors and as early as the 2nd century AD or earlier, the iotacism[80] of the Greek language reached awful levels with numerous variations, making it challenging for a scribe to distinguish the letter pronounced and led to errors in toponyms, etc. In light of this, manuscript corruptions in textual transmissions are primarily caused by errors or emendations in: a) features of ancient or medieval handwriting, b) changes in spelling/ pronounciation, c) omissions (of letters or entire line of text), d) additions (e.g. repetition of letters/syllables or instructive material), e) transposition (letter/word order), f) context (influenced by associated words/phrases), g) influence of religious/political thought, h) scribe's deliberate emendation (possibly misguided or affected by an unskilled scribe) (Reynolds and Wilson 1991:222-233). The presentation of texts also varied for time, as did toponyms and commentaries/*scholia* (marginal notes). Similar confusion can be traced in papyrus texts. Between the 2nd and 4th centuries AD, there was a development in the transmission of classical texts from writing tablets/papyrus rolls to parchment codex (Reynolds and Wilson 1991:34-36). A new edition in Byzantium in the 9th century AD also brought an innovation to cursive writing, which caused confusions as they started to clean texts from assumed *scholia*, but at times deleted key texts thinking it was *scholia*. Such transfers thus led to lost or miscopied works, and could justify certain gaps and discrepancies in the text/toponyms (e.g. *Stadiasmus*), and further draw out the considerable complexities in these often composite works.

A common feature of these various documents is that they were designed, developed and preserved by arm chair writers as "living texts", which were continually added to, changed and copied over-time by scribes/copyists to facilitate the updating of new information and/or corrections (see Arnaud 1998), making it hard to date and determine the sources used. For example, Ptolemy's *GH* is a complex text-compilation which was designed as a living document (Isaksen 2011), encouraging it to be added to, amended and improved as knowledge advanced:

[80] 'Ioticism': change in pronouncatiation of the Greek vowels/diphthongs ι, υ, η, οι, ει, ηι, υι into the phoneme "ι".

> “We have therefore put the degrees corresponding to each place at the outer edge of the columns in the manner of a table, setting the degrees of longitude before those of latitude, so that if anyone should come across corrections from fuller research, it will be possible to put them alongside in the remaining spaces of the columns.” (Ptolemy, *GH* 2.1)

Complexity & Context

In this chapter, these critical reflexions on the complexity linked to surviving manuscript traditions are recognised in their specific context for each study-author. Due to errors in transmission in the ancient texts, there is a need to look at toponyms and their origin more closely in their particular context to better understand the level of complexity in these works, particularly for the sections dealing with the region of the Levant coast (this is especially challenging for the *Stadiasmus* for which this region is considerably complex/corrupt). For instance, the majority of *toponyms* in the *Stadiasmus* (Ch.4.6) have been identified and attested archaeologically, as well as by literary, epigraphic and numismatic evidence. However, certain places are unidentified or poorly identified. In such cases, the toponym is either completely unidentified or is known in an identical/similar form in other sources (Arnaud 2009:175). This situation suggests the existence of a poorly legible copy interpreted by a dictator/copyist who was unskilled or unfamiliar with the palaeographic system or the particular region/event in question (Arnaud 2009:175). A comparable situation can be traced in relation to the common source used by Mela (Ch.4.3) and Pliny (Ch.4.4), which led to both authors’ texts carrying numerous pseudo-toponyms, formed by the amalgamation of places of neighbouring names and/or approximate *homophones*. Based on this, in such cases where a place is completely unknown, we can make an assumption that they are a pseudo-toponym or likely derived from multiple sources (Arnaud 2009:175). Strabo (Ch.4.2) also adopted a large set of sources, mostly derived from second-hand data; while with Ptolemy, it is hard to distinguish specific sources of his data, or that of Marinos (Ch.4.5). According to Van Paassen, when comparing Strabo and Ptolemy, though both geographers describe the *oikoumene,* their approach "differs so much that one might say that two totally different spheres of reality, two totally different sciences are gathered under the same nominal cover, having in common only the outward characteristic of both being active in the dimension of space and of both being concerned with the location of places" (1957:23). Thus, context is vital to understanding the underlying reasoning in their representations. This range of issues highlights the need for further work to better understand the nature of the sources adopted by the ancient authors’ and to be particularly cautious when approaching texts’ sections with ‘unidentified toponyms’, for which the archaeological data becomes all the more valuable for reliable interpretations.

4.2 Modern Sources

In addition to the primary reference material by ancient authors, a wide range of modern secondary resources were adopted, which provide further context for the source materials and support to the assertions made in this thesis. The modern sources include: 1) Maritime archaeology and nautical pilot/charts; and 2) Digital cartographic platforms and gazetteers.

4.2.1 Maritime Archaeology and Nautical Pilots

***Tabula Imperii Romani* (*TIR*):** The *TIR* served as an initial supplementary source for archaeological data, particularly for the database and catalogue of selected sites/features in the study area. It is a map of the Roman Empire based on the international 1:1,000,000 map of the world', specifically the sheet covering the case-study area: Judaea-Palestina (Tsafrir et al. 1998). It was founded in 1928 and placed under the supervision of the International Union of Academies, with the main goal to publish an archaeological atlas of the Roman Empire (Kriz et al. 2010:220). Largely focused on archaeological data, with references to the key literature, it contains ancient cities and towns, roads, military camps, temples, theatres, aqueducts, mines (with known place names in their Latin or Greek version). Though composed of brief, encyclopaedic-type entries with short supporting arguments, it serves as a useful starting point for archaeological sites/features found along the Levantine coast.

Barrington Atlas of the Greek and Roman World (BAtlas), Talbert 2000: This Map-by-Map directory recreates the Graeco-Roman world from the British Isles to the Indian subcontinent and North Africa. It is a particularly useful resource for identifying toponyms and site locations.

Nautical Charts and Pilots: As this thesis is of a predominantly maritime nature, modern sources included nautical admiralty charts and pilots, to understand and examine characteristic features and conditions of the coastlines of the study-region, which include: meteorological conditions; location of harbours and anchorages; sailing seasons and routes; visible landmarks and potential hazards en-route; and notable coastal geographical, geological and topographical features. The primary admiralty pilots used: Mediterranean Pilot, Vol. V (MPV 2005); Sailing Directions (enroute) for the Eastern Mediterranean (SDEEM 2005); British Admiralty charts/handbook (1987). A range of modern sailing guides and yachting handbooks were referred to (e.g. Heikell 2012; Seidman 2001; Toghil 1994). The main resources for modern wind observations and analysing maritime conditions were: www.windfinder.com, and the 'Wind & Wave Mediterranean Atlas 2004' (MedAtlas; see Cavaleri 2005).

Archaeological Reports & Papyrology: Archaeological data from site reports from excavations and surveys covering coastal aspects of the physical landscape and material record in the study region, particularly in harbour sites, were used to explore and support the research questions and themes (see appendix viii: archaeological catalogue). Maritime archaeological evidence included: archaeology of ports, harbours, anchorages; ceramic finds (e.g. evidence on trade artefacts and their patterns/links); archaeological journals, focusing on the maritime evidence. The study of ancient ports and harbours is integral to understanding aspects of the activities and perceptions associated with everyday life of maritime communities (data applied in Ch.6.2 and Ch.7 for the Levant case-study). In relation to harbours in the Mediterranean, the "peak in the size of the largest ships in the Hellenistic and Roman worlds is matched by an increase in the provision of port infrastructure" (Wilson 2011:46), though docking and unloading of small or medium-sized shipping vessels through the shallows still remained a custom up to the twentieth century (Houston 1988:560-4). However, during these periods (particularly between 200 BC-AD 300), there was a notable rise in the number and scale of artificial harbours and port infrastructures constructed on the Mediterranean coast (Wilson 2011:46; Ch.2.1.1.6 on recent fieldwork in the Levant). Papyrology also provides valuable evidence for the Levant, particularly on the different types of trade vessels and routes to find links between mariners' practical experience and ancient geographers' representations of this coastscape. A key resource used was *Papyrus Bingen 77*'s port registry (Heilporn 2000; discussed in Ch.7.2.3.1).

4.2.2 Digital Cartography and Geospatial Mapping

To examine the topography and geomorphology of the study region, with landscape changes, geographic coordinates of selected sites and features were plotted using Google-Earth and Google Maps, in conjunction with satellite images and published data. The collated data was processed and modelled within a Geographic Information System (GIS) framework, using ArcGIS 10.2.2. This enables an in-depth and quantitative spatial geoanalysis of the data, where actual elevations, topographic features, and patterns can be observed by overlapping different maps and data, and creating high-resolution images. Thus, it served as a platform for visually comparing data from the five main sources in order to establish veracity, themes and patterns. When analysing past landscapes in a modern context, it is important to be aware many of the conventions of maps reflect a particular world view(s), and one which would be unfamiliar to many (if not all) of the ancient authors being studied. ArcGIS uses coordinates to locate points or areas against a common datum. Such 'spaces' can be extremely useful, particularly when associated with data from archaeological excavations/surveys, meteorological conditions and literary/iconographic evidence. ArcGIS facilitates georeferencing, as different map types from a range of time periods can be imported into the programme, including historical maps. Another tool used was Quantum GIS (QGIS 2.8.2),[81] particularly useful for distinguishing elevations and observing the landscape from various angles/views, e.g. that of a mariner (Ch.2.1.1.5).

4.2.2.1 Latest Projects and Digital Gazeteers

Archaeological projects accessible in Open Context, Perseus, and Pleiades have made their ancient texts and source code openly accessible to the public online.[82] A range of gazetteers and encyclopedias were also used to gather data on place-names. The resources used include:

- **The Pleiades Project ('Pleiades'), www.pleiades.stoa.org:** A community-built digital gazetteer and platform with an extensive list of places derived from BAtlas. It is now a joint project with the AWMC, Institute for the Study of the Ancient World (ISAW), and Stoa Consortium. It relates historical place-names and locations in time, and enables users to access and share historical and geographical data on the classical world, so it can be continuously updated as knowledge and technology advances (Elliott and Gillies 2009). In relation to the thesis, it serves as a useful tool for identifying places and understanding their geographic context, as well as relating to toponyms and the dating of active sites.
- **Catalogue of Ancient Ports by A. De Graauw (2013), www.AncientPortsAntiques.com:** It offers the latitude and longitude of approximately 2850 coastal places (including ports and shelters), based on texts of 65 ancient authors (800 BC-400 AD) and modern authors (e.g. BAtlas). They are catalogued and geo-localised on Google-Earth. It serves as a valuable archaeological resource for coastal site locations and was integrated into the database of the thesis.
- **Digital Atlas of Roman & Medieval Civilizations (DARMC), www.medievalmap.harvard.edu**: The gazetteer data generated by DARMC makes extensive use of BAtlas and "offers a series of maps and geodatabases bearing on multiple aspects of Roman and Medieval civilization in the broadest terms". Pleiades also largely makes use of coordinates generated by DARMC, and De Graauw's catalogue has been published with DARMC (De Graauw et al. 2013).
- **Digital Atlas of the Roman Empire (DARE):** Provides one of the most accurate geographic locations available online. Similar and reliable gazetteers include the Princeton Encyclopedia of Classical Sites (PECS) and Smiths Dictionary (available via Perseus Digital Library).
- **The Ancient World Mapping Center (AWMC), www.unc.edu/awmc**: The website states that this multidisciplinary maping centre "promotes cartography, historical geography and

[81] Global Digital Elevation Model (DEM): SRTM_1km, and bathymetric data: www.emodnet-hydrography.eu.
[82] E.gs.: Barker et al. 2010, 2016; Bodard and Garcés 2009; Bodard 2009; Robinson 2009; Elliot and Gillies 2009.

geographic information science as essential disciplines within the field of ancient studies through innovative and collaborative research, teaching, and community outreach activities". This platform contains numerous resources and a selection of free ancient maps, but predominantly provides research articles addressing topics on latest publications or websites.

- **The Pelagios Project ('Pelagios'):** The main aim of Pelagios has been to integrate principles of "Linked Open Data" into digital resources to provide an index of historical toponyms and known places they refer to, accessible as Linked Open Data and via the Pelagios Web Service. This is achieved by annotating, linking and indexing references of place toponyms in ancient texts using written or visual representation as a means of describing geographic space. Sources include ancient geographic treatises (e.g. geographies, chorographies, itineraries, *periploi*), world maps (*mappaemundi*) and portolan charts. This enables a more advanced and linked visualisation of the data, which serves as a useful resource for this thesis as a means of cross-referencing and visualising links within the textual evidence. Moreover, it has recently linked (and mapped) a number of Greek and Latin geographers' texts available online.

4.3 Chapter Summary

This chapter has presented a comprehensive appraisal of the key ancient study-sources adopted for this investigation (4.1.2-6), in conjunction with the supporting modern evidence (archaeological, meteorological, geospatial) (4.2.1-2). A discussion of the internal structure of the ancient geographers' works aids in the identification of shared/distinct backgrounds and a clearer grasp of the genesis of these representations. It is has critically raised and considered the levels of complexity of the issues within the manuscript traditions (4.1.1, 4.17), particularly in relation to transmission errors and corruptions prevalent in composite works. These issues are taken into account throughout the thesis within their specific context, and such gaps in the data can be further elucidated through available archaeological evidence (see Ch.6.2.1-4, Ch.7). As demonstrated (Ch.2-4), maps, *periploi* and itineraries have served a wide array of functions in antiquity, incorporating a variety of approaches and intentions. These documents convey a growing curiosity and desire to reflect, share and record the landscape. To discern the logic of a specific text and what its respective author was aiming to represent, close attention must be given to the features that were chosen to be included and how these features were presented. Approaching the coastal landscape within its geopolitical and social contexts can help understand the different variables which would have influenced the ways people perceived, represented and navigated across this maritime cultural landscape, which were closely linked to mariners' reliance on navigational markers and mental-maps for spatial associations (Ch.3.2).

Chapter 5: Case-Study: The Levantine Coast

As set forth in Chapter 1 (1.1.1), the investigation now presents the evidence in the context of the case-study: the Levantine coast. For contextual and comparative purposes, this chapter involves systematically describing this coastal stretch according to the modern physical landscape, including its maritime conditions and geopolitical boundaries, in conjunction with the archaeological evidence where relevant. Throughout this chapter, and thesis, symbol (#L) and its assigned number (#L1-36) cross-references a specific site to its respective information in the archaeological database and catalogue (appendix i and viii, respectively).

5.1 Systematic Description of the Coastline: Modern Landscape

> "Navigation under oars and sail was always strongly influenced by, if not actually controlled by, the set of the currents and tides, the patterns of prevailing winds, the configurations of the coasts, and the contours of localised meteorological phenomena." (Pryor 1987:12)

How did the physical geography of the Mediterranean, and more specifically the Levant, shape the maritime societies established along its coasts and the development of their perceptions of the known world? When dealing with coastal sites, particularly harbours, it is crucial to understand the physical geography of the study-region, such as the coastal processes, meteorological conditions and hazardous features.[83] Such factors influenced when ancient sailors navigated from one port to another, their orientation and way-finding techniques, and sailing routes they chose.

5.1.1 Physical Landscape of the Levant

An understanding of the physical landscape and meteorological conditions of the region can help better understand the messages transferred through the landscape in relation to the people that interacted with it in the past, and how it altered or adapted over-time. Thus, to fully understand the Levant's past and how its coastal landscape was perceived by ancient geographers/mariners, we must approach the region in both its physical and cultural context, and address how the various geographic features and maritime cultures interacted (Ch.1.1.3).

[83] Key sources on Mediterranean history and notions: Horden and Purcell 2000; Rostovtzeff 1957; Braudel 1972; Goitein 1967. Horden and Purcell, in particular, linked patterns of maritime cultures, connectivity and geography.

The eastern basin of the Mediterranean is a relatively tideless body of water, with little alteration in tidal currents, apart from at narrow straits (Knapp and Blake 2005:7; McGrail 2004:92; Raban 1987). The topography of the Levant consists of large-scale geological features derived from the configuration of the Syro-African Great Rift Valley, dividing the region into north and south, along with a line of mountain ranges parallel to the coast, further separated by seasonal wadis. The coast is marked with many promontories, capes, cliffs, bays, offshore islands and sandy beaches, thus providing ideal natural conditions for seafaring and harbours. The coastal area of Syria extends from north to south for a short distance of approximately 177 km between Turkey and Lebanon, and varies in width from about 3 km in the north to 19 km in the south. The mountainous country of Lebanon has an area of 10,452 km^2, with a coastal zone extending over 225 km. Israel/Palestine is formed by a coastal plain backed by a chain of mountains which on their eastern sides slope down to the Rift Valley of the River Jordan and Dead Sea, and Negev Desert in the south (MPV 2005:12-15). The following section systematically addresses the nature of the topography of the Levantine coastline.

5.1.1.1 Topography: Northern Levant

The northern sector of the Levantine coastline (Fig.5.1, 5.2) is characterised as rocky and slightly indented, and it seems to have been minimally affected by Pleistocene sea level changes (Shea 2003:316; see next 5.1.2.2). Southward from the Orontes River[84]/Nahr el Asi there is the headland of Posidium/Ras al-Bassit (#L4), and from this to Leukos Limen/Minet-el Beida (#L5) and Heraclea/Ras Ibn Hani (#L6), and then to Laodicea/Latakia (#L7) (in the Bays of Minet el-Beida and Latakia, respectively) (see archaeological catalogue: appendix viii). Here, the coastline is characterised by a series of low-lying promontories and cliffs. There are many mountains close to shore, which served as landmarks to help and guide navigators, as well as the rocky promontories, bays, river estuaries, which offered many natural harbours (e.g. Sidon, Tyre, and Byblos). The small coastal plain, with its widest point between Antaradus/Tartus (#L11) and Tripolis/Tarabulus (#L17),[85] offers little protection and the only suitable shelter in the area is provided by the Bay of Latakia and the Bay of Minet el-Beida (Figs.5.1).

[84] Orontes River (Nahr el Asi), now silted, is a major river on the NE coast of the Levant, south of the Gulf of Iskenderun, on the border between Turkey and Syria. It offers a passage eastward, through the Amanus Range to the Antioch Plain.
[85] Tripolis comprises the three cities of Tyre, Sidon and Aradus (Strabo, *Geog.* 16.2.15).

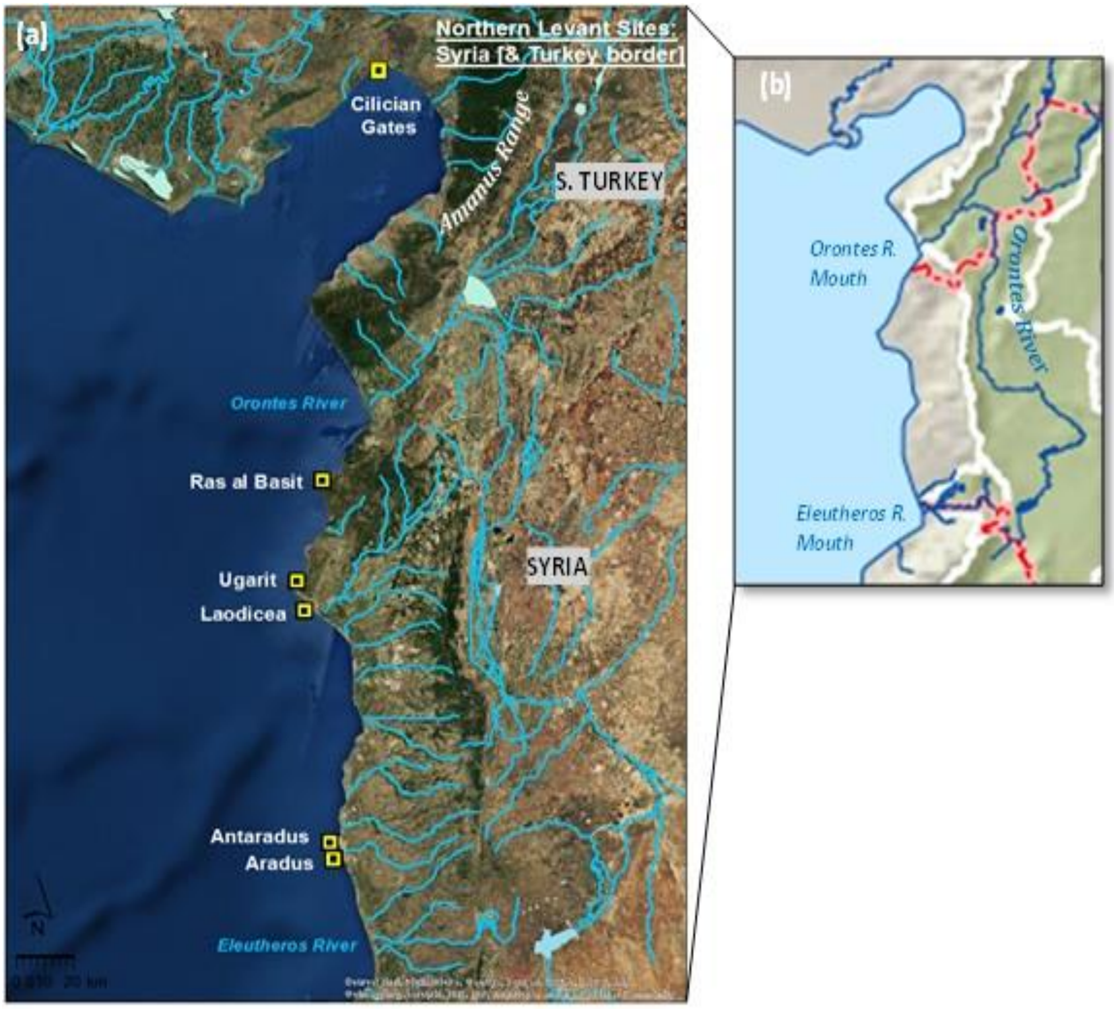


Figure 5.1 (a) Key sites in Northern Levant (in the text) - focus on Syria (and border of S. Turkey);
(b) Main river courses described in the region. (Map produced by author).

At its widest point, the interior can be accessed via a route from the Akkar Plain, which follows along the Eleutheros River/Nahr el-Kebir, between the Bargylus Mountains/Jebel Ansariyeh to the north and the Lebanon Mountains to the south, and connects Tripolis (#L17) and Simyra/Sumra (#L15) with Homs, located on the Upper Orontes River (Semple 1932; Blue 1995; Figs. 5.2, 5.3). On the south-western side of these are the high-rising Lebanon Range rising between Tripoli and Beirut (over 3000m, with its highest peak on Qornet es Saouda at 3088 m above sea level), which slope down westward to the sea (Hughes et al. 2006:339). As a result, a series of bays and promontories are formed along the coastline, making it dangerous to anchor. To the west of the Lebanon Range, the Hauran Plains join the Damascene east of the Anti-Lebanon Mountains (part of the Jordanian Plateau, with its highest peak on Mount Hermon at 2814 m) and the Beq'a Valley (part of the Jordan Valley) (Hughes et al. 2006:339).

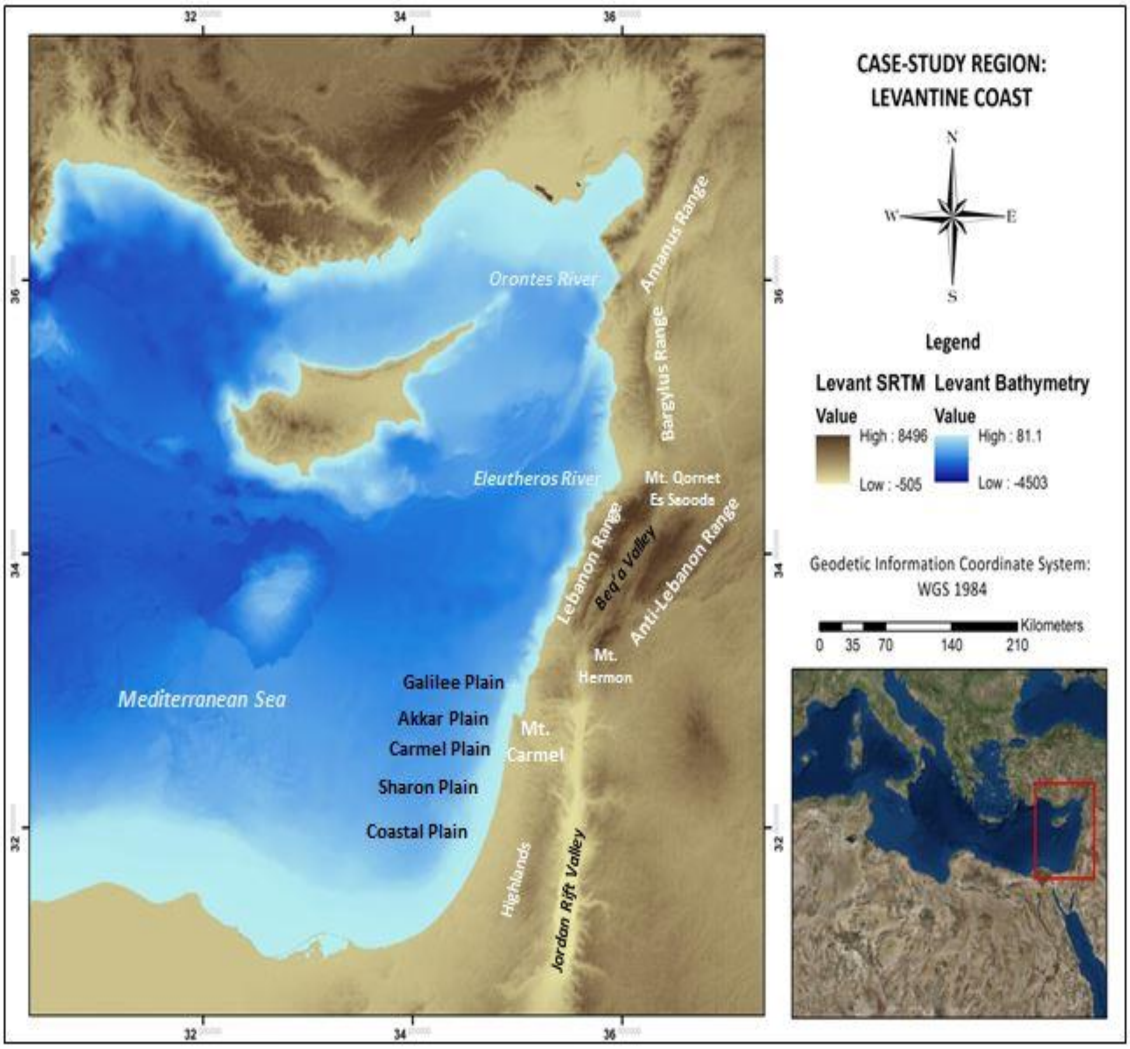


Figure 5.2 Topography of the Levant, showing key geographic features in the text (Produced by author).

In this part of the coast, the only safe shelters are: the lee of the peninsula at Tarabulus/Tripoli (#L17); the southern part of Huri Bay; Byblos/Jbeil (#L19) and Beirut/Berytus (#L20) (Fig.5.3). Further south from Beirut, the Lebanon Mountains reduce in height, giving way to the coastal plain with its sandy coves offering several safe anchorages, as well as some rocky peninsulas. Offshore islands along this coastline also provide protection; the most significant being Aradus/Arwad (#L12), Sidon/Saïda (#L21) and Tyre/Sur (#L22), although at present Tyre and Sidon are now connected to the mainland (see further discussions of such palaeo-islands and morphological changes in: Ch.6.3.1.3; Ch.7.1.1.4; and archaeological catalogue: appendix viii).

Figure 5.3 Key sites in Northern Levant described in the text - focus on Lebanon (Produced by author).

These sites are part of the northern extension of the kurkar ridges of the southern part of the Levant, which comprise a succession of longitudinal ridges of fossilised sand dunes extending parallel to the shoreline and forming irregular reefs. These ridges lie at a distance of 150-180m offshore (Galili and Sharvit 1994) and are believed to have formed during the interglacial (transgression) periods of the Middle and Upper Pleistocene (Ronen 1983).[86] The kurkar ridges are critical to the provision of shelter along the Levantine coast. Moreover, the points at which the Lebanon, Bargylus and Amanus/Nur Dağları mountains have formed natural buttresses towards the inshore reefs offer the greatest shelter from prevailing winds, which explains why most anchorages seem to have been located on this part of the coast (Blue 1995:Ch.4).

[86] The kurkar ridges were originally sand dunes that followed the coastline of Israel during phases of different sea levels, but over time the downward percolating of rainwater caused the gradual loss of their calcium carbonate, which caused them to then become lithified. The resulting cemented aeolian sand, or aeolianite, eventually led to the formation of the succession of kurkar ridges formed of limestone, rising sharply in particular areas and with depths ranging between 5-18 metres. Between these parallel ridges, the basins are layered with clay and mud deposits, and partially covered in shifting sand (Raban and Galili 1985; Galili and Weinstein-Evron 1985:37).

5.1.1.2 Topography: Southern Levant

In contrast, the southern sector of the Levantine coastline (Fig.5.4), which stretches out c.220km in length, consists of straight and flat sandy beaches, and lacks much natural shelter (Smith 1895). Here the Pleistocene sea-level changes are much more evident; as a result of sea-levels decreasing, the Israeli Coastal Plain would have expanded westward for tens of kilometers of its present point, as well as shifting the Nile Delta northward (Walter et al. 2000). However, on the coast of Haifa Bay, there are no sandstone kurkar ridges (MPV 2005:227-9).

In this southern section of the Levant, the Rift Valley acts as a natural barrier between two regions: the Cisjordan in the west (present Israel-Palestine) and the Transjordan in the east (Jordan). The Cisjordan can be further divided into the Coastal Plain, the Highlands region, and the Jordan Rift valley. To the east of the Jordan Rift Valley, the Jordanian Plateau extends parallel to the valley and highlands to the west, featuring wadis and hills, and surrounded by the desert to the east and south, and the Hauran Plains to the northeast. The Highlands slope towards the south and west, and then continue to the northwest and form the Carmel Ridge running down to the Coastal Plain, which is surrounded by foothills to the east and is wider in the south and narrower towards the north. The only two mountains that reach the shore are Mount Carmel and the ridge of Rosh Haniqra (Akko) (Fig.5.4). The Rosh Haniqra Mountains are composed of steep, white, chalky cliffs, and define the northern border of the region. They are the only mountains in the region to reach the coast at such great heights. East of the Coastal Plain there are the lowlands which form a transitional region between the mountainous region and the coastal plain. The coastal plain extends from Rosh Haniqra in the north to the Sinai Peninsula in the south, with a width of 4-7 km in the north and reaching a width of 50 km as it moves to the south. Further south of Rosh Haniqra, the coastline possesses very few natural havens, due to its straight, low, sandy morphology. It possesses isolated beaches and remains of the kurkar ridges which form small offshore islands and islets. Near the shore, coastal waters are low and the sea-bottom contains large quantities of quartz sand (Raban 1987). The coastal plain can be further divided from north to south into: the Galilee Plain, Acre Plain, Carmel Plain, Sharon Plain, Mediterranean Coastal Plain, and Southern Coastal Plain (Fig.5.4).

In the Coastal Plain, South of the Carmel coast, there are no mountains adjacent to the shore, and there are far less visible landmarks identifiable from the sea (Horden and Purcell 2000:139; Pryor 1988:21; MPV 2005:227-9). Although the southern section of the coast lacks much natural safe shelter for vessels, it does possess important artificial harbours, such as Ptolemais/Akko (#L25) and Caesarea Maritima/Qaisariye (#L28). At Haifa Bay, the regular straight and sandy coastline is interrupted. Haifa Bay is the only considerable sized bay along the Israeli coast, and is linked directly to the Carmel horst (raised fault block) and the Zevulun valley graben (depressed block), which forms a wide coastal plain to the east, approximately 10km in width (Neev and Bakler 1987; Nir 1982:87-89). At this point, the coastline moves in towards the interior, approximately 4 km, creating a wide, low-lying sandy bay, known as Haifa Bay. This bay extends about 12 km in length and is facing west-northwest. Along the coast of Haifa Bay there are no sandstone kurkar ridges (MPV 2005:227-9).

Following the coast southward from Haifa Bay, there is the large protruding mountain called Mount Carmel (a continental uplift over 500m above sea level). This notable mountain slopes down to the south-southwest and ends to the north at a steep cliff sloping towards the north-west (Raban 1983:216). The Carmel coastal plain, which is dominated by the Carmel Range to the east, is characterised as low and thin, with narrow beaches, indented in certain areas between the kurkar ridge. Examples include Boukolonpolis/Athlit and Dor/Burj et-Tantura (#L27), which form bays and promontories close to the coast, providing shelter and protection. Moreover, a parallel kurkar ridge, lying at a distance of around 200m offshore (and above the waterline in certain parts), offers a certain degree of shelter in its lee. River estuaries also offer further shelter. The Sharon Plain and the Pleshet Plain comprise the central part of coastline, between Beth Yanai and Appolonia/Tel Aviv (#L29), respectively. Coastal kurkar cliffs (20-50m high) dominate this central region, which are faced by narrow beaches (Neev et al. 1976:2) and have suffered erosion due to atmospheric agents and abrasion at their bases. This process in turn has increased the rate of coastal transgression, which has prograded at a rate of c.0.03 m/annum since 6000 BP (Nir 1982:96). The low linear escarpment decreases in height to about 10-15m to the south and is interrupted by a series of gaps formed by Late Pleistocene rivers, which have since been covered by beach, swamp and alluvial deposits (Raban 1983:216). This process has caused the local widening of the narrow coastal plain, most significantly in the Pleshet region. A certain degree of natural shelter is also still provided by the remains of the kurkar ridges. Between Bat Yam and Hadera (near Tel Aviv) the coast consists of the kurkar cliffs. South of Tel Aviv, the coastal plain widens up to a maximum of 40km in the far south. This flat, low-lying coastline possesses no offshore reefs, with certain parts being marshy and dominated by sand dunes. Thus, this part of the coast offers very little protection for vessels (Blue 1995:Ch.4).

Figure 5.4 Key sites in Southern Levant described in text - focus on Israel/Palestine (Produced by author)

The modern topography of the Levant has been largely influenced by processes relating to the last glaciation, most notably relative (eustatic) sea-level rise, regional or local tectonic activity, sediment deposition, and climatic change (5.1.2-5.1.3; Kraft et al. 1977:941). Since antiquity, these changing configurations in the landscape would have had an effect on peoples' perceptions of the sea and the coast, a dynamic interface for communication and exchange, where specific activities took place and communities had to adapt to changing conditions.

This section presents the coastal processes and modifications that have occurred in the Levant. Understanding the characteristics and alterations of the maritime landscape helps to contextualise the setting the ancient authors were describing and determine their level of awareness of the morphological changes, as well as settlement/harbour patterns and inland links.

5.1.2 Evolution of the Coastal Landscape

> "At any coastal site the relative sea level includes the global sea-level component (eustacy), tectonic uplift or down warping, and at some locations subsidence that is the result of natural sediment compaction or subsidence induced by the withdrawal of subsurface fluids such as groundwater, oil, and natural gas" (Morton 2004:13).

Understanding the dynamic environment and how it changed over-time is crucial to obtain a fuller grasp of human maritime activity and how people in the past engaged with their surroundings, particularly important in the context of changing perceptions and use of the sea. Landscape change has occurred regularly on a local or micro-regional level in the Mediterranean (Horden and Purcell 2000:123–72). However, on a broader level, the maritime conditions which directly influenced the coast and its activities in the Roman period, such as the prevailing winds and currents, the water temperatures and salinity, the incidence and severity of storms, are believed to have remained relatively stable and comparable with the present environment (Morton 2004:6; Murray 1987). The Mediterranean winds and currents played a crucial role in determining favourable routes and seasons for seafaring and commercial activities (see McCormick et al. 2012). In the past two millennia, the coastal evolution of the Mediterranean has been influenced by the following natural processes: (1) tectonically induced crustal shifts; (2) global eustatic changes; (3) regional isostatic adjustments of the Earth's crust; and (4) geomorphological change (Bloom 1998; Bird 2000; Lowe and Inman 1983; Pirazzoli 1996; Lambeck 1996).

5.1.2.1 Topographical Change – Tectonic Activity in the Levant

Coastal topographical features are predominantly a product of the geological history of a particular coast. However, how the current coastal features are configured is influenced by subsequent factors such as tectonic activity. The eastern Mediterranean basin lies on the boundary of two major tectonic plates, Eurasian and African-Arabian (Macklin et al. 1995; Stewart and Morhange 2009).[87] It is geologically older and more tectonically active in comparison to the western Mediterranean, as it has been constantly active due to the global plate tectonic shifts and subduction-convergence processes between the European-African plates (Stanley and Wezel 1985). In the Eastern Mediterranean, although isostatic effects are negligible, the movement and shifts in tectonic activity and resulting seismic activity can affect sea-level change on a local scale, and are thus crucial to an understanding of the coastal geomorphology of the Levant region (Fig.5.5), both past and present. The Levant fault

[87] Minor plates/crustal blocks, e.g. Anatolia and Apulia, also contribute to the tectonic activity (Macklin et al. 1995).

system (or "Dead Sea Transform"), the plate margin between Arabia and Africa, is the most tectonically active structure along the eastern Mediterranean coastline (Morhange et al. 2006:99), and links the Red Sea ridge to the SW of the East Anatolian fault system. The Levant continental boundary is a product of the Late Paleozoic–Early Mesozoic continental breakup stages, which impacted the Eastern Mediterranean basin (Garfunkel 1998; Sivan et al. 2010:451; Flemming 1972, 1978; Flemming and Webb 1986). The seabed is shaped by these complex networks of plate tectonic structures. Throughout the region, tectonic activity is of approximately <0.5m uplift in the last 2000 years (Raban 1995:143), influenced by a major tectonic NE-SW fault line (Pelusium Line), lying 60 km offshore and extending from Anatolia along the eastern Mediterranean down to the Damietta Branch of the River Nile in the NE Nile Delta (Neev 1975; Stanley 2002; Stanley et al. 2008).

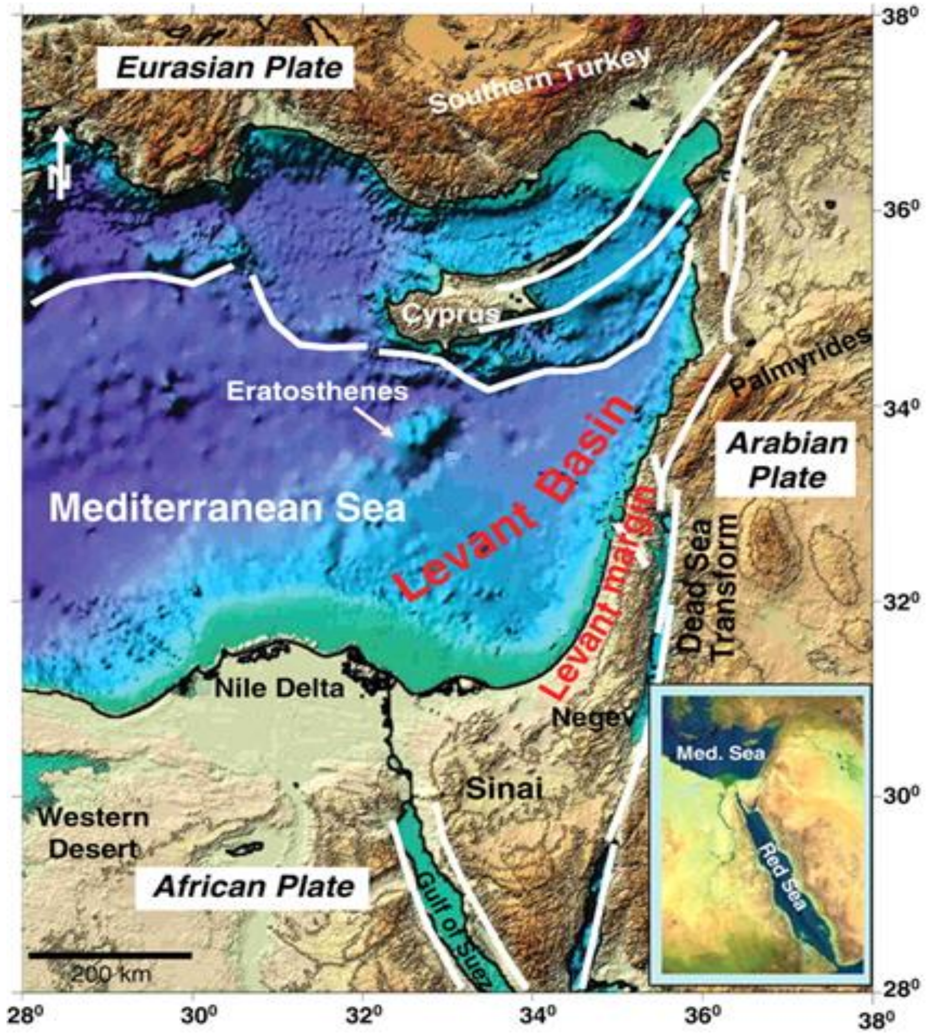


Figure 5.5 Eastern Mediterranean's main tectonic elements. The Levant Basin is on NE edge of African plate, south of Cyprian Arc plate boundary (white lines) (Gardosh et al. 2010:10).

5.1.2.2 Sea-Level Change in the Levant

The rising and falling in sea-level[88] also plays an influential role on the evolution of coastlines, and in turn potentially on the perceptions, representations and use of the maritime landscape. The global rate of sea-level rise changes as a response from the lithospheric blocks of the Earth (tectonic plates) to the combination of the released stress of unloading caused by ice sheet melting (isostasy), and the applied stress caused by meltwater (eustasy) (Lambeck 1995; 2005; Sivan et al. 2001:109). Studies[89] show sea-level changes are significantly affected by regional factors and local sea-level curves vary according to their location and relative proximity to ice sheets. During glacial cycles, sea-level change can be caused by eustatic change, which varies temporally, and glacio-hydro isostatic response, which varies spatially and is caused by waterloading of the marine basins following sea level transgression. Relative Sea-Level (RSL) change, whether as a result of eustacy or crustal (tectonic and isostatic) movements, is a critical process affecting topographical change in the landscape (Walsh 2014; FitzGerald et al. 2008). RSL change has remained within approximately 2-3 m of the modern coastline in the last 5-6,000 years.[90] Overall, in the eastern Mediterranean, it is said that the "eustatic component is <0.5m over the last 2000–3000 years and that coastal submergence and/or emergence are due to tectonic movements of crustal blocks on a scale of 50–100 km" (Poulos et al. 2009:12, cf.Flemming 1978). Sea levels rose during the Roman period and then fell again to approximately -1m around AD 1000. Following this period, sea levels are believed to have transgressed progressively to present-day sea-level (Morner 2005; Raban and Galili 1985).

(i) Northern Levant

In the northern Levant, studies on sea-level change have been relatively limited. During the Flandrian transgression (c.5500 BP) , there was a rise in sea level relative to land along this predominantly steep, cliff-lined coastline (Dalongeville et al. 1993; Morhange 2006). In the southern part of the coast, several offshore kurkar ridges and islands have been detected, forming part of the northern extension of those lying along the southern Levant. Studies have shown the

---

88 Sea level is defined by "the position of the sea surface relative to the adjacent land", while sea-level change is "a measure of the relative shift in position of these two surfaces" (Lambeck and Purcell 2005:1969).

89 Studies on RSL change: Galili and Rosen 2008; Lambeck and Purcell 2005; Lambeck et al. 2004; Pirazzolli 1991, 1996; Shea 2003:316; Sivan et al. 2001; Stewart and Morhange 2009:285. Impacts on different coasts: Blue 1995; Flemming 1971:29-30; Blackman 1973; Lambeck and Chappell 2001; Lambeck and Purcell 2005; Morton 2001:6; Pirazzoli 2005. Reliable archaeological indicators of SL change on the waterfront include: fish tanks (*piscinas*), piers, slipways and harbour constructions dated c.1st century BC-1st century AD (Morhange et al. 2013). Others include quarries carved on the coast and close to fish tanks and harbours/villas of similar date (Flemming 1978). Submerged settlements and shipwreck assemblages are also underwater archaeological indicators (Sivan et al. 2001:102).

90 Flemming 1971:29-30; Lambeck and Chappell 2001; Lambeck and Purcell 2005; Morton 2001:6; and Pirazzoli 2005. MEDFLOOD (2012-2015) creates an updatable database of collated RSL data available for the Mediterranean.

rise in eustatic sea-level has caused the erosion of platforms which were cut on the kurkar ridges to offer additional anchorage. The rates of erosion gradually increased as a result of the weakened reefs, which can be observed in the island of Sidon and in the offshore island anchorage of Machroud, south of Arwad, which became submerged as a result of sea-level rise and thus was substituted by the anchorage at Tabbat al Hamman (Sumra/Simyra) (Braidwood 1940). This effect is also apparent in the islands of Tyre and Arwad, of which parts of the ancient breakwaters have become partly submerged (Flemming 1979-80; Frost 1972; Pirazzoli 1991, 1996).

(ii) Southern Levant

In the southern Levant, due to the minimal gradient and low-lying coastline, the impacts of the progressively rising eustatic sea-level have been considerably pronounced, such as the submergence of the coastline, including several of the kurkar ridges (Sivan et al. 2004; Galili et al 2009; Galili and Sharvit 1994, 2000). As a result, the present shoreline has shifted approximately 300-400m to the east of where it was originally positioned in the Neolithic period (Raban and Galili 1985). Along the Israeli coast, Sivan et al. (2004) determined the past sea-level on the basis of 64 coastal water wells from the first century AD to the mid-thirteen century AD. Results show that at the start of the Roman period (1950 years BP) RSL was very close to the present-day level (Galili et al. 1988; Galili and Weinstein-Evron 1985; Lionello 2012:143; Sivan et al. 2001:102).

5.1.2.3 Geomorphological Changes in the Levant

One of the most important impacts of sea level rise is shoreline change. Flat low-lying coasts are more greatly affected by sea-level changes and sedimentary deposition compared to cliff-lined coasts (Blue 1995:Ch.4). This is particularly apparent in coastlines supplied by rivers or lying in marshy areas. Shores are in a virtually constant state of change in response to waves, currents and sediment availability. Large storms can result in alterations of the shape and position of a coastline that persevere for weeks to over a decade (Morton et al. 1994:884-908). Sediment deposition is a key factor affecting geomorphological or topographical change, and the rate of sediment supply on the coast is influenced by aspects relating to the type of sediment, fetch of winds and coastal morphology. Deposition of sediments from river mouths can have both beneficial and negative effects upon the topography of the coastline, and thus for the navigation of mariners. Advantages were found in spits and tombolos, which offered extra shelter for shipping vessels (e.g. Alexander the Great’s wave-dominated tombolos at Tyre and Alexandria); although in certain cases they could block harbours. Certain issues were faced due to the erosional sediments transported by rivers from the hinterland to the sea (Morton

2001:7).[91] Interactions with near-shore sand bodies and underlying geology also have an impact on coastal morphology (Schupp et al. 2006; Marriner and Morhange 2007).

(i) Northern Levant

In the northern Levant, there have been limited coastal geomorphological studies. However, the low-lying coastal plains of Latakia, Akkar and the Damur Plain to the south of Beirut were possibly formed, in part, by the increase in rates of alluvial deposition, which resulted from a decrease in the rates of sea-level rise during the late Holocene. The Levantine coast is characterised by well-sheltered lagoon-like harbours, resulting from "the consolidation of Roman construction techniques, coupled with the economic importance of the Levantine seaboard during the Byzantine period" (Marriner et al. 2014:7), as evidenced from geomorphological studies at the key harbour-towns of Beirut, Sidon and Tyre. Analyses of fine-grained silts and clays at these sites dating to the Hellenistic and Roman periods indicate an increase in human impact on the natural environment, causing fast rates of harbour siltation and frequent dredging (Marriner and Morhange 2006b). This stratigraphic phase is followed by the Roman-Byzantine apogee, influenced by artificial expansion and re-modelling of coastal harbours (and their morphologies), facilitated by the use of hydraulic concrete (Marriner et al. 2014:9; Oleson et al. 2004).

(ii) Southern Levant

In the southern Levant, the coastline has been subject to gradual on-going siltation since the Holocene. The process of sedimentation has caused several riverine harbours along this coastline to become silted up, including the sites of Tel Akko and Tel Mor, near Ashdod (Fig.6.5). The characteristic beach sands of the coast of Israel predominantly derive from the Nile River (Emery and Neev 1960; Bird 1985). Along this coast, erosion caused by wave-induced currents is the most significant geophysical process, although some deposition of wave-carried sediments also occurs (Emery and Neev 1960). Between Hadera and the Bay of Haifa, the coastline is subject to a combination of erosion and deposition (Emery and Neev 1960). Alluvial sediments are carried towards the coast by the Nile Delta, and by rivers running from limestone foothills to the east. Sediments also originate from the eroding kurkar cliffs and offshore ridges.

Overall, the seabed and coastal margins are shaped by the combination of these complex networks of plate tectonic structures and geodynamic processes (Stewart and Morhange 2009), in which the impacts of tectonic activity are superimposed by the relative changes from vertical

[91] For example, the accumulation of fluvial deposits caused extensive coastal shallows and surging breakers, which led to risk of ships becoming grounded and gradual siltation of harbours (Blackman 1982:186).

tectonic land shifts.[92] In this way, tectonic activity directly affects the morphological processes of the sea and its coast (Walsh 2014:33). RSL changes, tectonic activity and sediment supply have played a key role on the coastal evolution and geomorphology of the Mediterranean (Bloom 1998; Bird 2000; Lambeck 1996), particularly evident on the Levantine coastline.

5.1.3 Meteorological Conditions

The environmental conditions played a vital role to navigation and sailing, which was particularly dictated by the actions of the wind, and are often reflected in the geographical descriptions by ancient authors. It is important to understand the prevailing maritime conditions in the Levant when considering the capabilities and perceptions of early mariners or geographers.

5.1.3.1 Climatic Conditions

The Mediterranean Sea itself has a major impact on the distinct Mediterranean climate, due to it being a warm, almost entirely landlocked sea. As a result, this climate type spreads further into the continental areas of Eurasia and North Africa (MPV 2005:20; Meteorological Office 1962). For the Levant region, a distinctive geological feature is that it is closely positioned in the borders between a dry plain, a subtropical desert ridge and a temperate woodland, which is a result of the northward extension of the East African Rift ca. 3-4 Myr (Gasse et al. 2011:1262; Shea 2003:316). This caused the Jordan Rift Valley to divide the region of the Levant into a coastal lowland zone to the west and interior highland zone to the east. Moisture derives mainly from the eastern Mediterranean Sea. From north to south there is a significant decrease in rainfall; while from west to east there is increased rainfall as a result of the effect of the high-rising mountain chains aligned parallel to the shoreline; and to the east, a thin corridor is created by a chain of depressions (Gasse et al. 2011:1262). The Jordan Rift Valley, Anti-Lebanon Mountains and Palmyra Range trap a great amount of the moisture which runs into the Levant region and is derived from the cyclonic system across the Mediterranean Sea (Sharon and Kutiel 1986; Wigley and Farmer 1982). The northern and western sections of the Levant have more moisture, which offers favourable conditions for the growth of woodland vegetation on fertile land. The southern and eastern regions are characterised by arid desert (Zohary 1973). There is generally good visibility, though it can be restricted in late spring and summer, due to mist and fog, while in winter rainfall can cause restricted visibility (MPV 2005:32-3). Favourable weather conditions seem to have prevailed in the Levant in the Roman

[92] The combination of morphological factors enables observational data of modern coastline features to be related precisely to mean sea-level and past/future shoreline migrations traced/predicted (Lambeck and Purcell 2005).

period (between 1st century BC and early 3rd century AD), coinciding with the peak of Roman Imperial expansion and political-economic stability (McCormick et al. 2012; Harris 2013:262). Two long stable periods of wet conditions were divided and followed by drier conditions. These conditions declined and by the end of the 3rd/4th century AD the first wet period in the Roman Levant ended and the Nile flood and harvest patterns were affected by less favourable conditions after 155 AD. Around 300 AD, parallel to the recovery of the Roman Empire, climatic conditions recovered, though without the earlier stability (McCormick et al. 2012:203).

5.1.3.2 Wind Patterns in the Levant

Winds are the most crucial factor influencing the maritime conditions in the Levant region,[93] and knowledge of wind directions/seasons was the most crucial maritime condition determining patterns of early seafaring activity and wayfinding techniques (McGrail 2001:101; Ch.3.4). The prevailing winds in the Eastern Mediterranean are generally the Northerly and North-Westerly (Figs.5.7-9). Along this coast, winds can at times be unpredictable, which is especially apparent during the winter sailing season, although it is also the case during summer.[94] During winter, open sea winds vary considerably, especially in the northeastern part of the region. However, the predominant winds are the Westerly to North-Westerly winds, while in spring the North-Westerly winds prevail. During summer, the prevailing winds are between the Northerly and the NWW, but mostly Westerly in the extreme North-Eastern part of the region, known as the *Etesian*/*Meltemi*[95] (prevailing N-NW winds), that form part of the larger pattern of Northeast Trade winds (MPV 2005:25). The main regional winds include the *Etesians*; *Scirocco/Khamsin* (or *Sharakia* in the Levant - hot dry southerly winds from North Africa); and *Gharra* (from NE) (Fig.5.7-8). The *Sharakia* impacts the maritime conditions around the Levantine coast and Nile Delta, and as a result, southerly winds can blow offshore from these shores during spring (MPV 2005:25-32; Beresford 2013:64). To the seafarer sailing in the Eastern Mediterranean, the *Etesians* were the most influential winds for wayfinding. They start as predominantly northerly winds, but as they reach the Central Levantine Basin they become predominantly NW winds. Due to the distinct morphological characteristics between the Northern and Southern Levant, wind impact on the coastline and sailing would have also varied (see next sections: i-ii).

---

[93] Winds are the result of a pressure gradient blowing from areas of high to low pressure, also influenced by the deflecting force of the earth's rotation, which in the N hemisphere deflects winds to the right (Neumann 1986).

[94] Two main seasons of winds in the Mediterranean: summer and winter season, with predominant winds deriving from NW in the summer season. In summer, the warm trade wind belt travels to the north from the equator, in turn forcing the rain-bearing westerlies to return to Middle Europe. These resulting low barometric pressure conditions consequently suck in winds from the high pressure belt of Middle Europe (Semple 1932) i.e. the Etesian winds, or *Meltemi* winds.

[95] *Etesians* blow from May/June until October from NW, southward along the Aegean and eastward across the eastern Mediterranean. Their strength peaks in July/August, often reaching force 6-7. In winter, the heat belt moves southward again, enabling prevailing westerlies to blow into thelow pressure area over the Mediterranean (MPV 2005:25-32).

In relation to localised winds, features such as narrow straits, headlands and steep valleys can cause considerable local increases in wind strength due to funnelling. These winds can reach dangerous speeds, at times blowing with powerful gale force. Ancient sailors were often forced to seek shelter and anchor until winds became calm (Horden and Purcell 2000:137-43; Beresford 2013:81, 126; Morton 2001:145; Rougé 1952:316; MPV 2005:25-32). Diurnal breezes[96] also cause significant local changes to wind strength and direction (McKee 1983:23; Blue 1995:Ch.4; Fig.5.6). In this region the sea breeze in summer has the effect of reducing the air temperature. Wind speed increases until the afternoon; following sunset it reduces to a calm state. The land breeze is usually not as strong. Diurnal breezes thus played a major role on coastal navigation, enabling sailors to navigate along and access coasts, headlands and harbours with greater ease. In fact, "the increased strength and reliability of such diurnal winds during the summer months may offer another reason why navigation was preferable at this time of year" (Whitewright 2008:48), particularly on routes that kept close to the coast, or occurred mostly in daylight, as they would enable mariners to "work coastlines and headlands with greater ease and also to enter and access harbour more easily" (Whitewright 2008:48).

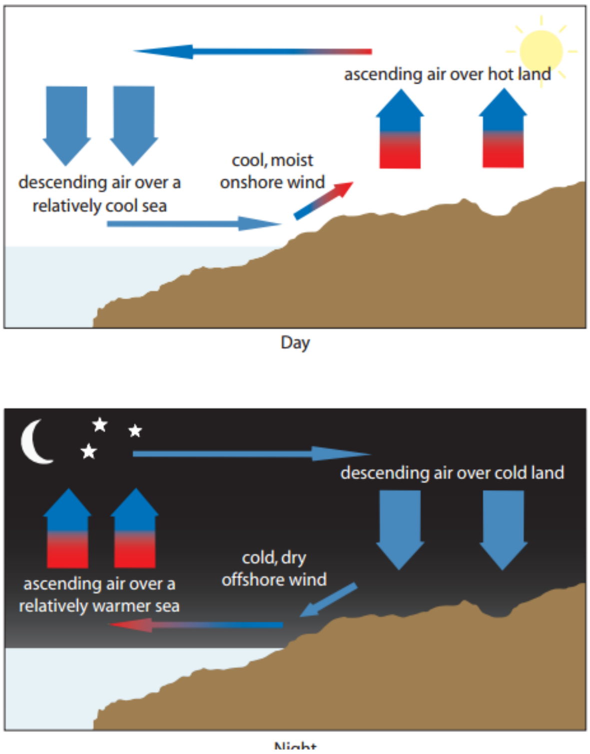


Figure 5.6 Diagram showing diurnal wind cycle
(Davis 2009:263, fig. 2.14).

[96] Diurnal winds can change within the 24-hour cycle as a result of temperature differentiation between land and sea. At night, when the earth's inland temperatures decrease, an offshore breeze is generated. This process is reversed in the day, generating an onshore breeze, due to an increase in inland temperatures, causing the colder air to be drawn in from the sea. In the hottest periods, these diurnal winds peak in strength, and can be used when making headway in opposing direction to the prevailing winds, particularly when the effects of the *Meltemi* reduce at sunset (Rougé 1966:34).

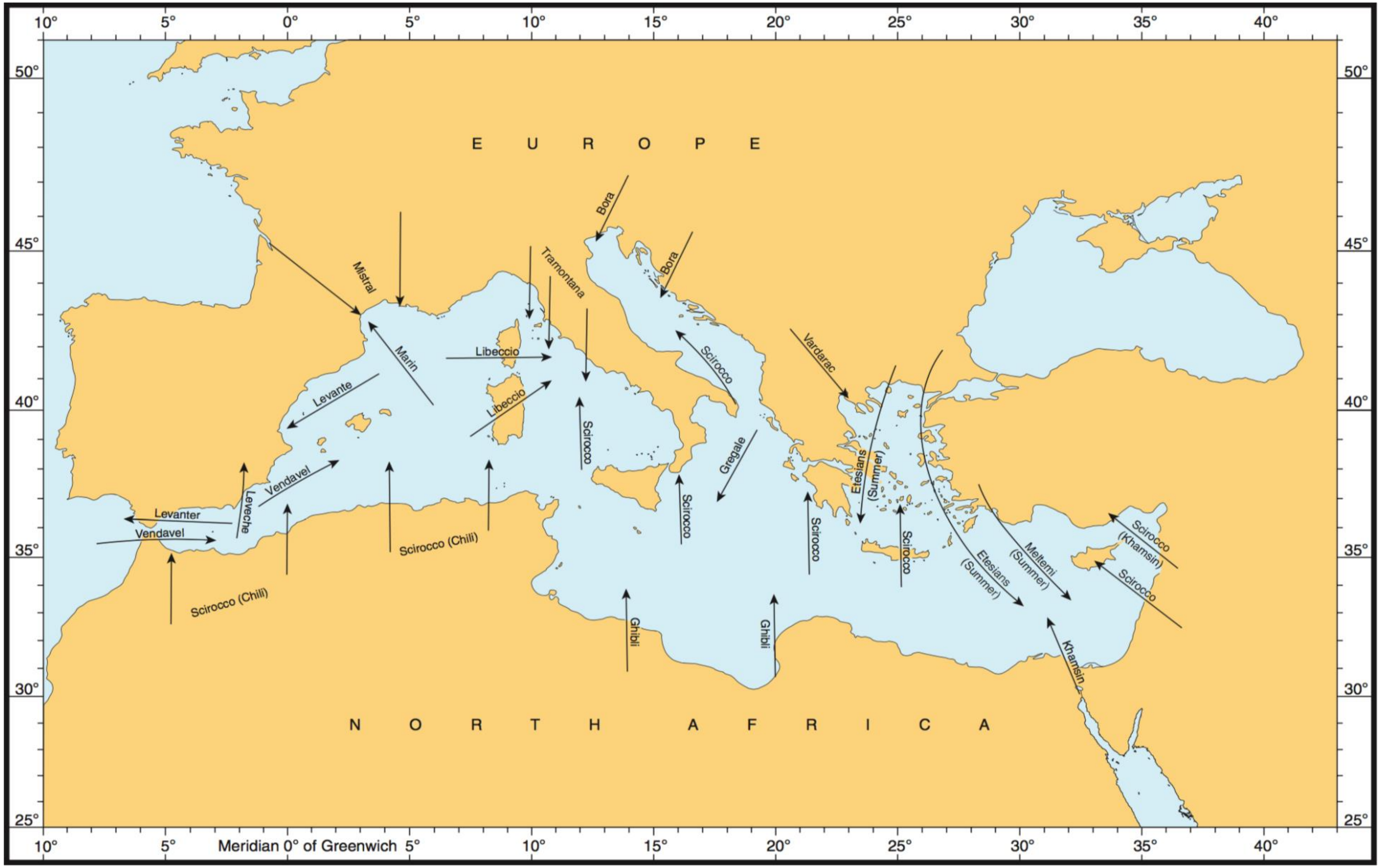


Figure 5.7 Map of the main winds of the Mediterranean Sea (Mediterranean Pilot V 2005:31).

(i) Wind Impact on the Coast: Northern Levant

In the general, the aspect of the coastline of northern Levant is westward-facing and is thus exposed to prevailing westerly winds. Thus, the best-suited location for anchorages would be in the lee of an off-lying island or promontory which is protected from the west (Blue 1995:Ch.4). Off the Syrian coast, the prevailing winds are Westerly to South-Westerly, with fluctuations in direction occurring more during the winter season than summer. Sea breezes, as well as land breezes are also significant, particularly during the summer months of July and August, and may vary considerably in the twenty-four hour cycle along the coast (Blue 1995:Ch.4). When the Westerly winds reach land, they rise above the Lebanon Range. Simultaneously, winds also cross from the Lebanon Range down to the coast and are often channeled along deep valleys, which can result in unpredictable local winds down this coast. This stretch of coastline, especially the Syrian coast in the north, is also affected by a local wind blowing off the Anatolian Mountains which at times results in northerly gales. In the northern area, there are low-lying cliffs and promontories which deviate from the general north-south alignment of the coastline and offer protection in bays for anchorage (MPV 2005:17-33; Blue 1995:Ch.4). Examples of these include Latakia and Ugarit, which are faced towards the SW and NW respectively and positioned at slight angles to the prevailing westerly wind, offering considerable shelter for anchorage. Between Tartus and Tripolis, the extremely exposed, westward-facing coastal plain provides limited shelter against the prevailing winds, apart from at river mouths. Protection from prevailing winds is also offered by the harbour of Tripolis; as well as the lee of the islands of Arwad and Machroud, which provide the best anchorage along this exposed section of the coastline. Southward from Tripolis, the western end of the Lebanon Range reaches the sea. Limited shelter is provided in this area, apart from at some bays. Examples include the bays of Jounieh (north of Beirut) and Byblos, and although their aspect faces the NW, they provide good shelter from the north, south, and east. Following the coast southward from Beirut, the aspect of this stretch is exposed to the west-northwest. Therefore, the lee of promontories or offshore islands (parts of the offshore kurkar ridges), such as Sidon and Tyre, provide the best form of shelter from prevailing winds in this area.

(ii) Wind Impact on the Coast: Southern Levant

In the Southern Levant, the coastline follows a generally north-south axis and is fully exposed to the prevailing westerly winds, as well as winds which prevail from the southwest and turn to the northwest by the end of the day. A certain amount of protection from these prevailing winds is offered by the few promontories and offshore kurkar ridges, as well as river mouths. In order to enter and leave such ‘exposed’ anchorages, ancient mariners would probably take advantage of the diurnal breezes also prevailing along this coast that were especially strong in the summer season and would likely “leave very early in the morning with the aid of the dying offshore breezes and would return late afternoon on the westerly sea breezes” (Blue 1995:Ch.4). Additional winds impacting this coast are the southerly *Sharakia* winds, resulting from the *khamsin* weather, blowing from the Sahara desert in the south (Rougé 1966:34). In the Southern Levant, the only significantly protected bay is Haifa Bay. The NW extent of the Carmel Mountain Range offers some certain shelter, particularly to the harbour of Tell Abu Hawam/Haifa. Despite its exposed coast lacking much natural shelter, sites such as Dor, Yavne-Yam and Achzib reflect how ancient mariners overcame the challenges of anchoring by taking advantage of the natural topography and diurnal breezes to ensure sheltered anchorage (Blue 1995:Ch.4).

Overall, it can be hard to determine the exact impact of the wind along a coastline, as the aspects of each particular harbour can vary significantly (Blue 1995:Ch.4), even on a predominantly rectilinear coast such as the Levant, further influenced by the maritime conditions prevailing in the region. Therefore, in order to understand past perceptions of this coastline, the harbour sites must be addressed within their specific context, with a consideration of the variables, physical determinents and morphological changes impacting the stretches of coast.

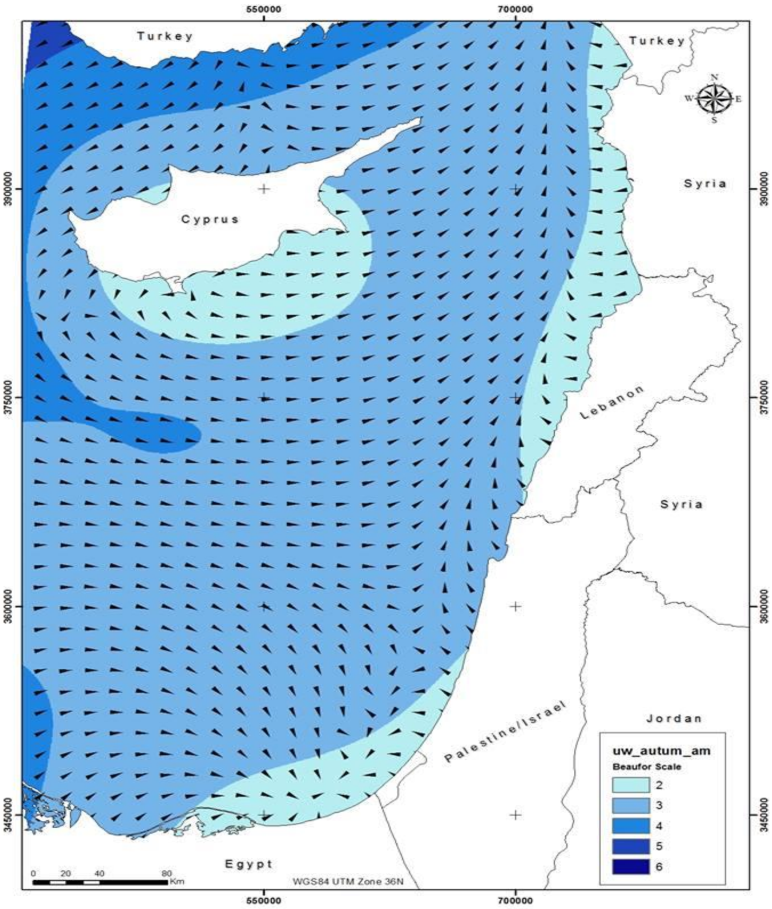


Figure 5.8 Autumn Wind Pattern in the Levant, showing direction and strength (a.m/morning) (Map & Wind Model produced by C. Safadi 2015 for this thesis).

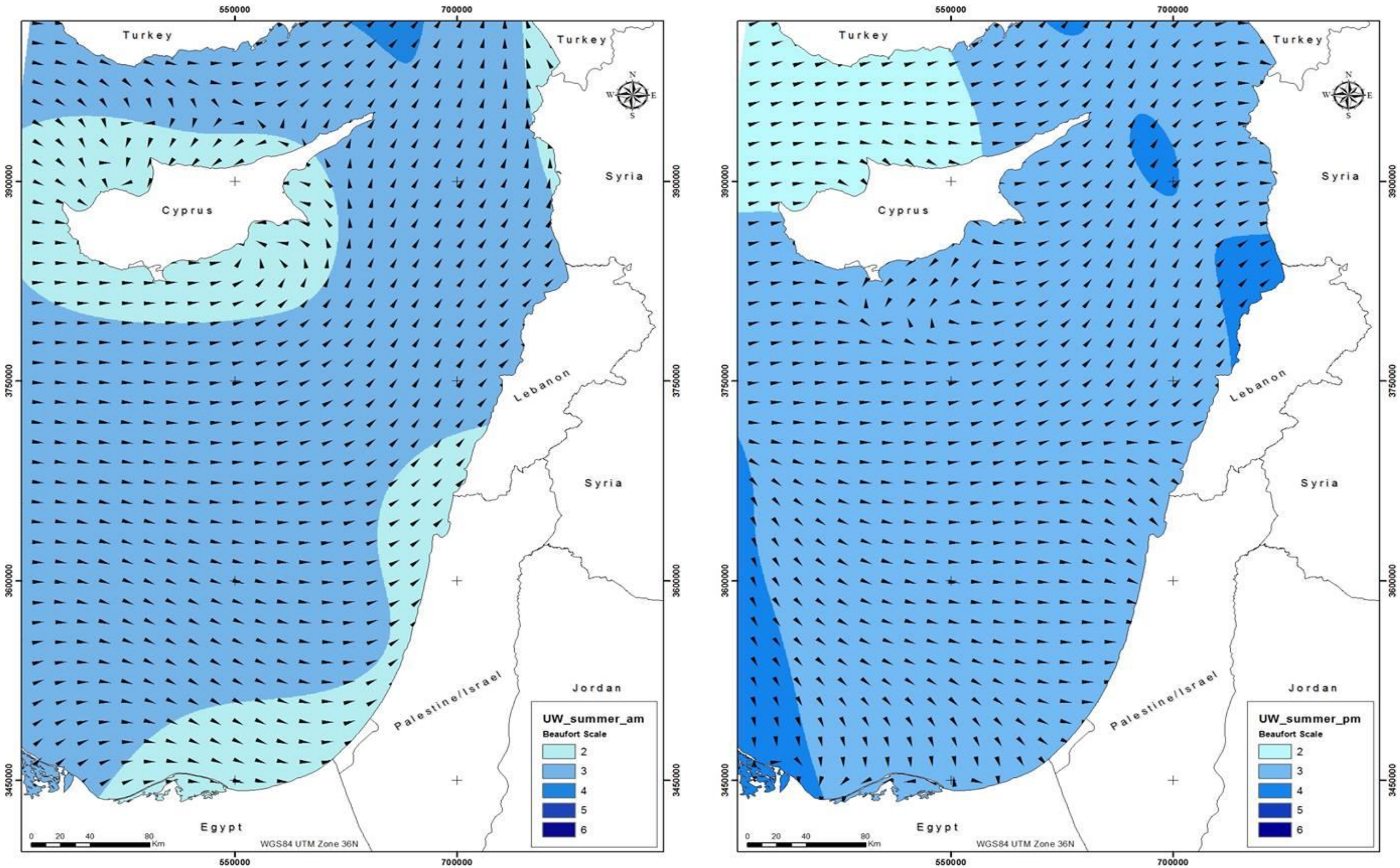


Figure 5.9 Summer Wind Pattern, a.m./morning (left) and p.m./evening (right) in the Levant, showing direction and strength. (Maps and Wind Models produced by C. Safadi 2015 for this thesis).

5.1.3.3 Currents, Fetch and Swell

Currents, fetch, swell and wave-patterns[97] served as basic reliable wayfinding tools, as they could indicate a vessel's orientation in relation to known winds or landmasses in proximity. The prevailing current in the Eastern Mediterranean is anti-clockwise due to the Coriolis effect which causes fluids in the Earth's northern hemisphere to move anti-clockwise (Hughes 1998:102-3). As a result, the current moves in a circular motion from the Nile Delta in a southerly direction up the coast of the Levant, thence turns in a westerly direction along the coast of southern Turkey, and as it reaches eastern Crete, the current flows back southward. This current undergoes limited variation in direction, and in terms of intensity varies from 0.25 to 1.25 knots, though it is usually over 1 knot 30% of the time (MPV 2005:17-19; Fig.5.10). In the eastern Mediterranean, surface currents were more a product of non-tidal forces, such as evaporation, as lunar-generated tides are not significant in this region (Heikell 1994:24). The principal eastward current flowing along the North coast of Africa turns to the northeast and northward direction along the coasts of Israel, Lebanon and Syria. Along the coast of Israel it keeps a steady mean rate of ¼ to ½ knots, with minimal fluctuations (MPV 2005:207). The main stream runs by the coast until Tel Aviv-Yafo, where its course temporarily changes in North-Northwest direction. As a result, the coasts of northern Israel and most of Lebanon are subject to mainly southward and south-eastward currents. As it continues northward and reaches Syria and Iskenderum Korfezi, the northward currents with a mean rate of ½ knots are re-established. The approach of the tidal progression suggests the flood currents set eastward, while the ebb currents set westward.

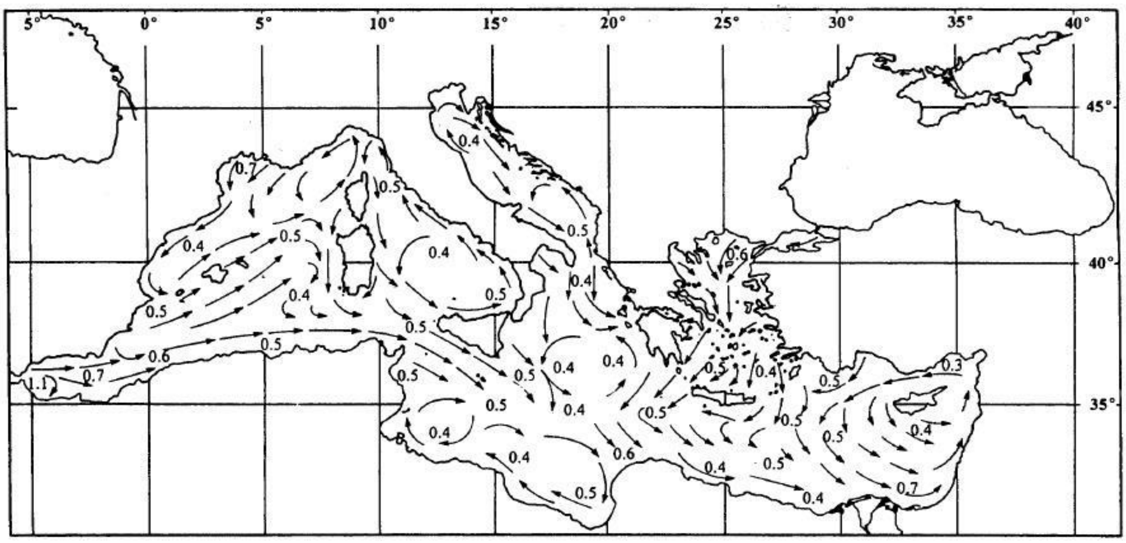


Figure 5.10 Mediterranean surface currents (Defense Mapping Agency Hydrographic/Topographic Centre 1991).

[97] "Fetch…the distance of open sea to windward of a place, which influences the effect of the wind on the sea; while swell is a product of the wind and is approximately proportional to the square-root of the fetch. The length and height of the swell is dependent on the strength of the wind, the time span over which it blows, and the length of the fetch" (Blue 1995:Ch.4; also Beresford 2013:222; Heikell 2012:29). Coasts exposed to long fetches and high swell may not be ideal for a harbour, due to difficulties in navigating and hazards with anchoring (Blue 1995:Ch.4). Sea waves, generated locally by the wind and varying in directions, also impact navigation, often causing extremely rough seas.

5.1.4 Geopolitical boundaries and divisions of the Levant

In the Roman period, the region of the Levant encompassed the Roman eastern provinces of Syria, Phoenicia and Judaea (later Palestina) (appendix vii: political timeline of Mediterranean). The Levant served as a key political and cultural interface for trade and exchange throughout antiquity, particularly due to its advantageous geographical location, linking the three continents of Europe, Africa and Asia. Long-distance trade routes were established linking Mesopotamia, Egypt, Asia Minor and the Aegean (Hitti 1957). These routes crossed directly through Canaan, Transjordan and Syria-Lebanon. Maritime communities along the Levantine coast established a unique exchange network in relation to overseas maritime trade, by integrating with their hinterland regions and forming secondary networks in an east-west orientation along the connecting rivers, wadis, or transport systems (Stager 2001:625). These channels provided the Eastern Mediterranean ports with raw materials and manufactured goods, thus linking the hinterland regions with international emporia and commerce. The array of archaeological evidence discovered in this region, together with the landscape and meteorological conditions, emphasises that Levantine coastal towns were active as trade ports within an established large-scale maritime trade network. Before exploring key archaeological sites along the coastal region of the Levant, it is essential to address the specific temporal and geographic factors to understand the nature and function of the different places/events.

5.1.4.1 Syria

Under Emperor Augustus' rule, the Roman province of Syria comprised three separate regions (see Cohen 2006:21, 71-140, 199-304; Butcher 2003; Millar 1993). The first coastal region consisted of northern Syria and the two ports of Laodicea (colony) and Seleucia, through Antioch (colony) to the Euphrates (Fig.5.11). The second region to the south encompassed the Phoenician coast, linked to the mountain-chain Jebel Ansariyeh in the north, onto Mount Lebanon to the south, then onto the hills of Galilee. The third region, inland, encompassed the ancient city Damascus, enclosed by the Anti-Lebanon Range, and further south, some cities of the Decapolis. Syria's province appears to have extended south as far as Mount Carmel, to the coastal town of Dor(a) (Millar 1993:237). The name 'Coele-Syria' (Hollow Syria) was vaguely used to refer to the region south of the River Eleutheros (its boundaries are inconsistent amid ancient authors). The term was not used in an official context until Seleucid's rule, 200-64 BC. It had varied designations by different people at different times, until in 194AD Severus divided Syria into two provinces, with Coele-Syria as the northern one (*ibid;* Cohen 2006:37-41).

5.1.4.2 Phoenicia

The central part of Phoenicia comprised the series of ancient cities following the coast backed onto Mount Lebanon and represents a key regional focal area of this thesis. The major cities included, from north to south, the island-city Aradus, Tripolis, Byblos, Berytus, Sidon and Tyre (Millar 1993:270; Cohen 2006:199-222). Little is known regarding other smaller places situated on this coast, such as Carne, Antaradus, Marathus, Simyra or Orthosia (Millar 1993:271). For the southern part of Phoenicia, notable cities include Dor and Akko/Ptolemais (*ibid*: 267).

5.1.4.3 Palestina-Judaea

The kingdom, and later province of Judaea, extended across large parts of the Transjordan, as was the case with the provinces of Palestine (see Cohen 2006:223-304). The area of western Galilee always remained under the control of Phoenicia. The Roman province of Judaea was founded in 63 BC. Following the suppression of the Bar Kokhba Revolt (AD 132-135), Hadrian substituted *Judaea* with *Provincia Syria Palaestina. Palaestina* mainly referred to the region of the coastal plain; while *Judaea* comprised the country's southern parts. Rhinocorura (Arish) acted as the boundary between Palestina and Egypt.

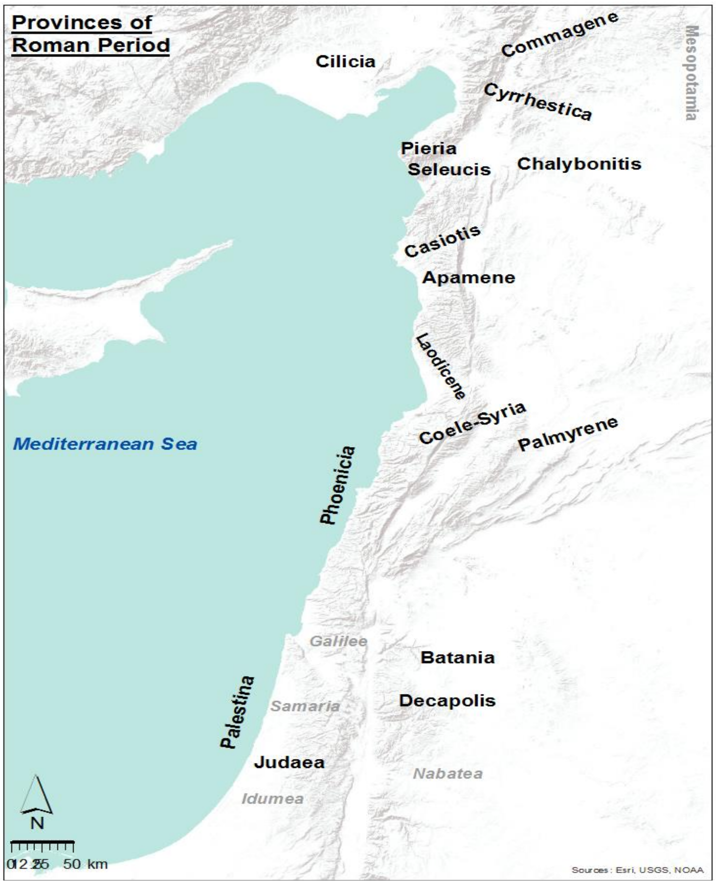


Figure 5.11 General location of key provinces/districts of the Roman Period within the ancient sources (cf.appendix iv for references of geopolitical subdivisions alluded in the sources (Produced by author).

5.1.5 Summary

The chapter above has served to outline the main physical, morphological, climatic and wind-seasonal patterns of the case-study region of the Levantine coast. The combination of changes in temperature and precipitation, along with topographical and geological features, all largely influence its distinct environment, sub-divided into micro-regions and geopolitical boundaries. The Levant’s diverse meteorological conditions and geomorphological changes were vital in advancing ancient navigation techniques and perceptions. This chapter highlighted the importance of the sea and its relationship with the maritime communities in its environmental context. Additionally, human action impacted these waterfronts, adding a social meaning to the landscape, thus providing an insight into how people interacted with and adapted to it.

In this way, the natural arrangement of the coast, with its sequence of geographic places and prominent features, often characterised by mountainous shores and chains of offshore islands, played a key part in framing perceptions of space and the logic behind the order and mapping of the maritime cultural landscape of this region. Through a systematic account and analysis of the Levantine coast, this research seeks to present a modern and ancient representation of the regional geopolitical and cultural settings for a comprehensive appraisal of the landscape/seascape as it would have been experienced by ancient geographers and mariners, both physically and cognitively. Structural patterns are emerging in the way these documents presented space to the reader, raising questions about how they were perceived and how they relate to the reality of the landscape and its use in the period. The following chapters explore the ancient geographers’ representations in the context the Levantine coast within an archaeological framework (Ch.6-8).

Chapter 6: Comparative Analysis: Theme A

6.1 Emerging Patterns and Key Themes

Which author is closest to the physical-cultural realities? Why did these authors choose to present or omit certain places/features? As demonstrated thus far through the ancient sources, a recurring notion that prevails in the selected texts is that the majority of these geographic descriptions appear to be based on an orientation toward the sea, rather than the land – implicitly apparent in geographic works of a broader nature (e.g. Ptolemy, Strabo, Pliny), in comparison with *periploi* accounts, which are naturally expected to be more maritime-based (e.g. *Stadiasmus,* and possibly Mela). This is in contrast to certain sources mentioned earlier (Ch.4.1.2-6; e.g. *Corpus Agrimensorum Romanorum*, *Itinerarium Antonini*[98], *Forma Urbis Romae, Notitia Dignitatum,* where orientation focused more on roads and inland features).[99] This is partially influenced by the focus of this research, which explores the data within a predominantly maritime framework. To overcome potential bias and fully understand the scale and nature of these ancient works and their approaches, this chapter considers both perspectives (maritime vs. terrestrial), focusing on the notion of this 'orientation to the sea' through the range of evidence available in the Levant for the Roman period (i.e. ancient literature, maritime archaeology, geospatial analysis) and two key themes (presented below). This evidence will be set against certain cases/sources of a terrestrial nature based on specific sites inland or in hinterland areas that shared links or notable patterns that potentially provide comparable insights between different past activities and views of this coastal landscape.

This chapter aims to discuss the sites found along the Levantine coast, from the Cilician Gates, in the north, to Raphia in the south (cf.case-study map: Ch.1.1.3). Firstly, the main discussion focuses on exploring sites and emerging themes that show notable patterns/anomalies in relation to the study-sources and archaeological evidence for a comparative data analysis (e.g. maritime vs terrestrial places; presence/absence of sites; settlement patterns) (Ch.6.2). This will in turn help understand the coastal area, the role and nature of these ports, and how this coastline would have been perceived. Secondly, it explores the environmental dynamics as represented in the ancient descriptions and how they tie in with the reality of the landscape (Ch.7.1). Thirdly, it investigates elements of navigation and the potential for routes to be described as they might have been sailed, accounting for 'real journey' challenges (Ch.7.2).

[98] However, the *Itinerarium Antonini* also contains a set of itineraries that are explicitly maritime.
[99] Though they are later than the study-sources and were produced under quite different political circumstances.

Two key themes emerged after formulating the database of the coastal sites and examining the coastal descriptions of the ancient study-authors (appendix I; Ch.2.1.1-2):

- ***THEME A: "STATIC"* - COASTAL VS INLAND PERCEPTIONS (Ch.6.2)**
- ***THEME B: "MOVEMENT*" – NAVIGATING THE SEASCAPE (Ch.7.1-2)**

These themes will be considered systematically, being divided into two detailed sub-chapters (i.e. Chapter 6 and Chapter 7 to represent Themes A and B, respectively), in order to elaborate the various cases and concepts for a more comprehensive examination of the data. The "Static" element (Ch.6.2) of this approach will reflect on emerging patterns relating to settlement presence/absence, spatial arrangements and links between coastal and inland sites. In comparison, the "Movement" element (Ch.7.1-2) explores environmental navigational markers, references to winds/orientation, and sea journeys and distances. Both themes are approached in an archaeological framework, building on the notions of geographers/mariners' practical '*common sense geography*' of the maritime cultural landscape (Ch.1.1, 3.2). In the following chapters, symbol (#L), and its assigned number (#L1-36), cross-references a specific site to its respective data in the archaeological database and catalogue (appendix i and viii).

6.2 THEME A: "STATIC" – Coastal vs Inland Perceptions

In the analysis of the collated data (see appendices i-iv; Fig. 6.1), one of the steps of the comparative stage has involved looking at gaps and omissions of places/features within these geographic works and how they tie in with the reality of the landscape. However, this gives us only a partial window into the physical, political, technical and cultural realities of the past, and will be explored further through supporting maritime archaeological evidence in this region. The table below (Table 6.1) presents the archaeological sites known along the Levantine coast, between the Cilician Gates (Southern Turkey) in the north and Raphia (Israel/Palestine) in the south. These were determined according to the ancient study-sources, in conjunction with those that are not mentioned but known from modern data sources (established from: BAtlas, DARCM/De Graauw catalogue, Google-Earth, modern nautical pilots: Ch.4.2). It has been compiled in a way that broadly demonstrates the presence and absence of these places in the authors' accounts of the coast to attempt to identify patterns or anomalies that can be explored in an archaeological framework (appendix viii: archaeological catalogue). From the table, several patterns and themes emerged that are investigated in the next sections. Results show a general correlation of key towns described on the coast, their order and positioning. However, certain discrepancies between authors are worth mentioning briefly (see below).

Presence & Absence of Coastal Sites along the Levantine Coast					
Ancient locations:	**Strabo**	**Mela**	**Pliny**	**Ptolemy**	**SMM**
Cilician Gates	**X**	**X**	**X**	**X**	**X**
Issos	**X**		**X**	**X**	**X**
Fano					**X**
Balae (modern)					
Karayilan (modern)					
Alexandria Ad Issum				**X**	**X**
Myriand(r)os		**X**	**X**	**X**	**X**
Rhosos	**X**	**X**	**X**	**X**	**X**
Burunlu (modern)					
Georgia					**X**
Hypatos		**X**			
Seleuceia Pieria	**X**	**X**	**X**	**X**	**X**
Bytyllion (modern)					
Nymphaion					**X**
Macra Island					**X**
Sidon(ia)					**X**
Posideion	**X**		**X**	**X**	**X**
Charadros	**X**		**X**	**X?**	**X**
Polia					**X**
Pasieria					**X**
White Harbour					**X**
Herakleia	**X**		**X**	**X**	**X**
Laodicea	**X**	**X**	**X**	**X***	**X**
Tell Tweini (modern)					
Gabala	**X**		**X**	**X**	**X**
small harbour					**X**
Palteni					**X**
Paltos	**X**		**X**	**X**	**X**
Balanea	**X**		**X**	**X**	**X**
Maracas (modern)					
Carne	**X**				**X**
Antarados				**inland**	
Arados	**X**	**X**	**X**	**X**	**X**
Enydra	**X**				
Marathos	**ruins**	**X**	**X**		
Simyra	**X**	**X**	**X**	**X**	
Tripolis	**X**	**X**	**X**	**X**	
Kalamos			**X**		
Trieres	**X**		**X**		
Shigata? (modern)					
Gigarta	**X**		**X**		
Botrys		**X**	**X**	**X**	
Byblos	**X**	**X**	**X**	**X**	
Palaebyblos	**X**		**X**	**inland**	
Berytus	**X**	**X**	**X**	**X**	
Balmarchodes, temple (modern)					
Heldua (modern)					
Porphyrean Polis (modern)					
Alsos Asklepiou (modern)					
Isle of Zire, Sidon (modern)					
Sidon	**X**	**X**	**X**	**X**	
Tell el-Bourak (modern)					
Sarepta			**X**		
Ornithon Polis?	**X**		**X**		
Tyrus	**X**	**X**	**X**	**X**	
Palaityros	**X**		**X**	**inland**	
Sinde (modern)					
Album Pr (modern)					
Alexandroschene (modern)					
Hammon (modern)					
Misrefot-Yam (modern)					
Ekdippa			**X**	**X**	
Nea Come? (modern)					
Evron (modern)					
Ptolemais/Acco	**X**		**X**	**X**	
Tel abu Hawam (modern)					
Sykamina	**deserted**		**deserted**	**X**	
Tel Megadim (modern)					
Boukolonpolis	**deserted**				
Dor(a)			**deserted**	**X**	
Krokodeilonpolis	**deserted**		**deserted**		
Tower Of Strato/Caesarea	**X**		**X**	**X***	
Burgatha? Port (modern)					
Tel Mikhmoret					
Natapia near Netanya (modern)					
Appolonia			**X**	**X**	
Tel Michal & Tel Makmish (modern)					
Ioppe/ Joppa	**X**	**X**	**X**	**X**	
Iamneia Paralios			**X**	**X**	
Iamneia	**X**		**X**	**X**	
Gadaris	**X**			**X**	
Azotos	**X**	**X**	**X**	**X**	
Maioma Ascalontis					
Ascalon	**X**	**X**	**X**	**X***	
Anthedon			**inland**	**X**	
Gazaion Limen / Gaza	**inland**	**X**	**X**	**X**	
Raphia	**X**		**inland**	**X**	

Table 6.1 Presence/Absence of Levantine coastal sites according to the study-sources (sites with* = Ptolemy's 'noteworthy cities', cf.Ch.4.1.5).

Summarised observations: Along the Syrian coast as far as Aradus (where *SMM* cuts off), there is a list of sites unique to *SMM***:** Fano, Georgia, Nymphaion, Macra Longa, Sidon(ia), Polia, Pasieria, White harbour, 'navigable river', 'small harbour', Palteni (Sidon in *SMM* differs to the one in Phoenicia in other sources - likely linked to transmission errors; cf.Ch.4.1.7, Ch.7.3.6). [100] Surprisingly, Issos, Posidion, Herakleia, Gabala, Paltos and Balanea are absent in Mela, though they were key sites on this coast and referenced in most ancient sources. He also lists a town and its river that are absent in other ancient authors, the Hypatos (of undetermined location).

Further south, after Arados, Mela leaves out the Eleutheros River from his description, even though it was a notable feature, and according to Strabo "some make it the boundary of Seleucis towards Phoenicia and Coele-Syria" (*Geog.* 16.2.12; also Pliny *NH* 5.13, Ptol., *GH* 15.4). A common misplacement amongst the geographers is of Charadros in Syria, rather than Cilicia. Strabo, after Carnos (also in *SMM*) lists Enydra (not in other study-sources) and Marathos, but omits Antarados from his account, which may imply his source dates before the town was established at Aradus' necropolis (Lipinski 2004:274; Ptol., *GH* 5.14). For Marathos (also in Mela, Pliny, Ptolemy), Strabo claims it was 'deserted' (*Geog.* 16.2.12); whereas it is mistakenly placed inland by Ptolemy, along with Antarados (see 6.2.3). Simyra is followed by Orthosia, then Tripolis. Next, Kalamos is included, a place unique to Pliny, followed by Trieres (also in Strabo), Cape Theouprosopon (a notable feature surprisingly absent in Pliny, though present in Strabo, Mela, Ptolemy), Gigarta, and Botrys. Between Byblos and Tyrus, several rivers are listed: Adonis, Lycus (possibly *SMM*'s 'navigable river'), Leontes (Pliny and Ptolemy mention its town), Magoras; Tamyras and Litas. Before the River Litas is Ornithonpolis (Strabo, *Geog.* 16.2.24), followed by Tyrus and Ekippa (in Pliny and Ptolemy). Moving onto the next stretch, along Israel/Palestine's coastline, it is surprising that in Mela the following important settlements and features are omitted: Ptolemais/Acco, Carmel Mountain, Tower of Strato/Caesarea, Iamneia, Raphia and Rhinocolura. Between these, there is also Appolonia and Iamneia Paralios, listed in Pliny and Ptolemy, though absent in Strabo and Mela, as well as Anthedon (Pliny and Ptolemy mistakenly placed it inland - see 6.2.3-4).

Interesting patterns emerged relating to sites mentioned as being in ruins/deserted (Marathos, Sykamina, Boukolopolis, Dor, Crocodeilonpolis, Gaza), along with cases of 'twin-settlements' in the Southern Levant (see next: 6.2.2-4), by comparing sources, archaeology and landscape.[101]

[100] For periods of when the sites were active and site reports see archaeological catalogue: appendix i & viii. It is worth noting, absences in *SMM* are likely due to the text's lacunae/corruptions rather than the author's intention. Also, Strabo refers to "the Nymphaeum" but as "a kind of sacred cave", not as a coastal settlement (*Geog.*16.2.8).
[101] 'Twin-Settlements': typically comprise a port-town (*epineion*) linked with its inland political town centre (*asty*).

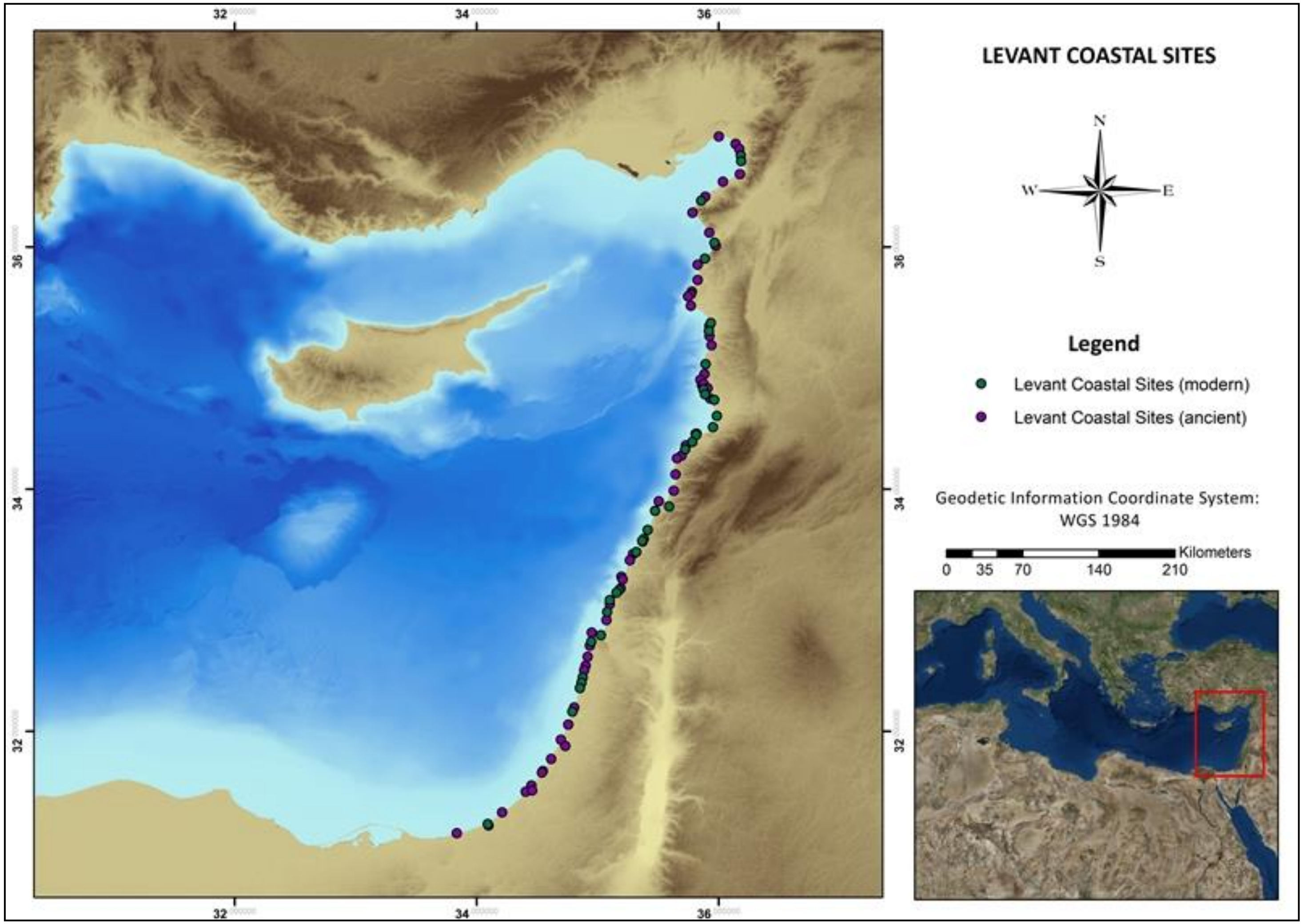


Figure 6.1 Map of Levant case-study showing sites ('ancient': coastal sites known according to ancient sources; while 'modern': known according to modern sources).

6.2.1 COASTAL VS INLAND SETTLEMENTS

The majority of these ancient accounts appear orientated to the sea, not the land (6.1, Ch.4.1.2-6). This section begins to analyse differences between ‘coastal vs inland’ perspectives. Charts were created (Fig.6.2) to visually compare the number of coastal and terrestrial settlements mentioned in the study-sources’ texts for the Levant, specifically Syria (and its districts, including Phoenicia) and Palestina (including Judaea). This offers a general overview of the sources’ nature and structure to contextualise emerging patterns analysed next in their maritime archaeological frame (6.2.2-5, Ch.7). As can be seen, clear distinctions exist between the authors’ works, as well as regional variation linked to the maritime and terrestrial nature of the sources, likely influenced by the backround, politics and purpose of their work (Ch.4.1.2-6). From a maritime perspective, the *Stadiasmus* and Mela’s works stand out here in particular. Both accounts provide a predominantly maritime based description, mentioning almost solely coastal settlements for their accounts of the region of the Levant. In the case of the *Stadiasmus* (Fig.6.2e), this was to be expected, as it is maritime treatise dealing solely with sea routes and sea distances between harbours, stopping points, islands and geographic features. Regarding Mela’s account, the charts (Fig.6.2b) seem to emphasise the sources used were predominantly derived from maritime itineraries/treatises, such as *periploi* and travel accounts. In fact, this is apparent throughout his work which is primarily coastal. This is chiefly linked to its genre and purpose, as opposed to a limitation in his sources, and seems to be structured similarly to a *periplous,* or a *periodos ges* (‘travel around the Earth’). The accounts of Strabo and Pliny (Fig.6.2 a,c) share relatively similar results within this context. They both mention a greater number of coastal settlements for Syria, and a few less for Palestina, but the difference between each is not very significant. This likely indicates the types of sources Strabo and Pliny referred to for Syria differed to those adopted for Palestina, highlighting that their knowledge of the landscape derived from various data sources. In Ptolemy’s case (Fig.6.2d), for Syria he lists a large number of settlements within the inland districts that were characterised by their mountainous and fertile topography. For Palestina-Judaea, the contrast between coastal and inland settlements is not as large, though this is probably due to its geographic extent being smaller and its flat, barren topography (linked to ‘twin settlement’ cases: 6.2.4) Commonalities between the ancient study-authors are the general arrangements of their descriptions, with a tendency of coastal settlements to be described first (though occasionally diverging from the coast to the interior), followed by inland descriptions and the connecting hinterland. The coastline served as a reference and way of perceiving the landscape (and likely the point of arrival if they had travelled there personally - Ch.7.2 on described sea journeys).

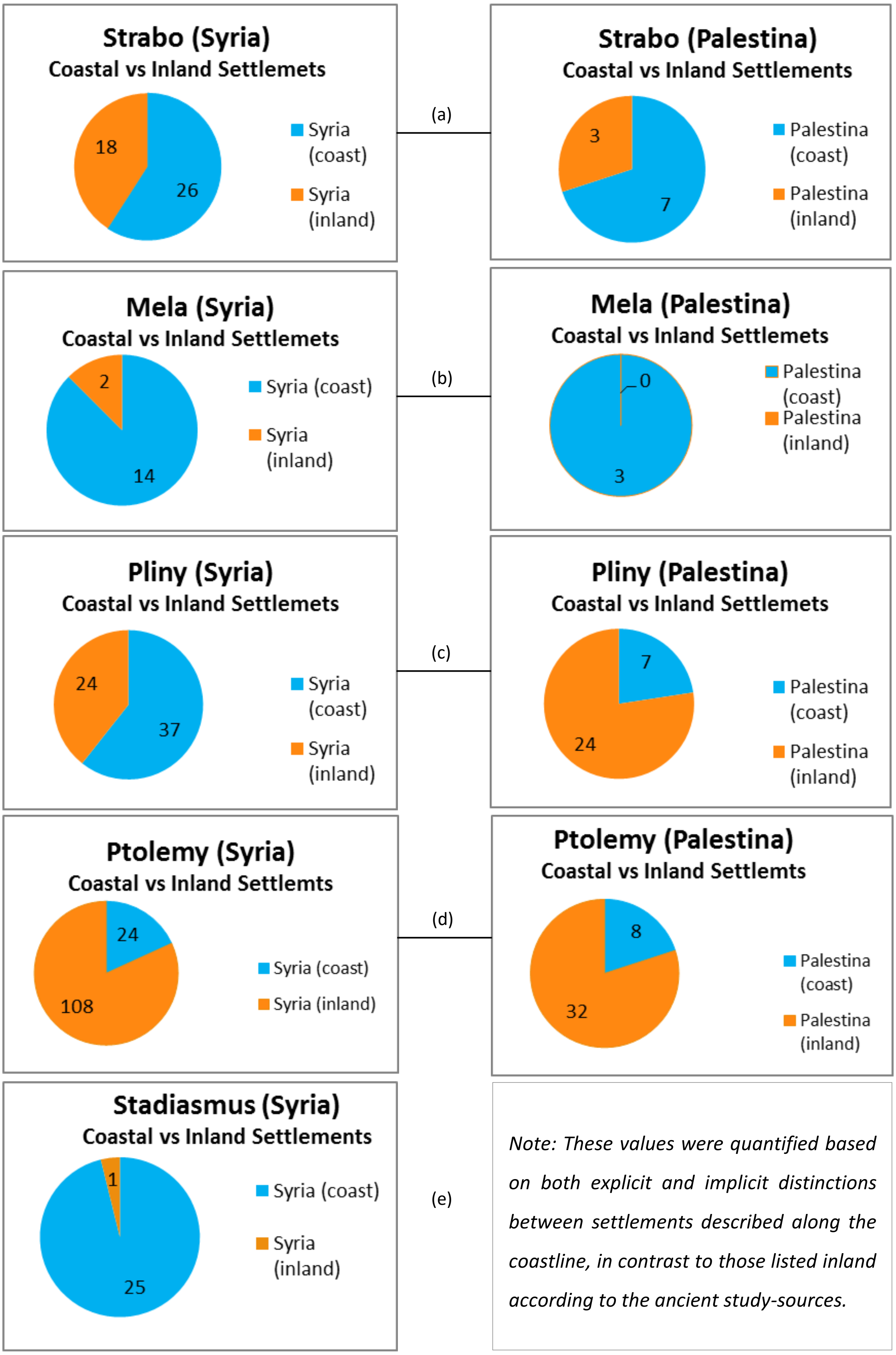


Figure 6.2 A series of charts comparing the number of coastal and terrestrial sites mentioned in the study-sources for the Levant region (Charts produced by author). These offer a general overview of the sources' nature and structure to contextualise the emerging patterns to be analysed next (6.2.3-5, Ch.7).

6.2.2 MARITIME ARCHAEOLOGICAL SIGNATURE

There are certain disagreements amongst the ancient sources regarding the relative status and importance of the Levantine coastal cities. These cases are explored in the following section (6.2.3.1-4, 2.4), reflected against the archaeology and changes between different periods. Interesting observations have emerged where the archaeology contradicts the documentary evidence by attesting to presence of activity on sites said to be abandoned or omitted in the geographic descriptions. A significant example is the ancient site of Dor (#L27). Given the site's archaeological complexity and evidence of continuous maritime activity at the port-city throughout antiquity, why was Dor overlooked by the majority of ancient authors or described as deserted? This gap and misperception is explored next (6.2.3) by seeking parallels along this coast in other towns described as deserted in the ancient sources: Marathus, Sycaminon, Bucolonpolis, Crocodilon and Gaza (6.3.1-5). This issue has been raised in another context by P.Counillon, who presents patterns of Λιμὴν ἔρημος/*limen eremos* (deserted harbours) according to Ps.-Skylax's accounts of Cyprus (Counillon 1998:55-67)[102] and compares such representations with other authors (e.g. *Stadiasmus*, Strabo) (6.2.5 on harbour terminology).

Another pattern is that a number of cities known to have served as active ports and harbours along the Southern Levant were situated relatively far inland (ranging between 3-6 km) (see 6.2.4 discussing twin-settlements). This would have been largely a result of there being few natural harbours along the Israeli/Palestinian coast. Many of these cities were of Phoenician foundation and were established at a considerable distance from the coast (with exception of Ascalon/Maiouma Ascalontis), located up river (i.e. highest navigation point), where they could exploit the fertile land and agriculture for sustenance (Raban 1985:14; Blue 1997:31-32). Examples of port-cities established further inland include: Iamneia/Iamneia Paralios, Azotos Mesogaios/Azotos Paralios, Gaza/Harbour of the Gazaeons, and Raphia. Thus, these cities took advantage of navigable rivers and streams nearby, using harbours at the mouth of these rivers for commercial exchanges with other neighbouring coastal cities. These observations raise an important question - how do we distinguish such twin- settlements in the archaeology and landscape? In light of all this, 6.2.3-4 explore such patterns and attempt to use the data at hand to establish possible links between these ancient sites in the Levant as attested in the archaeology and the landscape, to understand the past view of the coast and the hinterland.

[102] Aupert (1984:14) also explored issues linked to deserted ports: "Pourquoi tous les ports de fort actives seraient-ils déserts? La présence, plus haut, de χειμερινόν pourrait faire attendre ici θερινος comprendrait mieux: il s'agirait de ports non protégés par des moles et dangereux pendant les tempêtes d'…qui l'amène à traduire" / (*ibid*: 15): "Salamine la Grecque, pourvue d'un port ferme, sur l'hiver…Toutes ces…des ports déserts (ou d'été ?)" "Mais on ne relève aucun emploi de θερινος dans le *Périple,* et je ne pense pas puisse accepter cette correction; néanmoins, le fait que les ports soient dangereux pourrait les faire d'ἔρημοι, et c'est l'un des sens qui sera envisagé."

6.2.3 'DESERTED' SETTLEMENTS ACCORDING TO ANCIENT SOURCES

The following settlements are described in the ancient sources as either deserted, in ruins, uninhabited, or completely omitted (Table 6.2, Fig.6.3). In certain cases, archaeology shows they were in fact active during the periods these authors were writing (see 6.2.3.1-6.2.3.5; and archaeology catalogue: appendix viii, #L1-36). This section presents supporting archaeological evidence in relation to the ancient descriptions to find links and possible sources used in order to attempt to understand the reasons behind their misrepresentations of particular sites.

'DESERTED SETTLEMENTS'	STRABO (c.64/3 BC-AD 23)	MELA (c.AD 43)	PLINY (AD 23-79)	PTOLEMY (mid-2nd C BC)
Marathos / Amrit (#L14)	ruins	**X**	**X**	omitted
Sykamina / Tel Shikmona (#L24)	deserted	omitted	deserted	**X**
Boukolonpolis / Atlit (#L25)	deserted	omitted	omitted	omitted
Dor / Burj al-Tantura (#L26)	omitted	omitted	deserted	**X**
Krokodeilonpolis / Tel Tanninim (#L27)	deserted	omitted	deserted	omitted
Gaza (harbour) / Gaza (#L35)	uninhabited	**X**	**X**	**X**

Table 6.2 'Deserted' Settlements according to the ancient study-authors.
(X = these sites are mentioned/active in the study-sources, i.e. not deserted).

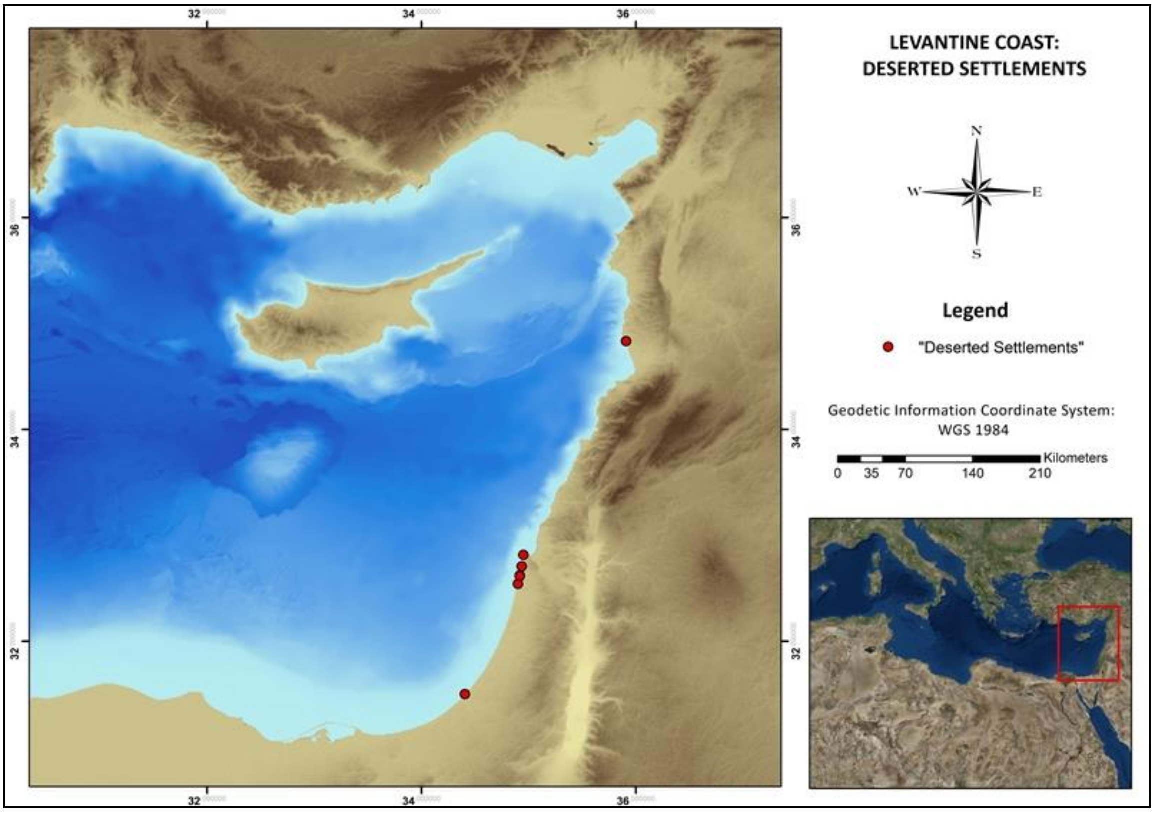


Figure 6.3 Map of 'Deserted Settlements' in Study-Sources (Map produced by author).

6.2.3.1 Case-study: Dor (#L26)

Ancient name: Dor(a) (Δώρα) **|** **Modern site:** Burj et-Tantura, Nahsholim Bay, Israel/ Palestine coast (#L26). **Periods:** Middle Bronze Age - Crusader. **Coordinates:** 32:36:30N, 34:54:42E.

The maritime site of Dor is an interesting case as the archaeological evidence clearly indicates the city was flourishing precisely when most of the ancient authors (1st-2nd century AD) surprisingly either omit the town or claim it to have been deserted. The harbour-town of Dor (Dora in Greek), characterised by a pocket beach environment (Marriner et al. 2012:39), possesses one of the few natural harbours on the Southern Levant's Carmel coast (Nitschke et al. 2011). It is a small but important bay between the Carmel Range and Plain of Sharon, about 60 km south of Haifa and 70 km north of Tel Aviv. The city was founded in the Middle Bronze Age and was continuously occupied up until the Crusader period (*ibid*). It developed into a significant Graeco-Roman port-city and regional fortress in the Hellenistic and Roman periods. After Alexander's conquests, Dor was first under Ptolemaic rule, and then subject to the Seleucids (Nitschke et al. 2011:132). In 63 BC, Dor was granted autonomy by Pompey (Jos., *Ant.* 14.4.4) and became part of the Roman province of Syria, thriving particularly in the Roman imperial period.[103] The city later declined economically, possibly linked with the dominance of neighbouring artificial harbour at Caesarea, particularly by Alexander Severus' rule (early 3rd century AD) (Nitschke et al. 2011:132). Dor, north of the ancient estuary of Nahal Dalia, had a double harbour, the division made by the natural cliff on which was built a massive tower. Tel Dor is located on part of a kurkar ridge (Ch.5.1.1.2) which overlooks the sea and the ancient port-city was on a tel site, serving as a tactical and commercial centre in the Levant throughout antiquity. Shelter and anchorage was provided by a succession of large, well-protected bays and lagoons to the north, east and south of the tel, formed as a result of the coastal sandstone ridge's partial eroding and flooding by the sea, with a second ridge offshore providing shelter (Blue 1995:Ch.4). Commerce, shipbuilding, fishing and purple-dye (from murex shells) led to the city developing into a thriving maritime centre (Fig.6.4).

Figure 6.4 Bay of Dor/Tel Dor, a pocket beach coastline (Image Source: Google-Earth)

103 See next section on 'Data from archaeological evidence'. Recent reports: Tel Dor Excavation Project, http://dor.huji.ac.il/; Nitschke, Martin and Shalev (2011)'s *Between Carmel and the Sea – Tel Dor: The Late Periods.*

(i) Data from Ancient Sources:

Strabo (early 1st century AD) omits Dor when describing the coastal cities of Israel/Palestine (*Geog.* 16.2), while Pliny (1st C AD) describes "Dorum…of which the remembrance only exists" (*NH* 15.2), along with Sycaminon and Crocodeilonpolis. According to Josephus (*Ant.* 19.6.3), c. 41-42 AD, there were conflicts amongst the Jewish and Phoenician/Greek inhabitants of Dor. It was reported as a place used by the Roman army for prisoners in the first Jewish war (*Vita* 8). In the 2nd century BC, Ptolemy and Pausanias simply list Dor (a port of Phoenicia) and in the early 4th century AD, Eusebius says it is in ruins (*Onom.* 376), as does St. Jerome, "the ruins of that city (Dora) which had been formerly so powerful." (*Onom.* 250:56; *Epist.* 108:8,2).

(ii) Data from Archaeological Evidence:

The earliest archaeological surveys of the site took place in the 1920s (J.Garstang), followed by initial excavations in the 1950s (led by J.Leibowitz), ongoing until present (see Tel Dor Excavation Project: http://dor.huji.ac.il/).[104] Excavations have yielded extensive remains dating from the Persian to the Roman period, with a predominance of Hellenistic, Roman and Byzantine material (Nitschke et al. 2011:147; Figs.6.5, 6.6) and characteristic features of cities in the Roman East: paved streets and piazzas (Areas B, G), a basilica (Area B), a theatre, a bathhouse (Area E), aqueducts and a complex drain-age system (all areas), wealthy houses decorated with fresco/mosaics (Areas D1, D2, H), and temples (Areas F, H). Systematic underwater surveys and excavations have been undertaken since 1975, revealing a range of material evidence between the Middle Bronze Age and Byzantine periods (Nitschke et al. 2011:147; Wachsmann et al. 1997:3-15; Raban 1995:343; Sibella 1997:16–18). Additionally, the Tantura Lagoon site has revealed archaeological remains of over 25 wrecks of wooden ships and over 200 stone anchors (mostly Byzantine), including a Byzantine shipwreck hull lying upon a large Roman-period shipwreck in Trench VIII (Fig.6.6; see Wachsmann et al. 1997:3-15; and Kahanov et al. 2008's 'Dor Underwater Excavation: Report of the 2008 Season' p.15-18).[105]

[104] Excavations 1980-2000: led by E.Stern (Hebrew University of Jerusalem). Unaffiliated group collaborated, e.g. organised by E. & W.Haury (1993–2000). Current projects/excavations directed by I.Sharon (Hebrew University of Jerusalem) & A. Gilboa (of Haifa); and independent group led by E.Bloch-Smith. Numismatic analysis by: Y. Farhi.

[105] See appendix vi for images of the archaeological site of Dor/Tel Dor.

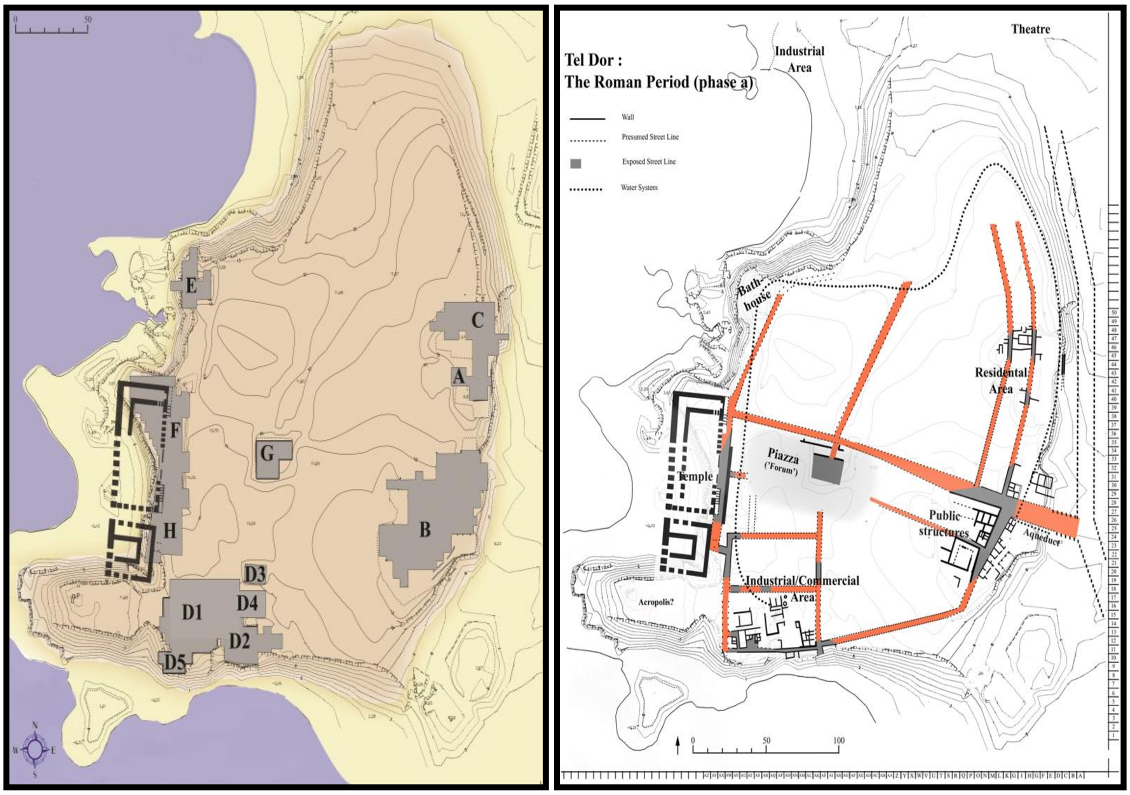
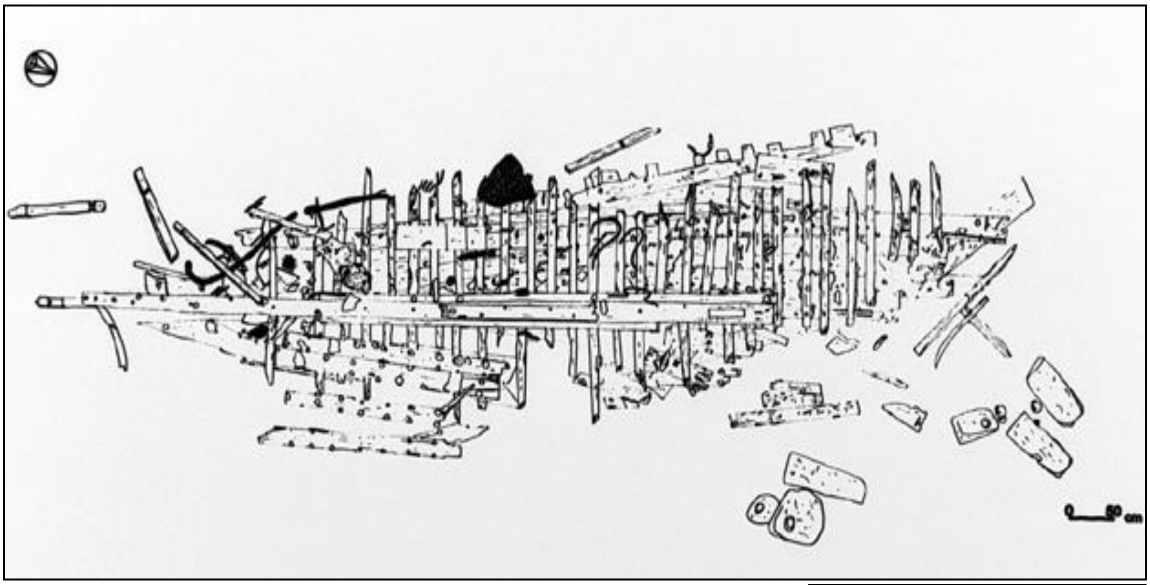


Figure 6.5 Archaeological Site Plan of Roman Dor, c.2nd century AD (Shalev in Nitschke et al. 2011:133-4)



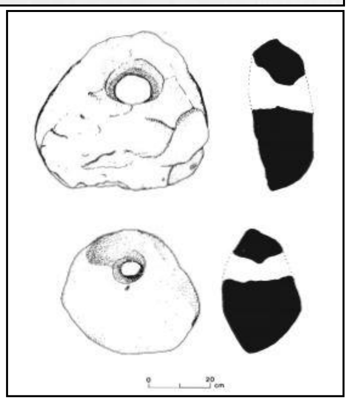


Figure 6.6 Dor/ Tantura Lagoon site - Trench VIII associated finds: (a) Site Plan: *Tantura B* Byzantine shipwreck hull lying on a large Roman shipwreck (b) Stone anchors, unknown date (Wachsmann et al. 1997:6-7, 11-2, figs.3,15,17).

(iii) Significance to Ancient Perceptions

What is particularly interesting in relation to this thesis is that recent coastal and underwater excavations in this region, as well as numismatic evidence, have revealed material indicating that not only was Dor not deserted during the periods in question, but the port-city's activity flourished from the end of the Hellenistic period into the third century AD (cf.6.2.3.1:ii). In fact, it "actually increased during the Herodian period and remained constant down through the middle of the seventh century, making it one of the most prosperous Mediterranean port complexes (late antique Dor had a thriving wine-trade)" (Nitschke et al. 2011:132). Numismatic studies of coins from the Roman period indicate that a mint was active in the re-established town following Pompey's rearrangements (63 to c.33 BC) and continued distributing coins at least through the rule of Caracalla (Nitschke et al. 2011:147), with evidence for the last coins produced at Dor dating to 211/212 AD (Stern et al. 1995:359).[106] Evidence of small finds and architectural structures reflect a "local continuity and adoption of foreign goods and artistic styles, suggesting in these periods Dor continued its long tradition as *entrepôt* and participant in cultural *koiné* developed in the Mediterranean" (Nitschke et al. 2011:132). Moreover, "it is at the height of the Imperial period that the city reached its greatest extent" (*ibid:* 147).

- **Discussion and Summary: Dor**

Presumably, the findings presented would allow us to infer that these authors did not have first-hand knowledge of this coastline. A further possibility could be related to landscape change and settlement shifts. For centuries, Dor was on a mound. By the late Roman period, it became uninhabited and a smaller version of the city appeared on the north-eastern slope of the original settlement (on which the basilica was built). The city Eusebius, St. Jerome and others mention may be the deserted one on the mound. Another reason is potentially linked to their sources of information and their date. In this instance, it seems likely that they were basing their descriptions on an earlier source(s), as Dor was destroyed by Alexander Jannaeus' attack on the cities of Ptolemais (Acre), Dora, and Gaza, which, with several others, had made themselves independent (although it seems strange that this is not reflected in observations of other sites). This likely relates to the source(s) the study-authors were referring to which mention such abandonment, such as older texts or maps, though this is hard to determine. However, one case is not enough to determine the reasoning behind such representations.

[106] Tel Dor Excavation Project: http://dor.huji.ac.il/. See also: Linder 1989:6-8; Misch-Brandl 1985; Stern 1993:368-371, 1994; Raban and Artzy 1982: 145-147, 256-259; Raveh 1988/89:50; Wachsman and Raveh 1984: 223-241.

To further explore this case of mistaken ‘abandonment’ during the Roman period of certain towns described in ancient sources, the next section compares the data by considering other Levantine towns together that are similarly described as deserted/abandoned to attempt to find parallels between places and authors (6.2.3.2-4; see 8.2.3.1 for parallels in other regions).

6.2.3.2 Marathus (#L14):

The Phoenician coastal settlement of Marathos/Amrit, which served as a mainland port for the island of Arados (Figs.6.7-8), is described by Strabo as being in ruins:

> “Then follows the maritime tract [παραλία] of the Aradii… then Enydra, and **Marathus,** an ancient city of the Phœnicians **in ruins** [κατεσπασμένη]**”** (*Geog.* 16.2.12).

Strabo omits the neighbouring settlement of Antarados/Tartous which suggests his source dates prior its emergence (Lipinski 2004:274; the earliest reference to Antaradus is by Ptolemy, *GH* 5.14.12; it also appears in the Peutinger Map; Fig.6.7). Archaeological excavations reveal an occupation from the Phoenician period until the 3^{rd}/late 2^{nd} century BC (Dunand and Saliby 1985:50; Duyrat 2005:197-8), with no evidence of Greek or Roman monumental finds or inscriptions.[107] In 1992, rescue excavations (see Haykal 1996:74-103; Elayi 2000:333-334) uncovered port facilities from the Hellenistic period. The findings, which include the presence of an extensive wharf, warehouses and dwelling-places, reflect the site’s social-economic basis and significance for trade and navigation. Literary sources say it was destroyed in the 3^{rd} century BC by the Arwadians (e.g. Diodorus 33:5), probably due to its attempt to break free of their control. This likely played a part in the town’s decline in the Hellenistic-Roman period, while Antarados became the more favoured port-town along this coastal tract in the Roman period. It is interesting, though, that Mela’s description appears to contradict Strabo’s, as he describes Marathos as a “not obscure city” (Mela 1:67). The settlement’s continuing existence is implied by later references by authors such as Pliny and Ptolemy. Pliny positions the *oppidum* (town) of Marathos opposite the island Arados (*NH* 5.17, 20; *SMM* 128; Strabo, *Geog.* 16.2), at a distance of 200 paces (possibly a corruption, as this seems a very short distance). Ptolemy mentions Marathus in his list, though mistakenly places

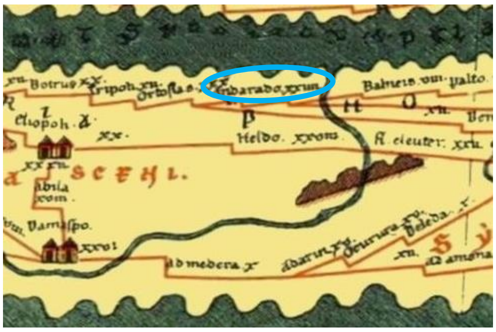


Figure 6.7 Antarados in the Peutinger Map.

[107] Site not fully excavated (see Dunand et al. 1954-55:189-190; Dunand and Saliby 1961; Saliby 1989:19-21; Carayon 2008:41). Finds date mostly to Persian period, though foundation is 3^{rd} millennium BC (Dunand et al. 1954-55). Excavated finds: Ma'abed sanctuary, mid-4^{th} BC (Dunand and Saliby 1961:13), ancient harbour facilities, stadium, 3^{rd} BC (Rey-Coquais 1977), necropolis, with rock-cut tombs, 4^{th} BC (Will 1949), with Roman tombs.

it in the subdivision of Casiotis in the interior, as is also the case with Antarados (this district encompassed the coastal stretch from the Orontes mouth and Arados, including part of of Phoenicia as far as the Orontes to the east and north, *GH* 15.5.16). Based on ancient and archaeological sources we know Marathos and Antarados were in fact situated on the coast.

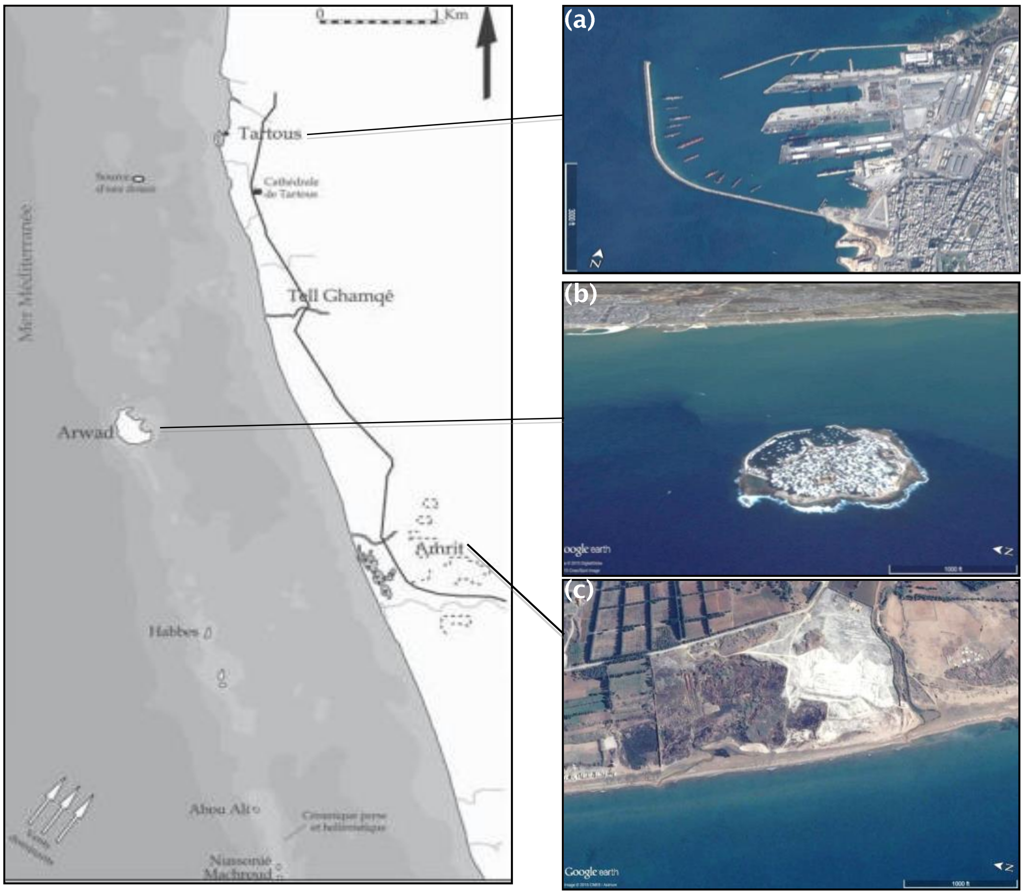


Figure 6.8 *Left*: Arados' *peraia* (Carayon 2012);
Right: Sites' bays - a: Antarados/Tartous, (b) Arados/Arwad, (c) Marathos/Amrit (G.Earth)

6.2.3.3 Sycaminopolis, Bucolopolis & Crocodeilopolis (#L24, 25, 27):

Strabo (*Geog.* 16.2.27) mentions three deserted cities between Ace and Strato's Tower:

> "Between the two places is Mt. Carmel, as **also towns of which nothing more than the names remain** - I mean **Sycaminopolis, Bucolopolis**, **Crocodeilopolis**, and others like them. / μεταξὺ δὲ ὅ τεΚάρμηλος τὸ ὄρος καὶ **πολιχνίων ὀνόματα, πλέον δ᾽ οὐδέν**, **Συκαμίνωνπόλις**, **Βουκόλων** καὶ **Κροκοδείλων πόλις** καὶ ἄλλα τοιαῦτα." (Strabo, *Geog.* 16.2.27)

Similarly, according to Pliny, the following places were described as abandoned:

> "There was **formerly a town** *[fuit oppidum]* here known as **Crocodilon**; there is still a river of that name: **Dorum** and **Sycaminon** are the **names of cities of which the remembrance only exists** *[memoria urbium]*." (Pliny, *NH* 5.17)

Amongst the places aforementioned, regarding Crocodeilopolis/Tel Tanninim (#L27; Fig.6.8) there is no other mention of a city of that name, apart from the above references in Strabo and Pliny. The archaeological site Tel Tanninim is on a largely eroded mound, 5km north of Caesarea, where Nahal Tanninim ('Crocodeilon River') empties out into the sea. The finds discovered date predominantly to the Byzantine period (4th-7th century AD), e.g. church apse, fishponds, wells, bathhouses.[108] There were finds of earlier periods (Late Iron Age-Persian-Hellenistic), as well as Islamic and Medieval. The earliest pottery at the tel infers it was originally a Phoenician town founded in the 5th century BC, renamed Crokodeilonpolis ('Crocodile City') in the Hellenistic period, after the nearby river. The site was abandoned in the early 1st century BC due to the Hasmonean activities in the region (Stieglitz 2006) and was not reoccupied until the Late Byzantine period (latest finds were Ottoman) (Taxel 2013:80). This abandonment is attested in the gap in the stratigraphy and confirms Strabo and Pliny's descriptions.

Figure 6.9 Bay of Crocodeilopolis/Tel Tanninim (Image source: Google-Earth.

In contrast, for Sycaminon/Tel Shikmona (#L24; Fig.6.9), though included in the list of deserted settlements by both authors, finds from underwater excavations and the tel reflect continuous activity between Late Bronze Age (c.1500–1200 BC) to the 7th century AD (c.AD 636-640).[109] The site is 1.3km SW of Mount Carmel, on a tel with a view extending from Atlit to Akko. Though ancient sources mention a coastal town, there are no traces of harbour facilities and its position offered little natural protection (Blue 1995:Ch.4). Archaeological records indicate Shikmona was a thriving fortified city in the Roman period, in contrast to Strabo and Pliny's claims. Looking toward earlier periods, there is a gap in the archaeology during the Persian period (Elgavish 1968:47; 1994:87). At the end of this period the town was destroyed and a destruction layer is also revealed from c.130 BC (Elgavish 1994:1373). This likely links with the phases of abandonment Strabo and Pliny (or their sources) were referring to.

Figure 6.10 Sycaminon/Tel Shikmona (Image source: Google-Earth.

[108] Final report on excavations directed by Stieglitz from 1996-1999: Stieglitz, R.R. 2006. *Tel Tanninim: Excavations at Krokodeilon Polis 1996-1999*. Boston: American Schools of Oriental Research). Also on: www.hadashot-esi.org.il. Evidence for foreign trade from ceramic data: e.g. Thasian amphora handle, c.350 BC and 5 Rhodian amphora handles, c. 3rd century BC, at Crocodeilopolis imply contact with the Aegean region (Cohen 2006:20).

[109] Taxel 2013; Yanklevitz 2008; Breman 2003: www.esri.com/library/journals/archaeology/volume_1/marine.pdf.

Regarding Bucolopolis/Atlit (#L25; Fig.6.11), a city of this name in this region is scarcely mentioned in Graeco-Roman sources (see Raban 1985:11-44, 1993:117-20). Earlier, in Pseudo-Skylax's *Periplous* (4th century BC), Atlit is mentioned between Carmel and Dor. In the Roman period, it seems Atlit was referred to as *Adarus* or *Bucolon Polis*, forming part of a site called Certha, being part of the territory Dor's seaport. At this time, it was excluded from Phoenicia's boundaries and submitted to *Palestina Prima*. Moreover, Pliny follows the coast from south to north, while Strabo goes in the opposite direction; Bucolopolis thus falls in Dor's place.

Figure 6.11 Bay of Bucolopolis/Atlit (Image Source: Google-Earth).

According to Cohen (2008:302-33), these cases of abandonment could relate to "the fact that the form of the toponym—Sykaminopolis ("Mulberry City"), Boukolopolis ("Herdsman City"), Krokodeilopolis ("Crocodile City"), Leontopolis ("Lion City")—recalls various toponyms in Ptolemaic Egypt; this would suggest these towns might have been so (re)named when the region was under Ptolemaic rule. On the other hand, the Periplus of Ps. -Scylax (see Shipley 2011), which dates to the fourth century BC, mentions Porphyreopolis and Ornithopolis in the region (104 = *GGM I*: 78); this leaves open the possibility that (some of) the toponyms recorded by Strabo predated the Hellenistic period" (see cases in Counillon 1988:55-67). Thus, the fact Strabo's account is the only other ancient literary evidence of a city named Crocodilon (combined with the inclusion of Sycaminon and the coastal description) could possibly infer that Strabo was potentially a source for later writers, such as Pliny, either directly or indirectly via other authors. More specifically, evidence from Sycaminon and Dor sites point towards Strabo and Pliny's use of an earlier source, likely dating to at least as early as the Hellenistic period. This also appears to be the case with Strabo's description of Gaza (6.2.3.4).

6.2.3.4 Gaza (#L35):

When describing inland Gaza, Strabo incorrectly describes it being deserted:

> "**The city of the Gazaeans is situated inland** at a distance of seven stadia; it became famous at one time, but was raised to the ground by Alexander **and remains uninhabited**" (*Geog.* 16.2.30).

As with the case of Dor (6.2.3.1), Gaza in fact thrived during the Roman period (appearing also in the descriptions of Mela 1:64, Pliny, *NH* 5.14, Ptol., *GH* 16.2.30). So why has Strabo claimed it to be abandoned? This statement could be an error, or suggests his information was out of date. In 332 BC, Gaza was destroyed by Alexander the Great, but soon resettled (Arr. 2.27.7).

In 96 BC, Alexander Jannaeus attacked and destroyed Gaza (*AJ* 13.358-64; *BJ* 1.87), but it was resettled (*AJ* 14.10; 15.252-60) and in 64 BC granted autonomy by Pompey and restored by Gabinius (*AJ* 13.75-76). The extant Zenon Papirus (3rd century BC) refers to Gaza as an active settlement (Cohen 2006:287). Archaeological and numismatic evidence[110] from excavations at the sites of Tel Gaza, its harbour and the vicinity reflect the importance of Gaza in the Graeco-Roman and Byzantine periods. Evidence shows that in 58 BC the Romans seized control of the city, extending occupation beyond the tel down to the coast (Clarke et al. 2004:33). This led to the development of its linked port Maiumas Neapolis along this straight sandy coastal stretch backed by low cliffs (Fig.6.12; see 6.2.4 on twin-settlements).

Figure 6.12 Bay of Gaza/Harbour of Gazaeons (Image Source: Google-Earth).

In the Graeco-Roman period it continued to serve as a major trade port along this coast (Glucker 1987; Bauzou 2000:47), linked with hinterland trade with Asia and Arabia, particularly perfumes and spices. The later activity and importance of Gaza is also reflected by its depiction on the Byzantine Madapa Mosaic Map (Fig.6.13; though, surprisingly, Gaza is absent in the Peutinger Map). Therefore, based on the evidence, it would seem Strabo's information was not up-to-date and his source was set before the resettlement of Gaza.[111] Another possible reason could be linked to its maritime town Maiumas Neapolis (a twin settlement; this pattern is explored next: 6.2.2.2).

Figure 6.13 Gaza depicted on the Madaba Mosaic Map.

6.2.3.5 Discussion and Summary: 'Deserted Settlements' in the Levant

Based on the analogous cases of "deserted" settlements discussed against the archaeological evidence, it is clear that there are certain discrepencies between the ancient authors' accounts and the archaeological record for the Levantine coastal sites. Although in some cases, their claims corroborate with archaeological levels of abandonment (e.g. Marathus, Crocodeilopolis), for the majority of cases presented the archaeological evidence in fact attests for their activity during the Roman period and the times the authors are writing (e.g. Dor, Gaza, Sycaminon).

---

[110] See work by: Clarke et al. 2004:31-36; Clarke and Steel 1999:311, 2000:189; Glucker 1987; Bauzou 2000:47–69. On Gaza and its hinterland, see also Lucker (1987)'s *The city of Gaza in the Roman and Byzantine periods* (BAR 325).

[111] According to Safrai (2005:253; 2000:65-78), Strabo was likely referring to the earlier destruction of Gaza by Alexander the Great, rather than Alexander Janneus, based on recent publications indicating that most of the coastal cities in this region (including Gaza) continued to be active during the Hasmonaean control.

Potential reasons for these discrepancies are related to: a) temporal/political contexts of when they were written; b) nature and date of the sources used (some dating to at least as early as the Hellenistic period), as well the possibility of the use of a common source for later writers (e.g. Strabo as a source for Pliny and others, either directly or indirectly); c) landscape change over-time; or d) possible bias of the author or political motives. Those omitted could imply they were either not founded at the time or became deserted/silted up, or due to transmission errors in the copying process from other sources, or loss of importance. It would also clearly seem to indicate that the ancient sources with such omissions were not written or corrected by people with first-hand experience of the coastline in question (see 6.2.4-5). Moreover, in relation to the terminology used, the term *eremos,* meaning deserted, can also generally imply the poor quality of a harbour's facilities or shelter (Counillon 1998; see 6.2.5 for reflections on harbour terminology). Such coastal 'deserted settlements' tended to be described as either '*kleistos'* (closed in time of war) or *eremos* (deserted natural harbours or trade ports). In this sense, the use of the term *eremos* expresses a judgement and perception from the author.

6.2.4 TWIN-SETTLEMENTS IN THE LEVANT

An interesting pattern observed along the Levantine coast, particularly on the southern part of Israel/Palestine's shoreline, is a tendency of establishing linked coastal and inland settlements, often referred to as 'twin-settlements' (Raban 1985:14; Blackman 1982:193; Patai 1998:134). These inland towns and their "daughter settlements" on the coast tended to be fortified, even during the *Pax Romana* (Blackman 1982:194). Cases of such twin-settlements on this coastal stretch (based on ancient authors and archaeology), include: Iamneia/Iamneia Paralios, Azotos Mesogaios/Azotos Paralios, Ascalon/Maiouma Ascalontis, Gaza/Harbour of the Gazaeons, and Raphia (Table 6.3; Fig.6.14). In certain cases the twin-settlements are explicitly distinguished in the ancient sources (e.g. Iamneia/Iamneia Paralios in Pliny, *NH* 5.14), while in others they are implied by the authors, who list both the coastal and inland towns (see cases: 6.2.4.1-5). In the Northern Levant, cases of twin-settlements, though fewer, include Seleucia Pieria, the main seaport of Antioch-on-the-Orontes (Strabo, *Geog.* 16.2; see Brands and Meyer 2005:149-54).

Focusing on the Southern Levant, we find a pattern of twin-settlements with a distance of c.3-6 km between the inland town and its linked daughter settlement on the coast (Blackman 1982:136; Raban 1985). Due to the physical geography on the Palestinian/Israeli coast, composed mostly of sand dunes, there was a limited availability of natural resources for cultivation. Thus, it is likely earlier settlements would have originally been founded further inland where the land was fertile, and then expanded towards the coast with the development of maritime activity and trade, leading to the establishment of linked port-towns on the coast. Regarding riverine settlements, another reason for this 'twin' arrangement was related to navigation upstream and the provision of a better protected upriver harbour town/village. The majority of these inland settlements thus tended to be situated on the coastal plain, or near it, close to navigable rivers and streams, allowing smaller vessels to navigate upstream from the estuary. These links are strengthened through various accounts from ancient authors and archaeological evidence - their nature is discussed next. This pattern was also evident along estuarine rivers in the MBA, with several settlements established on the shore at a river outlet, with a second settlement inland linked by the same river further upstream, usually "where the river course intersected one of the shore parallel sandstone ridges" (Raban 1985:14). Similarly, they were a characteristic feature of the Greek world, referred to as *epineion*/ἐπίνειον, a coastal place at a distance from its political centre (see 6.2.5 on harbour terminology; also Blackman 1982:193; Rougé 1966; Lehmann-Hartleben 1923:24-6; Bonnier 2008:54-7). Parallels of twin-settlements are apparent in other parts of the Mediterranean, e.g. Rome and Ostia, Athens and Piraeus, Troezene and Pogon, Gortyna and Leben (Semple 1916:137, 1908:78-9).

The towns distinguished by the ancient study-sources as having both an inland and linked coastal town are highlighted below (Table 6.3), such as Iamneia (in Pliny and Ptolemy) and Gaza (Strabo and Ptolemy). The twin-settlements are discussed next in relation to ancient texts and known archaeology to ascertain links between such coastal and inland sites (Fig.6.14).

COASTAL SITES	STRABO	MELA	PLINY	PTOLEMY
Iamneia/ Iamneia Paralios	Iamneia, 16.2.28	-	Iamneae, 5.14 Iamneae (inland) .5.14	Iamnitarum Harbour, 16.2 Iamneia (inland), 16.3
Azotos Mesogeios/ Azotos Paralios	Azotus, 16.2.29	Azotus, 1:61	Azotus, 5.14	Azotos, 16.2
Ascalon/ Maioma Ascalontis	Ascalon, 16.2.29	Ascalon, 1:64	Ascalo, 5.14	Askalon (*noteworthy city*), 16.2
Gazaion Limen/ Maiumas Gaza	harbour of Gazaei, 16.2.30 Gaza (inland), 16.2.30	Gaza, 1:64	Gaza (inland), 5.14	Gazaeorum Harbour, 16.2 Gaza (inland), 16.3
Raphia/ Raphia Yam	Raphia, 16.2.31	-	Raphaea (inland), 5.14	Rapheia, 16.3

Table 6.3 Twin-Settlements in Southern Levant (yellow: authors mention both coastal and inland town).

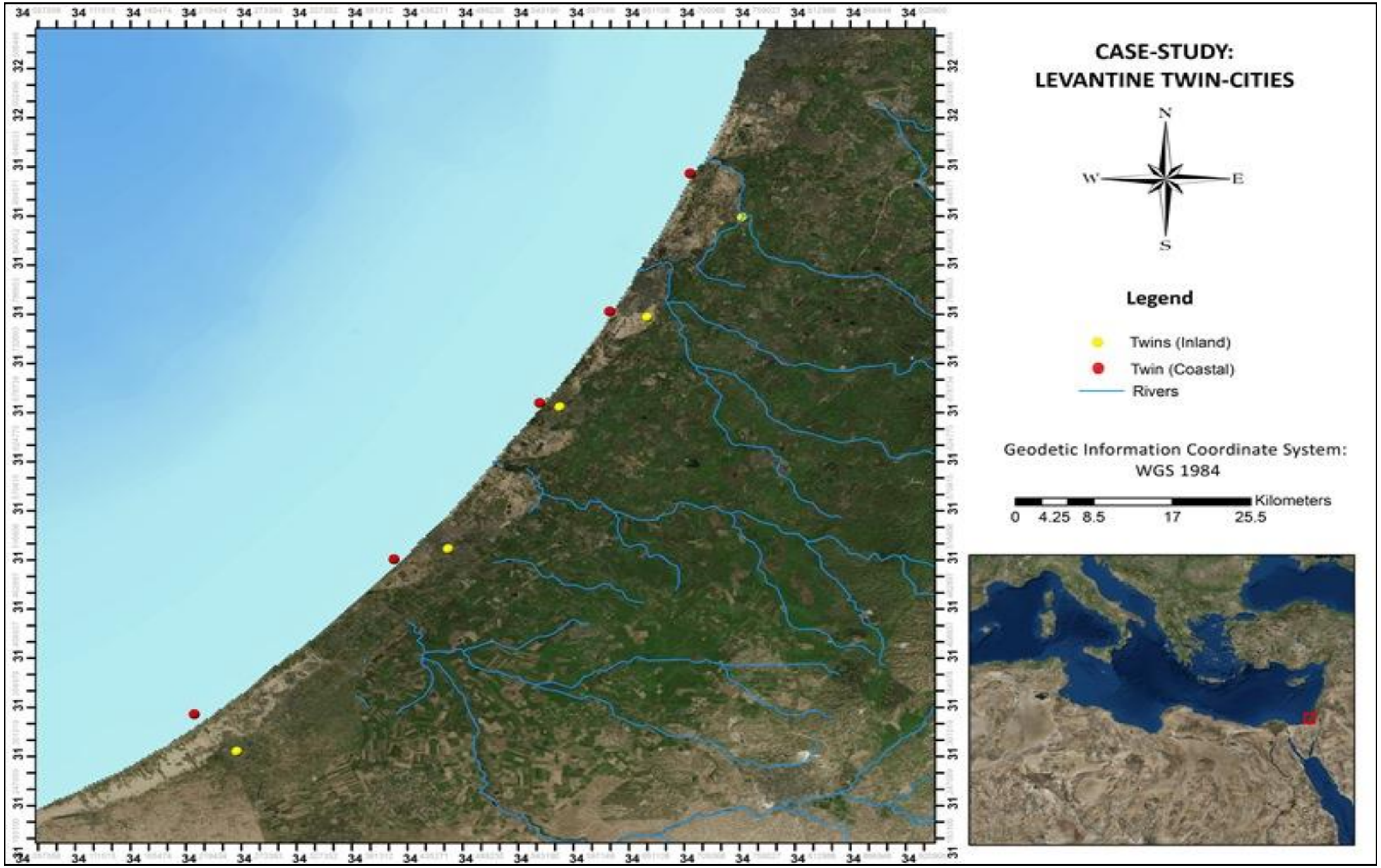


Figure 6.14 'Twin-Settlements' along the Southern Levantine coast (Map produced by E.S. Lopez 2015).

6.2.4.1 Iamneia/Iamneia Paralios (#L30-31):

Figure 6.16 Bay of Iamneia Paralios.
(Image Source: Google-Earth)

The fortified maritime town Iamneia is a good case of a 'twin settlement' distinguished as such in certain ancient sources and attested archaeologically. Iamneia Paralios/ Yavneh-Yam (and its inland city Iamneia/Yavneh) is c.20km south of Jaffa/Tel Aviv and north of Azotus/Ashdod (Fig.6.15). It had a good natural harbour due to its central location and natural sheltered anchorage, used for maritime activities and serving the hinterland (Fischer 2007:204-206). Both Pliny and Ptolemy distinguish between the seaport and inland town, while Mela completely omits Iamneia. Pliny (1st century AD) clearly expresses its 'twin' nature, "*Iamneae duae, altera intus*" (two towns Iamnea, one of them inland, *NH* 5.14). Ptolemy (2nd century AD) lists coastal "Iamneia Paralios" ('Iamneia-on-the-sea', *GH* 16.2-3), between Ashdod and Jaffa, and inland Iamneia, so the link is presumed. Though Strabo does not reference two distinct cities, he says Iamneia was 200 stadia from Azotus and Ascalon (*Geog.*16.2.28-29) and was Iope's "neighbouring village". Josephus describes Iamneia as a coastal town (*AJ* 13.10.395; yet also an inland town in *AJ* 14.4.75, *BJ* 1.7.156):

Figure 6.15 Iamneia depicted on:
a) Madaba Map b) Peutinger Map

> "At the **sea-side**… Joppa, **Jamneia**, Azotus, Gaza, Anthedon, Raphia…/ **πρὸς θαλάσσῃ** [toward the sea]… / Ἰόππην **Ἰάμνειαν** [Jamneia] Ἄζωτον Γάζαν Ἀνθηδόνα Ῥάφειαν…" (Jos. *AJ.* 13.10.395).

It is also depicted on the Peutinger Map (c.4th century AD), and inland on the Madaba Map (6th century AD) (Fig.6.16). In the Roman period, our knowledge of Iamneia/Yavneh and Iamneia Paralios/Yavneh-Yam is strengthened by historical/literary sources, rather than archaeological evidence, which is scanty for the Hellenistic and Roman eras in particular (in contrast with the case of Dor described earlier, 6.2.3.1; see Fischer and Taxel 2006, 2014). Pliny's account of Iamneia as a twin-settlement seems a notable mention, particularly as he emphasises the inland town, which could reflect its regained administrative importance during that period. However, the extent of the link between the inland and coastal town of Yavneh is still not fully known, "particularly during the periods when a settlement existed at both sites Middle Bronze Age II and from Iron Age II until the end of the Early Islamic period" (Fischer and Taxel 2006).

This raises the following significant question:

- **How can we identify and corroborate this inferred connection between twin-settlements in the archaeological record?**

At the inland site of Tel Yavneh and the foot of the tel, archaeological records[112] show a range of artefacts from MBA II to Ottoman and modern periods. Such finds, which include architectural remains and pottery spread across from the tel, reflect the extent and continuity of this inland town and its significant role along this coastal plain, with its greatest peak in the Byzantine period (Fischer and Taxel 2007:230-241). Similarly, underwater surveys in the area of the ancient harbour of Yavneh-Yam[113] exposed remains of continuous maritime activity since the MBA until the Byzantine (e.g. anchors, fishing equipment, sounding leads, amphorae), though most of the remains date to the Hellenistic period, when the port flourished (c.2nd century BC). This is also affected by the heavily eroded state of the site. Evidence validates that Yavneh-Yam served as a port from the 1st century AD for the imperial city Yavneh (c.24 km east).[114] In relation to this link, inland Yavneh was positioned on a major artery connecting the country at a crossroad leading towards the coast, particularly to Yavneh-Yam (Fischer and Taxel 2007: 206). However, the area is covered in sand dunes and the precise road from Yavneh has not yet been determined. According to Fischer, we can presume "that one of these roads ran along the banks of Naúal Soreq, perhaps even up to its estuary, and thence continued southwards to Yavneh-Yam along the seashore" (Fischer and Taxel 2007:206-7, cf.Dorsey 1991:60−61, 64, 185−186, maps 1, 13). Evidence for a road on this route throughout these periods is further strengthened by the discovery of other ancient sites along the navigable river Nahal Soreq through local systematic surveys (Fischer and Taxel 2007:207). Though not referred to by the ancient authors, Nahal Soreq was likely used by small vessels navigating upstream, thus linking the seaports with inland towns/villages and the hinterland.

For comparative purposes, the following range of twin settlement cases is discussed: Azotos, Ascalon, Gaza and Raphia (6.2.4.2-5). Although they are not explicitly described as such in the study-sources (with the exception of Gaza), when compared they can help determine links and whether their twin settlement nature is evident from the archaeology and physical geography.

---

[112] Surveys of Tel Yavneh and hinterland since 19th century, with initial excavations by Kaplan in 1940s (Kaplan 1957). On-going maritime archaeological surveys undertaken by Marine Unit of the Israel Antiquities Authority since 1980s.
[113] Tel Aviv University excavations directed by Prof. Fischer since 1992 (Fischer 2002, 2005, 2007; Fischer et al. 2008).
[114] Yavneh-Yam Project: www.tau.ac.il/~yavneyam; also Fischer and Taxel (2007:230-45, 2008). In the Roman period the site extended beyond the tel area. Roman artefacts include: pottery (e.g. 'Herodian'); 'discus' lamps, 'Jewish' stone vessels; range of coins (e.g. Herod Agrippa I; Roman city-coins); limestone ossuaries; tombs (1st-4th C AD). On a fragmented Greek inscription at Yavneh-Yam, see Isaac (1991)'s 'A Seleucid Inscription from Jamnia-On-The-Sea'.

6.2.4.2 Azotos Mesogeios/Azotos Paralios (#L32):


Figure 6.17 Bay of Azotos (Image Source: Google Earth)

The site of Azotos (Tel Ashdod, #L32) was a twin settlement, c.16km NE of Ashkelon (Fig.6.17). Despite the tel site being 6km from the coast, the majority of ancient sources considered Azotos a maritime city (Mela 10.61; Ptol., *GH* 5.16.2; Pliny *NH* 5.14; Jos. *AJ* 13.10.395). They were likely referring to Azotos' daughter port-town, Azotos Paralios ("Ashdod-on-the-Sea") (*Jos. AJ* 13.15). In the Hellenistic and Roman periods, the inland city was Azotos Mesogaios ("inland Azotos", a.k.a. Azotos Hippenos), and to the NW a new connecting maritime fortified town was built, Azotus Paralios (Ashdod Yam/Minet el-Qal'a). Conquered by the Hasmoneans, Pompey restored its autonomy (Jos. *BJ* 1.156) and Herod seized it. Eusebius referred to Ashdod as a "significant town", without specifying which, but it seems he implied Azotos Paralios, not Mesogaios, as archaeological evidence at Ashdod-Yam indicates that in the Roman period onwards Azotos Paralios became more important than its former capital Azotos Mesogeios, particularly by the Byzantine.[115] This is strengthened by extensive on-going excavations at inland Azotus which exposed scanty remains dating to Roman and Byzantine eras (Dothan and Freedman 1967:18-27). The Madaba Map differentiates between inland Azotus and Azotus Paralios (Fig.6.18), depicted on the coast and as the larger of the two, inferring its importance.

Figure 6.18 Inland and coastal Azotos distinguished on the Madaba Map (which also depicts the town Iamneia, inland).

[115] www.ashdod-yam-archaeological-excavations.com. Also, Tabula Imperii Romani, p72, and Peutinger Map.

6.2.4.3 Ascalon/Maiumas Ascalontis (#L33):

Figure 6.19 Bay of Ascalon (Image Source: Google Earth)

The site of Ashkelon/Ascalon (Fig.6.19), c.20 km north of Gaza, was another case of a twin settlement (Patai 1998:143), with the main settlement further inland, Ascalon, and its daughter port-city on the coast (Maiumas Ascalontis in the Byzantine period). Maiumas Ascalontis is not mentioned in Graeco-Roman sources, though it is worth mentioning Ptolemy distinguishes Ascalon as a 'noteworthy cit' (*GH* 16.2), and it appears on the Peutinger Map. In the 4th century AD, Ashkelon became a Roman colony (Patai 1998:14).[116] Nonetheless, Strabo (*Geog.* 16.2.29) places it along the coast between Azotos and Gaza, stating that:

> "Country of the Ascalonitae is a good onion-market, though the town is small" (cf.Mela 1.64)

Pliny mentions Ascalon, a free town on Samaria's coast, next to Azotos (*NH* 5.14). A surviving fragment on the Madaba Map depicts Ascalon on the coast (Fig.6.20), as does Peutinger map.

Figure 6.20 The Madaba Mosaic Map depicting: Ascalon, Maiumas, Gaza, and Raphia.

[116] *TIR*, p69: "A large city and harbour in the southern coastal plain, frequently described in literary sources. Many archaeological remains of the Roman and Byzantine period. Excavated site." Hdt. 1.105; Ps.Sky. 104; Strabo, *Geog.* 16.2.29; Mela 1.11.64; Pliny, *NH* 5.68; 6.213; 17.109; 19.101-6; Ptol. *GH* 5.16.2, 8.20.15; It.Ant. 151.1, 199.11, 200.3.

6.2.4.4 Gaza/Gazaion Limen (#L35)

Gaza was discussed in the previous section on so-called "deserted" settlements (6.2.3.4). Not only was the city active in the Roman period, it was also a twin-settlement. Ptolemy appears to infer its "twin" nature as he lists two separate towns, first a harbour (*GH* 16.2), then an inland town of Judaea (*GH* 16.3). Strabo distinguishes between the coastal and inland towns of Gaza:

> "…next is the harbour of the Gazaians. The city is above it, 7 stadia inland. It was once notable but was destroyed by Alexander, and remains deserted" (*Geog.* 16.2.30; trans. Roller 2014).

In the Roman period, the inland city of Gaza expanded towards the shore, forming the port of Gaza (known as Maiumas Gaza/Maiumas Neapolis), in turn becoming a thriving, well-built coastal town (Taxel 2013:100; Glucker 1987:43-44). This pattern is similar to the "daughter settlements" mentioned beforehand found on the Palestinian coast.**[117]** It is also differentiated on the Madaba Map (Fig.6.20, above), with the larger, mother-settlement of Gaza depicted inland and its smaller linked seaport, Maiumas Neapolis, illustrated nearby on the coast.

6.2.4.5 Raphia/Raphia Yam (#L36):

Figure 6.21 Bay of Raphia.
(Image Source: G.Earth).

Interestingly, on this coast we notice the pattern of certain towns mistakenly stated as inland, when they are in fact coastal (and vice-versa), as seen with Gaza, above.[118] In comparison, ancient Raphia (Tel Rafah, #L36; Fig.6.21), though a coastal town, was at some distance from the coast and considered an inland town by Pliny (*NH* 14.5.14). Similarly, when listing the inland towns of Judaea, west of the River Jordan, Ptolemy (*GH* 16.3) enumerates Rapheia, Gaza and Sebaste. So why did Pliny and Ptolemy consider Raphia an inland town? A probable reason for this mistake could be linked to Raphia being a twin-settlement, possessing its main city inland, with its 'daughter-settlement' and landing-place on the shore (*TIR*:s.v. 'Raphia', p212). Raphia was in fact a port-city in the extreme south of Israel/Palestine, on the coast between Gaza and Rhinocorura (c.18km SW of Gaza). Josephus reports it as a maritime town in the 1st century BC.[119] On its anchorage, Diodorus (20.74) mentions that in 306 BC several of Demetrius' galleys while sailing from Gaza were thrown by a storm onto Raphia, described as

---

[117] *TIR* s.v. 'Gaza Maiumas' p.175; "From Maiuma to Gaza: one mile." (Anon. Placentinus, *Itinerarium* 33 (c.570 AD).
[118] Ptol. (*GH* 5.17.20-1) wrongly puts coastal Palae-Byblos inland (Lemprière 1822:77; Renz 2000; Grote 1987:266).
[119] "[Jannaeus] made an expedition upon the maritime parts of the country, Raphia and Anthedon, (the name of which king Herod after changed to Agrippias) and took even that by force" (*AJ*. 13.356; 13.395-97 on inland Gadara).

“a city which affords no anchorage and is surrounded by shoals”. In *Itinerarium Antonini* (AD 285-305), along the Sinai region (on *Via Maris*) Raphia is included in the list of coastal towns. It also appears on the Madaba Map placed on the coast (Fig.6.20). Talmudic sources link Raphia with biblical Hazerot/Hazor (T.Sabbath 10:13, p.124; M.Sabbath 11:5, cf.Patai 1998:139), located some distance from the coast. Thus, possibly Pliny and Ptolemy were referring to this inland town when listing Raphia in the interior, rather than the port. As seen previously with Antaradus and Marathus on the Syrian coast, similar confusions on the positioning of certain towns are apparent along the Southern Levant, as shown with Raphia. In this case, however, Strabo incorrectly includes Gadaris in his coastal account of Phoenicia, after Iamneia:

> “In the interval is <u>Gadaris</u>…then <u>Azotus</u> and <u>Ascalon</u>” (*Geog.* 16.2.29). / “Next and near Ascalon is the harbour of the Gazæi. The city is situated <u>inland</u> at the distance of seven stadia…Next to Gaza is <u>Raphia</u>...” (*Geog.* 16.2.31).

Yet, he then states that it in fact belongs to Judaea,

> “…Gadaris, which the Jews have appropriated to themselves” (Geog. 16.2.29).

It is likely Strabo has mistaken Gadaris with Gezer/Gazara (Tel Gezer), at the foothills of the western edge of the Shephelah, overseeing the coastal plain (Safrai 2005:251; Ortiz and Wolff 2012:4). The actual site of Gadaris (Umm Qeis) is an inland town, east of the Jordan River, and was part of the Decapolis in the Graeco-Roman period.[120] As in the case of Raphia, the harbour of Anthedon (Khirbet Teda, #L34) is incorrectly described as an inland town:

> “…and, **in the interior**, Rhaphea, Gaza, and, still **more inland**, Anthedon” (NH 14.5.14).

Anthedon is in fact a coastal town, 3 km north of Gaza and c.1 km from the sea. Ptolemy correctly positions it on the coast after the harbour of Gaza (16.2).[121] In the cases of Gaza and Raphia discussed, the ancient authors’ misrepresentations could be due to them being “twin-settlements”. In contrast, this is not the case with Anthedon, which was established as a maritime town with no linked inland town/administrative centre, acting primarily as a port of trade (Patai 1998). With this in mind, why has Pliny incorrectly positioned it inland? No other ancient sources seem to have made this confusion (e.g. Strabo, in which we often find parallels with Pliny, lists it on the coast). To establish stronger links on such types of patterns between coastal and inland sites, further future archaeological research would be required.

---

[120] Gadara Region Project I: www.tallziraa.de/Gadara-Region-Project/1_325.html. Vieweger and Häser 2010. Das “Gadara Region Project”. *Der Tell Zerāʿa in den Jahren 2007 bis 2009. ZDPV* 126(1):1–28. See Fischer et al. 2008:155.
[121] Other authors place it on coast (e.g. Jos. *AJ.* 13.396,18.58; *BJ.* 1.416, Steph. Byz.; Sozomenos *Hist. Eccl.* 5.192). For archaeological information on Anthedon site: Abel (1938:244-45); TIR: Iudaea-Palaestina, p63; Dussaud (1927).

6.2.4.6 Discussion and Summary of Twin-Settlements:

Determining explicit connections between ‘twin-settlements’ in the landscape/archaeological record is a complex issue. Interpretations are reliant on a range of considerations relating to: distance between an inland centre and its presumed harbour-town; scale/political importance of the settlements during the period in question; ancient authors’ personal knowledge of the region and the context/dates of the sources they used; and, most significantly, whether there is available supporting archaeological material from excavations and surveys at these specific sites (and hinterland areas) in which direct links between the sites can be identified or implied. Types of evidence that can be discerned from the landscape/archaeological record include:

a) Presence of a road or navigable river that runs from the coast to the interior linking the two sites (as presented earlier for Yavneh and its port Yavneh-Yam – i.e. Iamneia/Iamneia Paralios - and a possible link suggested with the nearby river, Nahal Soreq - 6.2.4.1). Other similar types of evidence for such links include bridges and walls/fortifications (as attested in Greece, e.g. Athens and its port Piraeus (twin-settlements) were enclosed/linked by “long walls”, Ch.8). Moreover, river mouth harbours also served as connections for coastal harbours and their sister harbours upstream (7.1.1.2).

b) Evidence of trade artefacts attesting to active exchange-communication between the people/towns in this region during the Roman period (this link can be further supported if the inland centre reveals a significant number of foreign trade items at the site, suggesting that they likely originated from the coastal harbour/trade port).

Despite the confusions or misrepresentations of some sites, certain cases do demonstrate that some of these ancient authors (e.g. Pliny, Ptolemy, Strabo) distinguished associated coastal and inland towns, and implied an awareness of their links, though such occurrences are rare in the Levant and not consistent throughout their works. Their overall representation of this coastal landscape and the state of the towns presented (or omitted/misplaced) was likely primarily influenced by socio-political/economic circumstances (resulting from the many sieges, and subsequent restorations of several towns during this period at several sites).

6.2.5 Reflections on Harbour Terminology in the Levant

Ancient Greek and Latin[122] harbour terminology can reflect a harbour's functional or morphological features. Thus, to aid in understanding the complex nature and role of these settlement patterns (and their representations by ancient geographers), it is worth reflecting on the meaning of the various harbour terms in the context of the Levantine coast (Table 6.4; see Rougé 1966; Lehmann-Hartleben 1923:24-6; Blackman 1982:193; Leonard 1997; Medas 2009-10; Bonnier 2008:54-7). This builds onto cases explored later (Ch.7.2) through a practical approach of *SMM's* use of navigational terms such as *euthyploïa* ('straight-line sail', Ch.7.2.2).

Along the described journey of the Levantine coast, ancient authors generally refer to terms such as **χωρίον/*chōríon*** ('place')[123] and **Λιμὴν/*limen*** (harbour/port/haven). *Limen* is the most common term in ancient sources, though the wide range of *limenes* varies in type and quality (Arnaud 2009:174). More specifically it represents a large well-protected port (Rougé 1966:115-8). In the Levant, *limen* is used, for example, for Arados, Trieres, Berytus (Ps.-Skylax 140), Gaza (Strabo, *Geog.*16.2.30), and Leukos Limen (*SMM* 139-40) (see Buşilă 2012:235).[124] *Limen* also appears in its derivative forms as qualifying adjectives (Rougé 1966), such as **εὐλίμενος/*eulimenos*,** 'with good harbours, of fine quality', as attributed to Laodiceia (Strabo, *Geog.*16.2.9), while Sidon is **εὐφυεῖ λιμένι/*euphuei limeni***, 'of good natural disposition; naturally suited or adapted' (*Geog.*16.2.22). Certain coasts, in contrast, were deemed **ἀλιμένου/*alimenos***, 'harbourless, shelterless', such as Arados' shores (Strabo, *Geog.*16.2.13; see Ch.8.1.1.1 for *SMM's* 'harbourless' cases in other regions). *Limen* can also be accompanied by adjectives denoting a port's character such as **λιμὴν κλειστός/*limen kleistos*,** 'closed/fortified port' (e.g. Sidon and Berytus, Ps.-Skylax 104; Lehmann-Hartleben 1923:68). Regarding the Levantine 'deserted settlements' discussed (6.2.3), certain *limenes* were described as **Λιμὴν ἔρημος/*limen eremos*,** 'deserted harbour'. This term may reflect a harbour's abandoned state, or denote its poor facilities or lack of shelter (cf.Counillon 1998).[125]

A term similar to *limen,* that prevails in Roman age/Byzantine texts, is **ἐπίνειον/*epineion***, which tends to denote a port used by a nearby political centre, city or community (*asty/polis*), often further inland (as seen at Levant twin-settlements, e.g. Iamneia/Iamneia Paralios, 6.2.4;

[122] The focus is on the Greek terms, as there are many words (and variants) to refer to ports, while the Latin has one, *portus*, which has to cover the same semantic space as the many Greek words (each language has distinct semantics) – see, for example, Liddel and Scott 1996's 'Greek-English Lexicon', Glare 1976's 'Oxford Latin Dictionary', and TLG.
[123] Vague term referring to any named 'place', not necessarily denoting a 'village'; see Hansen and Nielsen 2008:31. Examples in the Levant where the *Stadiasmus* uses χωρίον/*chorion*: *SMM* 129 (for Balanea) and 133 (for Palteni). See Foraboschi (1988:179) on Strabo's use of terms such as *polis, metropolis, kome, chorion* as linked to decline.
[124] Ptolemy accompanies places with *limen, emporion* or *colonia* (e.g. Hispania-Gallia) - though not in the Levant.
[125] For Ps.-Skylax, Aupert proposed to correct *eremos* to *therinos*, 'summer port' (cf. Aupert and Hellmann 1984:14).

Rougé 1966:109-110; Lehmann-Hartleben 1923:24-6). It can also mean 'arsenal' as with Carnus in Strabo (*Geog.*16.2.12), though in *SMM* 128 it is described as **σαλος/*salos*,** 'open roadstead'. The term **ἐμπόριον/*emporion***, 'commercial centre', is only used in the Levant by the *Stadiasmus*, for Antiochia-on-the-Orontes (*SMM* 164). Additionally, **ὅρμος/*hormos*** (and its derivatives) is also used in ancient sources to mean 'roadstead/anchorage' (Rougé 1966:116), often accompanied by adjectives relating to a port's capacity, such as 'for summer', 'for all types of ships', 'for small ships', and 'during the summer winds' (*SMM* 39, 14, 57, 63; Table 6.4).

The range of harbour terms used in the ancient sources can thus be indicative of the functional, morphological or technical characteristics of the harbours, further supported by archaeological evidence of these Levantine portuary sites. The representations of harbours (and their status) in ancient accounts may reflect the authors' knowledge of the described coastal stretch, or alternatively echo biased/political motives, as well as the use of earlier/out-of-date sources.

SIMPLIFIED KEY HARBOUR TERMINOLOGY FOR THE LEVANTINE COAST			
Ancient Greek		**Transliteration**	**English Meaning**
Λιμήν :		*limen*	harbour/port/haven
Derivatives/ Adj. of Λιμήν	• εὐλίμενος	*eulimenos*	'with good harbours/fine quality'
	• εὐφυεῖ λιμένι	*euphuei limeni*	'of good natural disposition'
	• ἀλιμένου	*alimenoy*	harbourless/shelterless
	• λιμὴν κλειστός	*limen klistos*	closed/fortified port
	• Λιμὴν ἔρημος	*limen eremos*	deserted port, or with poor facilities/shelter
ἐπίνειον / ἐπίτομον		*epineion*	port used by political (inland) centre cf.twin
ορμος/ ὅρμος :		*hormos*	anchorage/mooring/roadstead
Derivatives/ Adj. of ὅρμος	• ὕφορμός / ὕφορμος	*euphormos*	small anchorage
	• …θερινός	*therinos*	'for summer'
	• …τοῖς ἐτησίοις	*tois ethsiois*	'during the summer winds'
	• …παντοίαις ναυσίν	*pantoiais naysin*	'for all types of ships'
	• …πλοιαρίοις μικροῖς	*ploiariois mikrois*	'for small ships'
σαλος / ἐπίσαλός		*salos/episalos*	open roadstead
ἐμπόριον		*emporion*	commercial centre

Table 6.4 Simplified Key Ancient Harbour Terminology for Levantine Coast. Definitions based on studies by: Rougé 1966; Lehmann-Hartleben 1923; Blackman 1982; Leonard 1997; Arnaud 2009; Counillon 1998; Bonnier 2008; Buşilă 2012; Kiesling and Isaksen 2014; Liddell and Scott 1996; Hansen and Nielsen 2008. Note: Use/meaning of these terms is dependent on context (e.g. source, period, region, politics/bias).

6.2.6 Overall Summary & Reflections of Theme A: "Static"

Through approaching the dataset within the framework of "Theme A: Static", two significant patterns emerged from the collated data: (i) Deserted Settlements; and (ii) Twin-Settlements. [126] Regarding such patterns in the Levant, there are several inconsistencies and confusions amongst the ancient authors, likely linked to lack of first-hand information and mix of sources:

[126] These sites were derived from the database developed for this research (appendix i), which identified coastal places and geographic features (e.g. mountains, rivers) based on ancient and modern/archaeological sources.

(i) "Deserted Settlements" (6.2.3):

The pattern of 'deserted settlements' emerged from comparing the presence/absence of the main coastal sites in the case-study region (based on ancient and modern sources; Table 6.2), from which cases were explored where textual accounts contradict archaeological evidence:

- This misrepresentation was particularly attested at Dor (as well as Gaza and Sycaminon), where archaeological evidence confirms continuous activity throughout the period.
- For cases mistakenly considered 'deserted' or 'inland' by ancient authors (e.g. Gaza and Raphia, respectively), this could potentially be linked to their "twin-settlement" nature.

Interpretations for the disagreements presented in these cases were potentially linked to: a) ancient authors' lack of first-hand knowledge of this coast; b) information for certain sites derived from earlier/outdated sources (not always easy to identify which), (c) bias/political motives. A probable reason is that, as is often the case, they likely consulted multiple sources. Certain cases may also reflect a harbour's poor quality of facilities/shelter (Counillon 1998).

(ii) "Twin-Settlements" (6.2.4):

This phenomenon of "twin settlement" (i.e. inland centre and linked harbour-town), particularly evidenced along the Southern Levantine coast, represent a characteristic feature of this landscape with the potential to provide significant insights into aspects relating to: spatial arrangement of places; environmental/political/economic shifts causing communities to adapt and modify the landscape/settlement distributions; and coastal vs inland links and perceptions. Several observations from the data were identified:

- Regular distances between the harbour-towns and their inland centres: ranging c.3-6km. These cases were regionally isolated to the Southern Levant due to its topography.
- Certain twin- settlements are explicitly differentiated as such by ancient authors: e.g. Iamneia/Iamneia Paralios (Pliny; Ptol.) and Gaza/Harbour of the Gazaeons (Strabo; Ptol.). However, such distinctions are scarce and do not appear to have been common practice.
- Often hard to ascertain direct links between the associated coastal and inland sites. Potential evidence: roads, rivers, bridges, walls; trade goods (especially foreign items).
- Potential link with the pattern of "deserted" settlements. Certain places considered by the ancient authors as "abandoned" that we know were active, or those mistakenly said to be inland, yet we know were located on the coast (and vice versa). In certain cases, these types of "errors" could be linked with confusions between these settlements.
- Analogous cases are attested in: (a) different periods (e.g. on estuarine rivers in MBA), and (b) different regions (e.g. Greece, Crete, Italy, Carthage - discussed in Ch.8.1.1.2), to find links or variances in how/why they developed and the way they were represented.

(iii) Concluding Discussion:

Determining the connections between these settlements is a complex issue, as it is dependent on various factors and contexts. Regarding the cases of misrepresented 'deserted settlements,' most appear to reflect the ancient authors' use of early/out-of-date sources, further suggesting those passages were not written based on first-hand experience of the coastline in question. The term *eremos limen* tends to also denote a harbour poorly sheltered from a storm (Counillon 1988:61-2). As highlighted in this chapter, the term *eremos* can thus reflect a geographic reality intertwined with political, military or conceptual connotations.

This complexity is further evidenced when interpreting twin-settlements, as establishing their physical relationship may depend on the extent of the excavations carried out on a site and whether there are clear links between the inland town and its port (e.g. a road/river/bridge/wall connecting the two places, trade artefacts suggesting exchange and activity between them during the same period, etc.). This evidence is not always available or clear, which makes it hard to determine. As well as misinformation, an alternative perspective could be that some of the settlements were in fact twin-settlements, and so the authors were either referring to the inland town or seaport only (but not explicitly distinguishing the two).

Furthermore, the natural maritime conditions of the landscape, as well as commercial and political events in the region, eventually led to the development of the aforementioned "twin-settlements," often reflected in ancient sources, as well as modern/archaeological evidence.

Overall, the various patterns explored under the "static" theme generally reflect a perspective of this region that is largely influenced by multiple sets of sources (of a varying nature), likely including earlier and out-of-date information, reflecting a world changing over the time represented in the ancient sources. Differences in the authors' perceptions are influenced by a difference in purpose, society and change over-time. The patterns explored further emphasise the complex issues linked to the textual tradition and technical terminology adopted, which led to transmission errors and inconsistencies in their representations. Nonetheless, their representations serve to highlight the importance of maritime places and activities in this area and the interconnectivity between harbours/trade-centres on the coast with those in the hinterland or further inland.

Chapter 7: Theme B – "MOVEMENT": Navigating the Coastal Landscape

By approaching the dataset within the framework of Theme A (Static), two significant patterns emerged from comparing the 'presence and absence' of the coastal sites in the Levant region: (i) deserted settlements; and (ii) twin-settlements (Ch.6.2.3-4). Although these patterns generally portray representations of the landscape influenced by mixed sources (often older and out-of-date), they nonetheless show an awareness of the maritime landscape (and its regional significance), as well as reflecting the various geopolitical transitions of the Roman period (and earlier). Following on, the current chapter approaches the dataset through Theme B (Movement), exploring the environmental dynamics in the ancient sources compared to the reality of the landscape, including navigational markers (mountains/promontories, rivers, islands: 7.1.1.1-4); and references to winds and how it reflects the authors' grasp and use of winds for navigation (7.1.2). It then examines the sources' use of travel distances and their representation of seafaring routes and voyages (7.2), through a hypothetical journey (7.2.2-3). This raises the question as to which authors experienced these voyages or had a sense of seafaring, and to what extent the mariner's practical experience influenced their perceptions.

7.2 ENVIRONMENTAL DYNAMICS

The physical features of the landscape played a vital role as natural landmarks, boundaries and means of communication and movement. Shifts in these coastal and riverine landscapes would have impacted transportation and exchange between places and people, and in turn influenced cultural practices and perceptions of the landscape (Ch.3.2). This section explores some of the diverse ways the ancient study-authors attempt to represent the relation between the coastal geographic features, maritime activities and people. As aforementioned (Ch.3.4.1), whether undergoing short or long voyages, mariners applied sensory navigation as a means of creating mental-maps while moving through the seascape, particularly along the Levant coast, which "comes into view only six to eight nautical miles out" (Davis 2001:29). Aspects of visibility (e.g. chromatics and elevations) thus played a key role (Ch.3.4.1),[127] with regional variations in topographic and meteorological conditions influencing way-finding and the distinction of visible navigational markers. Geographical features such as promontories or gulfs are less distinguishable from a distance. The relevance of such features being mentioned in

[127] Factors impacting visibility at sea include: geographic range and haze (Davis 2001:24).

ancient texts was linked predominantly with their role in the context of navigation or establishing spatial associations on a journey, rather than their height, often serving as start or end points between places/features, natural boundaries or anchorages (Arnaud 2014:59-60). This section thus explores the coastal topography as represented in the ancient study-sources on the Levantine coast (Fig.7.1-2) and how they relate to the reality based on available evidence. Comparing places and features in the accounts with those in the actual landscape, then and now, allows us to paint a better picture of the dynamic setting, the way people moved within it (descriptively and in actuality) and how they chose to depict this reality.

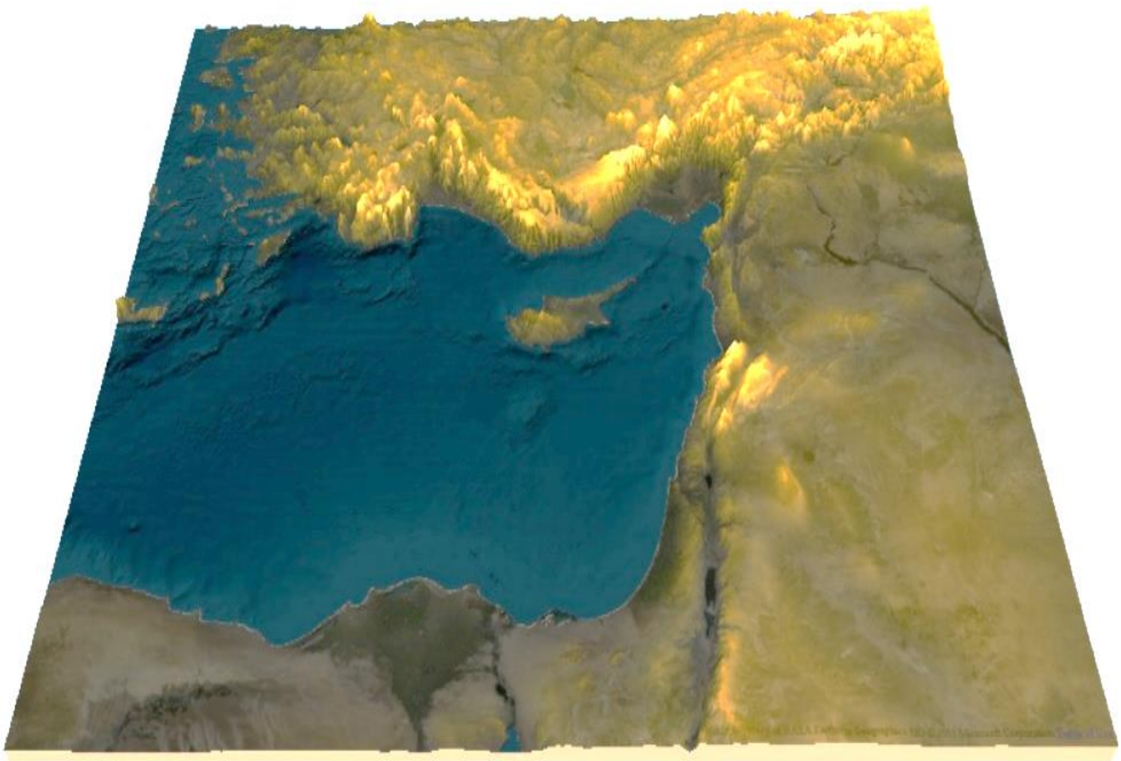


Figure 7.1 Overview 3D MAP of case-study region of the Levantine coast, highlighting contrasting elevations and landmarks to be used as a reference for next section 'Navigational Makers', particularly 7.1.3.1 (Map produced by author, using QGIS2.8.2 - Basemap: ©Bing Aerial Layer; DEM: SRTM_1km).

7.2.1 Navigational Markers

In ancient navigation, landmarks played a structural role in the mariners' understanding of the seascape, and subsequently, the geographers' arrangement of this space (Fig.7.2; Ch.3.1-4). These types of details aided mariners navigating this region and were considered noteworthy to the ancient study-sources. Thus, the next sections draw out significant **natural navigational markers** inherent in the texts, divided into: mountains and promontories (7.1.1.1); rivers and river mouths (7.1.1.2); and islands and 'palaeo-islands' (7.1.1.3), in relation to sea journeys and noteworthy **artificial navigational markers** (e.g. towers, lighthouses, shrines)(cf. 7.1-2).

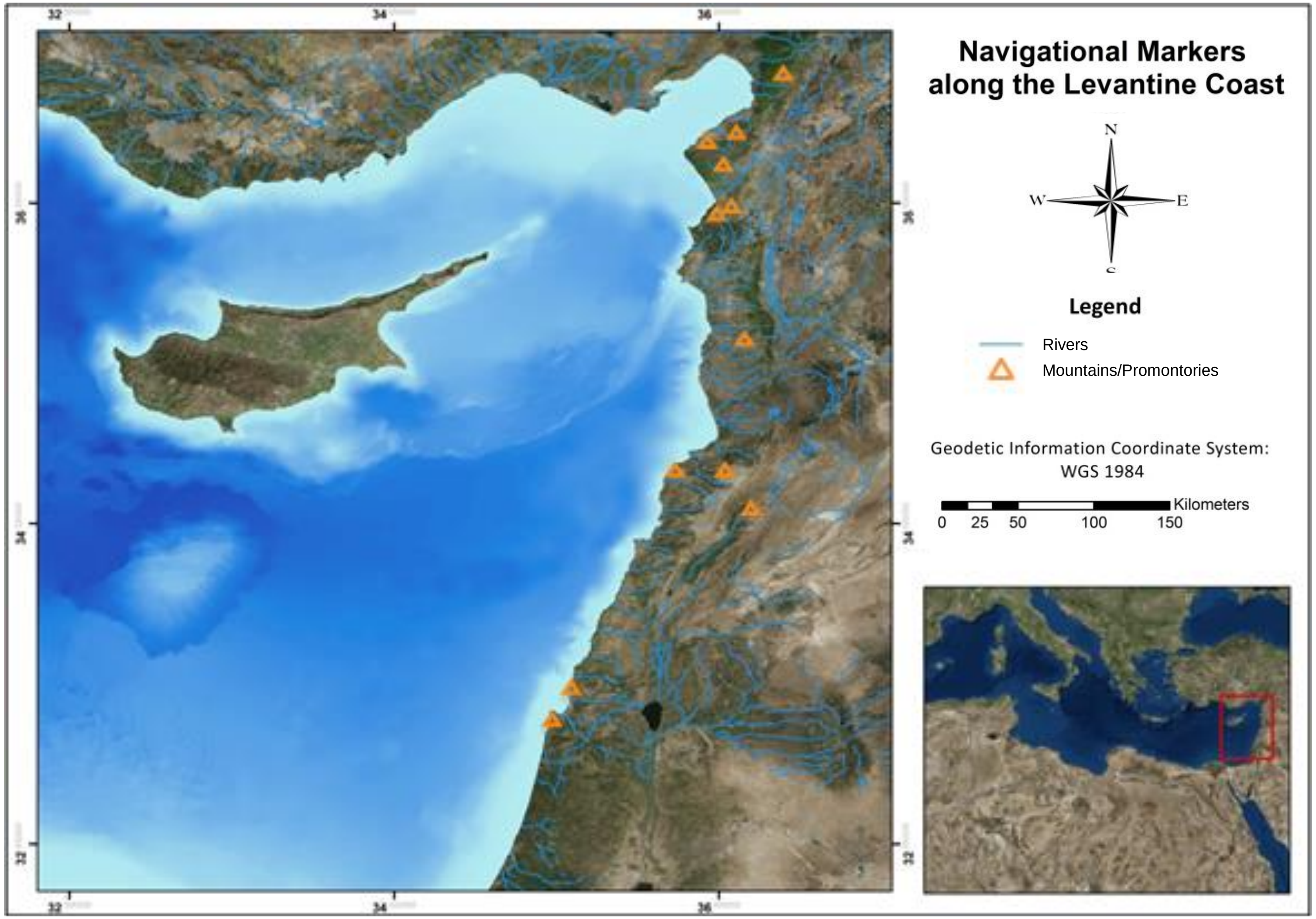


Figure 7.2 Navigational Markers along the Levantine coast: Mountains/Promontories; Rivers; and Islands (as a reference for 7.1.1.1-3).

7.2.1.1 Mountains and Promontories: Visibility, Protection and Boundaries

Mountains and promontories are featured prominently in the ancient sources (Table 7.1, Fig.7.2). Elements of visibility can be discerned in relation to navigation, such as elevated and chromatic[128] landmarks to aid mariners' mental-maps (Morton 2001:197; Semple 1908:72-90).

NAVIGATIONAL MARKERS: MOUNTAINS/PROMONTORIES	STRABO	MELA	PLINY	PTOLEMY	STADIASMUS
Amanus Mons **Nur Dağları, TKY**	Mt. Amanus, 16.2.1	Mt. Amanus, 1:69, p54	Mt. Amanus, 5.18.21	Amanus Mt., 5.15.1	Amanican Gates, 157
Rhossic Rock (Scopulus) **Hinzir Burun, TKY**	-	-	Rhosian Mts., 5.18.21	Rhossic Rock, 15.2	Rhosican Scopelus, 164
Pieria Mons **Kızıl Dağ, TKY**	Piera Mt. 16.2.8	-	-	-	-
Casius Mons **Jebel el-Akra, TKY**	Mt. Casius 16.2.5, 8	Mt. Casius 1:61, p52	Mt. Casius 5.18	-	Casium, 145
Anti-Casius Mons/ Thronos **Kara Douran Dağ, TKY**	Mt. Anticasius 16.2.5, 8	-	-	-	Mt. Thronus, 143
Bargylos Mons **Jebel Ansariye, SYR**	Mt. [Bargylus] 16.2.8	-	Bargylus, 5.17	-	-
Antilibanus Mt. **Jebel esh-Sherqi, LEB**	Mt. Antilibanus 16.2.16	-	Mt. Antilibanus 16.2.17, 19	-	-
Libanus Mt. **Jebel Lubnan, LEB**	Mt. Libanus 16.2.16	-	Mt. Libanus 5.17, 19	-	-
Theou Prosopon **Ras es-Shaqqa, LEB**	Theoposopon, 16.2.15, 18	Theuprosopon, 1:67, p54	-	Theuprosopon, 15.4	-
Klimax Tyrian **Ras en-Naqura, LEB**	Mt. Climax, 16.2.19	-	-	-	-
Carmel Mons **Hor Carmel, ISR-PAL**	Mt. Carmel, 16.2.27	-	Pr./Mt. Carmelus 5.7.19	Karmelos Mt. 15.5	-

Table 7.1 Navigational Markers: Key Mountains and Promontories along the Levantine coast (according to the ancient study-authors and the modern landscape). These are highlighted in bold in the text.

While navigating southward along the Levantine coast (Fig.7.1-2), mariners sailing from Cilicia reach the Bay of Iskenderun. At this point, the **Amanus** Mountain range appears into view and acts as a physical and political-cultural boundary in this region, as evidenced by Strabo's delineation of the province of Syria, said to be *"bounded on the north by Cilicia and the mountain Amanus"* (*Geog.* 16.2.1; also the border in Pliny, *NH* 5.19). This is the point at which the shape of the landscape curves and marks the start of the characteristic rectilinear coastline of the Levant, by which mariners would have adjusted their sails and trajectory accordingly, taking advantage of the prevailing winds. According to Strabo, continuous with the mountains Amanus and **Rhosus** was the mountain **Pieria**, by the coast between Issus and Seleuceia (Strabo, *Geog.* 6.2.8; Pliny, *NH* 5.19; Ptol. *GH* 15.2).[129] Together the three mountains form a connecting chain, guiding the mariner south along the rocky seascape of the Northern Levant.

[128] For the Levant region, examples of references to chromatic markers in the ancient study-sources include: "harbor called Leukas (White)" in *SMM* (139-40), or "the promontory known as White Harbour" in Pliny (*NH* 5.1.7).
[129] Here also rises Coryphaeum Mt., one of the southern peaks of Amanus Mt. (Polyb, *Hist.*, 5.59; Grainger 2004:70).

This visual line of reference was further extended by the high mountains **Casius**[130] and **Anti-Casius**[131] (Strabo, *Geog.* 16.2.5, 8; *SMM* 143), south of the Orontes River. Strabo's reference to Anti-Casius, "opposite Casius", highlights the north-south perspective of his described sailing voyage. Here the ancient authors add a more personal view alluding to the voice of a local or traveller observing the landscape and the conspicuous Mount Casius (Pliny, *NH* 5.18; Mela 1:61; *SMM* 144-5; Fig.7.3). Pliny, though exaggerated, implies visual significance of Mount Casius, adding a more personal view of an observer/traveller from a mountain top:

Figure 7.3 View of Mt. Casius (from border of S.Turkey).

> "…The height of this mountain is so vast, that, at the fourth watch of the night, you can see from it, in the midst of the darkness, the sun rising on the east; and thus, by merely turning round, we may at one and the same time behold both day and night. The winding road which leads to its summit is nineteen miles in length, its perpendicular height four." (Pliny, *NH* 5.18)

Similarly, Mela adds the view of an observer from Mount Casius, "being so elevated that, from the mountaintop, sunrise is visible from the fourth watch on" (1:61). As well as a boundary marker between Seleucia and Laodicea (*SMM* 143), Mount Casius functioned as both a navigational and sacred landmark for mariners, associated with the veneration of Zeus Casius ('Zeus of Mount Casius').[132] Coastal temples, shrines, and defensive towers/forts were often located on promontories which were clearly visible from the sea and thus served as valuable artificial landmarks for mariners navigating between harbours in the Levant (also prominent in ancient literature).[133] Promontories were thus often associated with religious/defensive symbols in ancient treatises. In this way, such features "continued the link between seafarer and holy patrons away from port, served as landmarks for navigation, and typically marked the location of freshwater sources" (Brody 2008; also Semple 1927; Morton 2001:189-201).

[130] I.e. modern Jebel Akra ('the bald mountain', derived from its bare limestone peak, which reaches c. 1.62 km): it is a high mountain rising abruptly from the sea (and the termination of the spur from Bargylus), south of river Orontes.
[131] *SMM* 144 states that, from Sidon to Chaladropolis, Casius Mts. act as a natural boundary dividing the landscape. Before Casius Mts, *SMM* 143 mentions high mountain Thronus (equivalent to Anti-Casius according to BAtlas 68 A2).
[132] Temples near Seleucia of Zeus, Apollo, deceased Seleukid kings. Evidence of Zeus Casius worship in Mt. Casius: Roman imperial coins, with sacred stone symbol; Graeco-Roman tiles stamped with Zeus' name (Cohen 2006:127-8)
[133] E.g. Discoveries at Nahariyah, Ashkelon, Mevorakh, Makmish, Tell Sukas, Kommos, Capo San Marco, Kition, and Ras ed-Drek show physical remains of the shrines that marked routes throughout the Mediterranean (Brody 1998). Due to their monumental nature/construction out of stone, Greek and Roman promontory temples or shrines better preserved - some still function as navigational aids for sailing the Mediterranean (Morton 2001:200).

Sailing further southward past the Casius and Anti-Casius mountains, as mariners reached the major seaport of Laodicea, the next distinct reference point is a mountain (**Mount Bargylus**),[134] which Strabo describes as overhanging the city with its summit at a great distance inland *"sloping gently and by degrees upwards from the city; but it rises perpendicularly over Apameia"* (*Geog.* 16.2.8; cf.*NH* 5.17). With this mountain range extending parallel to the coast for a long distance (c.114 km), surrounded by key navigable rivers (e.g. Orontes, Eleutheros), mariners could continue sailing following the mountain's line of reference until reaching the next navigational marker Cape **Theoprosopon**, terminus of Mount Libanus, adjacent to Tripolis (Strabo, *Geog.*16.2.25; also in Mela, 1:67, and Ptolemy, *GH* 15.4). An additional navigational guide on this stretch were the two parallel mountains **Libanus** and **Antilibanus**, a short distance from the coast, which Strabo says define the borders of Coele-Syria (*Geog.* 16.2.16).

From this point, the rugged coast reaches the '**Klimax Tyrian**' Mountains (which Strabo places between the Adonis and Lycus Rivers, *Geog.*16.2.19) crossing into the Southern Levant region, which possesses far less elevated landmarks or distinct peaks along the coast for mariners to reference (Galili et al. 2009:364-5). This mountain was described as a *"very high mountain called the Climax, or ladder of the Tyrians"* (Jos, *AJ.* 13.5.4; *BJ* 2.10.2), serving as the southern passage to the Plain of Tyre (the road used to narrow to a series of steps cut into the rock). A notable characteristic of this white-chalk promontory is the natural formation of the cliff's shape into a so-called "Elephant Leg" and its grottoes.[135] This is the only point on the coast of Southern Levant where a mountain slopes down into the sea without a sandy shore, and was once only accessible by sea.[136] To the south, **Carmel** promontory is one of the most prominent headlands on this coast, c.152m (Strabo, *Geog.* 16.2.27; Pliny, *NH* 5.7.19; Ptol. *GH* 15.5).

To grasp the element of movement from the view of a mariner, the following 3D Map (Fig.7.4, cf.7.1) serves to emphasise the contrasting elevations along the Levantine coastline which help to divide the landscape into a series of distinguishable reference points aiding orientation.

---

[134] Though unnamed in Strabo, likely corresponds to Mount Bargylus (which Pliny adds "is seen to rise", *NH* 5.17).
[135] Though a notable navigational marker on this coast, this geographic feature is absent in the other study-sources.
[136] From the Bronze Age, the ancient coastal route (western section of *Via Maris*) passed at Ras en-Naqura and there was no other crossing point near to the northern side of the coast (Frankel and Getzov 1997).

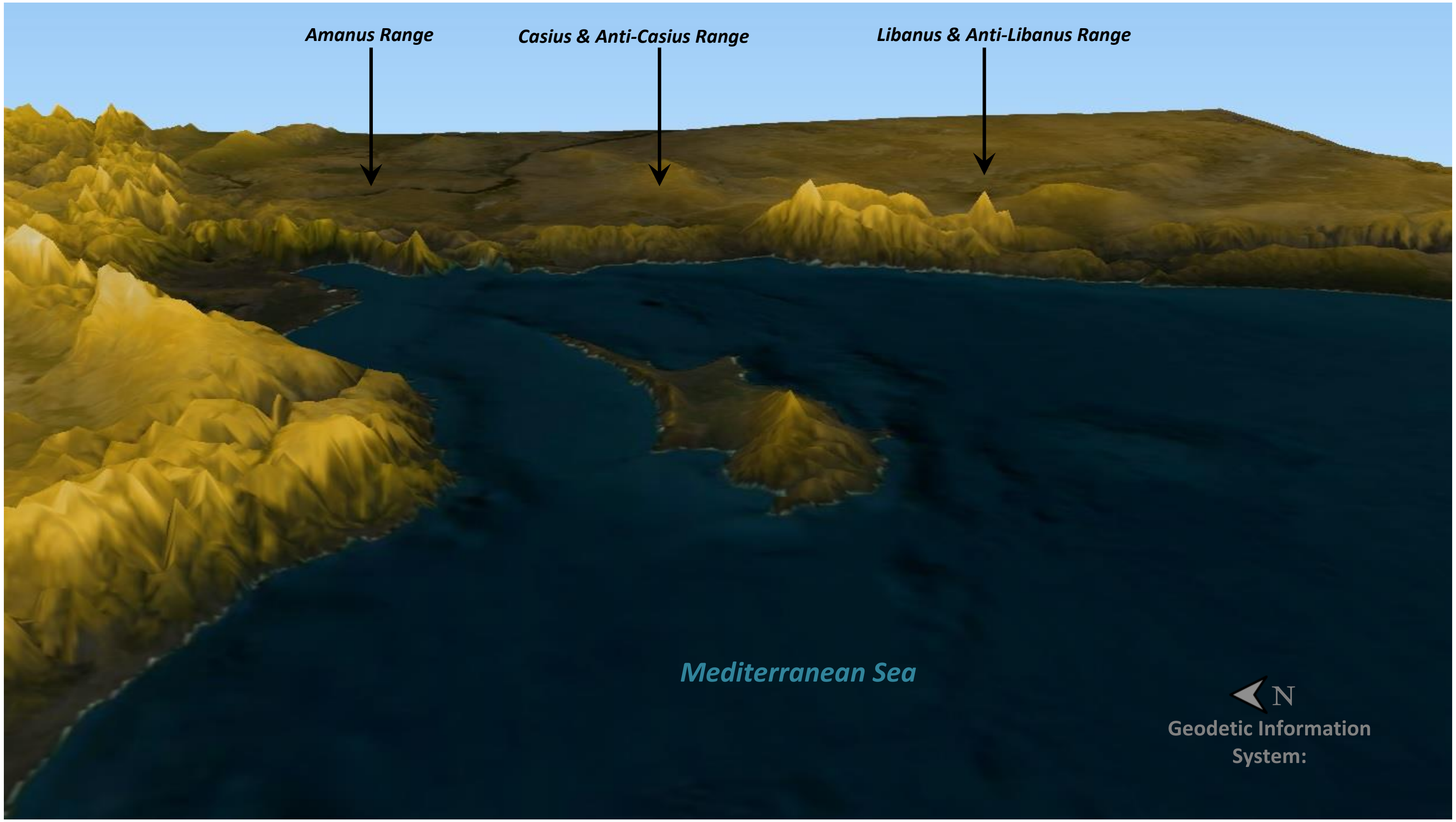


Figure 7.4 Navigational Markers: 3D Map of the Northern Levant region, highlighting key elevations observed along this stretch of the coast from the sea. (Map produced by author, using QGIS2.8.2. Basemap: ©Bing Aerial Layer; DEM: SRTM_1km).

7.2.1.2 Rivers and River Mouths: Anchorages, Borders and Distances

In Greek and Latin periplographic traditions, as with the sea, rivers act as a reference to guide a reader along the landscape or a journey. Strabo claims the “best known [towns] are those situated on the rivers, on the estuaries, and on the sea…due to their commercial intercourse” (*Geog.* 3.2.1). Along the Levantine coast (Table 7.2), river mouths played a notable role in navigation, mooring and moving goods upstream, linking the coast with societies in the region or hinterland (see Arnaud 2016a’s recent approach to fluvio-maritime ports; Campbell 2012).

NAVIGATIONAL MARKERS: RIVERS & RIVER MOUTHS	STRABO	MELA	PLINY	PTOLEMY	STADIASMUS
Hypatos river/ unknown, SYR	-	Hypatos R. 1:69, p54	-	-	-
Orontes R/ Nahr el-Asi, SYR	Orontes mouths	Orontes R. 1:69, p54	Orontes R. 5.18	Orontes mouth 15.3	Orontes R. 147
Damouras (Tamyras R)/ Kara Douran Dağ, TUR	-	-	-	-	-
Navigable river (?)/ Nahr el-Kalb?, SYR	Lycus R. 12.8.16, 19	Lycos R. 1:69, p54	-	-	‘Navigable river’ 136
Chrysorroas R. (Bardines?)/ Nahr Barada?, SYR	-	-	-	-	-
Eleutheros R/ Nahr el-Kebir mouth, LEB	Eleutherus R.	-	Eleutheros R. 5.17.20	Eleutheros mouth, 15.4	-
Adonis R/ Nahr Ibrahim mouth, LEB	Adonis R. 16.2.19	-	Adonis R. 5.7.20	Adonis mouth, 15.4	-
Phaidros R (?) (Lycos)/ unknown, LEB	Lycus R. 16.2.19	Lycos, 1:69, p54	Lycos R. 5.17.20	-	-
Leontes R/ unknown, LEB	Leontopolis 16.2.22	-	Leontos 5.7.20	Leon mouth, 15.5	-
Magoras R/ Nahr Bayrut, LEB	-	-	Magoras R. 5.17.20	-	-
Damouras (Tamyras R)/ Nahr ed-Damur, LEB	Tamyras R. 16.2.22	-	-	-	-
Meriyat R/ unknown, LEB	-	-	-	-	-
Bostrenos R (‘Ascleipeus')/ Nahr Bisri, LEB	-	-	-	-	-
Litas R/ Nahr Litani, LEB	Litas R. 16.2.24	-	-	-	-
Geato R/ unknown	-	-	-	-	-
Belus R/ Nahr Na'aman, ISR-PAL	-	-	Pacida/Belus R. 5.17.19	-	-
Chorseos R/ N. Daliya, ed-Diftle, ez-Zerka, ISR	-	-	-	Chorseos R. 15.4, 16.2	-
Crocodilon R/ Nahr Tanninim, ISR	-	-	Crocodilon R. 5.17	-	-

Table 7.2 Navigational Markers: Key Rivers and Rivers Mouths along the Levantine coast (according to the ancient study-authors and the modern landscape). These are highlighted in bold in the text.

The Rivers **Orontes**, **Eleutheros**, **Adonis**, **Lycus** and **Crocodilon** seem to be the major rivers noted by the ancient study-authors along the Levantine coast (Table 7.2). An unidentified river designed as ‘Navigable’ in *SMM* is believed to be the **Lycus** River of Strabo, Mela and Ptolemy (Ermatinger and Helmer, forthcoming). The **Leontes** River is in Strabo, Pliny and Ptolemy; while **Tamyras** and **Litas** Rivers are only in Strabo. Pliny is unique in mentioning **Magoras** and **Belus** Rivers; whereas **Chorseos** River only appears in Ptolemy (who considers it the boundary between Phoenicia and Judaea, *GH* 15.4, 16.2).The **Hypatos** River (and its town) is unique in Mela and unattested in any other ancient or modern sources.

Similar to mountains, rivers acted as natural boundaries. The **Orontes** River often served as a boundary marker between provinces (Austin 2004:1233). In his account of the Orontes River, Strabo says the journey from the sea to Antioch could be achieved in a day, adding that it was first called Typhon, then renamed Orontes after ***"****the man who built a bridge across it"* (*Geog.*16.2.7), adding a human character to it. This river was very influential in this region; Strabo even refers to it as *"the river-country of the Orontes"* (*Geog.*16.2.5) and Seleucia as being formally called Hydatos Potami ('Water Rivers') (16.2.8; see Cohen 2006:128). It is also used as a point for defining distances (e.g. *"and from Orontes to Orthosia 1130 stadia", Geog.* 16.2.34).[137] In Pliny, the Orontes River is said to divide Antiochia (*NH* 5.18.21), which *SMM* says had an *emporion* on this river (*SMM* 146; Ptol., *GH* 15.3). This river thus formed a major link between Antioch and the sea, where it also had a seaport (Seleucia Pieria; cf.Ch.6.2.4) – its navigability was prolongued by artificial rock-cut channels to overcome siltation (Paus.8.29.3).

Further south after Orthosia, Strabo tells us, though ambiguously, the **Eleutherus** River acted as a border *"river Eleutheros, which some make the boundary of Seleucis towards Phœnicia and Coele-Syria"* (*Geog.* 16.2.12; cf.Pliny, *NH* 5.17; Ptol. *GH* 15.4). Known/named rivers that could be distinguished on a journey served as useful landmarks, as well as indicators of fresh water sources (though the *Stadiasmus* frequently mentions the location of fresh water sources in his work, particularly for North Africa, such inclusions are surprisingly absent for the Levant). Certain places were also described in association to a river, such as Laodiceia near Lycus (Strabo, *Geog.* 12.8.16), to differentiate it from other Laodiceias. Rivers were often used as measurements of journey distances and markers of start-or end-points along sea routes[138], such as from river mouth to river mouth, or to harbour, or to other geographical markers, towns or trade-centres (Campbell 2012:52). Also, the Jordan and Lycus Rivers are said to be *"navigated upwards chiefly by the Aradii, with vessels of burden"* (Strabo, *Geog.* 16.2.16). Mela shares this notion of rivers and their connectivity when, north of Simyra and Marathus, he describes the coastline changing shape into a large gulf surrounded by wealthy, fertile lands:

> *"…the location makes them rich, because the fertile district, perforated by navigable riverbeds, exchanges and combines, in a ready traffic, the diverse riches of sea and land"* (Mela 1:68).

---

[137] Orthosia (Ard Arthusi, Leb.) was between Simyra and Tripolis, in Phoenicia, near the river Eleutheros to the south.
[138] *SMM* 136: From Gabala to the <u>navigable river</u> which is called * 40 stades./ 137: From the <u>navigable river</u> to the cape…<u>From that river</u> to Balanea 70 stades./ 147: From Nymphaeum to the city Antiochia, having an emporium and the <u>river called Orontes</u> alongside, 400 stades. The river is 15 stades away/ 148: <u>From the river</u> to Seleucia 40 stades

As demonstrated, Levantine coastal sites tended to be linked to a nearby river or stream, with river mouths serving as anchorages, navigational markers, fresh water sources and inland communication. Vessels would often use the *chôma,* a breakwater on the outside of a port, as a place for commercial exchange or unloading onto smaller vessels/barges moving upstream (Arnaud 2016a:3; see 7.2.3). This complex network was facilitated by secondary harbours along the coastal journey, as well as seaports functioning in tandem with fluvial harbours upstream, particularly with the advance of maritime trade in the Roman period. Moreover, as rivers are shiting features of the landscape, changes in the coast and associated rivers often led to settlement adaptation, as at Akko/Ptolemais, which caused a shift from the tel to the peninsula's bay, where an artificial harbour was built (Artzy 2015:206, 2012:6). The conditions of such fluvio-maritime secondary ports or moorings would have influenced route choices and efficiency of a journey (see 7.2; Arnaud 2011:417, 2016a; Raban 1985, 1991; Blue 1995, 1997).

Using rivers as a reference to compare links between places, features and people, ancient authors offer a holistic depiction of the landscape, making such geographical treatises "more than a presentation of a mere linear connectivity of areas and regions" (Campbell 2012:54).

7.2.1.3 Islands and Palaeo-Islands: Orientation, Shelter and Control

Few islands are mentioned along the Levantine coast in the ancient study-sources (Table 7.3). This coincides with the modern coast, with the exception of the island Arados (with its παραλία/*peraia*)[139] and several islets. Recent geoarchaeological studies of coastal tombolos/ breakwaters[140] and palaeo-landscapes show that in the past (pre-imperial period) certain harbour sites used to be islands, but became attached to the mainland over-time due to morphological coastal changes (e.g. Ras Ibn Hani, Sidon, Tyre - altered by natural and artificial actions; Carayon et al. 2011; Marriner 2007; Marriner et al. 2012, 2008a). In specific cases this phenomenon of 'palaeo-islands' is noted by ancient authors (e.g. Tyre in Strabo, Mela, Pliny).

[139] *Peraia:* mainland settlements politically controlled by an island-state (e.g. Strabo, *Geog.* 16.2.12-3; cf.Ch.8.1.14). The mainland territory/towns subject to the island-estate of Aradus included: Paltus, Balanea, Carnus, Enydra and Marathus. Moreover, Tripolis comprises the three cities of Tyre, Sidon and Aradus (e.g. Strabo, *Geog.* 16.2.15).
[140] *Tombolo* (spit)*:* sand isthmus linking palaeo-islands to the adjacent mainland (Marriner et al. 2008:377).

NAVIGATIONAL MARKERS: ISLANDS & PALAEO-ISLANDS	STRABO	MELA	PLINY	PTOLEMY	STADIASMUS
Macra (Longa) isl./ Isle of Hammam?, SYR	-	-	-	-	Macra island, 145
Arados isl./ Arwad, SYR	Aradus, 16.2.13, 15	Parabos/Arados 2:90	Arados 5.17.20	Arados, 15.27	Aradus, 128
Sidon (palaeo-isl.)/ Isle of Zire, LEB	-	-	-	-	-
Tyros (isl./palaeo-isl.)/ Sur, LEB	Tyre (former isl) 16.2.15, 22-24	Tyre (former isl) 1:65, p53	Tyre (former isl) 5.7.19	Tyros, 15.5, 15.27	-

Table 7.3 Navigational Markers: Islands and 'Palaeo-Islands' along the Levantine coast (according to the ancient study-authors and the modern landscape). These are highlighted in bold in the text.

The *Stadiasmus* is unique in mentioning **Macra** Island in his description of 'Syria Coele',

> "From Macra island to Nymphaeam 50 stades. All of this sailing is rugged from Casius. You sail to this place from land, 20 stades" (*SMM* 145).

In contrast, the rocky island **Arados** (Fig.7.5) appears in all the sources[141] and is described in detail for most, reflecting its role as a significant and active harbour and geographic feature throughout the Roman period (even though the importance shifted to Antaradus on the mainland from Ptolemy's time onwards). Strabo describes the *"arsenal of Aradus, which has a small harbour"* on the so-called 'maritime tract of the Aradii' (*peraia*), characterised by a 'harbourless seaboard' (*Geog.*16.2.12-3; cf.Ch.8.1.1.4 on *peraiai* in other regions). The island would have served as a key navigational marker on this stretch, offering shelter from prevailing winds and links with its mainland dependencies for water, re-supplies and trade. In *SMM's* extant section on the Levant, the island Aradus acts as the journey's start-point to **Carnae**, to which he adds anchoring/navigation details and advice, stating it *"has an open anchorage; there are berths for small ships; put in carefully"* (*SMM* 128).

Figure 7.5 Island of Arados, with Antarados lying opposite on the mainland (Source: Google Earth).

[141] Ptol. (*GH* 15.27) lists two islands in the Levant: Aradus, as one of the ***"islands near Syria"***, with the second being **Tyre, *"near the mainland"*** (he also lists Tyre beforehand as a coastal town in Phoenicia, *GH* 15.5). In Phoenicia, Mela mentions the island Arados (=Parabos), though places it in Book 2, which includes his account of islands (2:90).

Moving south along the coast, the next island a mariner would have reached was that of **Tyre**. Though a mainland settlement in the Roman period when the ancient study-authors were writing, they make reference to its 'palaeo-island' and breakwater formations (Fig.7.6), stating that the island of Tyre became attached to the mainland due to the semi-artificial breakwater created by Alexander the Great in 332 BC (Strabo, *Geog.* 16.2.22; Mela 1:65, Pliny, *NH* 5.17; Romer 1998:53).[142] Strabo compares the island of Tyre physically to the island of Aradus:

> *"…*wholly an island, built nearly in the same manner as Aradus. It is joined to the continent by a mound, which Alexander raised, when he was besieging it." (Strabo, *Geog.*16.2.22)

It is reasonable to assume Strabo had some direct knowledge of the region. He points out Tyre is famous in his day (*Geog.* 16.2.23)[143] and mentions that the sand of Sidon is sought for glass-making, of which he claims to have been informed by the glass manufacturers (*Geog.* 16.2.25; cf.Pliny, *NH* 5.17). A similar view of Tyre (and its 'palaeo-island') is portrayed in Mela and Pliny:

> "Tyre…once an island, but now tied to the mainland, because siegeworks were thrown up by Alexander, who at one time assailed it" (Mela 1:65)

> "…Tyre, formerly an island, separated from the mainland by a channel of the sea…but now joined to it by the works which were thrown up by Alexander when besieging it…" (Pliny, *NH* 5.17)

Ptolemy mentions both the coastal settlement of Tyre, and an island of Tyre (*GH* 15.5, 15.27).

These ancient representations of the landscape imply the authors' knowledge of coastline configurations, and corroborate with recent geoarchaeological research (e.g. Marriner et al. 2007, 2008:378; Fig.7.6) suggesting Alexander built the artificial breakwater on Tyre's shallow submerged proto-tombolo, thus strategically exploiting the coast's natural morphodynamics.

---

[142] Alexander used material from the ruins of the city of Tyre to build the causeway linking the island of Tyre to the mainland (Renz 2000). The old town of Ushu was a key fresh water supply for Tyre (and where its necropolis was).

[143] Strabo praises the Tyrians, "the great number and magnitude of their colonies and cities are proofs of their maritime skill and power" (16.2.23) and says Tyre was reknowned for its murex/dye and as the greatest Phoenician city, comparing it to its rival Sidon (which Mela considered the most important maritime city, 1:66). Sidon is protected from winds on W by a rocky island enclosing the harbour, N by a large range of islets/reefs, extending NE "strengthened by a continuous wall of huge blocks…[thus] a sheltering breakwater was formed" (Lipinsky 2004:290).

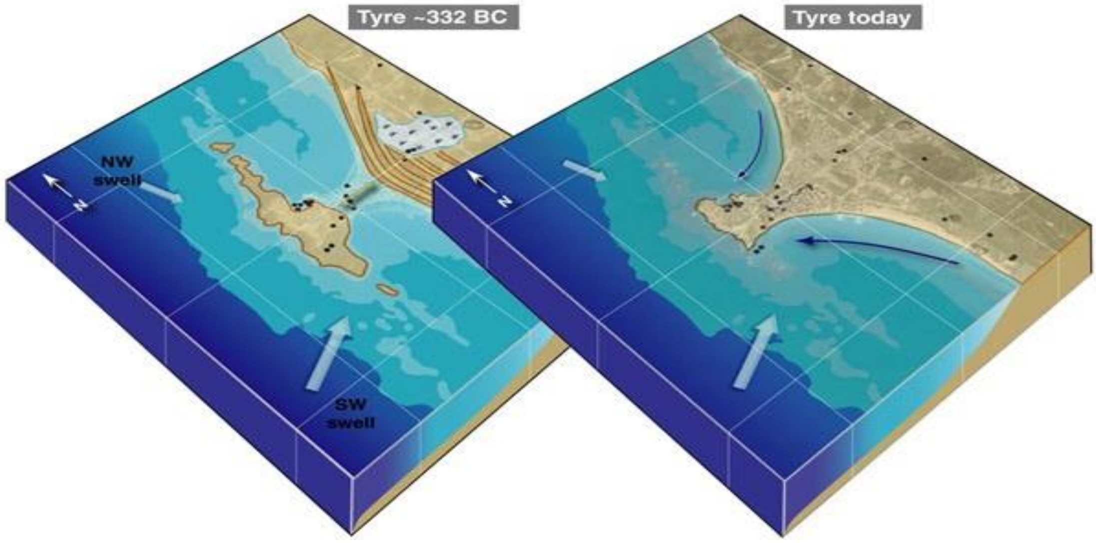


Figure 7.6 Morphodynamic evolution of Tyre and its breakwater/tombolo linking the palaeo-island to the mainland, between the Hellenistic period (4th century BC) and today (Marriner et al. 2010:26).

The types of harbours and anchorages (and their facilities/capacity)[144] along the Levantine coast would have influenced the impact of localised knowledge on a mariner's chosen sailing route, as well as possible stop-off points en-route (e.g. re-supplies, *cabotage*, or inland trade). Arados and Tyre comprised offshore island settlements and harbours (Marriner and Morhange 2007:507), comparable with the island of Zire at Sidon that functioned as a natural breakwater on the coast between the mouths of Nahr el-Awali and Nahr el-Litani (Carayon et al. 2011:9).[145]

7.2.1.4 Discussion

The various natural signs and landmarks depicted in these ancient treatises are interconnected with developing mental-maps, an acquired familiarity and experience of the seascape, and an ability to adapt to such dynamic settings through common sense geography. In this environmental context, features and places made sense and were perceived within diverse frameworks of spatial references and associations, whether positioned in reference to mountains, promontories, rivers, islands, or other familiar markers in the landscape. As highlighted (7.1.1.1-3), the function and representation of such major navigational features was of a multifaceted nature, serving as landmarks, anchorages and distance/boundary markers for both mariners and geographers. These references are not static; they change and are remembered depending on the context, forming part of the maritime cultural landscape

[144] According to Morhange (2007:450), stratigraphic/structural patterns reveal four key harbour types along the Levantine coast: (i) coastal peninsula harbours (Akko, Athlit, Sidon); (ii) offshore island harbours near the coastline (Tyre, Arwad, Zire); (iii) coastal lagoon and wadi harbours (Palaeo-Tyre, Dor); and (iv) composite harbours.
[145] Archaeological evidence, e.g. of seawalls and mooring, are still visible (Marriner and Morhange 2007:507).

(Ch.3.2). They are closely linked with past experiences, whether personal or hypothetical, based on mariners and travellers who sailed and made sense of the seascape.

The ancient authors' references and approaches towards this range of navigational markers and their context within the sea journeys suggest that mariners sailing the Levantine coastline often perceived the coast as a series of anchorage nodes, in which the connected features formed a continuous line of reference and guidance. In this context, at times less conspicuous features could also serve as useful intermediary navigational markers en-route, such as stopping-points for water/food re-supplies, shelter and small-scale trade, which can add to the knowledge of localised navigation. In coastal sailing, "minor headlands and inshore islands were points to steer by" (Semple 1908:77). Moreover, references to islands and formation of breakwaters/tombolos in the ancient accounts reflect an understanding of these types of morphological changes of the coastline, as well as human influence in shaping it. This was also the case with rivers and fluvio-maritime anchorages, which were often impacted by dynamic changes of a coast and its associated river's morphologies, in turn leading to adaptations of settlement/harbour distribution by the local maritime communities. The interaction between the prevailing maritime conditions and ships' capabilities either limited or encouraged the choice of particular harbours or anchorages along the Levantine coast (see 7.2.2-3).

The nature and role of the physical features described in these ancient treatises thus echo an awareness and ability of people to memorise and arrange distinct features in the landscape as useful markers for navigating and ordering space in the Roman period.

7.2.2 References to Winds and Orientation

Thus far, it is evident from the data presented that the Levant's maritime conditions and coastal topography played an active role in developing and shaping ancient authors' descriptions and, hence, their perceptions of this coastal landscape. This section looks into references to winds in the ancient study-sources and their grasp of their influence, particularly in the context of travel directions and sea journeys (7.2), as distances are closely associated to wind orientation. References to prevailing or favourable winds occur regularly in ancient accounts and mariners in the Graeco-Roman world were familiar with sailing and navigational benefits of local land/sea breezes (Morton 2001:51; Leidweinger 2013:3303-5). Winds described do not always match the reality (Arnaud 2014:56-57); though in certain cases, they do relate to actual winds and directions.[146] Cases are discussed in 7.2.2 in relation to the following questions: Do the ancient sources always refer to winds in the same context or do they use them differently? Are there patterns between the authors? How do the references and descriptions relate to the reality of the landscape and its maritime conditions? It is worth noting the wind names are not entirely standard and the number of winds increases over time (which is implied here by showing four winds with different directions, Table 7.4; cf.Ch.4.1.4.2):

Winds from Wind-Rose (Greek)	(Latin)	Orientation
Aparktias	Septembrio	NORTH
Boreas	Aquilo	NE – NNE
Kaikias	Caecias	ENE
Apeliotes	Subsolanus	EAST
Euros	Vulturnus	SE – ESE
Phoenikias/Euronotos	Phoenices/Euronotus	SSE
Notos	Auster	SOUTH
Leukonotos/Libonotos	Libonotos	SSW
Lips	Africus	SW – WSW
Zephyrus	Favonius	WEST
Argestes	Corus	NW – WNW
Thraskias	Thrascias	NNW

Table 7.4 Winds from Wind-Rose(based on Arist. *Met.*2.6; Pliny, *NH* 2.46-8).

This section presents references to winds and directions in the context of navigation and seaborne journeys (whether following the coast or crossing open-water), according to the ancient study-sources and their accounts, in order to discern patterns between them and see how they compare on a practical level to reality. Regarding winds, particularly related to sailing orientations and sea journeys, the *Stadiasmus* is the only source amid the ancient study-authors who offers cases specifically relevant to the Levant. Therefore, it serves as the main source of reference in this discussion, as well as on the *euthyploia*/straight-line sail cases explored later (7.2.2-4; cf.Ch.8.1.2.2 for parallels in other regions and ancient authors).

7.2.2.1 Wind References: *The Stadiasmus*

The *Stadiasmus* provides useful details on aspects of navigation and orientation, with certain passages specifying wind names in association to wind directions or directions of a sailing course (Arnaud 2014:51; Thiering 2014). In some cases, the author provides the direct shortest routes for a maritime journey (see 7.2.2 for analysis of '*euthyploïa*' vs. 'described' routes). The following winds are specifically mentioned in the *Stadiasmus* (Arnaud 2010:157-8; Table 7.5):

[146] As discussed (Ch.5.1.3), prevailing Mediterranean regional wind patterns are comparable to present conditions (Murray 1987, 1995:33). Source for modern winds: www.windfinder.com; Wind & Wave Mediterranean Atlas 2004.

WINDS	STADIASMUS REFERENCE
***Apeliotes* (E)**	*SMM* 280
***Boreas* (N)**	*SMM* 112, 318
***Leukonotos* (S-SW) / λευκονότῳ**	*SMM* 137
***Libs* (W-SW)**	*SMM* 77
***Notos* (S) / νότῳ**	*SMM* 18, 158, 159, 165
***Zephyros* (W) / ζεφύρῳ**	*SMM* 117, 148, 233, 272
"Winds from the West"	*SMM* 14, 53

Table 7.5 Winds referenced in the *Stadiasmus.*

These winds at times represent actual winds, but often indicate simple directions/orientation. Certain references in the *Stadiasmus* "associate the wind name, a reference to a supposed course under that wind and an astronomical orientation, or just mention a relationship of the ship to a wind (generally following it) to express the orientation of her course, when others, relying upon other sources, refer to winds just as orientations in a windrose" (Arnaud 2014:55). The most frequently mentioned wind is *Notos* (S) (Arnaud 2010:158) and *Zephyros* (W). This generally coincides with the prevailing SW winds in the region (see Ch.5.1.3.2: Figs.5.8-9 for modern wind models for the Levantine coast; also next section 7.2.2-3 on the practicality of such winds in the context of actual sailing). Wind references in the Levant include (Table 7.6):

SMM	Translated Passages (Kiesling and Isaksen 2014)	Original Passages in Greek (Arnaud 2016)
137	…From Balanea to Laodicea **cutting straight** *toward the NE* under a **south wind** *[S-SW],* 200 stades.	ἀπὸ Βαλανεῶν εἰς Λαοδίκειαν **εὐθυδρομοῦντι λευκονότῳ** ἐπὶ τὰ πρὸς ἠῶ τῆς ἄρκτου στάδιοι σ'.
148	…From Posidium **taking the short way** to Seleucia by means of the **west wind [***Zephyros*], 110 stades.	ἀπὸ δὲ τοῦ Ποσειδίου **τὸν ἐπίτομον** εἰς Σελεύκειαν πλεόντι **ζεφύρῳ** στάδιοι ρι'.
150	…From the Poseidium promontory to the bay **with a very fair wind,** 200 stades. …	ἀπὸ δὲ τοῦ Ποσειδίου ἀκρωτηρίου ἐπὶ τὸν κόλπον **οὐριώτατα** στάδιοι σ'.
157	From the Gates to the town of Alas, 50 stades. From Myriandros, **with a fair wind**, 100 stades	Ἀπὸ τῶν Πυλῶν εἰς κώμην Ἀλὰς στάδιοι ν' · ἀπὸ τοῦ Μυριάνδρου **οὐριοδρομοῦντος** στάδιοι ρ'.
158	From Alae to the city of Aegeae stadia 100; from Myriandros to Aegeae by a **straight journey** *towards the Pole* with a **south wind** *[Notos]*, 100 stades.	Ἀπὸ τῶν Ἀλῶν εἰς πόλιν Αἰγαίας στάδιοι ρ' · ἀπὸ δὲ τοῦ Μυριάνδρου **εὐθυδρομοῦντι** *ἐπὶ τὸν πόλον* **νότῳ** στάδιοι ρ'.
159	From Aegeae a *coastal sailing* along cliffs to the town of Serretillis, 150 stades. From Rhosos by **direct course** *north* to Serretillis with a **south wind** [*Notos*], 250 stades...	Ἀπὸ Αἰγαίων ὁ παράπλους κρημνώδης ἐπὶ κώμην Σερετίλην σταδίων ρν'. ἀπὸ δὲ Ῥωσοῦ **εὐθυδρομοῦντι** ἐπὶ τὴν Σερετίλην ἐπὶ τὸν πόλον **νότῳ** στάδιοι σν'.
164	From the [Rhosican] Lookout (Scopelus), without entering the gulf but **sailing straight** towards Antioch, *west of north*, with a **south wind** [*Notos*], keeping the mainland far to the left hand, 350 stades.	ἀπὸ τοῦ σκοπέλου δὲ μὴ κατακολπίζοντι, ἀλλ' **ἐπ' εὐθείας** πλέοντι εἰς Ἀντιόχειαν ἔπειτα *πρὸς ἀνατολὴν τῆς ἠπείρου* **νότῳ** *τὰ εὐώνυμα μακρὸν διαραμένῳ* στάδιοι τν'.

Table 7.6 References to winds and directions along the Levantine coast according to the *Stadiasmu*s.

The *SMM* (39, 53, 60, 77) mentions certain harbours as suitable only in summer (ὅρμοςθερινός) due to prevailing winds in the regions (see 6.2.5 on ancient harbour terminology). Regarding actual sea journeys and winds, *SMM* only employs the four cardinal winds (Arnaud 2014:56-57), with indirect terms for midway directions. For example, from the Rhosican Lookout:

"[Rhosican Lookout (Scopelus)]…without entering the gulf but **sailing straight** towards Antioch, **west of north**, **with a south wind**, keeping the mainland far to the left hand" (*SMM* 164)[147]

In a few specific specific cases, the wind described in the *Stadiasmus* matches the real wind, as is the case in the 'straight-line sail' journey from Balanea (Banyas) to Laodiceia (Lattakia) (*SMM* 137), sailing using the '*Leuconotus'* (this case is explored in detail in next section, 7.2.2-3, along with other cases, in relation to sea journeys in the Levant; cf.Ch.8.1.2.2 for other regions).[148]

7.2.2.2 Discussion

Based on the *Stadiasmus,* the author's references to winds (and their associated directions) suggest that, during the Roman period, mariners associated particular winds with particular and familiar routes and journeys, which relied on practical experience and knowledge of navigating the seascape. However, based on available evidence, it is hard to discern whether this was generally a common practice for most maritime routes travelled. As Davis (2009) suggests, it is possible that the more regular routes, such as Rhodes to Alexandria, were associated with specific winds/directions, as the prevailing winds (e.g. *Etesians*) were among the more stable winds in the Mediterranean (Davis 2009:118). If we consider the implicit practical nature of the *periploi,* it can be assumed that the described journeys refer to prevailing winds during a particular season, although this is hard to discern based on available evidence. This raises the question of what this can tell us about when the author of the *Stadiasmus* might have expected its reader to be sailing. Thus, to better understand these maritime relationships, the next section of this chapter (7.2) looks beyond the environmental context and focuses more on the human element of decision-making and interacting with this environment, looking closely at aspects of routes, distances and seaworthiness.

[147] *SMM* 164 (full original reference): "ἀπὸ τοῦ * σκοπέλου δὲ μὴ κατακολπίζοντι, ἀλλ' ἐπ' εὐθείας πλέοντι εἰς Ἀντιόχειαν ἔπειτα πρὸς ἀνατολὴν τῆς ἠπείρου νότῳ τὰ εὐώνυμα μακρὸν διαραμένῳ στάδιοι τν' "
[148] www.windfinder.com | http://www.windfinder.com/windstats/windstatistic_lattakia.htm (30-09-2013).

7.3 SEA JOURNEYS: DISTANCES, ROUTES AND SEAWORTHINESS

7.3.1 Distances and Durations (see appendix v on ancient measurements):

The duration of a seaborne journey or estimation of a distance between places[149] is influenced by several factors, notably: maritime conditions (e.g. wind, sea-state, seasonal pattern); technological capabilities (vessel types and their effective speed/seaworthiness) and economic-political motives. Moreover, human skill aboard and navigational knowledge of the landscape played a vital role in seafaring, which is attested in the archaeological record and applied on several models (see Leidwanger 2013; Whitewright 2012, 2011:91-93; Arnaud 2014; Blue 1995:Ch.4; Morton 2001:241). These factors were dependent on (and/or influenced) specific routes chosen, whether a direct course or following the coast, as the latter in particular often included stopping-points on the way (of varying lengths of time). Prevailing seasonal winds were a crucial factor and determinant for seaborne journeys (Ch.5.1.3). Ancient mariners were often able to overcome such conditions and effectively sail windward (it is possible to estimate windward performance, see Whitewright 2011a:3-15, 2011b:90-3; Tilley 1994a; Roberts 1995; Medas 2008). Greek and Roman mariners were also aware of diurnal cycles, likely taking advantage of these local occurrences (Morton 2001:51–53; McGrail 2004:95; Ch.3.4), particularly when facing predominant regional winds. Navigational hazards could be anticipated to an extent, reliant on a sailor's familiarity with a certain coast and chosen route. In light of this, it is important to be aware of the relation between wind direction and its relation to the direction/speed a boat can travel (Arnaud 2005:61-96; Whitewright 2011a:3-12, 2011b:90-3; discussed in 7.2.3). Respective journeys and their durations should be analysed in a broader framework accounting for the dynamic link between landscape, time and people. Considering the many sailing variables impacting aspects of navigation, a vessel's seaworthiness and calculations of estimates of travel distances/durations, the next section presents relative distances between places listed in the ancient study-sources for the Levant. It is worth noting that even actual or relative distances are variable. This section compares patterns in distances and journeys in the ancient authors' coastal descriptions in an attempt to establish how closely they tie with reality and the types of data used for their estimations. This builds onto the following section examining *SMM's* cases of *euthyploïa* (straight-line sail) by creating a conceptual model of a hypothetical journey along the Levant (7.2.2-3; cf.Ch.2.1.2.2).

---

[149] Appendix v on ancient distances/conversions; see also Arnaud 1993, 2005:61-96, 2014. A few authors remark on awareness of various values of measurements in their time, e.g. stades, miles, day's sail (Strabo, *Geog.* 11.8, 11.5, 17.1.24; Pliny, *NH* 6.61–62). Discussion on economic determinants affecting routes: Arnaud 2007; and Scheidel 2013.

7.3.1.1 Mela – Distances

In contrast to the other ancient study-sources, Mela's work lacks precise measurements and distances for the *oikoumene*, providing instead a more general overview and estimation for navigating the reader between places and features. He shows a tendency to use broad terms: "at a distance", "for some distance", "farther on"; or if emphasising: "an impressive distance", "immense distance", "quite a distance", "for a considerable distance", "the greatest distance":

▪ *absit*/ far (2.4); *longe*/ far (1.17)	▪ *maximae procul a mari*/greatest distance from sea (1.25)
▪ *non longe hinc/* not far from here (1.62)	▪ *non longe inter se distant*/ not far apart (2.109);
▪ *longe satis a litore*/ far enough from shore (1.27)	▪ *proxime*/ near (2.33)

In a few brief instances, he uses a unit of measurement, such as the stade:

> "Farther on there were once three towns, each separated from the next by a single stade, now the place is called Tripolis" (Mela 1:67, p54).[150]

Additionally, he uses miles (*passuum/milia passuum*) in certain cases:

▪ "…*decem milibus* [1000] *passuum*" (Mela 1.6);	▪ *"…quinque* [5] *milium passuum* (Mela 2.4)
▪ "…*quattuor* [4] *milia passuum*" (Mela 2.33);	

However, these are rare and overall Mela does not appear interested in (or able to) offer such data. This relates to the purpose and style of his approach, which is of a less scientific nature, with a tendency to focus instead on more unusual and mythical accounts (Romer 1998).

[150] "…*ultra tria fuerunt singulis inter se stadiis distantia; locus ex numero Tripolis dicitur*" (Mela 1:67, p54).

7.3.1.2 Strabo – Journey Routes and Distances

In the context of journeys, Strabo provides several distances between places in the Levant, which includes sum total distances (Table 7.7). To determine possible patterns and distinctions between the maritime and terrestrial measurements used, in the table below distances described between coastal places are labelled with a [M], whereas those referring to distances inland are labelled with a [T], though their nature is not always clearly distinguished in the text.

Geog.	Strabo's References to Distances along the Levantine coast	Strabo's Distances
14.5.20	**[M] Soli → Seleucia-in-Pieria**	1000 stadia
16.2.1	**[T] Issic Bay → Zeugma**	1400 stadia
16.2.6	**[T] Daphne → Antioch**	40 stadia
16.2.7	**[M] Seleucia → mouth of Orontes River**	40 stadia
16.2.7	**[M] Seleucia → Antioch**	120 stadia
16.2.7	**[M] river Orontes → Antioch**	1 day
16.2.7	**[T] Heraclea → temple of Diana Cyrrhestis**	20 stadia
16.2.13	**[M] Aradus → mainland** **[circumference of the island of Aradus]**	20 stadia [7 stadia]
16.2.22	**[M] Berytus → Sidon**	400 stadia
16.2.24	**[M] Sidon → Tyre**	≥ 200 stadia
16.2.24	**[M] Tyre → Palae-tyrus**	30 stadia
16.2.28	**[M] Joppa → Cassium** **[M] Joppa → Pelusium**	c.1000 stadia
16.2.29	**[M] Iamneia → Azotus & Ascalon**	c. 200 stadia
16.2.30	**[T] Harbour of the Gazaei → inland city Gaza**	7 stadia
16.2.30	**[T] inland city Gaza → Aila (Aelana)**	1260 stadia
16.2.33	**[M] *Total:* Orthosia → Pelusium**	3650 stadia
16.2.33	**[M] *Total:* Malaenae/Melania, Cilicia → Celendris**	1900 stadia
16.2.33	**[M] *Total:* Celendris → Orontes**	520 stadia
16.2.33	**[M] *Total:* Orontes → Orthosia**	1130 stadia

Table 7.7 Strabo's references to routes and assigned distances (in stadia) along the Levantine coast.

Based on the distances provided for the Levant region (Table 7.7), Strabo shows a tendency of using rounded values for distances between places. Given the variability of stades, decimal places are inconsistent for anything above 10 stades; and as noted, most of Strabo's numbers appear rounded to the nearest 10 stades (see appendix v on stade conversions; Arnaud 1993). Strabo generally gives far more distances in his accounts of the coast than for inland regions and seems to show an inclination towards maritime measurements from sailing estimations. Furthermore, "places are considered to lie on the same parallel if the journey between them is due east or west, and/or if the climate is similar and/or if celestial observations are the same at each place" (Pothecary 1995:107, also p.144 on his arrangement of the *oikoumene*, influenced by both a geographic framework and *periploi* – cf.Ch.4.1.2 in this thesis).

Strabo says the distance between Seleucia and the mouth of the Orontes River was 40 stadia, and then seems to suggest a 'day's sail' for the distance of the journey navigating up the river, which reflects different types of measurements used, in this case both of a maritime nature.

> "On the west the sea… Seleuceia, which is distant from the mouth of the river 40, and from Antioch 120 stadia. The ascent by the river to Antioch is performed in **one day**." (*Geog.*16.2.7)[151]

In the following example, Strabo provides the distance in stadia for a direct "voyage in a straight line" between Seleucia, in Syria, and Soli, in Cilicia:

> "After Cilicia, the first Syrian city is Seleucia-in-Pieria; near it the river Orontes empties itself. From Seleucia to Soli is a voyage in a **straight line** of nearly 1000 stadia." (*Geog.*14.5.20)

This is comparable to a pattern of *euthyploïa*/straight-line sail routes observed in the work of the *Stadiasmus,* which is discussed in section 7.2.2 and explored within a 'hypothetical journey' framework (analogous cases of *euthypoloïa* in Strabo for other regions are presented in Ch.8.1.3.2.2). Similarly, in a terrestrial context, after describing the route from the harbour of the Gazaei to the city Aila in the interior, Strabo provides the route for "the shortest road":

> "…harbour of the Gazæi. The city is situated inland at the distance of seven stadia. …There is said to be a passage thence across, of 1260 stadia, to the city Aila (Aelana), situated on the innermost recess of the Arabian Gulf. This recess has two branches, one, in the direction of Arabia and Gaza, is called Ailanites, from the city upon it; the other is in the direction of Egypt, towards Heroopolis, 4 to which from Pelusium **is the shortest road** (between the two seas)" (*Geog.*16.2.30)

As shown in the above cases, Strabo often used *stadia* as his value for distance and converted measurements in other systems to this measure (e.g. day's sail), stating:

> "…**every writer does not agree with every other, particularly about the distances**, as I often say. As for myself, where it is possible to reach a decision, I set forth my opinion, but where it is not, I think that I should make known the opinions of others" (*Geog.*6.3.10).

This is an important statement, as it clearly reflects thought and decision-making based on an awareness of the different distances amidst contemporary writers and an attempt to overcome these where possible. However, due to Strabo's conversions and various measures used in different areas, often obtained from other sources, his value for the *stadium* varied considerably. This is especially apparent when he received or used distances derived from a 'day's sail' and then converted them to stadia.

---

[151] It is also possible that the reference to "1 day" refers to a day's march, rather than sail.

7.3.1.3 Pliny – Journey Routes and Distances

In Pliny's work, in the context of the Levant, travel distances are provided between places on particular journeys and routes, as well as for delineating boundary extents and measuring circumferences or extents of cities, islands, lakes, etc. (Table 7.8). Under 'Distance values' column, units are listed according to the original passage in Latin, rather than the translation; and where the unit (*passibus* or *stadia*) is not specified in the original, it is not included.

NH	**Pliny's References to Distances along the Levantine coast (Rackham 1962)**	**Original passage extracts** (distances highlighted)	**Distance values**
5.19	**Mount Casius** "[Mt. Casius]… The winding road which leads to its summit is **nineteen miles** in length, its perpendicular height **four**."	*…ambitus ad cacumen **XVIIII p.** est, altitudo per derectum **IIII**.*	19 paces 4
5.17	**Arados → mainland** "Arados, a town seven stadia long, on an island, distant **200 paces** from the mainland."	*…Arados, **septem stadiorum**… et insula **ducentis passibus** a*	7 stadia 200 paces
5.17	**Tyre** "Tyre, formerly an island, separated from the mainland by a channel of the sea, of great depth, **700 paces** in width…" / "Its circumference, including therein Palætyrus, is **nineteen miles**, the place itself extending **twenty-two stadia**."	*…**DCC passibus*** *…circuitus **XVIIII** est, intra Palaetyro inclusa**…XXII stadia** optimet*	700 paces 19 22 stadia
5.17	**Sidon → Simyra** "…then Sidon…In the rear of this spot begins the chain of Libanus, which extends **1500 stadia**, as far as Simyra; this district has the name of Cœle Syria."	*…a tergo* eius *Libanus mons orsus **MD stadiis**, Zimyram usque porrigitur…*	1500 stadia
5.17	**Tower of Strato/Caesarea → border of Arabia** "…then the Tower of Strato, otherwise Caesarea, …this place is the frontier town of Palæstina, at a distance of **189 miles** from the confines of Arabia; after which comes Phoenice."	***…**Stratonis Turris, eadem Caesarea…finis Palaestines**, CLXXXVIIII p.** a confinio Arabiae. dein Phoenice.*	189 paces
5.14	**Sirbonian Lake** "Sirbonian Lake… This lake, which some writers have made to be **150 miles** in circumference…"	*quem quidam **CL** circuitu tradidere*	150
5.14	**Pelusium → Ostracine** "Ostracine at a distance of **sixty-five miles** from Pelusium, is the frontier town of Arabia."	*Ostracine Arabia finitur, a Pelusio **LXV p.***	65 paces
5.13	**Syria province** "Its length, between Cilicia and Arabia, is **470 miles**, and its breadth, from Seleucia Pieria [Note] to Zeugma [Note], a town on the Euphrates, **175**."	*longitudo eius inter… **CCCCLXX p.** … latitudo a... ad oppidum… **CLXXV***	470 paces 175
5.12	**Gaza → Laeana** "Between the two towns of Ælana and Gaza upon our sea there is a distance of **150 miles**.	***CL** intervallo inter duo oppida…*	150

Table 7.8 Pliny's references to routes and assigned distances (in *passibus* and *stadia*) along the Levantine coast.

In comparison with Strabo (7.2.1.2), Pliny's work uses varied measurement units for travel distances, predominantly in the form of stadia [*stadiorum*] and miles/paces [*passibus/ p.*] (appendix v), although in some cases he also uses *schoinoi* or runs/day's sail (examples presented next). In general, paces/miles were applied for terrestrial road distances, whereas stadia were maritime measures by sea. However, in Pliny's case, he seems to use them interchangeably. Based on the distances given for the Levantine coast (Table 7.8), in contrast to Strabo, Pliny does not show a tendency of using only round numbers to measure distances.

Pliny's references to the *stadia* units of measurement are used only in a few cases for the Levant (Arados, Tyre, and Mount Libanus). On the distance of "1500 stadia" for the extent of Mount Libanus (behind Sidon as far as Simyra), based on the distance patterns in the Levant within Pliny's text, it seems unusual that he would use stades for an inland distance, rather than miles/paces, as stades or 'day's sail' have generally been used for distances over bodies of water or between coastal places. This implies this type of data likely derives from sources of a maritime nature, e.g. *periploi*. Additionally, the fact Pliny is Roman could also have a bearing, although Romans generally used local measurements where available (e.g. *Stadiasmus Patarensis*, Gallic Leagues). Moreover, a noteworthy insight into Pliny's acknowledgement of the different values of the stade can be drawn from his passage on routes in Egypt (*NH* 5.11), in which Pliny converts between different measurements/values for travel distances. More specifically, he converts the distance from *schoinoi* (derived from other writers) into both stades and Roman miles.[152]

Overall, the various travel distances (and different forms of measurements for these) presented in Pliny's accounts of the Levantine coast (Table 7.8) reflect an awareness of the different values of distance measurements and an attempt to show the relationship between these different values. They further emphasise the diverse nature of the sources and types of data they were derived from.

[152] Strabo complains there is no single uniform value for *schoinos.* See e.g. Ptolemy (*GH* 4.5); also Pothecary (1995).

7.3.1.4 Ptolemy – Coordinates and Boundaries

Ptolemy's main measures of individual locations or geographic features are in fractions of arc (Ch.4.1.5; Berggren and Jones 2000:41; appendix v), rather than absolute distances (though Ptolemy gives some values in stades, or calculates degrees for a few places in the Mediterranean, e.g. *GH* 1.8). Apart from records of latitudes attributed to Hipparchus (*GH* 1.4), the majority of the sources for these positions derive from records for distances between places/features on coasts or river mouths; a pattern also generally apparent throughout the accounts of Strabo, Mela, Pliny and the *Stadiasmus*. In relation to Ptolemy's representation of the Levantine coast, by integrating his coordinates as a shapefile into ArcGIS10.2.2 (Fig.7.7), it possible to observe the spatial distribution and delineation of the coastal boundaries and hinterland regions that form his outline of the Levant. Shifting our focus beyond Ptolemy's degree of accuracy in his distances and coordinates, his overall representation appears to depict the general reality of the coastline. He emphasises indentations that symbolise promontories, capes and gulfs characteristic of the actual topography (e.g. Theou prosopon and Carmel Capes). Overall, this seems to reflect the types of markers prominent in the eyes of a mariner, rather than actual geographic representation (i.e. size) (Arnaud 2014:60).[153]

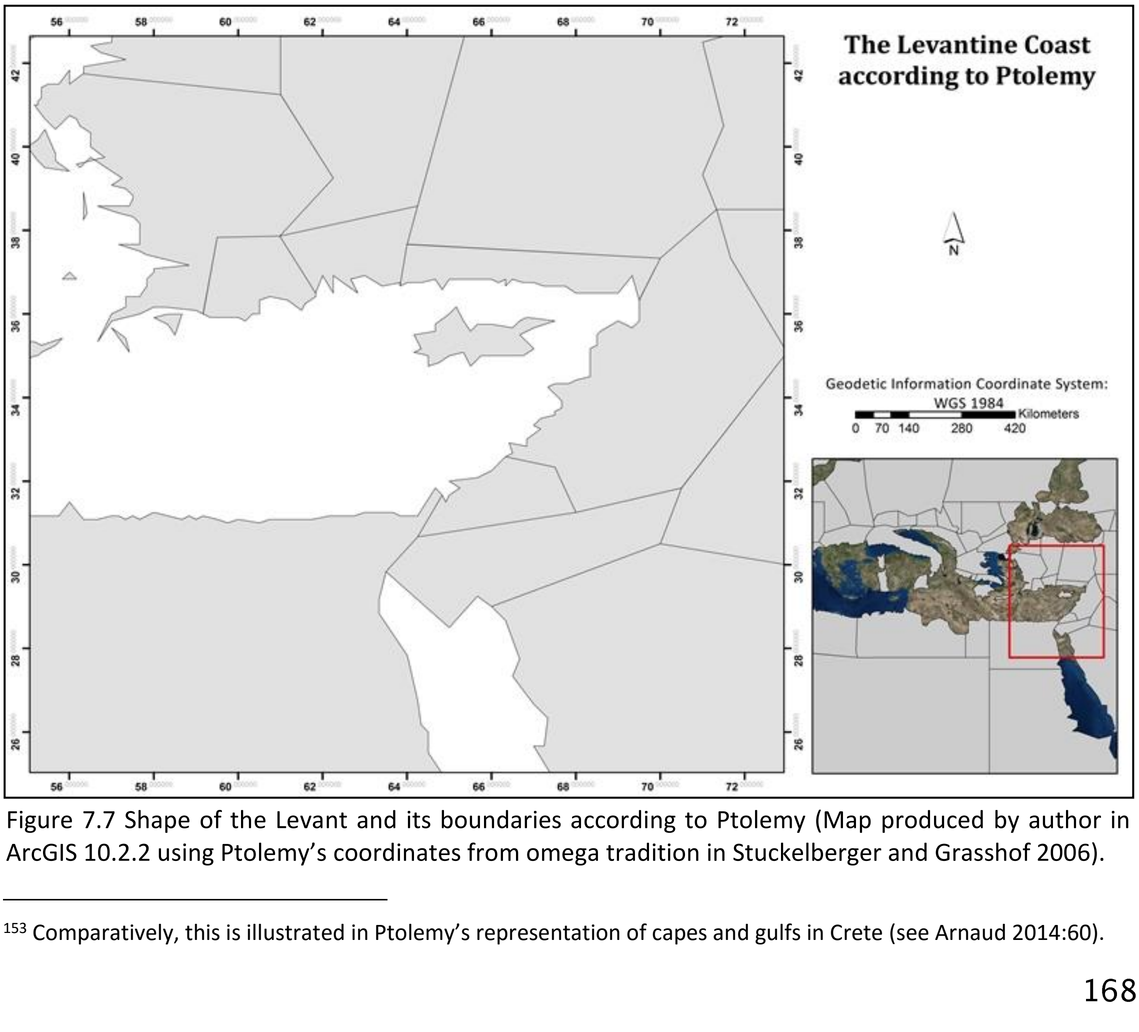


Figure 7.7 Shape of the Levant and its boundaries according to Ptolemy (Map produced by author in ArcGIS 10.2.2 using Ptolemy's coordinates from omega tradition in Stuckelberger and Grasshof 2006).

153 Comparatively, this is illustrated in Ptolemy's representation of capes and gulfs in Crete (see Arnaud 2014:60).

7.3.1.5 Stadiasmus – Journey Routes and Distances

As is to be expected with the *Stadiasmus Maris Magni*, implied by its title and maritime nature, conversions took place in measuring distances at sea: from that expressed in days on water (the more archaic system recorded by the sources) to that expressed by linear distances (appendix v). *SMM's* measurements for the Levant are given in stades. A table (Table 7.9) was thus created presenting *SMM*'s distances/routes and totals for the Levant, used in conjunction with data in appendix i for cross-referencing ancient sites with their modern locations.

SMM	ANCIENT COASTAL SITES IN THE STADIASMUS	SMM DISTANCES (STADES)
128	Aradus → Carnus	24
129	Carnus → Balanea Pr.	200
129	Balanea → village of Balanea	[corrupted]
130	Balanea Pr. → Paltos Pr.	90
131	Paltos Pr. → [rounding the Rocky Pr.]	10
132	**Balanea Pr. → Paltos [*eutyploïa*]**	**200**
132	**TOTAL DISTANCE: PTOLEMAIS → PALTOS**	**2000**
133	Paltos → Palteni	30
134	Palteni → small harbour on seashore	20
135	Paltenus → Gabala	30
136	Gabala → navigable river	40
137	navigable river → Laodicea	200
137	navigable river → Balanea	70
137	**Balanea - Laodicea [*eutyploïa*]**	**200**
138	Laodicea → Heracleum	20
139	Heracleum Pr. → White Harbour	30
140	White Harbour → Pasieria	30
141	Pasiera → Polia	120
142	**Heraclea → Posidium [*eutyploïa*]**	**100**
143	Posidium → Sidonia	300
143	*Thronus Mt.*	[above Sidonia]
144	*Casius Mt.*	[separates Chaladropolis]
144	Sidonia → Charadropolis	60
145	Macra Island → Nymphanaem	50
146	Nymphaem → Antiochia	400
146	Antiochia → Orontes R.	15
148	Orontes R. → Seleucia	40
148	**Posidium → Seleucia [*eutyploïa*]**	**110**
149	Seleucia → Georgia	142
150	Georgia → Rhosus Bay	300
150	Poseidion Pr. → Rhosus Bay	200
150	Gulf → Rhosus	80
151	Rhosus Terdinie → Myriandrus	90
152	Myriandrus → Alexandria ad Issus	120
153	Alexandria → Cilician Gates	200
153	**TOTAL DISTANCE: PALTUS → CILICIAN GATES**	**2500**

Table 7.9 *SMM* references to routes and assigned distances (in stades) along the Levantine coast. Legend: yellow symbolises '*euthyploïa*' (explored next: 7.2.2); grey highlights total distances.

Overall, from the values listed above (Table 7.9), we can see the *Stadiasmus* is consistently using stade counts/travel distances as round figures and estimations (as seemed to be the case with Strabo's figures for this region: 7.2.1.2). For the Levant routes, the table above illustrates a frequent occurrence of specific values and multiples thereof, particularly values of 20 and 30. In the next section (7.2.2-3) such estimates are contextualised and explored in terms of sailed journeys. Among the routes and their assigned distances (drawn from Table 7.9),[154] *SMM* also gives sum total distances for each of his subdivisions of the coast, as demonstrated below:[155]

Ptolemais → Paltos = 2000 stadia

Paltos → Cilician Gates = 2500 stadia

Though the distance of the whole coastline is not given in the extant text, it is interesting that the author marks Paltos as the start/stop-point for his sum totals, as it is a very small coastal site, suggesting that its significance likely relates to the round number (see 7.2.2.1 for Paltos in relation to specific journeys). It is worth noting that, while *SMM* provides a sum total from Paltos to the Cilician Gates of 2500 stades, if we compare this value to the individual stade count of each intermediary place en-route, the total amounts to 1817 stades.[156] This difference is likely linked to the corruption of the manuscript, or could also be the author's rounding up of the value that accounts for variables over a long distance. In particular instances distances between places do not coincide with the actual distances, such as the following routes:

Balanea → Paltos = 90 stadia

Posidium → Sidon = 300 stadia

In other cases certain values are not used consistently as estimates. For example, Laodicea to Heracleum's 20 stadia differs greatly from Palteni to the small harbour's value. When interpreting ancient distances and durations, it is worth re-emphasising there was no universal value for stades and converting units in other systems to the stade caused inconsistencies. Due to different measures/conversions used in different areas, often from other sources, the value for the stade varied considerably (especially if derived from a day's sail, as the ability to measure at sea was limited). To overcome this, a possible approach is to attempt to determine a consistent value for a 'day's sail' in the various cases/ancient sources to identify whether this estimated distance is based on accumulated knowledge from repeated journeys that would have led to rounded or average values (dependent on chosen route and maritime conditions).

[154] Using '*from X to Y, stades Z*' formula; Ch.4.1.6.
[155] For all cases of references to 'sum total distances' within the *Stadiasmus*: *SMM* 19, 93, 103, 132, 153, 183, 315.
[156] From Ptolemais to Paltos it is not possible to explore the value due to lacunae in the text – discussed in Ch.7.3.

7.3.2 '*Euthyploïa*' in the *Stadiasmus*

A salient pattern that emerged from the *Stadiasmus'* data presented above relates to *euthyploïa*/εὐθύπλοια (straight-line sail offshore),[157] referring to specific passages in which the author provides direct routes for a journey, often taking advantage of favourable winds and indicating the direction of the course (Table 7.10-11; section (c) for specific cases). Throughout, equivalent terms (and their forms) are used that allude to 'straight-line sail': εὐθυδρομοῦντι, ἐπ' εὐθείας πλέοντι, τὸν ἐπίτομον, οὐριώτατα, and οὐριοδρομοῦντος (Arnaud 2014:51)**:**[158]

'Straight-line sail' Terminology in the Stadiasmus			
Greek terms	**English**	**No. of occurences/ SMM passages**	**In the Levant**
εὐθυδρομοῦντς/ εὐθυδρομοῦντος	straight-line sail	4x/ SMM 137, 158, 159, 165	1x/ SMM 137
ἐπ' εὐθείας (πλέοντι)	straight-line sail	4x / SMM 132, 164, 229, 248	2x/ SMM 132
τὸν ἐπίτομον	shortcut	4x / SMM 142, 148, 183, 232	2x/ SMM 142, 148
οὐριώτατα	with a fair wind/ straight-line sail	5x/ SMM 150, 178, 233, 272, 280	1x/ SMM 150
οὐριοδρομοῦντος	with a fair wind/ straight-line sail	1x / SMM 157	-

Table 7.10 Terminology used for 'straight-line sailing' in the *Stadiasmus*. Note: The terms 'οὐριώτατα' and 'οὐριοδρομοῦντος' appear to carry a double-meaning, i.e. they can also express a sail 'following a fair wind'.

The *Stadiasmus* advocates *euthyploïa*, suggesting that mariners' perceptions of the coast were not so heavily influenced by models/techniques advocated by *periploi*, nor the further unrealistic idea of following winding coasts or gulfs (*katakolpizeïn/*κατακολπίζειν)[159] (Arnaud 2014:59, 2011:423, 2005). However, the Greeks established a distinction between the terms *euthyploïa* and *katakolpizein* due to not being able to clearly perceive the morphological characteristics of the shore from lengthy distances (Arnaud 2014:58-9). The nature of natural and artificial landmarks of the coast is to be perceptible from within close proximity, following their distictions from within the close visual range (which in relation to each other become stronger references, such as towers, etc). However, the sailing technique of *katakolpizein* is more of a theoretical notion not likely applied in practice, as it posed extreme danger for sailors and was highly impractical (Arnaud 2014:59). Following the coast or gulf's sinuosities may have occurred, but rather at the start or end of a journey through *cabotage* (*ibid*), particularly with coaster sailing vessels (7.2.3), which would have also been a favourable viable option along the Levantine coast. In the cases of *Stadiasmus* (Table 7.11)*,* the author seems to first provide the 'described journey' (i.e. what a mariner sees or passes en-route), while the *euthyploïa* correspond to the 'actual route' (i.e. the advised or chosen direct sailing route).

---

[157] *SMM* includes the term **"shortcut" (*epitomon,* ἐπίτομον)** as a synonym to express straight/direct courses. *SMM* also lists long-distance **"crossings" (διάπλου/*diaploi*)** between harbours across open-sea, plus circumnavigation routes; see Ch.8.1.3.2. E.g. in the Levant context: "From Kition in Cyprus to Askalon 3300 stadia (2300?)" (*SMM* 317).
[158] See also: *US Navy, Hydrographic Office. 1943. Table of distances between ports via the shortest navigable routes.*
[159] *SMM* 164: "From the reef by **not following the curves of the gulfs [μὴ κατακολπίζοντι],** but by **sailing straight [ἐπ' εὐθείας πλέοντι]** to Antiocheia then *to the east of the mainland crossing by the south wind far to the left*, 350"

The following table (Table 7.11) illustrates the *Stadiasmus'* cases of *euthypoloïa,* including *epitomon/*ἐπίτομον (shortcuts) along the Levantine coast (cf.Ch.8.1.2.2 for other regions):[160]

***Euthyploïa* (Straight-line sail) in the *Stadiasmus* along the Levantine Coast**			
SMM Ref	***SMM* Syria Passages for Syria** (trans. Kiesling and Isaksen 2014)	**Greek terms (straight-line sail)**	**Navigational Features**
132 Syria	From the Balanea cape **straight** to Paltum, 200 stades.	ἐπ' εὐθείας (straight-line sail)	Cape, distances
137 Syria Coele	From the navigable river to the cape, upon which lies the city Laodicea 200 stades. From that river to Balanea 70 stades. From Balanea to Laodicea **cutting straight** toward the NE under a south wind, 200 stades.	εὐθυδρομοῦντι (straight-line sail)	Navigable river, cape, orientation, wind direction, distances
142 Syria Coele	From Heraclea to Posidium, by the **short way**, 100 stades**.**	τὸν ἐπίτομον (shortcut)	Distances
148 Syria Coele	From the river to Seleucia 40 stades. From Posidium taking the **short way** to Seleucia by means of the west wind, 110 stades.	τὸν ἐπίτομον (shortcut)	River, wind direction, distances

Table 7.11 *Stadiasmus'* cases of '*euthyploïa*' along the Levantine coast (noting navigational features in the passages)

Are such cases of *euthypoloïa* in the *Stadiasmus* evidenced in other ancient sources? These cases are explored and compared to the 'described journeys' in the the *Stadiasmus* (and other ancient authors) through a hypothetical journey, presented next. This will enable a closer understanding of the significance of these sailing patterns, and how they compare to the reality of the journey/landscape, and ultimately to notions of navigation.

7.3.2.1 Conceptual Model of "*Euthyploïa*" Journeys in Syria:

An investigation of the *euthyploïa* (straight-line sail) cases is achieved by presenting a conceptual model of a 'hypotheti cal sea journey' (Figs.7.8-9; cf.Ch.2.1.2.2) within its modern context along the Levantine coast, as a means of comparing it to how it may have been sailed in the Roman period. This hypothetical journey is framed in the context of several specific parameters which have a significant impact on aspects of navigation, measurements and decision-making (cf.Ch.2.1.2.2:ii). Based on the pattern of '*euthyploïa*' in the *Stadiasmus*, this source will serve as the key control for comparison between ancient and modern representations of this coastal landscape (while also drawing together relevant comparisons with the other study-sources). Thus, the selected coastal stretch systematically follows the Syrian coast between Balanea (Baniyas) and Seleucia Pieria (Kapsiyu), guiding the reader in an anticlockwise direction, south to north (as is the case in the *SMM*, Mela and Pliny), taking advantage of the prevailing winds and currents in the region. As a result, this approach allows a closer insight into 'experiencing' the journey and, in turn, to be in a better position to compare and understand past approaches to such maritime journeys and landscapes.

---

[160] *SMM* 150 uses **οὐριώτατα** to express 'sail with the wind': "From Georgia to the Gulf of Rhossaeoi, 300 stades. From the peninsula of Poseidios to the gulf of Rossaeoi, ***with the fairest wind*** **[οὐριώτατα]**" (trans. Arnaud 2014:51)

Figure 7.8 Map of 'hypothetical journey' showing harbours used as start/end points (based on *SMM*'s journey and modern locations/sailing-guides) on the Syrian coast, with a wind-rose of prevailing SW winds (Map by author. Images: Google-Earth): a) Balanea/Banias, b) Laodicea/Lattakia, c) Posidium/Ras al-Bassit, d) Seleucia Pieria/Kapisuyu

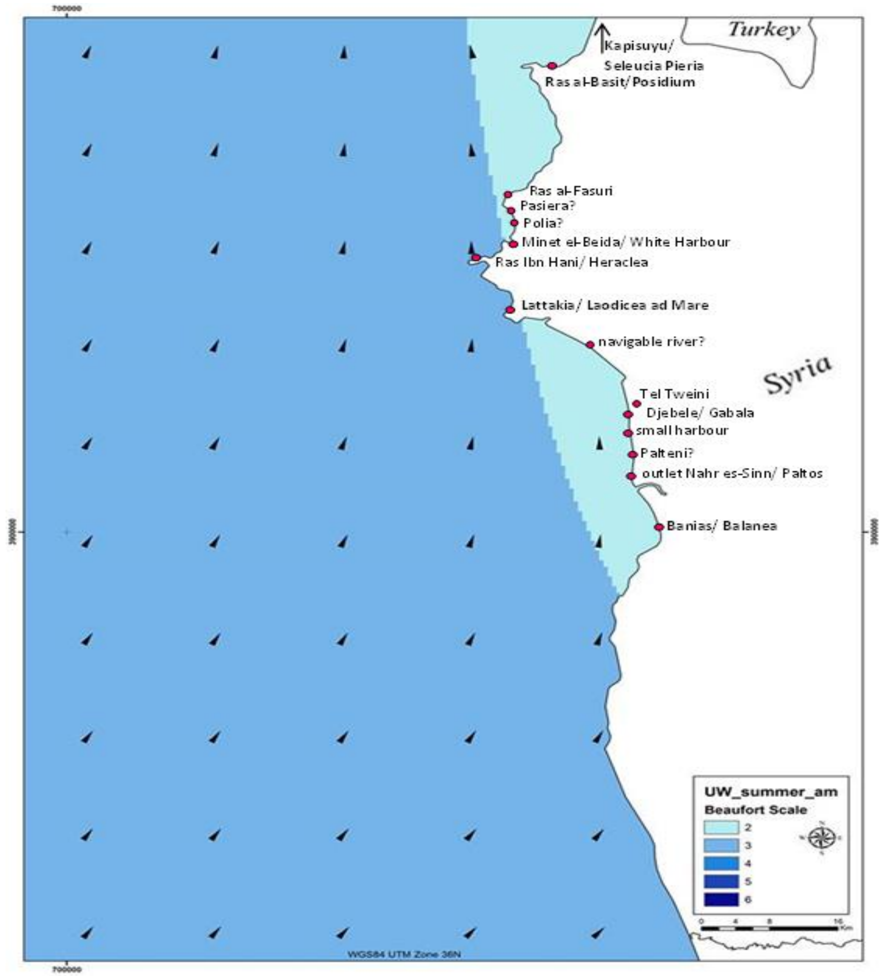


Figure 7.9 Hypothetical Journey: key sites mentioned in text (based on *SMM*'s journey and modern locations/sailing guides) on the Syrian coast, with morning summer winds (Map co-produced by author on ArcGIS10.2.2, superimposed on Levant Wind Model by Safadi 2015, Ch.5.1.3.2:Fig.5.7-9).

Furthermore, this approach attempts to discern parallels between ancient authors and establish whether the choice to present *euthyploïa* or shortest, direct routes was a norm, or rather an approach unique to the *Stadiasmus*; which raises some interesting questions, such as:

- Do other authors show these types of *euthyploïa* journeys; was it common practice?
- Do ancient authors tend to mention *euthyploïa* in areas of similar topographies, like the characteristic indented rocky coast of Northern Levant (as seen in the *Stadiasmus*)?
- Do these *euthyploïa* journeys represent preferred routes (i.e. associated with regular established routes throughout this region during the Roman period)?

In light of the parameters on a journey (Ch.2.1.2.2; also 7.2.3 on vessel types), estimated distances and tentative routes proposed in this chapter should be perceived within the context of 'optimum sailing journeys' under 'favourable conditions', as means of comparing and depicting ancient authors' representation of a journey, while accounting for the variables.

(a) Winds and Changing Wind Patterns[161]

As presented previously (Ch.5.1.3.2:i-ii), the Northern Levantine coastline, with its generally westward-facing aspect, is open and exposed to prevailing westerly winds (Ch.5.1.3.2:i, Fig.5.7-9). Thus, the most advantageous location for harbours and anchorages on this coast would be in the lee of an off-lying island, promontory or reef, sheltered from the west. The ideal wind speed for upwind sailing is a Beaufort-Scale 3, equivalent to 7-10 knots (pers.comm. Whitewright 2016; cf. Whitewright 2011a:3-15).[162] According to the SDEEM pilot (2005:47), for the Lattakia region "prevailing winds are from the SW, but gales from the NE have been experienced with winds attaining speeds of 55 knots at times". Sailing north from Lattakia, the journey reaches Ras Ibn Hani. Between this point and Ras al-Bassit, the coast possesses gulfs like Minet El-Beida (Figs.7.8-9).[163] A morning wind with an offshore diurnal wind would make this 'hypothetical journey' more viable (Fig.7.9); while an afternoon wind would be challenging to sail within the limits of ancient sailing rigs (see 7.2.3 on reflections related to the influences of various types of vessels, rigging and hull-forms). Thus, an awareness of the diurnal cycles (Fig.7.6, cf.Ch.5.1.3.2) is also crucial for navigating the Syrian coast, particularly in assisting the entering/leaving of a harbour and offering more flexibility in terms of mariners' capability of sailing with more unfavourable conditions, or against prevailing winds (Morton 2001:51–53).

[161] www.windfinder.com; Wind & Wave Atlas of the Mediterranean Sea (MedAtlas Group 2004); 'Earth'.
[162] See Whitewright (2011a:3-15) on variables and estimations of ancient sailing performance; also Casson 1951:143, 1995:283; Arnaud 2005:98-197 - and appendix v on ancient travel distances and measurements/conversions.
[163] Despite Ugarit's collapse (start of 12th century BC), Ras Ibn Hani's location meant that it continued to be occupied in the Iron Age, Persian, Hellenistic, Roman periods (Gatier 2008:269-83; Marriner et al. 2012; Rey-Coquais 1978b).

(b) Hypothetical Journey: Balanea to Seleucia Pieria

Having considered the main local meteorological conditions and patterns affecting seafaring (7.2.2.1a; cf.Ch.5.1.3.1-3), this section sets the 'hypothetical journey' (Fig.7.8, 7.9, 7.10), accounting for the coastal topography, shelter or potential hazards, and the practice of entering/leaving harbours en-route. In conjunction with these observations, supporting archaeological evidence serves to highlight the active state and role of these Levantine sites (refer to archaeological catalogue - appendix viii - for information on each site in the text).

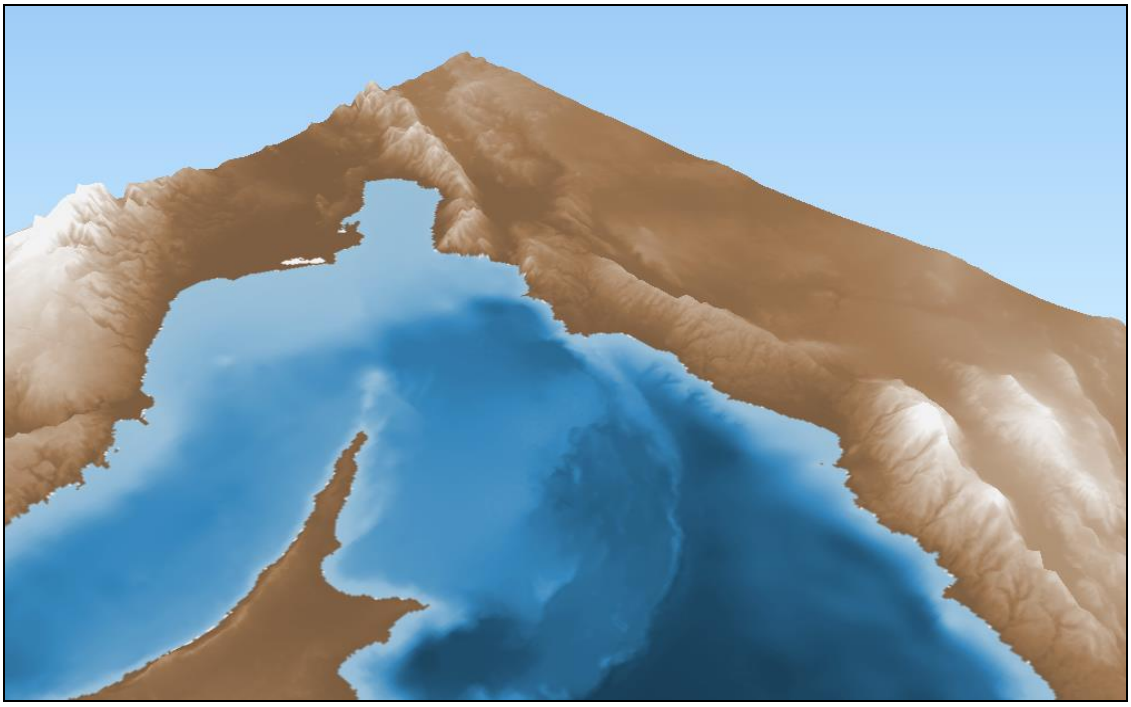


Figure 7.10 A 3D Map illustrating the coastline of the 'hypothetical journey' (Map produced by author).

BALANEA (BANIAS) → LAODICEA (LATTAKIA)[164] (cf.7.2.2.1:c (i))

Between Balanea (Baniyas, #L19) and Laodicea (Lattakia, #L14), the *Stadiasmus* lists the following anchorages (*SMM* 129-137): Paltos (#L18), Palteni (#L17), "a small harbour on the seashore" (#L16), Gabala (#L15), a "navigable river" and then Laodicea (Fig.7.11-13). Similarly, Strabo (*Geog.*16.2.12) and Pliny (*NH* 5.21) present the sites of Balanea, Paltos, and Gabala in their descriptions of this coastal stretch. It is worth re-iterating that although Pliny follows the same anticlockwise order as the *SMM*, Strabo presents the voyage in the opposite direction, which is also contrary to the actual direction of prevailing local currents and winds (and in reality would have been more challenging to navigate, though reliant on variables discussed).

164 'Hypothetical journey' builds onto 7.2.2.1:c comparing routes/distances of '*euthyploïa*' vs 'described routes'.

Along the Levantine coast, the first '*euthyploïa*' route in the *Stadiasmus* is presented from Balanea as a starting-point (Fig.7.8-9), in which the author advises the reader to "cut straight" directly towards the north-east, using the *Leuconotus* wind (S-SW):[165]

> "From Balanea to Laodicea <u>cutting straight</u> toward the NE under a <u>south wind [*Leuconotus*]</u>, 200 stades" *SMM* 137 / ἀπὸ Βαλανεῶν εἰς Λαοδίκειαν **<u>εὐθυδρομοῦντι</u>** **<u>λευκονότῳ</u>** ἐπὶ τὰ πρὸς ἠῶ τῆς ἄρκτου στάδιοι σ'

In the framework of the hypothetical journey, a mariner sailing from **Balanea** would move northward, navigating past a series of navigational markers and anchorages: **Chrysorroas River** (Nahr Barada/Baniyas?); **Paltos** (Arab al-Mulk);[166] and **Tell Sukhas**, a 40m high mound conspicuous from seaward (MPV 2005:210). Continuing from here, a short distance northwards (c.10 km north of Paltos/Arab al-Mulk), comes the coastal town **Gabala** (Djebele), fronted by a small craft harbour and described by Strabo as one of the "small towns" (with Poseidium/Ras al-Bassit and Heraclea/Ras Ibn Hani).[167] The route shortly passes **Tell Tweini,** presently further inland (c.1.7 km from the sea), at the junction of two rivers (Rumailiah and Al- Fawar). From Gabala to Laodicea (Lattakia), in a north by west direction, is a distance of c.19 km. The stretch of coast covered thus far has a moderate depth, "but even so, anchorage is not recommended here, as it is open to S and SW winds" (MPV 2005:210). However, after this, the shape of the coast changes and the journey reaches one of the main harbours and best-sheltered anchorages in this region (Fig.7.13). The rocky promontory is **Ras Ziyarah**, forming the southern side of the approach to **Laodicea** (Lattakia)[168] and on which is situated the harbour of Lattakia (of which the ancient authors offer a detailed account of the city, its favourable harbour and surrounding mountainous features (Strabo, *Geog.* 16.2.9, 10; Pliny, *NH* 5.12). From Latakia you can sight Mount Lebanon (Norie 1831:324; Figs.7.11-13).

---

[165] Strabo 16.2.12: "…small cities, Poseidium, Heracleium, and Gabala."/ Mela (1:69): Laodicea, Lycos / Pliny 5.18: "…Carne, Balanea, Paltos, and Gabale; then the promontory upon which is situated…Laodicea; and then Diospolis, Heraclea…Charadrus, and Posidium"/ Ptol. 15.3: Balaneai, Paltos, Gabala, and Laodikeia ('a noteworthy city').
[166] According to the SDEEM pilot (2005: 38): "S side of the entrance of Nahr Sinn, close N… of Baniyas. Rocks and shoals extending up to 0.8 mile seaward in this vicinity are marked by a lighted buoy."
[167] Strabo, *Geog.* 16.2.12; and is omitted by Mela.
[168] Strabo, *Geog.* 16.2.9, 10: Laodicea: beautifully built, excellent harbour; Pliny, *NH* 5.12: a coastal "free town".

Figure 7.11 View of Syrian coast from Laodicea (Latakia) to Balanea (Banias) (SDEEM 2005:3-7).

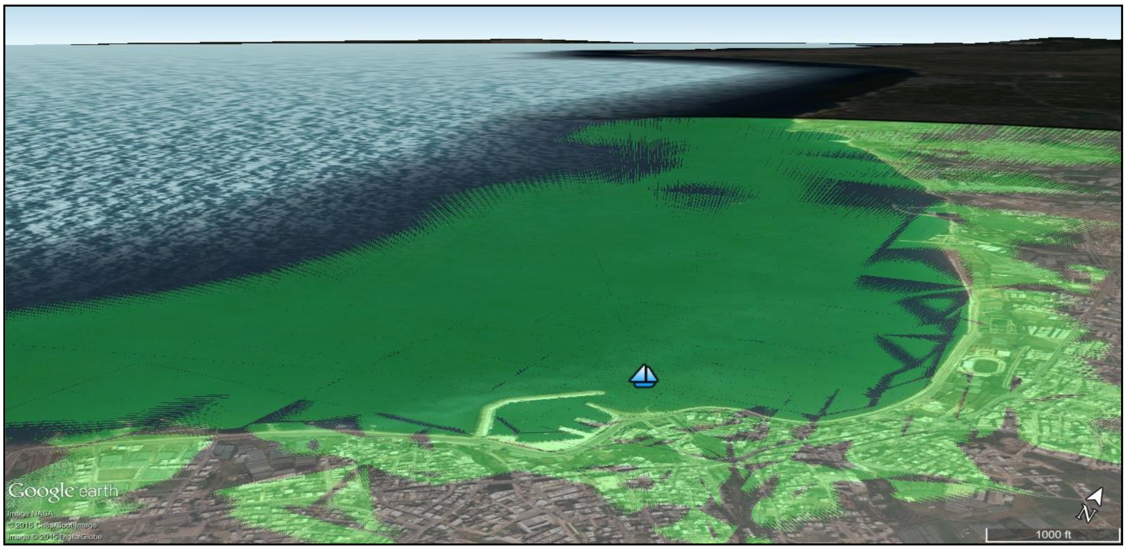


Figure 7.12 Start-point of 'hypothetical journey': Balanea → Laodicea (Viewshed shows the distance a mariner would be able to see, from a 5m mast. Map produced by author; Image source: Google-Earth).

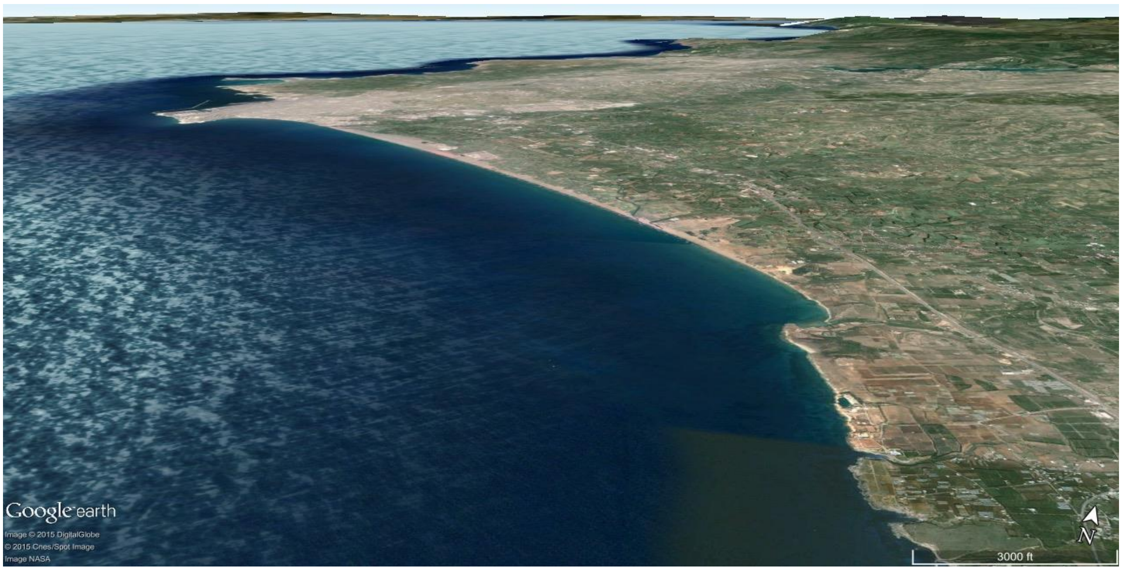


Figure 7.13 Route to Laodicea (Map produced by author. Image source: Google Earth).

LAODICEA (LATTAKIA) → POSIDIUM (RAS AL-BASSIT) (cf.7.2.2.1: c (ii))

> "From Laodicea to Heraclea 20 stades. Rounding the promontory there is the harbor called Leukos (White), 30 stades/From Heraclea to Posidium, **by the short way,** 100 stades." *SMM* 138/142

Between **Laodicea** (Lattakia, #L14) and Posidium (Ras al-Bassit, #L4), a coastal route leading North by East for c.32km (MPV 2005:207) *SMM* lists the following ports/anchorages (137-142): Heraclea (Ras Ibn Hani, #L6), White Harbour (Minet el-Beida, #L5), Pasiera (outlet near Al Shamiyah), Polia (unidentified) and Posidium, southern point of Antioch bay (Fig.7.14-16).

Along the modern coastline, sailing around towards the NW extremity of a low peninsula, a mariner would approach **Heraclea** (Ras Ibn Hani - Fig.7.14, chart:Fig.7.16),[169] a small sheltered harbour on the SW, which serves as a great natural anchorage on this coast with white calcareous cliffs that can be seen at the bay. After a short sail, one reaches **White Harbour/ *Leukos Limen*** (Minet el-Beida, Fig.7.15),[170] which "when viewed from a distance to the S, this peninsula appears as a chain of rocky islets" (MPV 2005:39). As its name implies, it is characterised by white calcareous cliffs and this chromatic marker is noted by *SMM* as a *"*harbor called Leukos (White)" (*SMM* 139-40). Along the peninsula there are several small shoals and shallow bays, obstructed by reefs, and the northern bay in particular offers good protection due to the sandy isthmus crossing the palaeo-bay (Mariner et al. 2012:35-6). Recent palaeo-geographical research has revealed that "after ~3000 cal yr BP, the northern bay, flanked by the subaerial tombolo, probably offered the best shelter from the predominant southwest winds and swell, where large vessels could anchor in the bay and smaller vessels be hauled up onto the beach face. A jetty of possible Hellenistic age…confirms the importance of this bay as a harbor complex" (Mariner et al. 2012:48). In the vicinity, notable modern features/anchorages (not distinguished in ancient sources) include **Ras al-Fasuri,** a conspicuous steep promontory with deep depths by this point, and **Fasuri Islet** offshore in the bay on the northern side with a rocky shoal (5-5m depth), north of the islet (MPV 2005:207-8).

On approaching **Posidium** bay (Ras al-Bassit, Fig.7.15-6), mariners would sight the prominent low-lying promontory, surmounted by a flat-topped limestone hill (c.50m high), with N-going currents at a mean rate of ~½ knots (MPV 2005:177-8). The well-sheltered harbour complexes of Ras Ibn Hani, Minet el-Beida and Ras al-Bassit en-route took advantage of the series of surrounding natural anchorages (estuaries, lagoons, bays, pocket beaches – similar to Tel Dor).

---

[169] For convincing evidence on identifying Heraclea with Ras Ibn Hani: Gatier 2008 (& map:p270). Despite Ugarit's collapse (12th BC), Ras Ibn Hani's location led to continuous occupation (LBA-Roman) (Bounni et al. 1978; Yon 2006).
[170] Archaeological evidence suggests it was active from the LBA to the Roman period (Mariner et al. 2012:37).

This topography played a key role in facilitating maritime exchange with coastal and inland centres, particularly as Ras Ibn Hani is strategically the closest crossing point to Cyprus from the Levant (Marriner et al. 2012:39). This stretch is linked in relation to shelter, anchorage, and its visual aspect (white calcarous cliffs as chromatic markers from the sea; Figs.7.14-6).

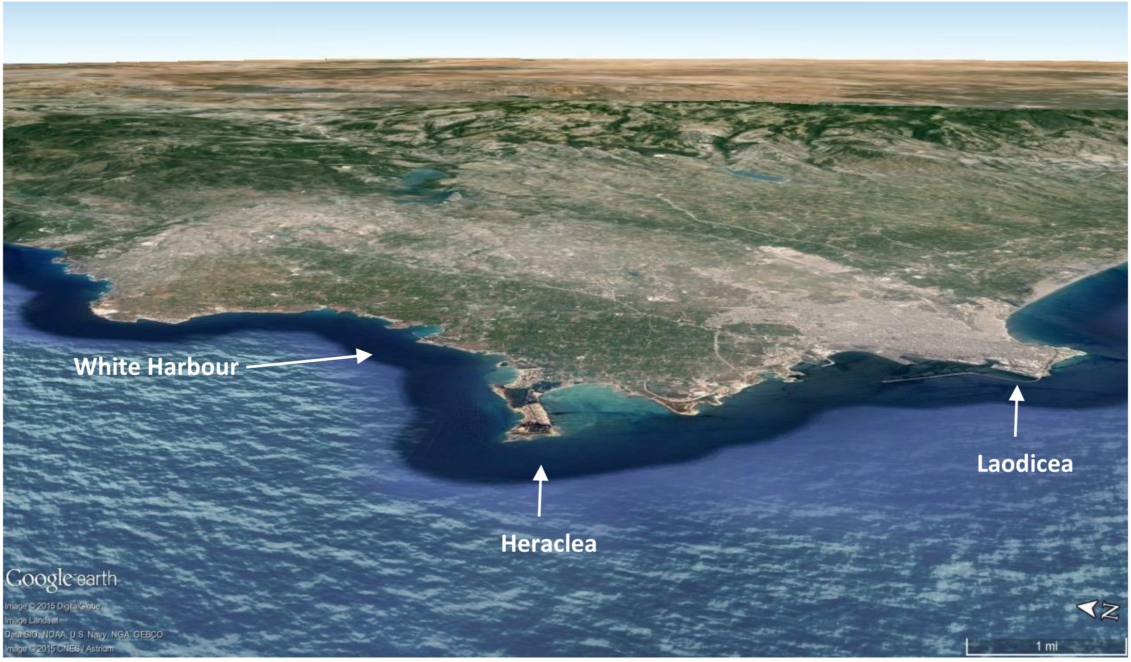


Figure 7.14 Laodicea → Heraclea → White Harbour (Map produced by author. Image: Google Earth).

Figure 7.15 Posidium/ Ras al-Bassit (Map produced by author. Image: Google Earth).

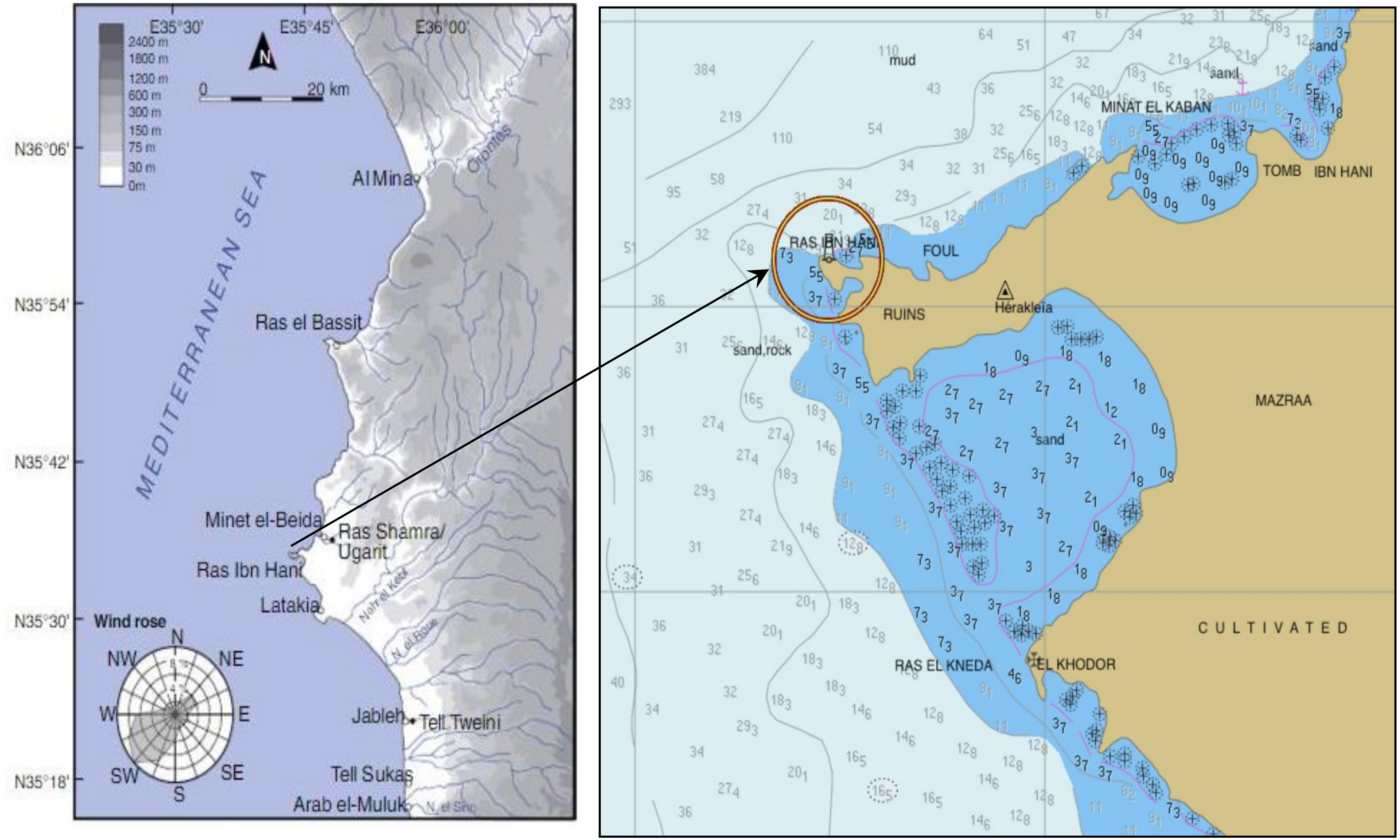


Figure 7.16 (left) Map of the locations of the key harbours on the coastal stretch of the 'hypothetical journey': 'Laodicea → Posidium' (after Marriner et al. 2012:36). (right) High-scale chart of roadstead of Ras Ibn Hani/Heraclea (Ref: CM93 ChartE, 1/50,000) - it seems there is a submerged breakwater (pers.comm.Arnaud 2016).

POSIDIUM (RAS AL-BASSIT) → SELEUCIA PIERIA (KAPISUYU) (cf.7.2.2.1 c (iii))

"From Posidium taking **the short way** to Seleucia by means of the west wind,110 stades" *SMM* 148

Near the final stretch of the Syrian coast, the *Stadiasmus* guides the mariner from **Posidium** (Ras al-Bassit, #L4), one of the best naturally-sheltered anchorages in this area (MPV 2005:177, 207). Between this point and **Seleucia Pieria** (Kapsiyu, #L3)[171] *SMM* lists a series of anchorages: **Sidonia**, **Macra Longa** island (Isle al-Hamam?) and **Nymphaion** (Samandagi Plaji) (Figs.7.17-19).

Sailing from Posidium to the **Orontes River** (Nahr al-Asi)**,** c.14 ¼ miles NNW, the coast becomes steeper and more indented with rocky cliffs, which would have been potentially hazardous to navigation (MPV 2005:177). A familiarity with this stretch is vital for safe and efficient sailing. Similarly, *SMM* describes this stretch of the voyage from Casium as rugged, advising the mariner to "sail past this place keeping 20 stades from land" (*SMM* 146). En-route, the Orontes mouth serves as a natural anchorage, as it did in antiquity, represented in ancient sources as a major navigable river in the region.[172] Sailing NE of Ras al-Mina Bay, the mariner would reach the final destination of the hypothetical journey at **Seleucia** (Kapsiyu), which appears "white and visible from a considerable distance seaward" (MPV 2005:177).[173] Seleucia (4th BC-5th AD) was the main port of Antioch (Syria's metropolis, c.25 km inland), with two harbours: an inner harbour and seaport in the Hellenistic and Roman eras (Pamir 2005:74-76; Yener et al. 2000). It acted as a link between the coast and inland caravan routes, closely linked to the Orontes and aiding communication with the hinterland with a natural anchorage at its mouth (Figs.7.17-9).

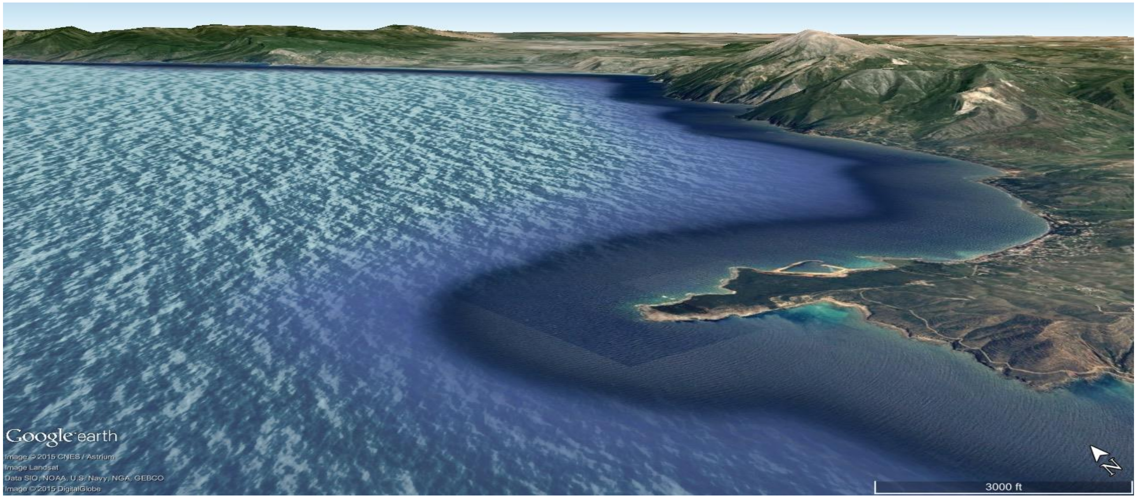


Figure 7.17 Posidium → Seleucia Pieria (Map produced by author, Image source: Google Earth).

[171] Alternatively: Samandag, Turkey. Coastal border of Syria-Turkey is close to Kassab Bay, c.11km NE of Ras al-Bassit.
[172] Local evidence from 19th century AD attests that rivers in the region maintained navigability, of which Nahr Asi is the most navigable, with the depths of its mouth ranging between 0.9-1.8m (Pamir 2005:69 - The Asi Delta Survey).
[173] A well-known coastal feature on this stretch is Rhossic Rock, southern extremity of Rhosos promontory (*SMM* 148-9; Strabo 16.2.8). It is worth noting there is no mention of the Rock Channel in the ancient sources - a notable feature of this area under Vespasian (may imply *SMM* was written earlier, cf.Ermatinger and Helmer, forthcoming).

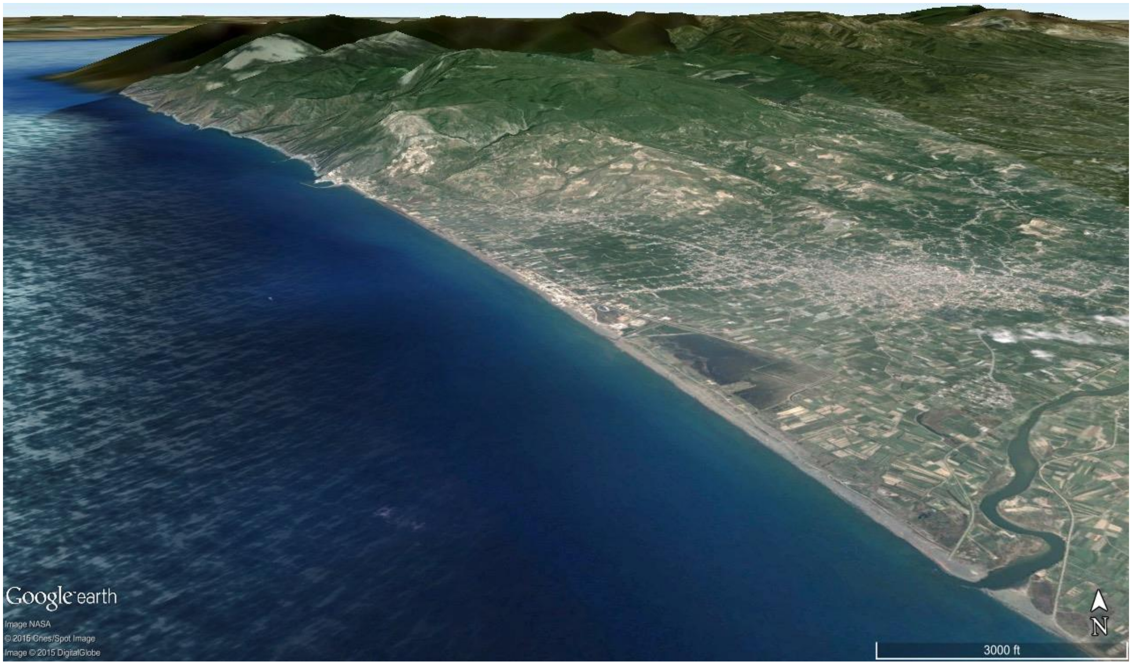


Figure 7.18 Orontes River → Seleucia Pieria (Map produced by author. Image source: Google Earth).

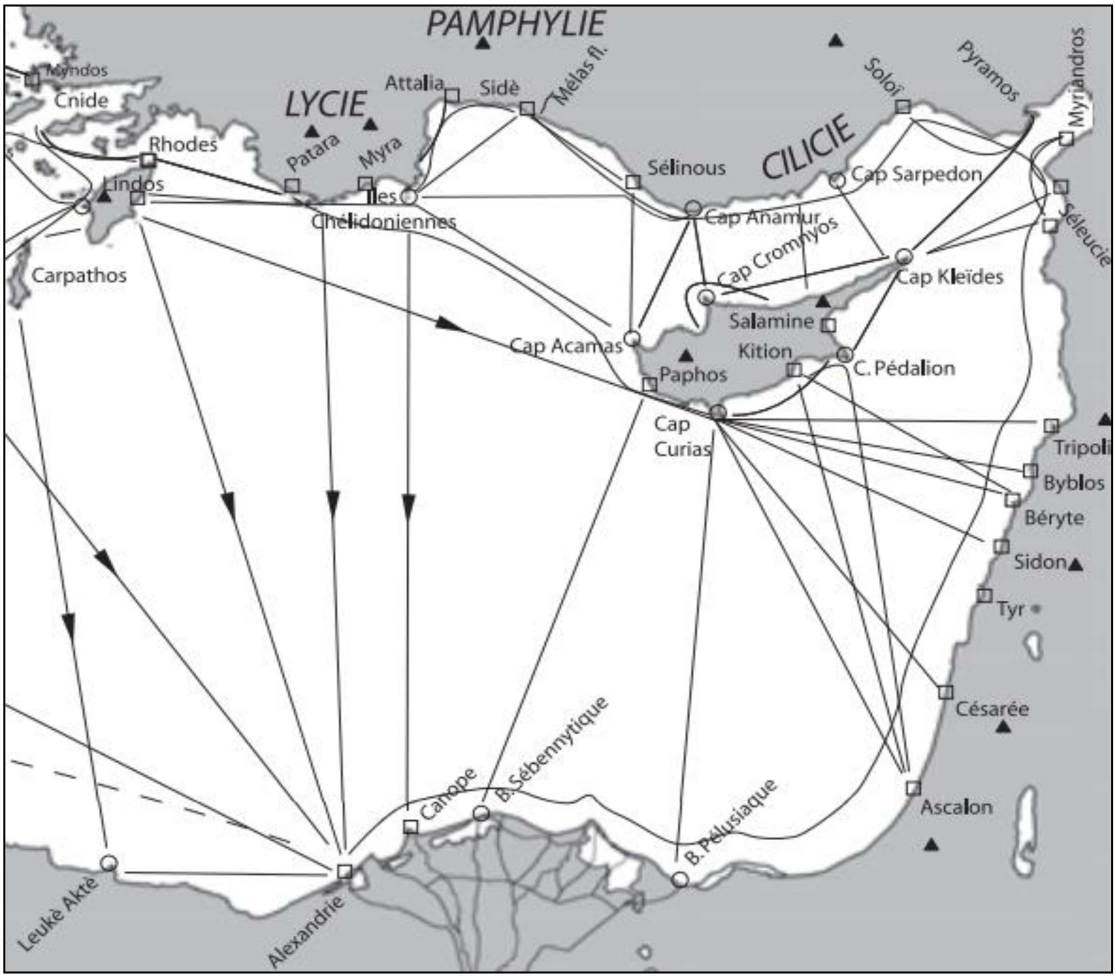


Figure 7.19 Map of common ancient sailing routes in the Eastern Mediterranean (Arnaud 2005:57) illustrating the major and active role of the Levant coast in the maritime trade network of the region. (local and long-distance scale), including the 'hypothetical journey' area described in this section.

(c) Distances and Durations: *Stadiasmus' Euthyploïa Routes*

Having considered the practical experience of the *Stadiasmus' euthyploïa* routes through the perspective of an on board hypothetical journey and its parameters, the final stage of analysis involves examining the distances and durations for such seaborne journeys of the *euthyploïa* routes and comparing them to the 'described routes'. In this way it is possible to visually map both tentative courses onto the landscape and discern the mariners' logic behind chosen routes. This is achieved by looking at the distances/durations provided between places along the specific routes to determine whether these ostensible '*euthyploïa'* would have been a favourable option. This would also be dependent on several other factors discussed (e.g. purpose of journey, vessel type/function, environmental conditions, types of harbours/anchorages and available shelter/facilities).

The following cases are approached with the presumption that the 'described route' involved following the winding of the coast, often mentioning stopping-points at harbours or anchorages on the way (for shelter, re-supplies or over-night mooring), depending on the purpose and limitations of the journey. For comparative purposes, the tables below (Tables 7.12-8.14) present the figures for: firstly, distances provided in the *Stadiasmus* between ancient coastal towns*;* secondly, their approximate estimated value in kilometres; and, thirdly, relative distances between the equivalent modern locations identified with these sites.[174] These *euthyploïa* routes versus the 'described routes' are mapped out onto their physical topography (using Google-Earth: Fig.7.20, 22, 24) as a means of observing what the general outline of these journeys may have looked like and what insights they can yield about the sailing practicalities in relation to the ancient geographers' representations. This next section thus shows relative distances between places mentioned in the ancient study-sources in the Levantine coast, to compare patterns in distances and journeys, and attempt to establish how closely they tie with reality and the types of data used for their calculations and descriptions.

[174] Calculations and approximate conversions are examined next, along with issues associated with converting ancient units (appendix i for database of sites (ancient/modern); cf.7.2.1.5 for full table of *SMM* Levant distances).

(i) *'Euthyploïa* 1'*: Balanea (Banias) → Laodicea (Lattakia)*:

"From Balanea to Laodicea ***cutting straight*** *toward the NE under a south wind, 200 stades."*
(SMM 137)

Described route: Perceived route following the coast's contour/features, accounting for short/long stop-overs.

Conversions (*stadia* to km): Approximate estimates for basic comparisons (using the '185m' value: see appendix v).

Actual Journey Distances (Modern): Calculated between coordinates of the known sites (see database: appendix i).

Journey (*Euthyploïa route* vs. Described Route)		*SMM* (*stadia*/km)	'Actual Journey' (km/*stadia*)
Euthyploïa Route	Balanea → Laodicea	200 stadia/ c.37 km	27.53 km/ 149 stadia
Described Route	Balanea → Paltos → Palteni → small harbour → Gabala → navigable river → Laodicea	-	35.9 km/ c.194 stadia

Table 7.12 '*Euthyploïa* 1' versus 'Described Route 1' in the *Stadiasmus* along the Levantine coast.

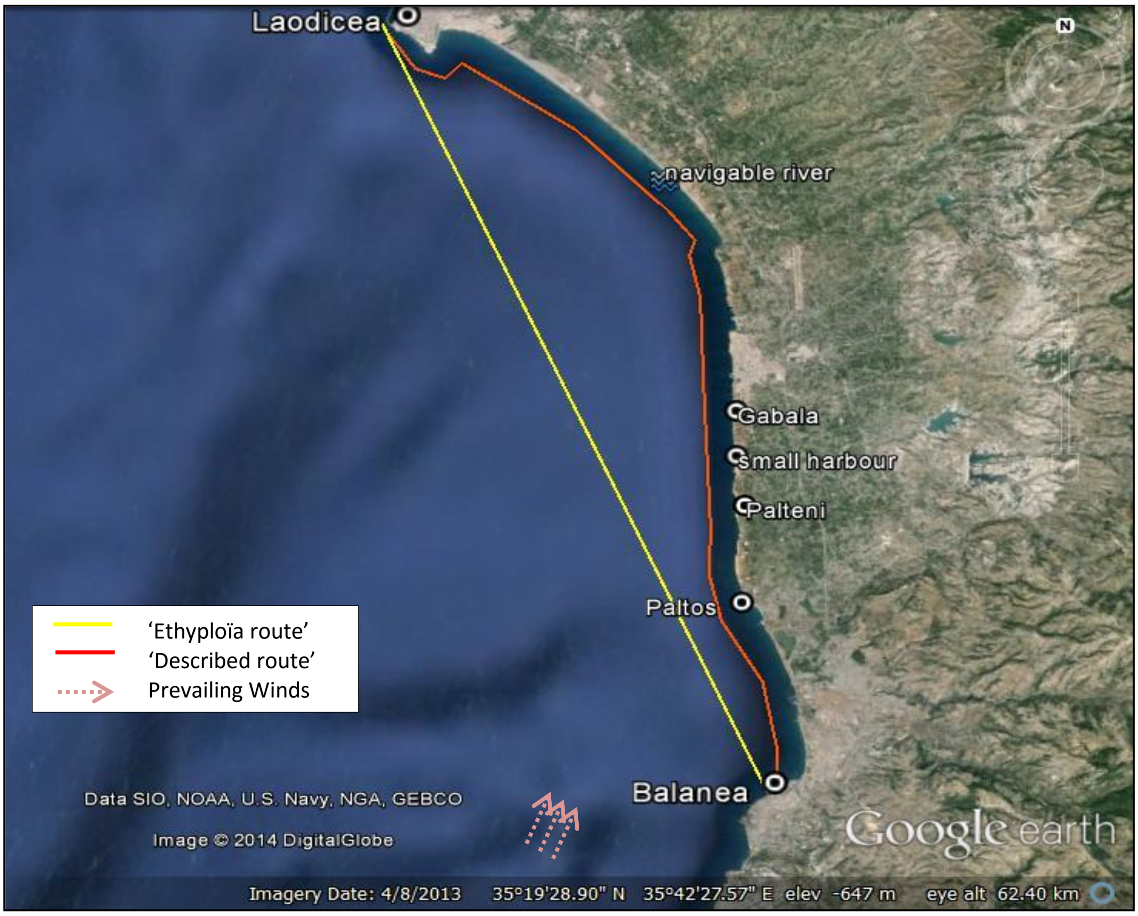


Figure 7.20 'Euthyploïa 1' vs 'Described Route 1' - Balanea → Laodicea (Map by author, Image: GEarth).

- ***'Euthyploïa 1':***

As seen (Fig.7.20; and earlier description: 7.2.2.1b), the stretch between Laodicea and Balanea, along the Ras Ziaret Peninsula, is a lee shore exposed to the local prevailing winds and swells due to its generally rectilinear shape and open rocky coast with little natural shelter en-route (modern pilots advise to avoid anchoring here: MPV 2005:210). A basic comparison between values for the *'euthyploïa'* (Table 7.12) show that *SMM* seems to give a direct distance that is approximately 35% of the real distance, which in this case is the direct measurement of c.28 km (Fig.7.21). To sail this direct journey and distance, *SMM* advises sailing by following the *Leukonotos* (S-SW), which in this case equates to the actual wind blowing in this region (prevailing SW). However, the NE direction[175] suggested does not represent the orientation a vessel would sail for this route (Arnaud 2014:57); in actuality, it would sail in a North-NW direction, probably on a beam or broad reach. This would have enabled a considerably fast, non-challenging direct sail from Balanea with favourable winds sailing in a North-NW direction, then turning eastward beyond the breakwater in Laodicea's harbour to anchor and shelter from the westerly winds. It is clear that for this stretch the '*euthyploïa*' would commonly be the preferred, safer one. In certain circumstances, the longer route could also be a viable (or necessary) option, as discussed next.

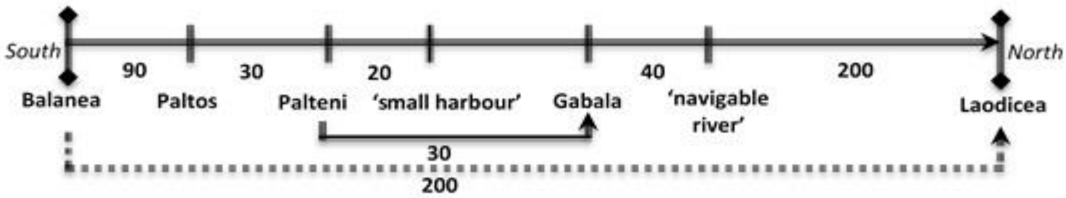


Figure 7.21 Balanea → Laodicea | 'Euthyploïa 2' (dotted-line) vs. 'Described Route 2' (solid-line).

- ***'Described Route 1'***:

Though the author advises the reader or mariner to take the '*euthyploïa'* route from Balanea directly to Laodicea (*SMM* 137), earlier in his acccount (*SMM* 130-137) he first describes the perceived route following the coast, representing what a mariner sees or passes along the way. The *SMM* lists five small anchorages en-route (Paltos, Palteni, small harbour, Gabala, navigable river),[176] along with the sailing distances between them (Fig.7.20-21). In the Roman period, the harbour-town of Balanea served the island of Arados, and appears several times in the *SMM* as a starting reference point for measuring distances between coastal places (i.e. Balanea to Carnos, to Balanea village, to Paltos, to the 'navigable river': *SMM* 129, 130-132, 137, respectively). Similarly, Paltos, the next harbour en-route on a rocky promontory, serves

[175] In Ptol., orientation is also NE. *SMM*'s misconception of orientation may imply that the wind is also misconceived.
[176] Palteni, a small harbour and navigable river are only present in *SMM* (no other mention in ancient sources).

as a distance marker. It is used as a geographic reference point for defining total distances between places: from Ptolemais to Paltos "as you sail by the shore" (*SMM* 132) and Paltos to the Cilician Gates (*SMM* 153).[177] It is also considered the border/starting-point of 'Syria Coele' (*SMM* 133). On the distances given between Balanea and Paltos (*SMM* 130-1), there seems to be a notable difference between the values provided for a similar route/distance:

> "From Balanea promontory to Paltum promontory **90 stades**. From Paltum promontory *rounding* the Rocky promontory is 10 stades. From the Balanea cape *straight* to Paltum, **200 stades**."

This difference could potentially be linked with the author accounting for a route sailed by "rounding" the promontory compared to a "straight" sail. Even so, this seems like a large difference, particularly due to the short distance between these two harbours and the fact there are no intermediary anchorages or stop-off points.[178] A further discrepancy relates to the distances provided for the 'navigable river' (unidentified, but thought to be the Lycos River, i.e. Nahr el-Kalb). They appear inconsistent with the reality of the landscape, as the (possible) location of this river does not seem to be located at a distance of 200 stades from Laodicea and 70 stades from Balanea. It seems distances are used as rounded, general estimations and the variations are likely dependent on the authors' familiarity with a particular part of the coast or the nature of the sources referred to.

Discussion: Overall, although the *euthyploïa* route would normally be the ideal choice for sailing this exposed stretch of the coast, if the weather conditions were to change abruptly and become less favourable, a vessel sailing this route could anchor and find protection at the small harbours listed along the coastal route. Alternatively, if needing to re-supply or carry out smaller-scale trade (e.g. at Gabala), the non-direct coastal route was also an option. On lee shores, mariners faced the risk of being blown to the shore, dangerous rocks/waves or running aground. It would also be challenging to get around the headland at Laodicea by following the coastal route. Nonetheless, mariners likely overcame potential hazards of the lee shore by taking advantage of the diurnal winds present along this coastal stretch, particularly strong in the hot summer (MPV 2005; Blue 1995:Ch.4; McKee 1983:23). The 'straight-line sail' acts as a way to mitigate the challenges, and a wind shift to the west from the SW (which is the wind shown in Fig.7.9). The fact the *Stadiasmus* advises the favourable and direct 'straight-line sailing' journey, while also providing details on the anchorages and features en-route, demonstrates an understanding of sailing and awareness of this stretch of the Levantine coastline.

[177] Alternatively this choice may simply imply Paltos lies approximately where the 2000th stade count happens to fall.
[178] On the other hand, as the direct route seems twice as long as the indirect route it may be a corruption in the text.

(ii) '*Euthyploïa* Route 2': Heraclea (Ras Ibn Hani) → Posidium (Ras al-Bassit)

"From Heraclea to Posidium, ***by the short way****, 100 stades."*
(SMM 142)

Journey (*Euthyploïa* vs. Described Route)		***SMM* (*stadia*/km)**	**'Actual Journey' (km/*stadia*)**
Euthyploïa Route	Heraclea → Posidium	100 stadia/ c.18.5 km	39.31 km/ c.213 stadia
Described Route	Heraclea → White Harbour → Pasiera → Polia → Posidium	-	46.32 km/ c.250 stadia

Table 7.13 '*Euthyploïa* 2' vs. 'Described Route 2', in the *Stadiasmus* along the Levantine coast.

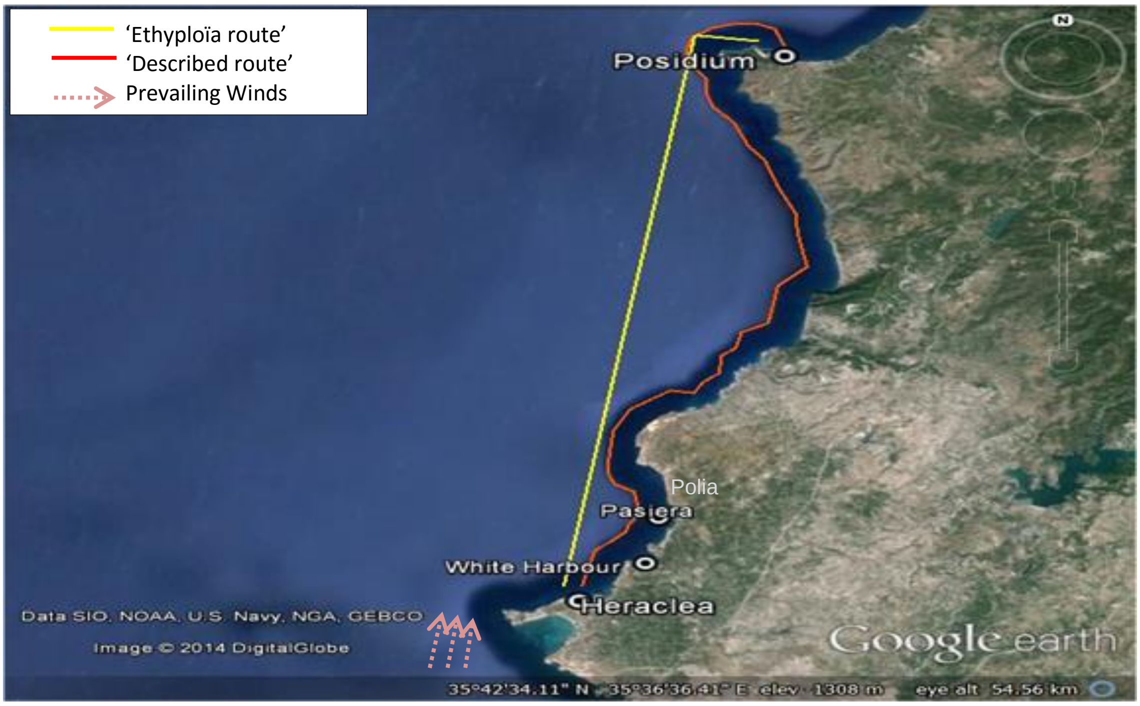


Figure 7.22 'Euthyploïa 2' vs ' Described Route 2': Heraclea → Posidium (Map by author, Image: GEarth).

It is worth emphasising that along this journey between Heraclea (Ras Ibn Hani) and Posidium (Ras al-Bassit), particularly in the area of the White Harbour (Minet el-Beida), the two key wind patterns aforementioned (7.2.2.1a)[179] would have influenced durations and distances travelled at sea, depending on if the journey was undertaken in summer or winter periods. Consequently, these conditions would have dictated the choice of taking the '*euthyploïa*' or stopping off at one of the anchorages/shelters described en-route. The coast's topography and shape here becomes far more indented and rocky compared to the previous more rectilinear route (Fig.7.22-3). However, the first part of the route, between Heraclea and White Harbour, possesses a characteristic pocket beach environment, with well-protected, anchorages for vessels (Ras al-Bassit, with these two, offers the best natural shelter on the Syrian coast).

---

[179] To re-iterate: April-Oct: stable, SW prevailing winds vs. Nov.-March: unstable, prevailing NE-N, and SW-W storms.

- ***'Euthyploïa 2':***

As described (7.2.2.1b), this route between Heraclea (Ras Ibn Hani) and Posidium (Ras al-Bassit) has some of the best naturally-sheltered bays/anchorages in the area.[180] For this '*euthyploïa*' (Table 7.13), *SMM* gives a direct distance that is approximately 47% of the real distance (c.39 km), which would probably be sailed on a beam or broad reach (Fig.7.22). The author's rounded distance of 100 stades seems to generally represent a common estimated value for direct '*euthyploïa*' courses between ports on this coast (ranging from c.100-120 stades; Fig.7.23).

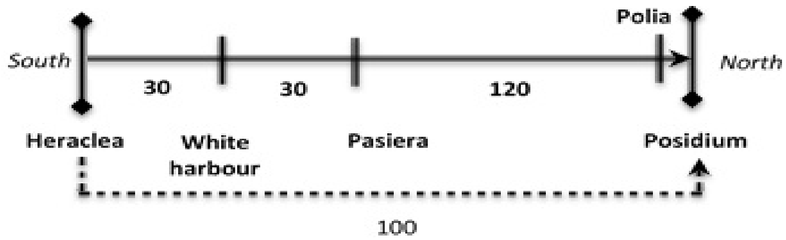


Figure 7.23 Heraclea → Posidium | 'Euthyploïa 2' (dotted-line) vs. 'Described Route 2' (solid-line).

- ***'Described Route 2':***

When describing the coastal route between Heraclea and Posidium (Table 7.13, Fig.7.23), *SMM* enumerates three coastal places that do not appear in any other ancient sources (*SMM* 138-41): White Harbour (Ras Ibn Hani), Pasieria (possibly outlet near Al Shamiyah) and Polia (unidentified). The first two are at equal distance intervals of 30 stades, which seems to be a common rounded value adopted by the author for short distances between smaller harbours. For the remaining stretch, the shape of the bay changes, curving around the indented coast and becoming exposed to SW winds before reaching the protected bay of Ras al-Bassit. For this stretch, the *Stadiasmus* gives 120 stades from Pasiera to Polia cape, which seems an unusual estimation if we compare to other distances provided between small places/stop-off points en-route (ranging between c.20-60 stades). It is hard to assess this distance as the location of Polia is unidentified (see 7.2.4). Based on *SMM's* account and distance, Polia Cape could refer to the projecting low headland at Posidium, and, thus, the distance of 120 stades reflects the longer sail following the curving and exposed coastal route.

Discussion: Similarly, the '*euthyploïa'* route would have been a favourabe option, particularly between Pasiera and Posidium, where it is more exposed and lacking safe anchorage. However, on the coastal route, the White Harbour provided very good shelter and served as a key stop-off point in this region, connected to hinterland/inland communication-exchange.

---

[180] See also Ptolemy (*GH* 5.15), Strabo (*Geog.* 16.2.10) and Pliny (*NH* 5.20).

(iii) ‘*Euthyploïa* 3’: Posidium (Ras al-Bassit) → Seleucia Pieria (Kapisuyu)

---

*“From Posidium taking the **short way** to Seleucia by means of the west wind, 110 stades.”*
(SMM 148)

Journey (*Euthyploïa* route vs. Described route)		*SMM* (*stadia*/km)	‘Actual Journey’ (km/*stadia*)
Euthyploïa Route	Posidium → Seleucia	110 stadia/ c.20.35 km	c. 30.86 km/ c.169 stadia
Described Route	Posidium → Sidonia → Macra Longa → Nymphaem → Orontes River → Seleucia	-	35.3 km/ 191 stadia

Table 7.14 ‘*Euthyploïa* 3’ vs. ‘Described Route 3’, in the *Stadiasmus* along the Levantine coast.

Figure 7.24 'Euthyploïa 3' vs Described Route 3': Posidium → Seleucia (Map by author, Image: GEarth).

- ***‘Euthyploïa 3’:***

As shown in the hypothetical journey (7.2.2.1b), the coast from Posidium (Ras al-Bassit) to Seleucia (Kapsiyu) is rocky, steep and indented (except at the plain extending from the Orontes mouth to Seleucia) (Fig.7.24-5). For this ‘*euthyploïa*’ (Table 7.14), the author gives a direct distance that is 66% of the real distance (30.86 km).[181] Taking advantage of the favourable SW winds, this route would have been sailed on a broad reach or run. The two sites served as strategically positioned trade-ports in the Roman period and would have been the preferred crossing points for journeys linked with Cyprus/Asia Minor/Aegean/Egypt and inland networks.

[181] Other study-authors: Strabo (*Geog.* 16.2.8-9): “After these places, near the sea, are Seleuceia and Pieria…further on from Seleuceia are the mouths of the Orontes, then the Nymphæum…next Casium, then follows Poseidium a small city, and Heracleia. Then follows Laodiceia, situated on the sea” | Mela (1:69): “On the gulf is the remainder of Syria…on its shore are the cities Seleucia, Hypatos, Berytos, Laodicea, and Rhosos” | Pliny (*NH* 5.18): “…promontory upon which is situated the free town of Laodicea; and then Diospolis, Heraclea, Charadrus, and Posidium. We then come to the Promontory of Syria Antiochia. On the promontory is Seleucia, called Pieria, a free city.”

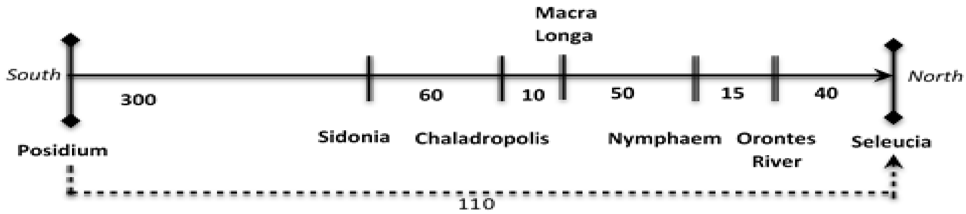


Figure 7.25 Posidium → Seleucia | 'Euthyploïa 3' (dotted-line) vs. 'Described Route 3' (solid-line).

- ***'Described Route 3':***

The Orontes mouth (Nahr el-Asi) served as a natural harbour, influencing inland centers to establish other harbours in close proximity of the river (e.g. Seleucia, harbour of Antioch – included by *SMM* on this route; cf.pattern of twin-settlements: Ch.6.1.2, Ch.8.1.1.2). However, this part of the coast around the river mouth is exposed to prevailing winds blowing from the west and heavy swell (MPV 2005:178), thus was likely mostly used by smaller vessels (7.2.3 on vessel types). Strong easterly gales (*raghieh*) and westerlies intermittently affect the entrance to the river mouth, as well as northerly winds that occasionally blow off the Cilician Delta. Landing would have been impractical and hazardous for larger vessels, as it was a natural anchorage lacking harbour installations or facilities needed for safe anchoring, unloading/loading and re-supplying. Such conditions would have led mariners to likely choose the '*euthyploïa* route', unless undertaking small-scale trade with inland regions on the riverine route (in this case, best approached from the north at a slight angle to parallel – Blue 1995:Ch.4). Along the rocky stretch of coast, the author again lists intermediary places unique to the *Stadiasmus*, absent in other ancient sources: Sidonia (and Mount Thronus), Macra Longa and Nymphaeam (likely due to transmission errors by copyist: 7.3, cf. Ch.4.1.1, 1.7; Ch.6.2.5). Similar to the other cases, between the small intermediary harbours/stop-offs, *SMM* gives values of c.40-60 stades (though more spaced out; Fig.7.25), as well as the distance from the mainland to nearby Macra Longa island offshore (10 stades), which offered extra shelter from winds. Though for the first part of the journey, there is a significant discrepancy in the distance from Posidium to Sidonia of 300 stadia, which does not match the reality of the landscape.

Discussion: For this case, the direct '*euthyploïa*' between Posidium and Seleucia would have also been a favourable option, particularly for larger vessels. This was due to the steep, indented coast, possessing areas with dangerous rocks and exposed coasts (e.g. at the Orontes mouth), which would have been hazardous for entering/leaving harbours during unfavourable conditions. If travelling on a smaller vessel, this coastal route also offered anchorages and stop-off points on the way and links with inland travel or trade via the Orontes River.

7.3.3 Considerations of Vessel Types and Seaworthiness

This is a complex issue, particularly due to the multiple variables encountered along an anticlockwise sea journey under 'favourable conditions', as well as the inconsistencies presented in the maritime distances (and the estimations of such distances). In order to further deduce the nature of the *Stadiasmus*' 'straight-line sail routes' (e*uthyploïa),* and a mariner's reason for choosing these, a consideration of the various vessel types, sizes and rigging forms can help draw out correlations, particularly relating to accessible harbours, settlements and local physical conditions in the Levant. The vessel type can also provide insight into the specific relationship of the vessel or mariner with the coast, along with role of the coastal sites described along the journeys by the ancient authors.

Archaeological data reflects a range of vessel types and sizes active in the Roman period, including large merchant-ships, medium trading vessels, and smaller vessels for local work, as well as specialised vessels, such as dredgers, river barges and lighters (Whitewright 2008:64; Wilson 2011:39,54; Parker 1992:1-33, 1995; Casson 1971:159; Janni 1996). Evidence for ships' relative size, style and function is also attested in the Althiburus mosaic (c.4th AD; Fig.7.26).[182] The wide variation in hull-forms and sailing rigs would have also impacted sailing performance and navigation. Contrary to traditional views, sail design did not develop in a linear way (as put forward by Whitewright 2001a:5-6, 2001b:90-1), as the choices in vessel-type and rigging were influenced by varying socio-economic, technological and environmental determinants of the region, rather than simply speed or the 'need' to sail windward (Fig.2.7). The same is argued for hull-forms, as though deeper keels allow boats to head upwind more easily, they prevent boats anchoring in shallower harbours. Archaeological and historical records suggest Roman vessels in the Mediterranean were generally rigged with a square-sail or lateen/setee sail (Whitewright 2011a:5; Adams 2003:64; Pryor 1994:78). Shipwreck data illustrates a variety of hull-forms, such as flat-bottomed or vessels with deep underwater profiles,[183] suggesting vessels of varied specialisations. In light of the collated evidence, sailing rigs and hull-forms advanced multi-linearly based on changing geopolitical contexts. Though hard to ascertain from ancient literary sources, the vast archaeological evidence sheds light on such critical factors that impacted on sailing and ancient mariners' practices in the Levant, characterised by different ship-types adapted to different harbour-types on this coast and a journey's purpose.

[182] +80 types of merchant galleys/sailing ships attested in Aulus Gellius *NA*10.25.5), Iulius Pollux (*Onom.*1.82-3), Nonius Marcellinus (*Non.*13), Isidore (*Etym.*19.1) - Cf.Pliny's list of vessel types (*NH* 7.56); Strabo, *Geog.* 16.2.16.
[183] E.g. Fat-bottomed hull: Cavalière (Charlin et al. 1978), Laurons 2 (Gassend et al. 1984); E.g. Deep keel: Kyrenia (Steffy 1985), Madrague de Giens (Rival 1991), Yassi Ada (Bass and van Doorninck 1971)(cf.Whitewright 2011a:5-6).

Additionally, papyrological evidence, though rare, also yields valuable insights on the nature of trade and trading vessels in the Levant. The aforementioned *euthyploïa* in the *Stadiasmus* follow the stretch from Balanea to Laodiceia, thence to Posidium, then Seleucia Pieria, with small harbours/anchorages listed en-route (e.g. Paltos, Gabala, Heraclea, White Harbour, Orontes River, as shown earlier, according to *SMM,* archaeology and modern records). Small coaster merchant galleys, '*akatos*/*actuaria'* (Fig.7.26; Rougé 1966:60-1), were likely used on this route and were a predominant vessel type in the Eastern Mediterranean, as evidenced by the *Papyrus Bingen 77* (early 2nd century AD).[184] *PBingen 77* attests for coaster ships, such as *akatos,* and active sailing routes from the harbours of Paltos and Laodikeia:

> "…From Paltos. 20. [The ship] of Zenon, son of Protos, "Dragon";2500 artabae. Transport for Heliodoros 500 jars of wine.; From Laodike, 18. The ship of Kassianos, son of Kyros and of Dominios, son of Agathokles, "Elpis and ...". Isi( );2000 artabae, transpoterd for Dominios [x jars] of wine…" / ( ) 15Π̣ά̣λτου κ Ζ̣ή̣γ̣ω̣νοστοῦ̣ Π̣ρώ̣τοụ [-ca.?-] ̣ ̣ ̣κ( )( ) Δρά̣κ̣ων ( ) ̣ ̣ω̣τ̣( ) (ἀρτάβαι(?)) Βφ ἄγει Ἡλιοδώρῳ οἴν(ου) Λε… [-ca.?-] φ Λαδικ(ειας) ιη Κασ̣ιανοῦ τοῦ Κύρου καὶ Δόμν[ου τοῦ Ἀγ]α̣θοκλέους **ἄκ̣(ατος)** Ἐλπὶς [-ca.?-] ̣ Ἰσ̣ι̣ ̣( ) (ἀρτάβαι) Β ἄγει Δόμνῳ οἴν(ου) […] ̣" (*PBingen 77*)

The average speed of these coaster vessels ranged from 1.6-3.5 knots (Heilporn 2000:346). This considerably slow speed was likely a result of the unfavourable meteorological conditions, countering the ability to effectively sail (Heilporn 2000:342). Slower speeds may have also been due to stop-offs at harbours and anchorages along the Levant. As shown (7.2.2), Levantine harbours and anchorages between Balanea and Seleucia (Paltos, Laodicea, Heraclea, White Harbour, Posidium) were often used by such merchant coasters for shelter, water or re-supplies, as well as overnight anchoring and/or awaiting favourable winds (a basic pattern of this vessel type, cf.Casson 1971:159). Moreover, the majority of distances collated by ancient geographers were derived from "a corpus of durations, either converted into distances according to rather simple tables, or extrapolated after a combination of distances driven from durations…durations consist of the core of the common sense geography of ancient mariners and formed their legacy" (Arnaud 2014:46, 2005:61-96).

The range of data (literary, archaeological, replica vessels) suggests the practice of close-hauled sailing at the time the authors were writing (i.e. sailing as close to the wind as a vessel is capable) (Whitewright 2012:11, 2011:7-11; Rougé 1981:22), which compliments the various cases of described journeys in the Levant, sailing almost against the wind and using opposite-

[184] *PBingen 77* is a port registry recording arrival and tonnage of 11 merchant vessels to an unspecified Roman Egyptian port in the Delta, likely Alexandria (Heilporn 2000; Arnaud 2005:35; Rougé 1966:348; Casson 1971:159, 338). Cargo capacity ranged from 1000-7000 *artabs* (Egyptian unit for wheat), i.e. c.30-200 tonnes for grain cargoes.

blowing diurnal winds to their advantage. Records from replica square-sail vessels suggest that, in optimum calm conditions with mild winds, vessels could perform close-hauled sailing with a heading of c.60°–65° (Whitewright 2012:11).[185] The most stable and efficient point of sail tended to be a broad reach (wind from behind at an angle), though "with reasonable skill and a well-trimmed sail, an ancient mariner could effectively accomplish a beam reach, utilizing winds perpendicular to the intended direction of movement" (Leidwanger 2013:3305, cf.Arnaud 2011). Thus, mariners had the technology and ability to adapt to prevailing winds.

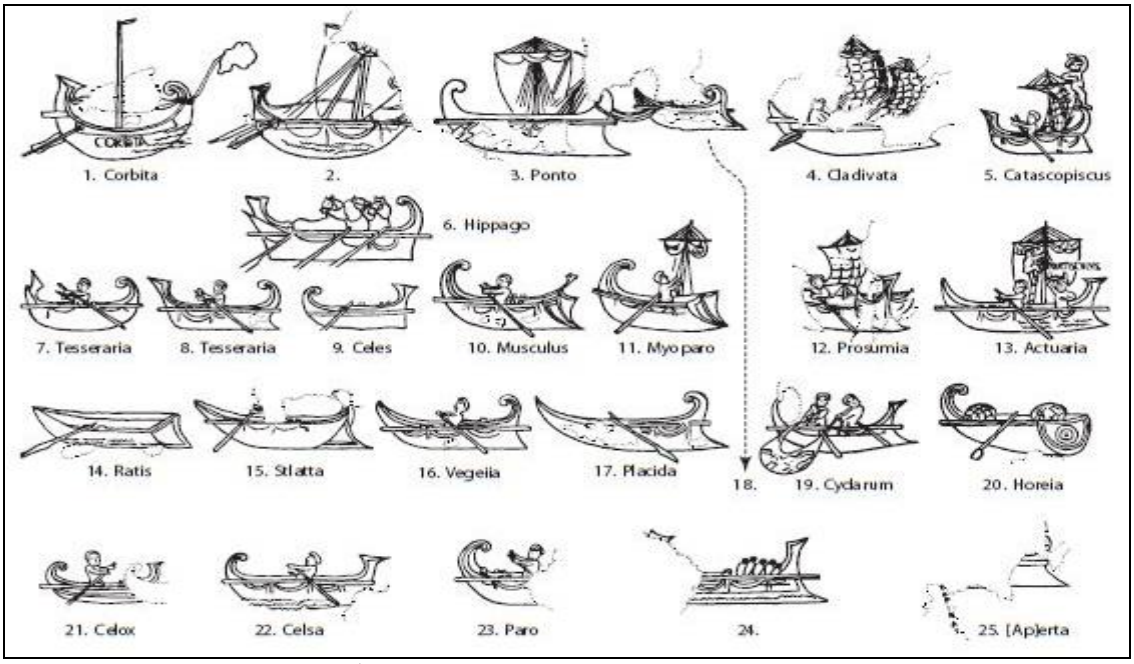


Figure 7.26 Althiburus mosaic (4th BC) depicting various vessel types (Davis 2009:268 after Duval 1949).

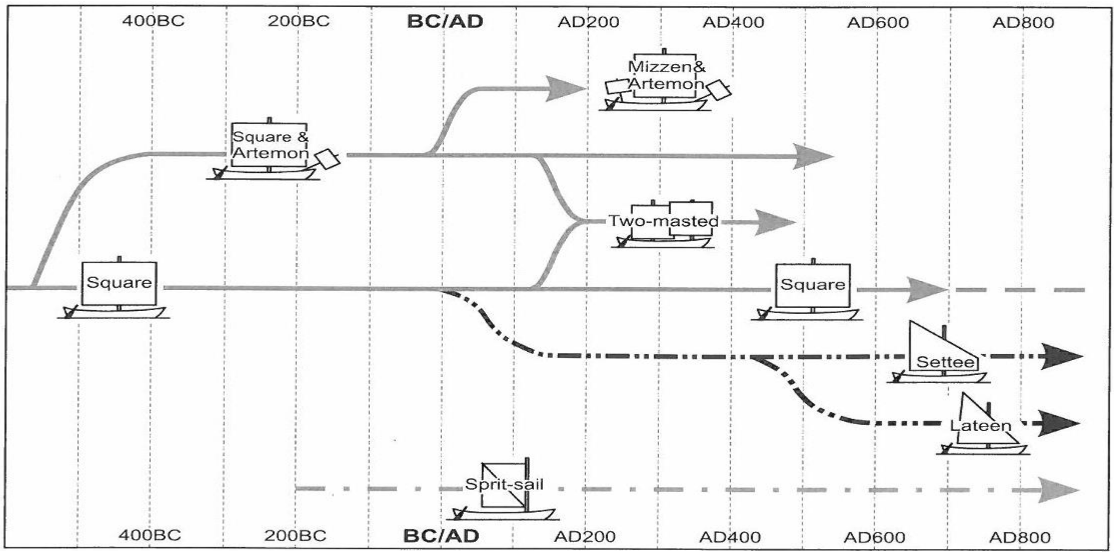


Figure 7.27 Summary of sail-rig's multilinear advances in the Mediterranean (Whitewright 2011b:90).

---

185 See Whitewright (2008:136) on sailing performance and technological change; Palmer (1986) on using data from full-scale vessels to measure sail-rig performance; and Palmer (2009) on capabilities of vessels sailing windward.

The sailing considerations and variables in the Levant highlight the signifcance of the *Stadiasmus* mentioning the various harbours/anchorages along this itinerary, as well as providing the direct straight-line journeys that would have likely been used by oared sailing vessels adapted for this region. These ports-of-call either had infrastructures for berthing, or were natural anchorages, such as river mouths (e.g. river Orontes; see Galili and Arenson 2014; Marriner et al. 2012; Raban 1991). As highlighted, coasting was also a favourable option for ancient mariners sailing the Levantine coast. For example, during the Roman Imperial period, Phoenician merchant ships returning to Alexandria often opted for the longer coasting route from Brentesium, including the Levantine ports along the final stretch of the journey (Arnaud 2011:63). Supporting archaeological evidence for coasting in the Eastern Mediterranean coast includes: anchors, sounding-weights, wrecks, and ceramics (Galili et al. 2010:125-146; Galili and Rosen 2007; Oleson 2000, 2008; Parker 1992, 1995; Raban 1991; Campbell 2012:411-16).

Particularly notable indicators for coaster wrecks and sailing patterns are the number of anchors available onboard (Arnaud 2011:63). Evidence of anchors has been along the Levantine coast, particularly in the Southern Levant's less sheltered coastal stretch stretch: e.g. Hellenistic/Roman wreck off Ashkelon (Galili et al. 2010:125-145; see Galili and Rosen 2007). The growing number of small iron anchors found on small vessels spanning from the 3rd century AD to the Byzantine period serves as a valuable indication of coasting and a growing number of anchorages en route.[186] It also suggests losses of an anchor(s) in a rocky sea bed or because a vessel had to escape quickly from an anchorage that had become dangerous. Also, a fouled anchor could not be hauled back. Possessing several anchors onboard was thus a mariner's means to counteract such challenges on the shore (Arnaud 2011:63). Furthermore, research indicates that "small coasters were the majority of units engaged in commercial transportation, even at medium range… and shows that on comparable exchange medium distance lines, although less numerous, medium sized vessels are vectors carrying more than half of business volumes, and the large vessels were not exceptional." (Arnaud 2011:35).

These sailing patterns were influenced by increased knowledge of the maritime conditions and advanced technological skills, efficient networks of communication and exchange, periods of peace and stability, and organised specialised trade. Within the abundance of visible archaeological variation in these critical factors for sailing, it is difficult to make a fast modern model due to the many variables discussed (environmental, technological, economic, political).

[186] As an example in the W.Mediterrnanean, Dramont E wreck (5th AD) sunk with 10 anchors onboard and 11 anchors on Yassi Ada (7th AD). It transported amphorae from Tunisia and sank in S.France, attesting for long routes using small boats. The most important feature of an anchor is the angle it makes with the seabed, rather than its weight. They were more economical and practical, assembled before use (made of 2 pieces) and carried on deck.

The ancient authors were either catering for a wide range of audiences or one specific audience difficult to identify with certainty. Thus, considerations of the different vessel types and number of anchors on board, particularly in relation to the prevailing coaster ships in the Levant, can shed some light on the role of smaller settlements or anchorages on the described journeys and how mariners adapted to the coastal landscape and local maritime conditions.

7.3.4 Summary Conclusions

Overall, based on the *Stadiasmus'* cases presented, general patterns for this coast emerge:

(i) <u>Distances:</u> From the values listed above, we can see that the *Stadiasmus* is using stade counts/travel distances as very round figures and estimations (this also seems to be the case with Strabo's figures for this region, presented earlier). In the case of S*MM*, there is a frequent occurrence of specific values and multiples thereof, particularly values 20 and 30 (7.2.1.7: table with all *SMM* distances for Levant). As can be seen from the maps (Figs.7.20, 22, 24) and attested in the tables (Tables 7.12-14), certain distances in *SMM* do not coincide with the reality of the landscape (e.g. Balanea – Paltos, 90 stadia; Posidium – Sidon, 300 stadia); while other values are not used consistently for estimations (e.g. 20 stadia: Laodicea to Heraclea's 20 stadia differs greatly from that of Palteni to the "small harbour").

(ii) '<u>Straight-line Sailing</u>' (*euthyploïa*): As observed, the cases of '*euthyploïa*' in the Levant represent 'real routes', rather than the perceived itinerary. These cases show a tendency of using rounded estimations, particularly values ranging between ~100-200 stades, for distance intervals between larger coastal towns on direct '*euthyploïa*'. Due to the mostly rocky, indented nature of this coast and prevailing SW winds and diurnal cycles (cf.Ch.5.1.2.2: Fig.5.7-11), sailing the direct '*euthyploïa*' would generally be a favourable, safer option. *SMM* also presents '*euthyploïa*' in other regions, as does Strabo (Ch.8.1.2.2.1).

(iii) '<u>Coasting patterns</u>': Comparative cases of the 'described routes' along the itinerary also showed a tendency of using rounded numbers, particularly values between ~20-60 stades, for distance intervals between smaller harbours or anchorages. Depending on the vessel type (7.2.3) and changing maritime conditions, smaller ships could put in at these stops en-route for shelter and awaiting favourable weather, re-supplying/water, or small-scale trade. Though medium/standard sized vessels (up to 100 tonnes or less) were generally the norm in the Mediterranean in the Roman Period (Parker 1992; Houston 1988; Wilson 2011:39; Casson 1971; Bass 1972:11-36). As depicted on *PBingen 77* (Heilporn 2000), merchant galleys such as *akatoi* (7.2.3) sailed into Egypt from the Levantine ports (e.g. Laodicea and Paltos) and the rest of the Eastern Mediterranean (Heilporn 2000; Davis 2009:54).

The fact the author provides details about the 'described route' along the itinerary, and then advises to opt for the favourable 'straight-line sailing' route (and often specifying a certain wind and orientation to follow), reflects a degree of awareness of the coastal landscape. It also demonstrates considerations of the navigational aspects involved on a journey in this region which could account for different types of voyages and their purpose, such as scale of trade (direct/long-distance trade vs. *cabotage* along minor ports), socio-economic/political motives, and/or environmental shifts or sailing limitations. Moreover, in *SMM'* representation of the coast, the author mentions the key harbour-towns located in this region, as well as smaller, secondary harbours, natural anchorages and coastal features. These accounts, in conjunction with modern data and archaeological evidence, show that these harbours tended to be established in strategic locations, taking advantage of natural features and navigational landmarks on the coast, such as mountains, sheltered bays, promontories and offshore islands.

Additionally, based on the complex and corrupt nature of the *Stadiasmus* (Ch.4.1.6-7), particularly for the Levant, it is worth addressing certain toponyms unidentified/unique to *SMM* to better interpret the genesis of its structure and sources. Recently, Arnaud (2016b:13-4) has proposed that the preserved form of these toponyms is the result of distortions of a known place-name (or merging of two place-names). For example, when *SMM* mentions the unknown locality Polia/Polis (*SMM* 141) it seems to be derived from a distortion of *Poseidonia* (*SMM* 142), divided into two place-names, *Polia* (*SMM* 141) and *Sidonia* (*SMM* 143) – or alternatively a division of Charadropolis (*Chaladru* and *Polia*). Doublets and distortions occur throughout,[187] with place-names repeated in other regions, or cases of two distinct forms of a same place-name being considered as two separate places. An analogous case is the confusion between Mallos, Magarsos and Antiochia ad Pyramum in Cilicia, considered distinct places by ancient authors, but were actually one single place (Arnaud 2016b, 2009:175). Overall, this implies *SMM* was compiled in sections and such errors were not recognised by the compiler.

Overall, the significance of demonstrating a 'hypothetical journey' (7.2.2.1) was to compare the ancient representation of this coast with the reality of the landscape. Therefore, this section has served to further contextualise these sea routes in an "actual journey" setting to observe patterns and better understand the perceptions and approaches of the ancient authors. However, it is worth noting that the conditions presented in this hypothetical journey would have varied on the return voyage (this clockwise journey is the chosen direction/route in Strabo's descriptive voyage). On the return, mariners would have sailed against the

[187] E.g. *SMM* 133 gives a distance from Paltos to an unknown place, which could be a distortion of Paltos or Gabala (or the two merged): *Pelleta* (see Arnaud 2016b:12-14 for his arguments and examples on this topic).

prevailing SW winds and anticlockwise currents, which would affect factors such as the speed of the journey, number of stop-offs and chosen routes. This further highlights the importance of the smaller, secondary ports and landing sites (e.g. Balanea, Palots, Gabala, Heraclea, White Harbour, Orontes Mouth) listed on the 'described route'. [188] The conditions of such secondary ports also influenced the effective performance of a sea journey. Overall, these factors would have have aided mariners' efficiency in overcoming challenges of meteorological conditions faced on a return journey along this lee shore, taking advantage of the diurnal winds and series of anchorage nodes en-route. The vessel-type would have also influenced the sailing tactic (7.2.3), for instance "merchant galleys returning to Levantine and Egyptian ports likely retraced their steps, while sailing ships simply utilized prevailing northerlies and northwesterlies to push them across the wide-open Levantine Sea toward their point of origin—a corridor well attested throughout antiquity" (Davis 2009:79).[189] Moreover, durations and distances for certain routes traversed were extremely varied, reliant on the many factors discussed (7.2.1).

7.4 Chapter Summary:

Regardless of certain discrepancies for particular winds, directions and distances (compared with the reality of the landscape), the overall picture created by the ancient author's work does reflect a sense of awareness of seafaring and navigation along this coast, guiding the reader through the eyes of a mariner on a journey. It is clear that the various cases and patterns researched are extremely complex, in terms of the routes, conditions, vessels and the ancient representations of these factors. Although it is difficult to assess this fully within the scope of this research, the cases explored here help to visualise and compare the type of journeys and distances being described in these ancient sources and their relationship to the actual reality of the landscape. Moreover, it highlights some of the challenges of calculating and analysing these types of estimations and the importance of a knowledge and experience of seafaring and familiarity with the local coastal landscape. This is where the mental-map of the mariners and the practical experience implicit in the data can play an important role in our understanding of ancient geographers' perceptions of mapping and navigation. Therefore, the final chapter places the case-study within its broader context of the Eastern Mediterranean region as a whole (Ch.8.1), as a means of drawing out parallels in the patterns identified in the Levant (in both Themes A and B). In effect, concluding discussions (Ch.8.2) are presented in a framework focusing on the pragmatics of mariners' sailing experience in antiquity, real or conceptual, through cognitive approaches toward the maritime cultural landscape (cf.Ch.3.2).

---

[188] The importance of secondary ports has been re-evaluated (see Arnaud 2011:417, 2016a; Rougé1966:107-19).

[189] E.g. return clockwise journeys: Homer, *Od.* 14.252–8; Hdt. 4.152; Strabo, *Geog.*1.2.17, 2.5.24; Lucian 9.1004–5.

Chapter 8: Maritime Perceptions of the *Oikoumene*: The Levant and beyond

This final chapter extends beyond the Levant case-study to locate the research arguments within a wider scope (spatial, temporal and conceptual) and substantiate claims put forward in the comparative analysis. The hypotheses explored for the Levantine region (Ch.6.2.1-3 and Ch.7.3.1-5), in relation to the key study-authors (i.e. Strabo, Mela, Pliny, Ptolemy and *Stadiasmus*: Ch.4.1.2-6), are brought together here to establish concluding views, drawing on the evidence discussed throughout this research. This is achieved by comparing the ancient authors' representation of the Levant to other coastal regions where such patterns/features are also apparent or significantly differ, measured against the archaeological evidence (and supported, where relevant, by other comparable ancient authors). These subjects and issues are based on (and cross-referenced with) observations and arguments raised earlier as a means of determining patterns of continuity or contrasts in approaches and views. The primary aim is to show how each of these ancient authors compare to one another in terms of representing and perceiving the known inhabited world (*oikoumene*). Therefore, this chapter seeks parallels in other regions, framed in the Eastern Mediterranean basin as a whole (including North Africa, Asia Minor and the Aegean) for the purpose of answering the original questions raised from the outset of this thesis (Ch.1.1.1):

- How was the Roman coastal landscape perceived by ancient authors dealing with geographic and navigational dynamics of the 'known world'?
- How did mariners navigate both physically and cognitively through this seascape?

The selective focus of the Eastern Mediterranean (Fig.8.1), often referred to as the "birthplace of seafaring" (Davis 2001:4), offers the greatest range of evidence associated with navigational practices and perceptions. Thus, this region provides an ideal setting for exploring patterns of connectivity in this active exchange network and how they reflect on ancient knowledge of navigation and seafaring.

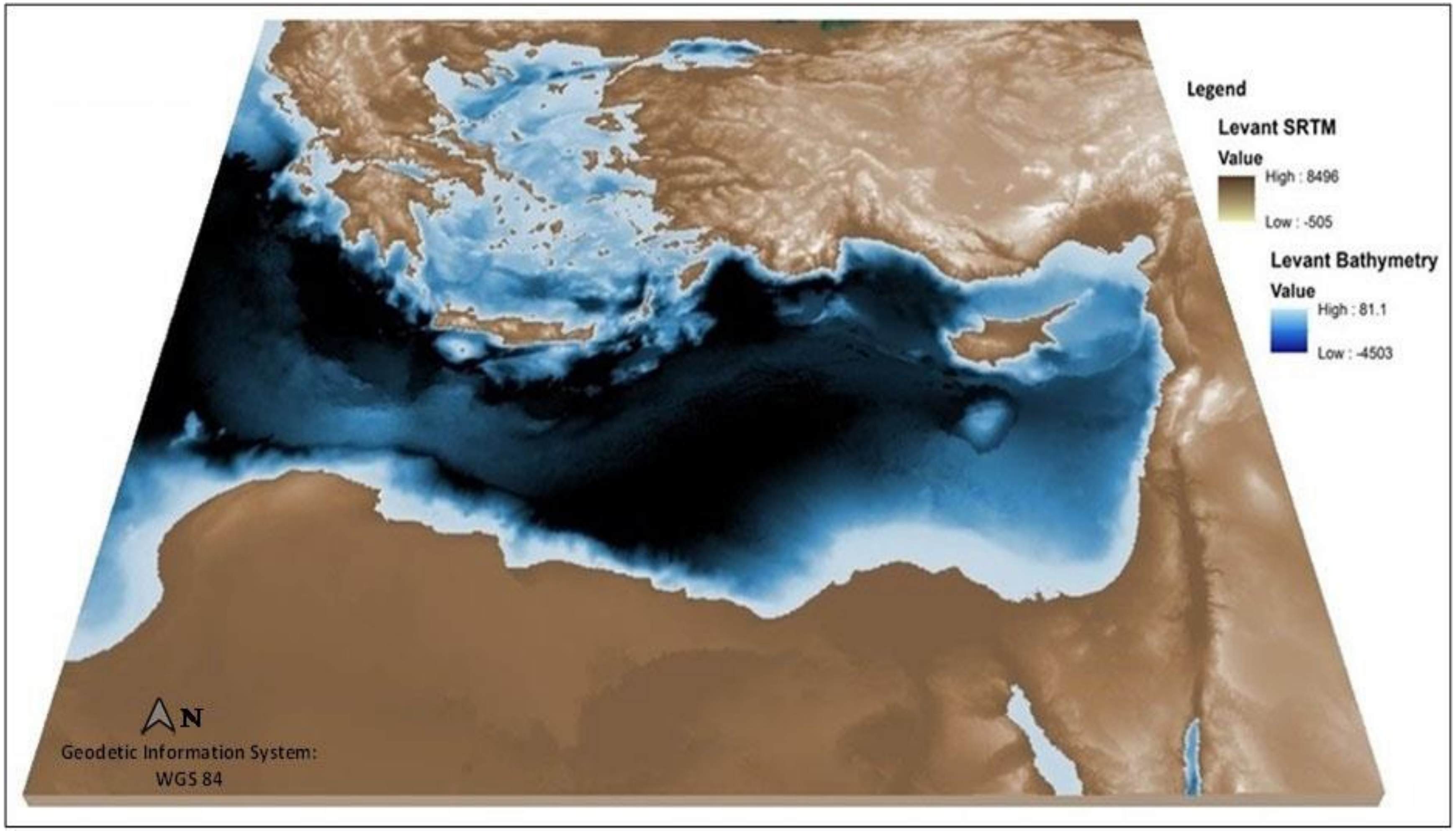


Figure 8.1 Analogous cases discussed in this chapter, framed within the Eastern Mediterranean (3D Map produced by author using QGIS 2.8.2. DEM: SRTM_1km).

8.1 Parallels in the Eastern Mediterranean

8.1.1 THEME A: "STATIC

In seeking parallels for Theme A (Ch.6.2)'s 'deserted' and 'twin' sites in other parts of the Mediterranean, the island-dominated seascape of the Aegean proved ideal for comparison.[190]

8.1.1.1 DESERTED SETTLEMENTS IN THE AEGEAN

In the context of mainland Greece[191] and the Aegean Islands, Graeco-Roman sources generally portray an image of a region heavily disturbed and in decline, with numerous cities "that once thrived" described as deserted, isolated, or in ruins (e.g. Strabo, Pausanias, Pliny, Polybius).[192] For instance, Pausanias' account of Greece (often compared with Strabo's account) [193] offers a good insight into the political state of this region; commonly listing cities "now" deserted or destroyed. Such details and observations coincide in Strabo's work (c.0 BC/AD), and Polybius' (36.17.5), who described the "Greek heartland from the late 3rd century BC onwards, where a general depopulation is claimed" (Bintliff 2008:22-3; also Alcock 1993:24-32). For Crete, Pliny *NH* (4.12) enumerates the major cities, which included *"20 located along the coast, and then 20 inland* (*et in mediterraneo*), followed by the statement "and *about 60 other towns of which only the memory exists"* (…*et aliorum circiter LX oppidorum memoria extat*; cf.Ch.7.2.33 compared to Dor and Sycaminon, "*names of cities of which the remembrance only exists [memoria urbium]" NH* 5.17.75).[194]

Similar to the case of Dor and other Levantine cases where archaeology contradicts textual evidence, this discrepancy is apparent in ancient descriptions of Arcadia, Greece.[195] Particularly

---

190 Archaic/Classical *poleis:* Hansen and Nielsen 2004; Archaeology on exchange in Aegean: Knapp 1990; Cline 1994.
191 Hellenistic-Roman landscape surveys (Greece): Bintliff and Snodgrass 1985; Alcock 1993; Barker and Lloyd 1991.
192 Examples of 'deserted' cases: Strabo, *Geog.*8.8.1-2; Paus. 8; Pliny, *NH* 5.31; and Polyb. 36.17.5-12. Additional coinciding accounts written during the imperial period include: e.g. Dio Chrys. 33.25, 7; Plut. *De dei: or.* 4 J3 F.
193 See, for example, Pretzler, M. 2005. *Comparing Strabo with Pausanias: Greece in context vs. Greece in depth.*
194 (Pliny, *NH* 5.31): "Near Erythrae were formerly the towns of Pteleon, Helos and Dorion, and there is now the river Aleon, Corynaeum the promontory of Mimas, Clazomenae, and Parthenie and Hippi, which were called the Chytrophoria when they were islands…Places in the interior that exist no longer were Daphnus and Hermesta and Sipylum previously called Tantalis, the capital of Maeonia, situated where there is now the marsh named Sale; Archaeopolis which replaced Sipylus has also perished, and later Colpe which replaced Archaeopolis and Libade which replaced Colpe"/ *"iuxta eas fuerunt oppida Pteleon, Helos, Dorion, nunc est Aleon fluvius, Corynaeum Mimantis promunturium, Clazomenae, Parthenie et Hippi, Chytrophoria appellatae cum insulae essent…interiere intus Daphnus et Hermesta et Sipylum quod ante Tantalis vocabatur, caput Maeoniae, ubi nunc est stagnum Sale; obiit et Archaeopolis substituta Sipylo et inde illi Colpe et huic Libade."*
195 A similar situation of "desolation" is reflected in the inland region of Boeto, according to ancient representations. For example, contrary to archaeological evidence, Strabo (*Geog.* 9.2.14) mentions a number of supposed "deserted" sites in Boeto region which were active, such as: Harma, Isus, Haliartus, and Onchestus grove. E.g. Haliartus, inscription attests the site's activity (Frazer *Paus.* 5.166; Weller 1906:354).

in Strabo’s account (*Geog.*8.8.1-2), in which he claims that the multitude of settlements no longer exists (except for Tegea and the temples of Alean Athene and Zeus Lzcaeus).[196]

> “Arcadia…on account of the complete **devastation of the countr**y…**cities, which in earlier times had become famous, were wiped out by the continuous wars**…now the Great City [Megalopolis] itself has suffered the fate described by the comic poet: “**’The Great City is a great desert.’”**[197]
>
> “…Mantineia itself, as also Orchomenus, Heraea, Cleitor, Pheneus, Stymphalus, Maenalus, Methydrium, Caphyeis, and Cynaetha, **no longer exist; or else traces or signs of them are scarcely to be seen**. …But three of the cities mentioned by the poet, “Rhipê and Stratiê, and windy Enispê” [i.e. Homer, *Iliad* 2.606] **are not only hard to find, but are of no use to any who find them, because they are deserted**”[198]

In contrast, the combined data from archaeological, numismatic (Gardner 1887:178-204) and epigraphical evidence attest to the presence of a relatively thriving community at Megapolis[199] and the overall region of Arcadia during the Roman period, at the time that Strabo was writing (di Napoli 2005:516). Numismatic evidence[200] confirms that out of the eleven cities Pausanias places within the Arcadia region, at least eight of the claimed “deserted” settlements are confirmed as active during this period and of continuing to mint coins until at least the age of Septimius Severus (AD 193-211). These include Megalopolis, Mantineia, Orchomenos, Heraea, Clitor, Pheneus, Caphyae, Cynaetha (Gardner 1887:178-204), as well as evidence of coins for Tegea[201], Phigaleia, Psophis and Thelpousa.

Several inscriptions (e.g. at Mantinea**:** *IG* V.2, figure of C. Iulius Eurykles Herculanus) provide insights into activities of rebuilding and improvements to these sites in the imperial period, as well as the construction of new public/religious buildings and donations by Roman patrons or local benefactors (di Napoli 2005:516). Archaeological evidence from surveys and excavations

[196] Strabo’s 8.8.1-2 is analogous to Pausanias’ Book 8, which fills about 130 Teubner pages, and in Pausanias’ account the majority of ‘deserted’ cities in Strabo appear in good condition/active (Pretzer 2005:152-3).

[197] Strabo, *Geog.*8.8.1: διὰ δὲ τὴν τῆς χώρας παντελῆ κάκωσιν οὐκ ἂν προσήκοι μακρολογεῖν περὶ αὐτῶν· αἵ τε γὰρ πόλεις ὑπὸ τῶν συνεχῶν πολέμων ἠφανίσθησαν, ἔνδοξοι γενόμεναι πρότερον, τήν τε χώραν οἱ γεωργήσαντες ἐκλελοίπασιν ἐξ ἐκείνων ἔτι τῶν χρόνων, ἐξ ὧν εἰς τὴν προσαγορευθεῖσαν Μεγάλην πόλιν[4] αἱ πλεῖσται συνῳκίσθησαν. νυνὶ δὲ καὶ αὐτὴ ἡ Μεγάλη πόλις τὸ τοῦ κωμικοῦ πέπονθε, καὶ

[198] Strabo, *Geog.*8.8.2: Μαντίνειαν μὲν οὖν ἐποίησεν ἔνδοξον Ἐπαμεινώνδας, τῇ δευτέρᾳ νικήσας μάχῃ Λακεδαιμονίους, ἐν ᾗ καὶ αὐτὸς ἐτελεύτα· καὶ αὐτὴ δὲ καὶ Ὀρχόμενος καὶ Ἡραία καὶ Κλείτωρ καὶ Φενεὸς καὶ Στύμφαλος καὶ Μαίναλος καὶ Μεθύδριον καὶ Καφυεῖς καὶ Κύναιθα ἢ οὐκέτ᾽ εἰσίν, ἢ μόλις αὐτῶν ἴχνη φαίνεται καὶ σημεῖα. Τεγέα δ᾽ ἔτι μετρίως συμμένει, καὶ τὸ ἱερὸν τῆς Ἀλέας Ἀθηνᾶς· τιμᾶται δ᾽ ἐπὶ μικρὸν καὶ τὸ τοῦ Λυκαίου Διὸς ἱερὸν κατὰ τὸ Λύκαιον κείμενον ὄρος. τῶν δ᾽ ὑπὸ τοῦ ποιητοῦ λεγομένων Ῥίπην τε Στρατίην τε καὶ ἠνεμόεσσαν Ἐνίσπην εὑρεῖν τε χαλεπόν, καὶ εὑροῦσιν οὐδὲν ὄφελος διὰ τὴν ἐρημίαν.

[199] Paus. says it lay “mostly in ruins, shorn of all its beauty and ancient prosperity” Roman Megapolis: Roy et al. 1988

[200] *Paus.* I. See Mionnet (1806-1837:247-253)’s *Description de Medailles antiques Grecques et Romaines*. This confusion is especially evident for Mantinea (in Paus.): “The only two cities which from his description we should gather to have been in a tolerably thriving condition are Tegea and Mantinea.”

[201] IGV.2, 51-2 - attests that in 124 AD Hadrian visited Tegea, had the baths rebuilt and was thus active (as in Strabo).

at the site of Kleitor (Petritaki 1996:88), which is amongst Strabo's "deserted" Arcadian cities, implies it thrived during the Classical/Hellenistic periods through to the early imperial Roman period. Similarly, material evidence from the Megalopolis has "demonstrated a strong vitality during imperial times" (di Napoli 2005:517).[202] Evidence includes a bilingual inscription revealing that a bridge was constructed in Augustus' reign on initiative of Titus Arrninius Tauriscus (*IG* V.2, 456), and Domitian paid to reconstruct a *stoa* burnt by a fire (*IG* V.2, 457). Despite the intense earthquake (c.200 AD) that caused sizeable damage to Megalopolis, a surviving fragment of the edict of prices by Diocletian implies continuity of the city's trade, at the start of the 4th century AD (Loring 1890). Similarly, the site of Kleitor revealed another fragment of this edict of prices (*CIL* III Suppl. pars 2, p.2328 FFF).

Such "deserted" cases also appear in the *Stadiasmus'* account of Cyprus (cf.Counillon 1998) where, for example, the coastal city Ammochostos (meaning 'covered in sand') is said to be deserted, with a harbour for every wind and and hazardous "hogs-back rocks in the approach" (*SMM* 304). Its name reflects the silted mouth of the estuary Pedieos River north of the town. Also in Cyprus, Arsinoe is said to be a city with "**a deserted harbour** exposed to the North wind" (*SMM* 309). The author also describes "deserted forts" (*SMM* 70, 78), for example "Serapeion to Caenum…the **fort is deserted**; it has water and **no harbor**" (*SMM* 70). This links to references of a similar nature made in association with places considered "harbourless" (ἀλίμενος/alimenos) in Cyprus and North Africa (or alternatively said to possess "no harbour", "no anchorage", or "a deserted harbour"):[203]

> "From Castra Cornelii to Utica 24 stades, a city; it has **no harbor** but an open roadstead. Take precautions." (*SMM* 126)

Such references to deserted and harbourless settlements do not occur in the other regions of the Levant and Asia Minor, while the majority of "harbourless" places are included in North Africa. From the various cases from North Africa and Cyprus, it can be inferred that the *Stadiasmus* considers it noteworthy for the reader to be aware of: a) the presence/absence of a harbour at a destination, b) a possible access to an alternative anchorage, and c) advice/warnings for safe sailing. The fact the author chooses to explicitly note such distinctions relates to the importance of such features and details for safe navigation along these coastlines, as well as the fact the *Stadiasmus* is written in the style of a handbook for sailors.

[202] Coins, remains, inscription attest to its activity in Strabo's time; and theatre was under repairs (*Paus.* 4.347).

[203] References to "Harbourless": *SMM* 3, 4, 19, 70, 93, 99, 116, 126, 301, 302, 309, 311; "Deserted": *SMM* 78, 304, 309. Strabo also makes reference to Arados' coast being "harbourless" (ἀλιμένου, *Geog.*16.2.13), and Ostia is said to be harbourless due to silting from the Tiber (*Geog.*5.2.5); while Mela says the Gulf of Syrtis "has no ports" (1:35).

Discussion of 'Deserted Settlements'

Though highly dependent on context, these types of evidence highlight the active commercial state of many of these sites in the Roman period and paint a different image of a less desolate land. As observed in the Levantine cases (Ch.6.2.3), ancient sources provide contradictory representations of the actual state of the settlements/landscape in the Aegean during the imperial period, particularly in Strabo's account of the regions of Arcadia. This contrasts with the range of material evidence (archaeological, epigraphical and numismatic). Though Arcadia was in decline by the 2nd century AD and several sites abandoned or reduced, Strabo's account was noticeably exaggerated when tied with reality.[204] This likely relates to the geopolitical transformations of Greece (and variations in impact) in the Roman period, particularly from the 2nd century BC to the 3rd century AD (Alcock 1993; Bintliff 2008, 2013).[205] Moreover, it is supposed that Strabo did not visit Arcadia, and his representation is thus influenced by oral accounts and other writers (di Napoli 2005:517-8; Baladié 1980:301-38).

In comparison, Strabo's perceptions of the maritime landscape of the Levant reflect a representation of exaggerated abandonment, depicting an "earlier landscape", derived mostly from earlier sources (Ch.6.2.3.5). This practice of adopting older sources was prevalent in the Greek sphere and these representations of decline/desertion seem to have be linked to elements of bias, nostalgia and power which were influenced by the geo-political changes of the Roman imperial period and idealised situations of the past (Alcock 2002:29, 43). In contrast, the *Stadiasmus*' representation of "deserted" or "harbourless" cases (of settlements, harbours, forts) relates more closely to their significance to navigation and safe anchoring, reflecting a mariner's practical familiarity with the region set within the Roman period.

[204] "Wars and major conflicts with Rome in the second century BC probably did accelerate decline" (Morris 2005:17).
[205] Particularly in rural regions of central and southern Greece, as evidenced by regional archaeological surveys.

8.1.1.2 TWIN-SETTLEMENTS: THE AEGEAN

Another parallel in the Aegean region relates to the "twin-settlements" of the Southern Levant (Ch.6.2.4). Similarly, evidence in mainland Greece and the surrounding Aegean islands shows that this development of twin-settlements seems to have also been a characteristic settlement arrangement (the associated ports were often referred to as "*epineion*", a coastal place at a distance from its political town centre, "*asty*"; Table 8.1).[206] There was a common tendency of maritime communities being forced to shift their earlier cities further inland, ranging from 3-16 km distance from the coast (Semple 1916:136)[207], while along the Levantine coast the distance between twin-settltements ranged between c.3-5 km. In the Aegean, this arrangement was primarily due to the need to protect early coastal towns from regular piratical raids,[208] a threat which prevailed in this region, particularly in the Hellenistic and Early Roman period, prior to the *Pax Romana*,[209] as highlighted by ancient authors such as Thucydides (460–395 BC).[210]

In light of such threats, fortified settlements were constructed inland on defensible acropoleis, and subsequently, with the increase in maritime activity, expansion of colonies and decrease in piracy, linked towns were established on the "outer edge" of the coast due to their open access to trade and other maritime activities, and "such of the older towns as were not too far from the seaboard established there each its own port" (Semple 1916:137). In certain cases, large inland cities could possess a harbour-town, which was "often treated as part of the city itself[211] and sometimes connected to the city by walls[212]" (Hansen 2006:101), making it possible to use the long walls to create a single fortified complex and secure their link with the sea, serving as a link/division between the coast and its hinterland (e.g. Athens, Corinth, Megara). Although piracy was the prime catalyst for these shifts, it is important to explore the various cases in their specific spatial/temporal context, which would have been subjected to different geographic and political circumstances. However, on the basis of the limited time-frame and scope of this thesis, only specific key case(s) are presented (e.g. the case of twin-settlement of Athens/Piraeus, which is explored next: 8.1.1.2.1).

---

[206] See Bonnier (2008:54) on terms/context of harbour-types (*epineion, limên, limên kleistos*). Term found in Hdt. 6.116, Thuc. 1.30.2, Aris. *Politcs*, 1327; more often in later authors, e.g. Diod. Sic., Strabo, Paus, Appian, Dio. Cassius.

[207] Similar twin-settlement patterns occurred on riverine estuaries in the Bronze Age (Blackman 1982; Raban 1985).

[208] (Semple 1916:136) "The Mediterranean afforded a profitable field for the pirate... population was concentrated on the coastal hems and small deltaic plains near the sea. Piratical raids upon these littoral communities forced the very early inhabitants of Greece…to locate their cities from two to ten miles back from the shore"

[209] In the Hellenistic era piracy spread across the Mediterranean particularly in the Aegean, Cilicia and Illyria/Balkans. On piracy in the ancient world: Semple 1982; De Souza 1992; Dell 1967:345; Graeco-Roman context: De Souza 1999.

[210] *"…cities were built upon the sea-shore and fortified; peninsulas too were occupied and walled-off with a view to commerce and defence against the neighboring tribes. But the older towns both in the islands and on the continent, in order to protect themselves against the piracy which so long prevailed, were built inland."* (Thuc. *Pelop. Wars,* 1.7).

[211] Skandeia, the port of Kythera, called *polis* in urban context at Thuc.4.54.

[212] E.g. Piraeus with Athens (Thuc.1.107–8; Xen. *Hell*.2.2.20, 4.8.9–10); and Lecheion with Corinth (Xen. *Hell*.4.4.13).

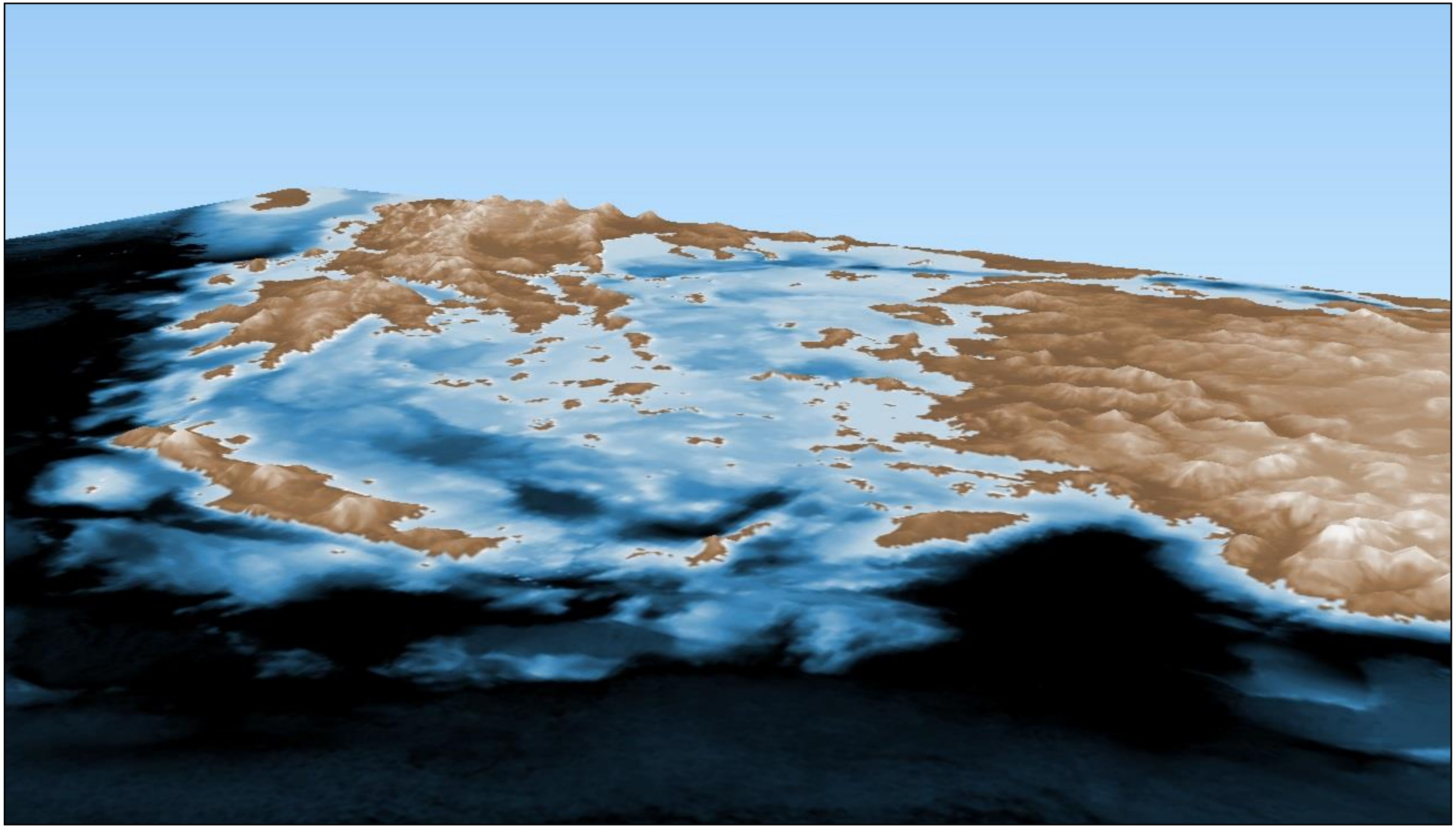


Figure 8.2 The Aegean region and its islands (3D Map produced by author, using QGIS 2.8.2. DEM: SRTM_1km).

The following table (Table 8.1) serves to highlight key cases of "twin-settlements" described in ancient sources (not intended as an exhaustive list), particularly for the Aegean region where this is a common phenomenon. This serves as a means of comparing patterns between the Levantine cases in Ch.6.2.4 with other regions of the Eastern Mediterranean.

Pattern of Key Ancient Twin-Settlements in the Mediterranean				
Inland City (*Asty/Polis*)	**Harbour-town (*Epeinon/ Limen*)**	**Region**	**Ancient References**	**Archaeological evidence for links**
Athens	**Piraeus**	Greece mainland / Aegean	Strabo 10.4.7, 11; Thuc. 1.107–8; Xen. 2.2.20, 4.8.9–10	**Long-walls** (Thuc. mid5th BC; Garland 1987:22–6). Buried urban harbour (Marriner and Morhange 2007)
Megara	**Nisaea/ Pegae**	Greece / Aegean	Strabo 8.1, 9.1; Paus. 1, 39; Thuc. 4.66-76, 2.93-4; Diod. 12,27; Plut. *Nicias* 8, *Phocion* 14	**Long-walls** (c.417 BC, Strabo; Thuc) No trace, construction: Lawrence 1979:156.
Corinth	**Lecheion & Cenchreai**	Greece / Aegean	Pliny, 4.6; Ptol. 3.16; Paus. 2.2; Thuc. 1.13-14; Xen. 4.4.9, 13; Diod. 14.21, 15.68; Livy 32.23; Polyb. 5.5; Philo, Flacc., 155; Plut., Aratus, 27, Cleomene 46	**Long-walls** (Xen, c.392 BC; Strabo, c.370). Chronology/Archaeology: Salmon 1984:33,180. Carpenter et al. 1936:121; Lawrence 1979:157. Uplifted harbour, unstable coast (Marriner and Morhange 2007)
Kythera isl.	**Skandeia**	Greece/ Ionian Isl.	Paus. 3.23.1, 3.3; Thuc. 4.54.1	
Argos	**Nauplia**	Greece / Aegean	Strabo 8.6; Ptol. 3.16	**Long-walls** (Thuc; Plut.). Construction: Camp 2000:45.[213]
Elis	**Kyllene**	Greece / Aegean		
Chalsis	**Eritria**	Eubea/ Aegean		
Gortyna	**Leben & Matalum**	Crete / Aegean	Strabo, 10.4.7, 11; *SMM* 321	
Troezen	**Pogon**	Crete / Aegean	Strabo, 8.6.14	
Knossos	**Herakleion**	Crete / Aegean	Strabo 10.4.7; *SMM* 348 Plut. *Thesee,* 17;	
Rome	**Ostia**	Italy / Tyrrhenian	Strabo 3.2.6, 5.2.1	
Pisa	**Arno**	Italy / Tyrrhenian	Strabo, 5.11.5, 7	
Vetulonium, Volci, Caere, Tarquinii	**Spina & Atria**	Tyrrhenian & Adriatic	Strabo 5.2; *Itin.Ant.Mar*; Pliny 3.20	
Priene	**Naulochon**	Asia Minor		Buried urban harbour, stable coast (Marriner and Morhange 2007)
Pergamus	**Elaae**	Asia Minor		
Apollonia	**Cyrene**	N. Africa	Strabo 17.3; Mela 1.39; Pliny 5.5; Ptol. 4.4; *SMM* 48-57	
Ptolemais	**Barke**	N. Africa	Strabo 17.3; Mela 1.39; Pliny 5.5; Ptol. 4.4; *SMM* 48-57	

Table 8.1 Key Parallel Cases of Ancient Twin-Settlements across the Eastern Mediterranean.

[213] Thucydides (5.52, 82) mentions walls between Patras and the coast in relation to Alcibiades' campaigns in 418 BC in Peloponnese. On their construction: Lawrence 1979. Patras was a Roman colony (Augustus) - see Rizakis 1998.

(i) Parallels of Twin-Settlements: Athens and its *seaport* Piraeus

A notable analogous case with the Levant is Athens and its seaport Piraeus, with a distance of c.7km, physically linked and fortified by "Long Walls" (Steinhauer 2000). Strabo explicitly distinguishes Piraeus as Athen's ἐπίνειον/epeinon (arsenal/port): "Piraeus, the naval arsenal of the Athenians" (ὁ Πειραιεὺς τὸ τῶν Ἀθηνῶν`, *Geog.*9.1.2). Piraeus was a key coastal trade-port with a good natural harbour on a rocky promontory and three enclosed deep-water harbours: Kantharos, Zea, Munychia;[214] with an outer anchorage in Phaleron Bay (Garland 1987:151).[215]

"Long-Walls": Physical and Conceptual Links

As illustrated in Chapter 6 (6.2.4.6), for the Levantine twin-settlements it was often hard to determine direct physical links between the inland centres and their associated seaports. Potential evidence included coastal roads, local navigable rivers, bridges, walls/fortifications, and/or foreign trade items (cf. Iamneia/Iamneia Paralios, Ch.6.2.4.1). Once again, Athens and Piraeus serve as a comparable case, where this link is clearly attested physically in the form of the "Long Walls" (Fig.8.3).[216] Walls provide strong "indications of the physical connection and political appropriation of specific harbours and harbour sites by urban centres situated in the hinterland, as well as of what may be defined as controlled separation in the physical sense" (Bonnier 2008:50; see Garland 1987:22). Such walls were not built only for naval defensive/military purposes, but also as a means of facilitating trade and "imports of supplies when the city was put under siege and would perform an important strategic function" (Bonnier 2008:50). Other examples in Greece of "Long Walls" linking twin-settlements are attested between Megara and its harbour Nisaea (built c.417 BC); Corinth and its harbours Lecheion and Cenchreai (c.292-320 BC); and Argos and its harbour Nauplia (Table 8.1).

In relation to the images of "deserted landscapes" (8.1.1.1), idealised stereotypes of what a city should look like shaped contemporary literary opinions (Constantokoupoulou 2007:35). For example, Strabo's treatment of the Piraeus walls in which his observation, that in his time the city walls are torn down and in disuse, compels him to state that Piraeus no longer exists, despite the fact that earlier in his account he gives details on the town's contemporary fabric.

---

[214] *Zea*: Ptol. *GH* 3.15, Pseudo-Skylax; *Munychia*: Ptol. *GH* 3.15; Pseudo-Skylax; *Phaleron*: Pliny, *NH* 4.11. Also, see appendix vi for images of modern Piraeus and its harbours.

[215] Cf.Paus. 2.1.1, Piraeus as Athen's *peraia*: "Peiraeus was a parish from early times…Their port was Phalerum, for at this place the sea comes nearest to Athens…[Themistocles] thought that the Peiraeus was more conveniently situated for mariners, and had three harbors as against one at Phalerum, he made it the Athenian port [ἐπίνειον]".

[216] Conwell 2008: on literary, epigraphical, archaeological data on Long-Walls and their role linking the city to the sea.

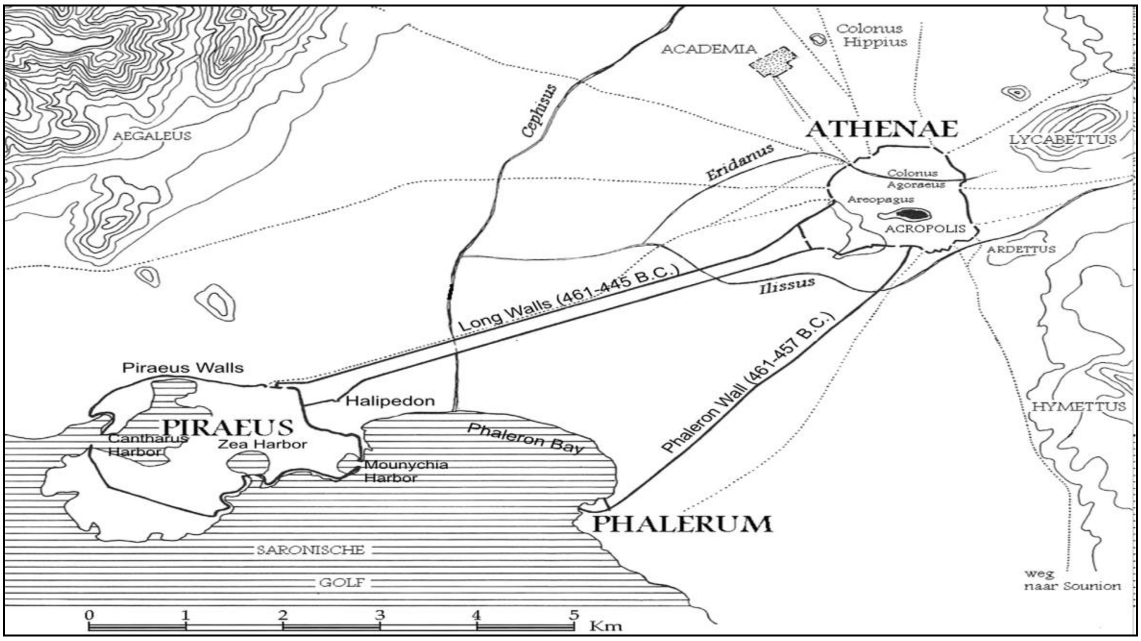


Figure 8.3 Map of "Long Walls" linking the Athens' inland centre with its seaport Piraeus in antiquity; and Piraeus' three deep-water harbours: Cantharus, Zea and Munichia (Apostolopoulos et al. 2014:413).

8.1.1.3 TWIN-SETTLEMENTS: NORTH AFRICA

Along the North African coast, fortified twin-settlement patterns also appear to have been a frequent settlement arrangement (Mattingly 1996:559),[217] particularly in the fertile, elevated coastal region of Cyrenaica (Pentapolis, cf.Pliny, *NH* 5.5),[218] bounded by desert hinterland and characterised by a rugged coast, springs, towers/forts and sanctuaries/shrines (Fig.8.4).

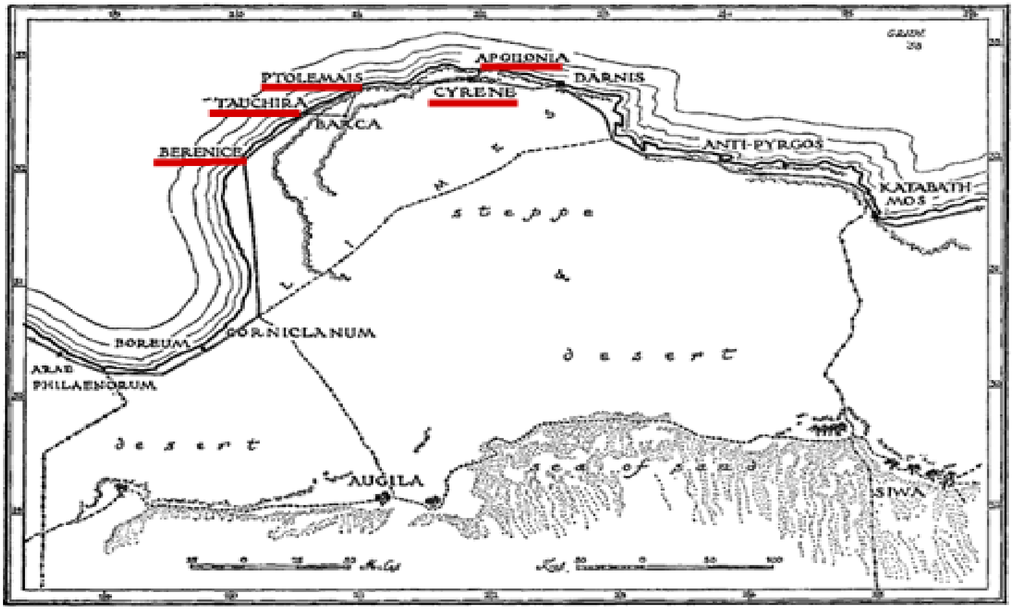


Figure 8.4 Map of Cyrenaica (Pentapolis cities in red) (after G.R.H.Wright in Kraeling 1962:34).

[217]E.g.: Cyrene and Apollonia (Soussa); Barce and Ptolemais (Tolmeta); Neapolis Theodorias and Kainopolis (Maatin el-Agla); Artamis and Aptouchou Hieron (Haniya); Balagrae and Phykous (Hamama); Marazig and Erythre (Athrun).
[218] Roman province, jointly with Crete; also called Pentapolis in Roman period (first attested in Pliny 5.5), comprising five cities: Cyrene, Apollonia, Euesperides/Berenice, Barce/Ptolemais, Taucheira/Arsinoe (Mattingley 1996:559).

In comparison to ancient representations of twin-settlements along the Levantine coast (Ch.6.2.4), the coastline of Cyrenaica is described as possessing few natural harbours and distinctive landmarks along its exposed and dangerous shores (see Morton 2001:147):

> "The rest of the sea-coast of Cyrene from Apollonia to Catabathmus…does not throughout afford facilities for coasting along it; for harbours, anchorage, habitations, and watering-places are few." (Strabo, *Geog.* 17.2.23)

In all periods, links between the inland sites and the coast remained important,[219] as reflected in the ancient sources (Strabo, *Geog.*17.3; Mela 1.39; Pliny, *NH* 5.5; Ptol. *GH* 4.4; *SMM* 48-57). The *Stadiasmus'* account of North Africa[220] in particular offers far more detail on regional topography and navigational aids in contrast with the Levant and Asia Minor (see 8.1.3.1).[221] Physical links between the twin-settlements are evidenced, for instance, in the surviving regional road-system (and Roman milestones),[222] such as the road linking Cyrene (18km inland on a conspicuous hill) to its seaport Apollonia[223] (also Barca-Ptolemais: Laronde 1978:187; Goodchild 1950). Evidence for repairs/improvements of these roads in Trajan's reign reflects an importance in maintaining links between coastal and inland sites. For the port of Ptolemais, Strabo (*Geog.*17.3.20) and Pliny (*NH* 5.5) state it was formerly called Barca (as with Berenice, formerly Euesperides "city of the Hesperides").[224] This suggests that the inland centre Barca was relocated on the coast and absorbed (by synoecism) into a re-established "New Barca" (Cohen 2006:293). Thus, their representations reflect political shifts in the region toward the coastal zone from the Hellenistic period onwards. As with Levant (Ch.6.2.4), the strategic establishment of the twin-sites benefitted from the fertile coastal plain (Semple 1916:148), as illustrated by Strabo for Cyrene, which **"**flourished from the excellence of the soil…and the growth of fine crops" (*Geog.*17.3.21) In this way the twin-settlements were able to secure links between maritime and inland trade,[225] and offer good, safe harbours/anchorages along this otherwise exposed coast. These 'twin' parallels attested in the ancient authors' accounts of the Levant, Aegean and North Africa emphasise the common practice of linking coastal, inland and hinterland spaces in the past, whether due to warfare, piracy, or natural conditions/changes.

---

[219] For archaeological research and evidence on the sites: Laronde 1987:257-87; Goodchild 1968; Cuttler et al. 2006.
[220] In *SMM's* clockwise route along North African coast (*SMM* 1-127): from Alexandria to Utica (thence a lacuna).
[221]Pliny is more general on Africa, and Asia (Book 6) compared to Europe (3-4); possibly linked to statement (*NH* 5.1) where he perceives names/towns of Africa's people as unpronounceable, thus unsuitable of mentioning in detail.
[222] Roman milestones and Trajanic column found in area of Cyrene derive from the Cyrene-Apollonia coastal road, running "from Berenice to Teuchira and Ptolemais later swings inland to reach Cyrene, and climbs to the second plateau of the Gebel Akhdar (some 500 metres above sea-level)" (Goodchild 1950). Links in: *Peut.Map.,* and *It.Ant.*
[223] Apollonia, *epeinon* of Cyrene (first attested in Strabo 17.3.20), excavations revealed a Greek colony, which by 4thBC was enclosed by a 1km defensive wall, with two harbours to handle different sized vessels (White 1966:260).
[224] Strabo (*Geog.* 17.3.20) and Pliny (*NH* 5.5) also mention Taucheira was commonly called Arsinoe.
[225] E.g. 2nd-4th AD kiln production sites, amphorae, oileries: Mattingly and Hitcher 1995:204; Goodchild 1952.

8.1.1.4 ISLANDS AND THEIR *PERAIAI*

In light of the trend of twin-settlements discussed, islands and *peraiai*[226] (as represented in Greek and Roman sources) can serve here as a "bridge", thus unifying coastal and inland settlements. This phenomenon was observed in the Levant (Ch.6.2.3.2, 6.2.4; Ch.7.1.1.3), with the island-state of Arados and its *peraia* ("the maritime tract of the Aradii" as seen in Strabo, *Geog.*16.2.12, under which he lists the mainland coastal towns: Paltos, Balanea, Carnus, Enydra and Marathos). Numismatic and archaeological data indicates that settlements in the Aradian territory minting coins of Aradian-type included: Gabala, Marathos, Carne and Simyra (Seyrig 1964:12-15; Rey-Coquais 1974). This control of mainland territories was also exercised by Tyre (which Strabo compares to Arados, *Geog.*16.2.23-4: both rocky, fortified island-states, with limited natural resources, thus strategically profiting from their access to the mainland territories and their resources; see Aubet 1993:30).

Even more so, this practice of *peraia* was a significantly common phenomenon across the Aegean; in fact, this region offers the best evidence for cases of island-states controlling a *peraia*. Such cases are attested for the island-states of Thasos, Samothrace, Tenedos, Lesbos, Chios, Samos and Rhodes (Constantakopoulou 2007:235-253; Lazaridis 1971). Regarding the relationship between Arados and its mainland territory, potential parallels can be found with the Aegean cases of Rhodes and Thasos, and their respective *peraiai* (Lazaridis 1971:37-8). The island of Thasos, through its *peraia* (Galepsos, Apollonia, Oisyme, Antisara, Neapolis, Acontisma, Pistyros, Stryme),[227] as well as trade with inland Thracian tribes, benefited significantly from its access to mainland natural resources, particularly in terms of precious metal resources[228] and wine/viticultural resources[229]. In the case of Rhodes, the large island-state operated with dual control over both a *peraia* (in Asia Minor)[230] and a group of smaller neighbouring islands (also attested at Samos and Chios; Constantakopoulou 2007:178, 215). This strategic arrangement would have provided geographic advantages, as well as safe navigation and anchorages.[231] As a result, Rhodes, "with its *peraia* in Asia Minor, its close political contact with other islands of the Dodecanese but also with Crete and its international trade" represents the multivalent nature of the networks and spatial associations developed in the Graeco-Roman world (Constantakopoulou 2007:195).

---

[226] *Peraiai:* refer to settlements (or parts of the mainland or neighbouring island clusters) controlled by island-states. Gaining/maintaining such dependencies was reliant on continuous maritime contact (Constantakopoulou 2007:229).
[227] See Strabo, *Geog.* 7. frag. 33, 35, for surviving fragments on description of Macedonia and Thrace
[228] Evidence of mines (e.g. of gold and siver) found in mainland (and the island); Hdt. 6.46; Isaac (1986:50, 69).
[229] Amphorae sherds and production centres found on the island, see Garlan (1999).
[230] Pliny, *NH* 5.133; Strabo, *Geog.* 14.2.11; Diod. 13.75.1. See Hansen and Nielson 2004 on status of the *Greek polis*.
[231] E.g. remains of three towers on Pergousa and Pachia islets; Pliny, *NH* 5.133; Gabrielsen 1997.

Notions of islands linked to the mainland due to progradation and other geomorphological factors were also identified in the Levant (Ch.7.1.1.3); Tyre being a notable case, in which the ancient authors share a unanimous representation of a former island linked to the mainland due to the breakwater created by Alexander in 332 BC (Strabo, *Geog.*16.2.22; Mela 1.65, Pliny, *NH* 5.17). Following this, Tyre served as Alexander's proto-type for the *Heptastadion* breakwater created in Alexandria's harbour to link the palaeo-island of Pharos to the mainland in 331 BC (Goiran et al. 2005; Marriner et al. 2007), as represented in Strabo's account:

> "…The embankment [the Heptastadion] forms a bridge extending from the mainland to the western portion of the island [of Pharos] ... However, this work formed not only a bridge to the island but also an aqueduct, at least when Pharos was inhabited…" (Strabo, *Geog.* 17.1.6).

Similarly in the Aegean, a comparable case is illustrated by Strabo (*Geog.*1.3.18)'s description of Piraeus as "formerly an island" that lay "over against" the mainland (πέαν/*peraia*, of which it derived its name),[232] with recent geoarchaeological evidence proving his claim to be true (Goiran et al. 2001; Fig.8.5).[233] The evidence suggests that Strabo likely relied on a combination of oral accounts and his personal deduction (in agreement with Goiran et al. 2001:533; Aujac 1966), thus reflecting an understanding of this landscape and coastal morphological changes.

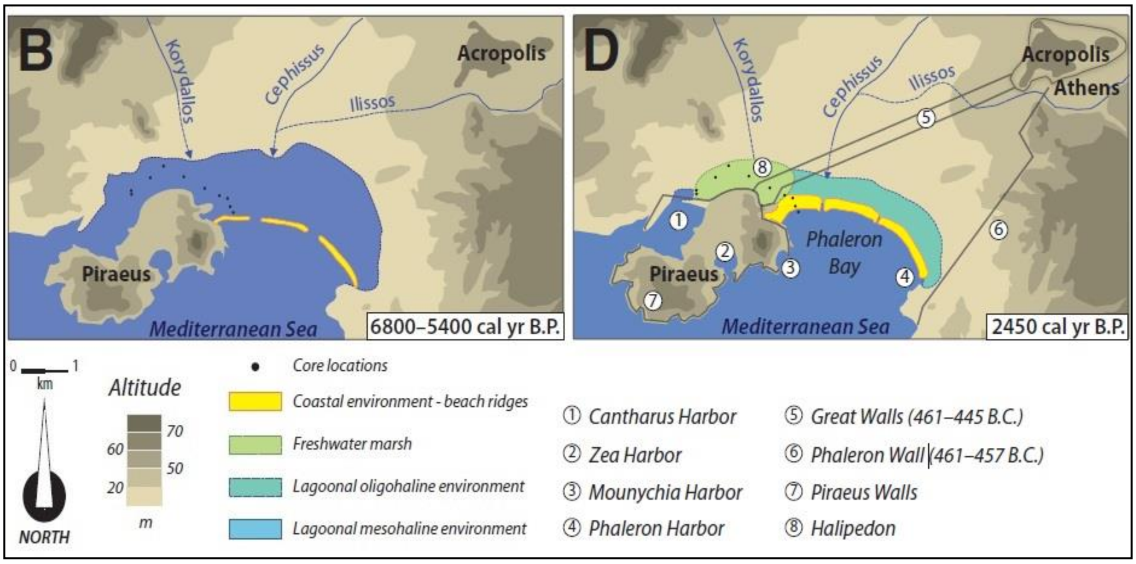


Figure 8.5 Map of geoarchaeological evidence that corroborates Strabo's claim that Piraeus was "formerly an island." | B: island, D: linked to mainland (In: Goiran et al. 2001:534, refer to footnote 44).

---

232 "Piræus having been formerly an island, and lying πέαν, or off the shore, is said to have thus received its name"/ Τόν τε Πειραιᾶ νησιάζοντα πρότερον καὶ <u>πέραν τῆς ἀκτῆς</u> [offshore] κείμενον οὕτως φασὶν ὀνομασθῆναι· ὑπεναντίως δ'

233 (Goiran et al. 2001:533): Results are based on multiproxy paleoenvironmental analyses and radiocarbon dating in Cephissus coastal plain. Piraeus became an island in a shallow marine bay in Final Neolithic period (4850-3450 BC) due to Holocene sea-level rise. It was divided by a wide lagoon that periodically silted by the deltaic fans (Cephissus and Kordydallos Rivers). Later it linked to the mainland (after 3000 cal. B.P., prior 6th BC). By 5th century, when 'Long Walls' were built on the residual coastal marsh (*Halipedon*) it was already linked to the mainland (Garland 1987:22).

Discussion of 'Twin-Settlements' & *Peraiai*

In Greek thought, although islands served an active role in commercial and military networks, in Graeco-Roman sources (and earlier), they were often associated with notions of isolated, poor, and abandoned spaces (Constantakopoulou 2007:99-103; Vilatte 1991). However this was often in contradiction to the reality of the conditions and status of these islands. In this sense, insularity became linked with conceptual constructs of poverty, political weakness or lack of self-sufficiency (e.g. Thasos, portrayed negatively, though powerful at the time). In the Roman period, islands also served as prisons or places of exile (e.g. in the Aegean, Adriatic, Tyrrhenian), further inducing this metaphorical negative image of 'poor' or 'deserted' landscapes prominent in Graeco-Roman sources (Constantakopoulou 2007:129). Overall, these types of control and incorporation of territories, whether comprising mainland areas, settlements or island clusters, are clear representative elements of sea power and the political product of island communication/exchange and regional imperial expansion, forming part of a 'political seascape' (Lopez 2015:12). Their inclusion in the ancient authors' accounts emphasises their significance within this maritime 'political seascape'.

8.1.1.5 Reflections on Theme A - "Static": Coast vs. Inland

From the range of analogous cases identified in other regions in the Eastern Mediterranean, it is clear that the patterns of 'deserted settlements' and 'twin-settlements' explored under the "static" theme were not only a phenomenon specific to the Levant. However, the nature of these patterns and their representations in the ancient sources was largely dependent on the context of the particular cases, such as their role in the region and geo-political setting. These practices largely developed in consequence to factors such as piracy, war and trade shifts. In this way, they were intertwined with strategic elements of: sea power; protection; self-sufficiency/access to natural resources; and maritime-inland trade. Similarly, the practice of *peraiai* enabled interaction between islanders and local mainland people/resources.

Characteristic factors amidst the range of cases discussed were influenced by the geographic proximity between coastal and inland centres (i.e. twin-settlements and *peraiai*), located in strategic positions with close access to both sea and the hinterland, as a means of linking coastal and inland activities. Varied perceptions among the ancient authors suggest there was not such a clear-cut division, though they do show a common tendency of focusing more on the coastal landscape in their described journeys. Based on ancient references to twin-settlements and/or *peraiai*, such political annexations can provide insights into temporal and political-economic setting of descriptions or town status. For example, ancient Gabala (discussed in the Levant: Ch.6.2; Ch.7.1.1.3, 7.2.2) was part of Arados' *peraia* in earlier periods until the 3rd century BC (based on archaeological and numismatic data), but is not mentioned in Strabo's Aradian *peraia*, implying his description (or source) is set in a later period (following Caesar's intervention in Syria). Such insights can thus potentially reveal the date/setting of the sources the ancient authors relied upon and reflect the authors' diverse perceptions on shifts in settlement arrangements, geomorphological changes and ways of conceptualising space.

Overall, common patterns of twin-settlements and *peraiai* reflect ancient authors' tendency to perceive the *oikoumene* ('known world') in terms of divisions and/or links between the coast and inland, or islands and mainland (as highlighted by Aristotle, *Mund.* 394:3–4). There is a prevailing emphasis on the role of the sea as a driving factor for the development of their rationalising and represention of space. The patterns emphasise the diverse nature of Graeco-Roman perceptions of the coastal landscape. The various patterns explored under the "static" theme generally reflect a perspective of this region largely influenced by multiple sets of sources (of varying nature), likely including earlier and out-of-date information. Furthermore, instances of gaps and inconsistencies identified in the ancient texts resulted from a range of different compilations, leading to transmission errors, distortions and duplications of place-names. However, identifying these, particularly for the corrupt section of the Levant, helped explain the reason for the existence of trasmissional errors, allowing us to perceive the landsape as they did, which was not always an accurate perception of the actual political or economic reality in antiquity, thus revealing a bias in their knowledge. Nevertheless, their representations highlight the importance of maritime places, along with the activities in this area and interconnectivity between coastal harbours/centres with those in the hinterland.

8.1.2 THEME B: "MOVEMENT" - MENTAL-MAPS & *EUTHYPLOÏA*

In the Eastern Mediterranean, the coasts of the Aegean, Cyprus, Asia Minor and North Africa serve as good analogous cases for exploring seaborne journeys and navigation in relation to the patterns discussed in Ch.7.1-2 (under Theme B: 'Movement'). These regions were linked via a maritime corridor, well-attested in the literary and archaeological evidence (see Davis 2009:78; Wachsmann 1998:295; Dagron and Rougé 1982:120–3; Parker 1992; Arnaud 2005:57; Casson 1994a-b; 1995).[234] In the Eastern Mediterranean, "ships heading south and east from Crete, Rhodes or Cyprus used the prevailing *etesians.*" (Davis 2009:335-6; cf.Ch.5.1.3).

8.1.2.1 NAVIGATIONAL MARKERS: NORTH AFRICA

As aforementioned (8.1.2.1), though the *Stadiasmus* presents useful nautical information for the Levant case-study (Ch.7.1.1.1-4, 7.2.1-4), this is in stark contrast with the level of navigational and topographical detail provided for the North African coast[235], which contains the most comprehensive account (Table 8.2; Fig.8.6). Why is more detail offered in the section covering Africa in comparison with accounts of Asia Minor and the extant part of the Levant? These types of details would have aided mariners navigating these regions,[236] and included:

(a) Natural Features (landmarks/meteorology): capes, mountains, islands, rivers, winds, chromatics

(b) Artificial Features (landmarks/fortifications/religious): towers, forts, lookouts, sanctuaries, shrines

(c) Harbour/Anchorage Facilities/Capacity: number/size of vessels it can handle, water sources, moles

(d) Journeys & Routes: sailing directions and travel distances (in stades), including "*euthyploïa*" routes

(e) Advice & Warnings: advantageous/safer approaches, anchorages, shelter, routes, potential hazards

---

[234] See Luke's account in the *Acts of the Apostles* 27; and Lucian's description in *Navigium* 7–9.

[235] *SMM's* route along the North African coast is clockwise from Alexandria to Utica (thence a lacuna) (*SMM* 1-127).

[236] See Ch.6.25 on ancient harbour terms; also Medas (2008, 2009-10) on nautical terms/practical aspects of *SMM.*

Navigational Markers in the *Stadiasmus:* North African Region		
Ref	**Passages for North African coastline**	**Navigational/Topographic**
2	From Chersonesus to Dysmae - a harbor for merchant ships not exceeding a thousand units of cargo, 7 [stades].	harbour & ship capacity
14	From Hermaea to Leuce Acte (White Shore) 20 stades. A low island lies off it, 2 stades from land. It is a small anchorage for cargo ships, with winds from the west. On the land below the promontory there is a long anchorage for all kinds of ships; a sanctuary of Apollo, with a notable oracle; there is water by the temple.	chromatic, 2 anchorages, capacity, shelter, sanctuary; water source
19	From Old Woman's Knee to Artos 120 stades, a rough promontory with no anchorage, and at the promontory there are two bulls [horns?] extending as islands into the sea. Rounding this you see the city of Paraetonium. All in all there are 1550 stades from Alexandria to Paraetonium.	anchoring difficulties; descriptive shapes; visual advice; total distances
30	From Katabathmus to Petras 150 stades. Sailing along another 30 stades you will see next to you a high, large cape; and on the other side you will see an open roadstead and a big lake. On the left side there is an artificial anchorage, it has water under the fig tree, and because of this, the place is called Syce.	visual ('you will see'); cape size, open roadstead, lake, artificial anchorage, tree
35	From Kardamis to Menelaum 100 stades; it is a harbor; it has brackish water in the sand.	water transition
57	From Teuchira to Bernicide (Berenice?) 350 stades. The sailing voyage turns. After sailing 90 stades you see a promontory stretching out toward the west. Shoals lie on the surface beside it; keep watch as you sail past. You will see a low, dark island. The promontory is called Shallows (Brachea), on the left is an anchorage for small boats. All in all, from Apollonias to Bernicide is 1150 stades.	navigation type; visual advice; hazards; topography, island, cape, anchorage
63	From Boreion to Chersis 140 stades, an anchorage for the Etesian (summer north) winds. It has water near the fort.	shelter/prevailing winds
73	From Hyphali to Scopelites 80 stades; it is a lookout rock, 15 stades from shore; tall, similar to an elephant.	Lookout; descriptive shapes
84	From Automalaca to Philaenorum Arae (Altars of Philaena) 185 stades. It is a good summer anchorage, and it has water. Up to this promontory you have the mountains and country of the Cyrenaeans. All in all from Berenice up to Philaenorum Arae 2000 stades.	summer anchorage; water; trib; total distances
86	From Hippo cape to Eperos 350 stades; there is a harbor for small ships. There is water. This is a fort of the barbarians.	fort linked to tribe
93	[From Cephalae to Neapolis] Sailing from the open sea you see a low-lying country with islands, approaching which you see the seaside city and a white strand and beach; the city is all white. It has no harbor. Anchor safely at the Hermaeum. It is called Leptis. All in all from from the Altars of Philaena to Leptis Magna is 4200 stades	navigation type, topography, islands, chromatic, harbourless; total distances
95	From Hermaeum to Gaphara 300 stades. It is a cape with anchorages on both sides; it has water. It is called Aeneospora, for it is like an island.	cape; double anchorage; water; descriptive shapes
103	From Gergis to Meninx (membrane) 150 stades, a city on an island. The island lies 8 stades offshore. It has a number of cities and this one is the metropolis. This is the island of the Lotus eaters. On it there is an altar to Hercules, called the greatest. There is a harbor with water…	island with many cities/ metropolis; tribal group; altar; harbour; water
112	[From Meninge…to Thapsus]… These are cities with harbors; but because of the shoals lying off them moderate sized boats sail there. The island Cercina lies offshore from Acholla and Alipota and Cidiphtha, 120 stades away. From the Lotus eaters, Meninx, to the island Cercina is a passage of 750 stades. From Thena to Cercina **. By the city are shoals stretching toward the city. From Cercina to Thapsus is 700 stades. It has a beautiful island on the open sea lying off Thapsus toward the north, about 80 stades distant. It has a harbor and water. These islands enclose the Icarian [Cercinaean] Sea.	hazards; boat-size; island navigation; harbour, water
124	From Galabras to Carthage 120 stades; it is a great city with a harbor, in the city there is a tower; anchor on the right beneath the mole.	city with harbour & tower; directional advice; mole
125	From Carthage to Castra Cornelii 303 stades; the harbor is for over-wintering; large ships pass the winter in it.	winter harbour; ship-size

Table 8.2 Navigational Markers in the *Stadiasmus*: North African Region.

The *Stadiasmus* depicts the North African region as "a low-lying country" (e.g. *SMM* 93), as is clear from the 3D Map (Fig.8.6; Table 8.2); being also characterised by "low-lying promontories" and "low islands" (e.g. *SMM* 11 and 14, respectively). To distinguish orientation markers along such a low-lying topography, reference towers (or forts/lookouts) feature abundantly in *SMM*, more than in any other ancient text (Davis 2009:176; Goodchild 1953:75), as well as sanctuaries and temples on promontories.[237] These features would have been visible to mariners moving along this coast, acting as key navigational markers. They often also served as indicators of fresh water sources (Semple 1927; Morton 2001:203), which are also a prevailing feature noted by the *Stadiasmus* throughout this coast. Moreover, they served defensive and religious purposes, connecting mariners with their holy patrons that guided them along their sea journeys (Brody 2008). Excavated examples of shrines in the Eastern Mediterranean include: Ashkelon (Israel), Tell Sukas (Syria), Kition (Cyprus), Kommos (Crete), and Ras ed-Drek (North Africa) (Brody 2008). Due to their monumental nature and stone construction, Graeco-Roman promontory sanctuaries/temples are well-preserved, with some still in use as navigational markers in the Mediterranean (Morton 2001:203).

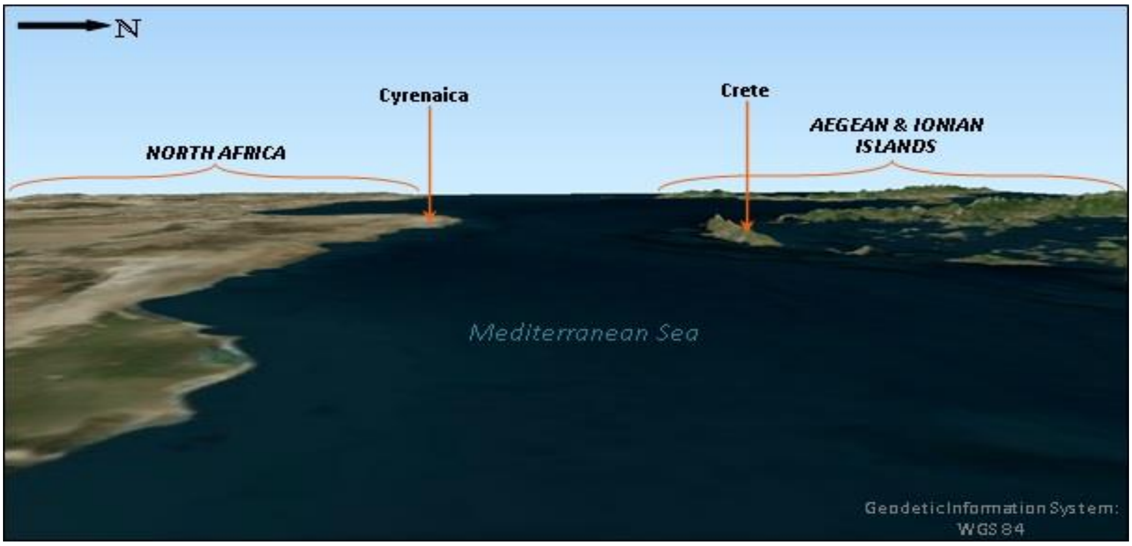


Figure 8.6. 3D Map of North African coastal region from a mariner's perspective (horizontal) from the Levantine coast (Map by author, using QGIS2.8.2 – Basemap: ©Bing Aerial Layer; DEM: SRTM_1km).

As observed earlier in Chapter 8, chromatic features along the Levantine coast served as distinguishable navigational markers visible from the sea, such as Minet el-Beida (explicitly called "White Promontory" by ancient authors), and Ras Ibn Hani (Heraclea), resulting from their white-chalk, calcareous topographic nature. Such chromatic markers were used in reference to coasts, harbours, and promontories/mountains/cliffs. Similarly for the North African coastline, the *Stadiasmus* presents a good example in the case of Leptis Magna:

[237]Promontory shrines of Phoenicians, Greeks and Romans prevail in classical authors for coastal sites of the Eastern Mediterranean to the Atlantic (Thuc., *Pel.War* 3.94.2, 6.3.1–2/44.2–3, 7.26.2; Apoll. *Argo.* 6.1693; Livy 24.3.3–7).

> "[From Cephalae to Neapolis *] Sailing from the open sea you see a low-lying country with islands, approaching which you see the seaside city and a white strand and beach; the city is all white. It has no harbor. Anchor safely at the Hermaeum. It is called Leptis. All in all from from the Altars of Philaena to Leptis Magna is 4200 stades." (*SMM* 93)[238]

In comparison, Ptolemy references 'white' promontories/harbours/shores, such as *Leuke Akte* ('white coast') and *Leukos Limen* ('white harbour') in Egypt (*GH* 4.5.7, 14-5), while Pliny mentions a "White Cape" (Ras el-Abiad) on the Levant coast near Ptolemais/Acce (*NH* 5.17). Similarly, Strabo describes Mount Argaion (Erdjias) in Cappadocia as "the Argaeus, the highest mountain of all, whose summit never fails to have snow upon it; and those who ascend it (those are few) say that in clear weather both seas, both the Pontus and the Issian Sea, are visible from it" (*Geog.* 12.2.7). These navigational markers and warnings create a reference framework to orient the reader as though sailing a journey, revealing the nature and conditions for navigating within this maritime cultural landscape.

Discussion of Navigational Markers

As evidenced in the case of the *Stadiasmus,* the type of navigational markers included raises questions regarding the knowledge and purpose, particularly in light of the difference in the level of detail for the regions of North Africa in contrast with the Levant/Asia Minor. This possibly reflects the author (or source)'s personal familiarity with the coastal landscape, suggesting also the author's concern to ensure the reader is aware of such navigational markers and details when moving along what is a particularly dangerous, exposed coast with limited landmarks for sailors. Additionally, it could indicate a favoured interest towards Africa than the other regions. In either case, the question still stands and is likely related with the source(s) adopted. As traced in the works of Strabo, Mela and Ptolemy, it is possible that the *Stadiasmus* derived some of its information from merchants involved in these trade networks. In light of this, such an inclination towards the North African region could also reflect commercial shifts occurring during this period between trans-regional trade markets. During the 2nd century AD, there was a transition in commercial roles from Italy and the Eastern Mediterranean to North Africa, during which its coast became the dominant region within the Mediterranean trade network from which the seaports of the Pentapolis thrived, particularly in the Roman imperial period (Davis 2009:81; Goodchild 1950; Glicksman 2005:202).

---

[238] All cases of chromatic references in *SMM*: 14, 19, 36, 57, 66, 67, 93, 139, 307, 344. In comparison, Ptolemy also references "white" promontories, harbours, shores, e.g. *Leuke Akte* ('white shore') in *GH* 4.5.7 (North Africa).

8.1.2.2 SEA JOURNEYS & *EUTHYPLOÏA*: EASTERN MEDITERRANEAN

(i) Cases of '*Euthyploïa*' in other regions

In the context of seaborne journeys, the detailed discussion presented earlier for the Levant (Ch.7.2.2) explored the striking cases of '*euthyploïa*' in the *Stadiasmus,* whereby the author suggests to the reader to sail the shortest, direct, or straight route[239]. This pattern is also evidenced in other parts of the Eastern Mediterranean (see Table 8.3). It is interesting to note that the author only provides these '*euthyploïa*' routes for the regions of Asia Minor (Cilicia, Pamphylia, Lycia) and the Levant, excluding the North African and Aegean regions.

For example, along the region of Cilicia, in Asia Minor, the author provides '*euthyploïa*' from Myriandros to Aegeae, then from Rhosos to Serretillis, as well as from River Pyramus to Soli:

> "From Alae to the city of Aegeae, stadia 100; from Myriandros to Aegeae by a **straight journey** *towards the Pole* with a **south wind [*Notos*]**, 100 stades." (*SMM* 158)

> "From Aegeae a coastal sailing along cliffs to the town of Serretillis, 150 stades. **From Rhosos by direct course *north* to Serretillis with a south wind [*Notos*], 250 stades**. Behind the town of Serretillis inland is the [river] called Pyramus, and above it Mt. Parium said to be a distance of 60 stades." (*SMM* 159)[240]

> "From the river Pyramus **by direct route** to Soli to the northwest, carried by a slight south [*Apeliotes*] wind, 500 stades." (*SMM* 165)

However, as can be seen, in these particular cases the author also provides the coastal route (Aegeae to Serretillis), as well as the inland riverine route, via the navigable River Pyramus.

[239] To re-iterate, the '*euthyploïa*' cases presented for the Levant were: *SMM* 132, 137, 142, 148.

[240] *SMM* 164 - From Rhosic lookout to Antioch ad Pyramum, though due W, is sailed with *Notos* (Davis 2009:114).

'Euthyploïa' Journeys In The *Stadiasmus* Eastern Mediterranean (beyond the Levant)			
SMM	**'*Euthyploïa*' route**	**Original term (Greek) used for the '*Euthyploïa*' routes**	**Long/Described Route**
158 **Cilicia**	***EUTHYPLOÏA*: MYRIANDROS → AEGEAE** From Alae to the city of Aegeae, stadia 100; from Myriandros to Aegeae by a **straight journey** *towards the Pole* with a **south wind [*notos*]**, 100 stades	**[εὐθυδρομοῦντι]** …ἀπὸ δὲ τοῦ Μυριάνδρου **εὐθυδρομοῦντι** ἐπὶ τὸν πόλον **νότῳ** στάδιοι ρʹ	–
159 **Cilicia**	***EUTHYPLOÏA*: RHOSOS → SERRETILLIS** From Aegeae a coastal sailing along cliffs to the town of Serretillis, 150 stades. From Rhosos by **direct course** *north* to Serretillis with a **south wind [*notos*]**, 250 stades. Behind the town of Serretillis inland is the [river] called Pyramus, and above it Mt. Parium said to be a distance of 60 stades.	**[εὐθυδρομοῦντι]** …ἀπὸ δὲ Ῥωσοῦ **εὐθυδρομοῦντι** ἐπὶ τὴν Σερετίλην ἐπὶ τὸν πόλον **νότῳ** στάδιοι σνʹ. …κώμη ἐπάνω Πύραμος καλεῖται καὶ ὑπεράνω αὐτοῦ ὄρος καλούμενον Πάριον…	**LONG ROUTE: AEGEAE → SERRETILLIS** From Aegaeae a **coastal sailing** along cliffs to the town of Serretillis, 150 stades.
164 **Cilicia**	***EUTHYPLOÏA*: RHOSICAN LOOKOUT → ANTIOCH** From Antiochia to Ionia… From the [Rhosican] Lookout (Scopelus), without entering the gulf but **sailing straight** towards Antioch, *west of north*, with **a south wind [*notos*]**, keeping the mainland far to the left hand, 350 stades.	**[ἐπ' εὐθείας πλέοντι]** …ἀπὸ τοῦ * σκοπέλου δὲ μὴ κατακολπίζοντι, ἀλλ' **ἐπ' εὐθείας πλέοντι** εἰς Ἀντιόχειαν ἔπειτα πρὸς ἀνατολὴν τῆς ἠπείρου **νότῳ** τὰ εὐώνυμα μακρὸν διαραμένῳ…	–
165 **Cilicia**	***EUTHYPLOÏA*: R. PYRAMUS → SOLI** From the river Pyramus by **direct route** to Soli to the *northwest*, carried by a slight **south wind [*notos*]**, 500 stades.	**εὐθυδρομοῦντι** Ἀπὸ τοῦ Πυράμου ποταμοῦ **εὐθυδρομοῦντι** εἰς Σώλους ἐπὶ τὰ πρὸς ἑσπέραν μέρη τῆς ἄρκτου **νότῳ** μικρῷ παρέλκας στάδιοι φʹ.	–
183 **Cilicia**	***EUTHYPLOÏA*: MYLAE → PHILAEA** From the promontory to the place Philaea (Palaea) 500 stades. The whole distance from Mylae to Philaea, **cut short,** is 500 stades.	**[τὸν ἐπίτομον]** Οἱ πάντες ἀπὸ Μυλαίων εἰς Φιλαίαν τὸν ἐπίτομον στάδιοι φʹ.	–
229 **Pamph**	***EUTHYPLOÏA*: PHASELIS → CRAMBUSA** [From Phoenicus to Crambusa 50 stades]. From Phaselis **the straight route** to Crambusa 100 stades.	**[ἐπ' εὐθείας]** ἐκ δὲ Φασήλιδος **ἐπ' εὐθείας** εἰς Κράμβουσαν στάδιοι ρʹ.	227. From Phaselis to Corycus 80 stades. /228. From Corycus to Phoenicus 30 stades. Above it is a high mountain called Olympus. /229. [From Phoenicus to Crambusa 50 stades].
232 **Pamph**	***EUTHYPLOÏA*: R. MELAS *[through the sea passage*] → CHELIDONIAE** From Morum Water to the Sacred Promontory and Chelidonian islands 50 stades. Altogether, from the River Melas to the Chelidoniae sailing next to the land 500 stades. **The short way through the sea passage** to the Chelidoniae 600 stades.	**[τὸν δὲ ἐπίτομον]** …**τὸν δὲ ἐπίτομον** διὰ πόρου εἰς τὰς Χελιδονίας στάδιοι χʹ.	**RIVER MELAS *[sailing next to the land*] → CHELIDONIAE** From Morum Water to the Sacred Promontory and Chelidonian islands 50 stades. Altogether, from the River Melas to the Chelidoniae sailing next to the land 500 stades.
248 **Lycia**	***EUTHYPLOÏA*: R. XANTHOS → PYDNA** From the river Xanthos to Pydna **directly** 60 stades.	**[ἐπ' εὐθείας]** Ἀπὸ ποταμοῦ Ξάνθου εἰς Πύδνας **ἐπ' εὐθείας** στάδιοι ξʹ.	–

Table 8.3 '*Euthyploïa*' journeys in the *Stadiasmus* (Direct/Open-Sea Crossings/Coastal) in the Aegean, Cyprus and Cilicia Regions.

(ii) Cases of '*Euthyploïa*' in other ancient works

A comparable case to these '*euthyploïa*' is found in Strabo's work, where he highlights the significance of taking the shortest route rather than the direct one in certain cases (e.g. *Geog.* 6.3.5) to reduce the distance sailed across open seas (Morton 2001:167):

> "Cape Iapygia [is] a huge rock which extends out into the sea towards the winter sunrise [SE]… And with it the Keraunian mountains, likewise, bar the mouth of the Ionian Gulf; the passage across from it both to the Keraunian mountains and to the Lakinion is about 700 stadia… Thence [from Hydros] to Brundisium [is a distance of] four hundred stadia, and it is an equal distance to the island Sason, which is situated about midway of the distance across from Epeiros to Brundisium. And therefore those who cannot accomplish the straight voyage [from Epeiros to Brundisium) sail to the left [i.e. south] of Sason and put in at Hydrus; and then, watching for a favourable wind, they hold their course towards the harbours of the Brentesini." (*Geog.* 6.3.5)

In contrast, in another case, Strabo presents the longer route as being the preferred option in his account of the sail from Brentesium to the opposite mainland (*Geog.* 6.3.8), to which he seems surprised (or believes the reader will be surprised) by stating "and yet"/ δὲ καὶ , as the shortest route between headlands was the more assumed norm (Morton 2001:167):

> "The voyage from Brentesium to the opposite mainland is made either to the Keraunian mountains and those parts of the seaboard of Epeirus and of Greece which come next to them, or else to Epidamnos; <u>the latter is longer than the former</u>, for it is one thousand eight hundred stadia. <u>And yet the latter is the usual route</u>, because the city has a good position with reference both to the tribes of the Illyrians and to those of the Macedonians." (Strabo, *Geog.* 6.3.8)

Regardless of which route is chosen, Strabo demonstrates an awareness of both the short and long routes (see other examples in Table 8.4 for Strabo and Pliny). Navigating across the gulfs was common practice in the Roman period, which is likely linked to the reason ancient geographers show a tendency to describe headlands located on either side of a gulf as 'opposite' (ἐναντίον) one another (e.g. Strabo, *Geog.* 13.3.5; Ps-Sky. 52).[241] This draws on earlier points regarding mariners' knowledge of coastal features (Ch.7.1), as important

[241] Ptolemy (*GH* 1.4-1.5) references localities "oppositely situated" (*antikeimen*), though these refer to places on the same meridian: "[Marinos] says: [1] that Tarraco is opposite Caesarea Iol, although he draws the meridian through [Caesarea Iol] also through the Pyranees, which are more than little to the east of Tarraco. [2] [he says that] Pachynus is opposite Leptis Magna, and Himera opposite Thena, yet the distance from Pachynus to Himera amounts to about 400 stades, while that from Leptis Magna to Thene amounts to over 1,500 [stades] according to what Timosthenes records. [3] Again he says that Tergeste lies opposite Ravenna, whereas Tergeste is 480 stades from the inlet of the Adriatic at the river Tileventus in the direction of the winter sunrise. [4] Similarly he says that Chelidoniai lies opposite Canopus, and Akamas opposite Paphos, and Paphos opposite Sebennytos (…). [5] Pisae – Ravenna (…) [6] Londinium – Noviomagus (…) [7] Athos/ Amphipolis/ mouths of Strymon/ Hellespont (…) [8] Thrace …) [9] Trapezous – Satala (…) [10] river Nile (…)

landmarks for navigation (and thus would have known details such as features' names, etc). In the majority of cases this represents the actual maritime topography of the regions, rather than simply geographic descriptions, indicating the relevance of the feature not simply its specific name, as "the expression only really makes sense if understood from the point of view of a mariner approaching the headland at one end of the gulf, and intending to sail straight across to the headland at the other end" (Morton 2001:161). Strabo also explicitly states:

> "All agree that the route by sea from Alexandria to Rhodes is a **straight line** with the course of the Nile." (Strabo, *Geog.* 2.5.7)

ANCIENT ROUTES AND NAVIGATIONAL REFERENCES – FROM/TO OTHER LEVANTINE REGIONS	
Strabo, *Geog.*	
2.5.24	Rhodes → Alexandria (with ***Boreas*****),** approximately four thousand stadia, while the coasting voyage is double the distance.
14.1.35	From Chios to Lesbos, sailing southwards, is 400 stadia *[with **Notos**]*
17.3.21	From Cyrene to Kriou Metopon (Crete) is 200 stadia with ***Leukonotos***
Pliny, *NH*	
4.12.71	… [Carpathum] to Rhodes, in the direction of the **south-west wind [*Africo*]**, is 50 miles.

Table 8.4 Routes and navigational references (in Strabo and Pliny's treatises).gational references (in Strabo and Pliny's treatises).

(iii) Crossings and Open-Sea Sailing

The *Stadiasmus* also describes and advises long-distance 'crossings",[242] between locations sailing across open-sea (e.g. to/from Cyprus and to/from the islands, e.g. Rhodes, Delos; *SMM* 271-283)[243] and circumnavigation routes (around Cyprus, *SMM* 297-317, and Crete, 318-55).[244] Among such crossings, the author includes long-distance routes such as: Rhodes → Alexandria; Rhodes → Sidon; Rhodes → Cyprus; and Mindo → Attica (Medas 2009-10:345-346).

The island of Rhodes was one of the major regular trade-ports (and crossroad points) along the commercial seaways of the Eastern Mediterranean. According to the *Stadiasmus*, Rhodes was linked with a total of 26 maritime crossings/destinations (*SMM* 272), namely: Alexandria, Ascalon, Caesarea Maritima, Berytus, Sidon, Byblus, Tripolis, Seleucia Pieria, Cilicia, Corycus, Cyprus, Patara, Caunus, Rhopusa [island], Physucus, Agne (?), Knidus, Nisyros, Telos,

[242] See Medas (2009-10:345) on ancient concept of crossing, 'διάπλους/diaplous' (i.e. "crossing an arm of the sea").
[243] Crossings: "From Anemourion in Kilikia to Akamas on Cyprus is 700 stadia." (*SMM* 308) / "From Karpaseia to Akra 100 stades. From there we cross to Anemourion. The whole circumnavigation of Cyprus is 3250 stades." / "From the same Kouriakon to Pelousion 2300 stades" / "From Kition in Cyprus to Askalon 3300 stadia (2300?)" (*SMM* 315-7).
[244] See Medas (2009-10:345-6) on structure and patterns in the *Stadiasmus* from a practical/nautical perspective.

Karphathos, Kos, Chios, Myndos, Samos, and Tenedos. In comparison, the island of Delos was linked with 16 maritime crossings/destinations (*SMM* 284).[245] In certain cases, the author also designates if sailing conditions are favourable along a given route (often indicating the wind and/or direction to follow) or potential hazards encountered. The author's inclusion of these maritime crossings illustrates the key role of the islands of Rhodes and Delos in the Aegean region, both geographically and strategically (Medas 2009-10:347). They highlight his knowledge of sailing and navigational practicalities and major maritime trade routes and networks, as well as local nautical/topographic features to aid mariners navigating the region.

Discussion of Sea Journeys

As illustrated throughout, there is an interconnected relationship between maritime activities, movement and the landscape. The physical features of the landscape played a fundamental role as natural landmarks, distance/boundary-markers, and anchorages, as well as a means of communication within a dynamic exchange network connecting sea and land. The structure and nature of the geographers' described sea journeys were driven by mariners' cognitive experience of sea travel within the maritime cultural landscape. Parallels with the pattern of '*euthyploïa*' identified in the *Stadiasmus* in the Levant were also evidenced in other parts of the Eastern Mediterranean (e.g. Cilicia), as well as in other authors (e.g. Strabo). The ancient authors also provided longer routes, such as crossings over open-sea sailing (e.g. Rhodes to Alexandria) and circumnavigation routes (e.g. around Cyprus and Crete). Though *euthyploïa* would generally be the assumed preferred route, this would have been dependent on the variables discussed (physical/technological/socio-economic) and the purpose of the journey. The patterns explored highlight the important role of secondary harbours, mooring sites and riverine routes within this network, showing an ability to adapt to a particular conditions and needs. Regardless of the route selected, certain ancient authors show an awareness of both sailing options (plus crossings/open-sea sailing), as well as the notable navigational features en-route which would have aided mariners in their orientation and conception of space.

[245] Also crossing from Rhodes to promontory Scilleo, in Argolis, specifying intermediate islands found on the left and on the right of the route (*SMM* 273); crossing from Cos to Delos and Mindo Attica, with intermediate islands (*SMM* 280-281); as well as crossings between the individual islands of the Aegean region (*SMM* 274-279, 282-283).

8.2 Common Sense Geography through "Static" & "Movement"

8.2.1 LINKING LAND AND SEA: 'DESERTED SETTLEMENTS' AND 'TWIN-SETTLEMENTS'

The "common sense geography" framework (Ch.1:1.1.2) was adopted by exploring the themes of "static" and "movement" represented in ancient Roman sources. Firstly, by approaching the dataset within Theme A ("Static", Ch.6.2), significant patterns emerged from comparing the presence/absence of the coastal sites in the Levant: "deserted settlements" and "twin-settlements". These patterns reflect several inconsistencies and misrepresentations among the ancient study-authors, likely linked to a lack of first-hand information and a mixture of sources.

For instance, Chapter 6 (6.2.3) explored notable cases along the Levantine coast where the archaeological material at certain sites contradicts the associated ancient documentary evidence. In the Levant, a key example was the striking case of Dor which is described as deserted (or completely omitted) in the Roman period by several ancient authors, yet the archaeology implies it was an active maritime settlement for the period in question (Ch.6.2.3.1-5). Settlements mistakenly placed inland (e.g. Antarados, Marathos, Raphia), or vice-versa, were explored alongside the deserted cases. In a wider scope, similar images of 'abandonment' (of towns, islands, harbours, lands) are evidenced in other areas of the Eastern Mediterranean, such as the Aegean (8.1) and Cyprus (Counillon 1998), and can also be traced in earlier accounts by other authors writing in the Hellenistic-Roman transition, or as early as the Archaic period (8.1.1.1). These likely served as sources for the authors in this investigation and the pattern of development of these sites reflects geomorphological and ideological changes over-time. Considering the harbour terminology used in the sources (Ch.6.2.5) also helped understand the harbours' role and status as perceived by the ancient authors, with *eremos/*deserted either implying a harbour's poor infrastructure, lack of suitable shelter from storms, or desertion (cf.Counillon 1998), often echoing the authors' subjective or political vision of the maritime space versus reality. Conversely, the use of terms such as "harbourless" (e.g. *SMM*) relate to their role in navigation. Overall, key factors influencing misconceptions of 'deserted settlements' in the Eastern Mediterranean included: (a) cases dating from the period of civil wars, or Roman expansion/control (b) limited direct first-hand knowledge; (c) mixed sources; (d) context/purpose of author's work and knowledge (hence, diverse agendas and perspectives are reflected in these ancient literary sources). Such representations are moulded under the influence of perceived and idealised situations of the past, particularly in the Roman imperial period (Alcock 1993:29). As well as mixed sources and misinformation, these representations underline a sense of decline and 'imperialist nostalgia' (Alcock 2002:43).

Regarding the pattern of "twin-settlements" observed along the Southern Levant (Ch.6.2.4), in specific cases the authors make explicit distinctions between the coastal site and its inland centre (i.e. *polis* and its *epeinon/limen*), with the key case being the fortified twin-settlement of Iamneia/Yavneh and Iamneia Paralios/Yavneh Yam (Pliny, *NH* 5.13; Ptol., *GH* 16.2; Ch.6.2.4.1). In the context of the Levant, such clear-cut distinctions of twin-settlements appear to be rare amidst most ancient writers and establishing their physical link in the archaeological record often proves challenging. Conversely, for regions such as the Aegean and North Africa (8.1.1.2.1), this distinction of "twin-settlements" occurs frequently amongst several ancient authors writing in the Classic-Roman periods (e.g. Strabo, Pliny, Thucydides),[246] often attested archaeologically (e.g. 'Long Walls' of Athens-Piraeus). This is also apparent in earlier sources such as Pseudo-Skylax' *Periplous* (mid-4th BC),[247] which frequently distinguishes between cities/towns and their harbour, particularly for the Peloponnese region in Greece (Ps.-Sky. 43, 45, 46, 49, 50).[248] When placed in the broader regional context, cases of "twin-settlements" exhibit how widespread coastal, island and mainland relations were, and emphasise that these ancient authors did in fact show a tendency to distinguish twin-settlements, implying an awareness of links between coastal and inland sites, whether physical, political or conceptual.

In relation to the maritime cultural landscape, elements of sea power played a vital role in shaping the ancient authors' representations of the coastal sites and their interconnectivity (8.3.2.1). The advance of the maritime role of these regions meant the towns and harbours became primarily dependent on maritime trade, and thus the ordering of commercial space is key to understanding the perceptions of the inhabitants. It also explains the demographic shifts and images of "desolation" (8.1.1.1; Ch.6.2.3.1). Overall, it is highly probable that the ancient authors' representations of these coastal landscapes and the status/links between these settlements were predominantly influenced by transitional socio-political/economic circumstances throughout the Eastern Mediterranean. This led to the shaping of perceptions

---

[246] The physical distinction between city (*polis/asty*) and harbour (*limên*) is also highlighted in Thuc, e.g. harbour Cophos, situated in the territory of Torone "not far from the city" (Thuc. 5.2; also 1.46) (Bonnier 2008:49; see 54-7).

[247] (Shipley 2008:285): "a striking feature is the absence of the new 'capital' of Arkadia founded in the 360s, Megalopolis… Ps.-Skylax's information is more up to date for mainland Greece than for other places, so this omission would be surprising as well as potentially damaging to the notion of sole authorship in the 330s."

[248] "Elis… Kyllene with a harbour; …Opposite this territory is the island of Zakynthos, in which there is both a *polis* and a harbour." (43)/ "Messene….Prote island with a harbour" (45)/ "Lakedaimon…and Las, a *polis* with a harbour; Gytheion, in which is a shipyard; and a fort; and the river Eurotas; and Boïa, a *polis*; and Malea, a cape. Opposite this lies Kythera island, with a *polis* and a harbour. After the aforesaid cape Malea are Sidē, a *polis* with a harbour; Epidauros, a *polis* with a harbour; Prasia, a *polis* with a harbour; Anthana, a *polis* with a harbour." (46)/ "Argos…Nauplia, a polis with a harbour." (49) Similar distinctions or references to orientation terms include "a *polis* with a sanctuary" (e.g. Corinth, Ps.-Skylax 40); "opposite" or "directly facing" (e.g. Ps.-Skylax 50).

that were inter-reliant on the many reconfigurations of the landscape and settlement distributions impacted by trade shifts, military sieges and piracy during Roman expansion.

8.2.2 MOVING THROUGH THE SEASCAPE: NAVIGATION MARKERS & *EUTHYPLOÏA:*

Secondly, approaching the data through Theme B ("Movement", Ch.7) placed the maritime data within its maritime cultural landscape, drawing out the practical modes of travelling the seascape and establishing spatial associations (both physically and conceptually). The principle patterns explored related to environmental dynamics and their role as navigational markers (Ch.7.1), as well as cases of '*euthyploïa*' identified in the *Stadiasmus* (Ch.7.2.2).

Understanding the environmental representations of geographic and navigational markers highlighted the vital role of such features to ancient mariners as natural landmarks, boundaries and means of communication and movement. In these ancient sources, features such as rivers, mountains and islands served as reference markers for travel and orientation through the seascape/landscape and establishing boundaries/distances, shaping the arrangement of space. Evidence portrayed elevated points and chromatic features visible on the mainland as essential for wayfinding at sea, while promontories often acted as useful anchorages and start/end markers along journeys. References to islands and landscape changes were also significant, such as formations of breakwaters (e.g. Alexandria: 8.1.1.4; Tyre and Sidon: Ch.7.3.1.3). They reflect the ancient authors' grasp of these types of morphological changes of the coastline, as well as human influences in shaping it (e.g. artificial harbours at Caesarea and Seleuceia Pieria). The hypothetical journey of the *Stadiasmus*' *euthyploïa/*straight-line sail routes (Ch.7.2.2) in the Levant showed that the author provided first a 'described route', as observed along the itinerary, and then advised the 'actual route' to be sailed (i.e. *euthyploïa*), which reveals a sense of awareness of sailing and of the coastal landscape. The range of patterns explored have emphasised the complexity attached to maritime sailing as represented in ancient texts, and the importance of secondary ports and rivers in connecting this coast and chosen routes, including both short and long-distance routes (open-sea crossings e.g. Rhodes to Alexandria). The role of smaller settements and anchorages in the Levant was further supported through a reflection on various vessel types (e.g. *akatoi* coasters) and evidence of anchors (Ch.7.2.3.1), highlighting the ancient authors' insights on maritime people adapting to this dynamic coast.

As a result of comparing the environmental features and their ancient representations, it has been possible to portray the various modes of perceiving and navigating the seascape through connections and nodes within a wide network. Building on Ingold, who contrasts navigation and wayfinding as the two fundamental modes of moving through a landscape,[249] "every place holds with it memories of previous arrivals and departures, as well as expectations of how one may reach it, or reach other places from it" (Ingold 2000:237, 242). The wayfinder or mariner's sensory interaction with the physical landscape/seascape is varied and continually advances, adapting overtime through accumulated experiences and memories. This in turns shapes their dynamic perceptions of a place, feature or region. In light of this, navigating the maritime cultural landscape/seascape is dependent on the perceptions of the mariner undertaking the journey, and in turn this could provide first-hand insights for geographers to draw a more practical account from. The various natural signs and landmarks depicted in these ancient treatises are thus interconnected with: memory and mental-maps, familiarity and experience of the seascape and an ability to adapt to change. These markers and references are not static, with context and accumulated experience being central to the type of data transmitted to these ancient texts, which act as verbal representations of sea journeys. Hence, mariners' and travellers' perceptions of the landscape/seascape heavily influenced the development of geographic notions of space. The nature and role of these factors as described in ancient texts reveal an awareness of the landscape and their role in conceptualising space.

8.2.3 ROMAN PERCEPTIONS OF COASTAL LANDSCAPES: RECONSIDERED

As put forward in Chapter 1 (1.1.2-5), the commonly accepted hodological notions were brought into question in this research, illustrating that the dominance of surviving itineraries and *periploi* is not evidence enough to prove for a solely linear mode of perception. By building on on-going work by researchers challenging hodological models and adopting a "common sense geography" approach, this investigation has aimed to highlight the significance of reconsidering the available corpus of maritime data. Alternative modes of perceptions were explored through the two themes, revealing diverse perspectives of the landscape, such as: coastal vs inland links, mariners' mental-maps for orientation/movement, and bird's eye views. Traces of mariners' practical knowledge are inherent throughout these ancient texts, reflecting a link between the static armchair geographer and the practical movements of the mariner.

Mariners' mental-maps thus influenced the geographers' conceptualisation of space. Evidence has continuously emphasised the need to interpret specific sources and cases within their particular regional and cultural-historical context to understand their nature and purpose.

[249] In Ingold, *Navigation* is a mode of movement involving the intermediary of the map, by which an individual positions themselves through a comparison to a "location in space, as defined by particular map coordinates" (Ingold 2000:237). In contrast, *Wayfinding* "depends on the atonement of the traveller's movements in response to the movements, in his or her surroundings of other people, animals, the wind, celestial bodies, and so on" (*ibid*:242).

Furthermore, understanding Roman perceptions of the coastal landscape was achieved through a theoretical, archaeological and geospatial analysis of the dynamic links between people and the sea. Genre was a focal aspect of this investigation, as illustrated in the analysis of the various sources' style and purpose of writing as a means of verbally mapping spatial orientation, time and distance. The many surviving verbal accounts offered a useful means of evaluation, together with supporting evidence (archaeological, environmental, geospatial). As demonstrated throughout the ancient study-authors' accounts, whether guiding a journey or describing the *oikoumene,* the sea served as a vital cognitive tool for understanding and defining spatial relations. In this way, it acted as a reference for orientation and arrangement of places and features along a hypothetical journey. In a similar way, rivers and mountains also acted as reference guides, as well as boundary-and distance-markers amid the ancient authors. River mouths offered fluvio-maritime anchorages for vessels and extended links with inland/hinterland networks, revealing an important relationship between rivers and harbours along the Levantine coast in antiquity. It is hard to determine whether the ancient-study authors themselves travelled or sailed the described places or journeys. However, based on the varied nature of the evidence and inconsistencies in certain representations (e.g. 'deserted settlements'), it would seem that for the majority of places the authors predominantly obtained their information through secondary means (with the possible exception of the *Stadiasmus*)[250] and, at times, earlier, outdated sources of a Hellenistic date or earlier.

Strabo claims his extensive travels placed him in the best position to write the *Geographia* (*Geog.* 2.5.11) and adds the significance of the senses in perceiving the *oikoumene* (*Geog.* 2.5.11). As aforementioned, in relation to the extent of Strabo's travels (Ch.4.1.2), it seems plausible that he had some first-hand knowledge of certain Levantine sites, such as Tyre (*Geog.* 16.2.22-3) and Sidon (*Geog.* 16.2.25). He also suggests familiarity with philosophers of his time (e.g. Boethus, Appolonius and Antiochus, *Geog.* 16.2.24), who likely offered him their own first-hand knowledge of the region or local events. Similarly with Pliny, though he likely applied useful first-hand insights from his broad travels throughout his military and political pursuits (Ch.4.1.4), he primarily adopted secondary sources and oral accounts of merchants/mariners for his descriptions of journeys and the *oikoumene*. Similar overall representations along with parallels identified at specific sites (e.g. Crocodilon and Sycaminon) amongst the ancient authors potentially imply that Strabo may have been a source for later writers (e.g. Pliny), whether directly or indirectly through other writers, or that they used a common source (as was likely the case between Mela and Pliny). In contrast, Mela's work is a far more general,

[250] Though for most parts of the Levant it may not have been first-hand as the data is very fragmented and complex.

less scientific/technical account (Ch.4.1.3). This is related to its style, purpose and readership, as it is structured in a brief, popular style, focusing on providing an interesting account of the regions and peculiar features/events, rather than a concern for accuracy and measurements. Its significance and comparative purpose lay in its maritime nature and arrangement like a *periplous,* using the sea as a guide and mentioning relevant navigational markers in the Levant. In the case of Ptolemy, although he was also not a mariner and strived to derive his data through solely scientific means, he also resorted to mariners' and merchants' accounts when data was lacking (Ch.4.1.5), and used the seas and rivers as a means of shaping and guiding his representations. Despite certain inaccuracies, he demonstrated a clear, non-political systematic overview and ordering of the Levantine coastal landscape, comprising its contours and key places, as well as physical features which would have been notable for navigation, travelling and visualising the coast (e.g. mountains, capes, islands).

Finally, the *Stadiasmus* (Ch.4.1.6) served as a valuable source for the mariners' perspective, being the closest representation of what a pilot or sailing directions handbook would have looked like in antiquity. Whether based on an actual or hypothetical journey, its style and content was far more catered to a mariner on-board a ship and the places/features that would have been encountered en-route. Overall, for the majority of the Levantine coast it appears *Strabo, Mela, Pliny* and *Ptolemy* did not have a direct knowledge of the landscape/seascape (apart from a few specific cases discussed) (see Arnaud 2009:187). The same is possibly the case for *SMM'* account of the Levant, one of the most corrupted sections of the extant text;[251] though for North Africa and Cyprus/Crete it seems *SMM* had first-hand knowledge of the coast. It is hard to discern if the *Stadiasmus'* account was written by a mariner or for a mariner, but it is certainly written as though the reader is perceiving the journey through the eyes of a mariner, both physically (by the sea and in a specific direction) and conceptually (in the type of information and related in recognition methods for coasts) (Medas 2009-10:349). For a mariner at sea, it would have been helpful for the author to also include some more specific navigational details and insights relating to return routes, travel times, seasons or considerations of night-sailing. Nonetheless, the author does provide direct advice or warnings throughout and overall shows a good understanding of navigation, as well as the notable navigational markers or useful features (water sources, hazards, forts, shrines) helpful to sailors for safe anchoring, orientation and constructing their mental-maps along the journey. The fact *SMM* mentions far more nautical and navigational detail for the North African region is also noteworthy and worth pursuing further. Additionally, the other study-sources serve as

[251] Similar to the severely corrupt section of Cilicia for Mallos/Magarsos/Antioch ad Pyramus (Arnaud 2016b:12-14).

important comparative cases for drawing links between mariners' activities/views and armchair geographers' writings/representations of such maritime activities and settings, which are intertwined and non-linear in their relationship and wider development.

As emphasised towards the start of this investigation (Ch.4.1.1, 4.1.7), the genesis of the selected ancient texts, particularly concerning the Levant region, derives from a chaotic and complex manuscript tradition that should be approached with caution. By addressing such complexities within their specific context, clues arose for answering structural questions. These related to gaps or misrepresentations in the described itineraries, places and features in these texts, as well as the many orthographical errors, confusions and doublets of toponyms (also of unidentified/unique places, especially in *SMM*). As demonstrated, such discrepancies often resulted from transmission errors by the compiler/scribe, who did not recognise the place-names nor realise these repetition/doublets when transferring or piecing together the information. Reflections on the harbour terminology used in these texts also helped to further elucidate the authors' representation of particular coastal sites, by attaching a characteristic quality or status to a place (technical or morphological). The ancient study-sources' texts were composite works based on a compilation of sources, often serving more geographical rather than practical purposes. Nonetheless, the perceptions of these ancient geographers are clearly heavily shaped by the mariners' practical experience and visions of the regions in question.

The key significance of approaching this research data through the range of ancient study-sources lies in the different contexts they offer in terms of their genesis, genre/style, spatial-temporal setting, purpose, and readership audience. Yet they also share similar influences in forming their perceptions and representations, thus providing us with a more holistic image of the heterogeneous nature of writing during the Roman period and the importance of the sea and mariners in shaping these ideologies. As aforementioned, records show certain recurring tendencies in ancient authors' works, such as using the coastline and rivers as a reference for their descriptions and establishing their position within the *oikoumene* (Talbert 2010:4), as a way of conceiving and representing their knowledge, power and understanding of the maritime cultural landscape and its relation with cosmological phenomena. Through re-evaluating the ancient sources, implicit practical elements and multi-dimensional perspectives begin emerging in the form of bird's-eye panoramic views, on-board perspectives, mariners/traveller's mental-maps, and linguistic topographies (using toponyms as a reference). In this way, the wide range of navigational and sensory markers created a 'memory database' of places and features along a journey/region (Thiering 2012:33). From an on-board view, the practical and sensory experience is illustrated in Strabo's account of Egypt, sailing up the Nile:

> "Take, for example, the proposition that the earth is sphere-shaped… the suggestion comes immediately from the phenomena observed at sea and in the heavens; for our sense-perception and also our intuition can bear testimony in the latter case. For instance, **it is obviously the curvature of the sea that prevents sailors from seeing distant lights at an elevation equal to that of the eye**; however, if they are at a higher elevation than that of the eye, they become visible, even though they be at a greater distance from the eyes; and similarly if the eyes themselves are elevated, they see what was before invisible. This fact is noted by Homer, also, for such is the meaning of the words: "With a quick glance ahead, being upborne on a great wave, [he saw the land very near]." So, also, when sailors are approaching land, the different parts of the shore become revealed progressively, more and more, and what at first appeared to be low-lying land grows gradually higher and higher." (Strabo, *Geog.*1.1.20)

In the above passage, Strabo provides a personal perspective of the region from the point of view of a passenger on a boat moving through the landscape. Moreover, this directly contradicts the widely held 'hodological' view presented in Chapter 1 (Ch.1.1.2, 1.1.5). From a practical point of view, mariners would not have likely envisioned the landscape/seascape in a solely linear way, particularly due to the fluctuations of wind direction, strength and speed, as well as the changing maritime conditions and coastal morphology. Unlike with roads and terrestrial routes, a mariner could not always travel the exact same lines/routes repeatedly. The regional differences in the accounts and perceptions are noteworthy, as they can reflect specific geopolitical contexts the authors were writing in and what led to their representations.

8.2.4 CONCLUSIONS: LINKING ARMCHAIR GEOGRAPHERS' & MARINERS' PERCEPTIONS

As with the unravelling of a story, the descriptive geographies and journeys set the scene and introduce the various characters, components, events and chosen paths, which co-exist and interplay to create the overall plot and significance behind the people's actions and perceptions. Somewhat comparable to narratives and fictional tales, such as the earlier *Odyssey,* the extensive Graeco-Roman corpus of descriptive journeys and geographic accounts create "templates for action and action-sequences" (Thiering 2012:246-7). In this sense they show a tendency to represent the journey through the eyes of the imaginary traveller or mariner who is moving and orienting themselves through space and time. In this way, these accounts frame people's navigational capabilities along a chosen route through which they interact within a dynamic network of spatial associations. In this context, Graeco-Roman treatises use motion verbs as a particularly useful means of navigating the described journeys, such as a white harbour being recognised as one approaches a shore or curves past a cape, or emerging features of distinctive or peculiar shapes/colours sighted in the distance. Accounts often offer directional references to “right” or “left” in relation to geographic features and landmarks en-route (e.g. Ilyushechkina 2012:136-7, Ilyushechkina et al. 2014). This gives the reader a sense of observing the landscape/seascape from an ‘on-board a ship’ view, through the perspective of the hypothetical mariner or passenger. Other types of references to orientation were marked according to winds, cardinal directions and celestial bodies.

These navigational markers reflect dynamic representations of cultural practices consisting of embodied skills which involve specific ways of perceiving the landscape. For instance, though everyone can see stars, a constellation is given meaning through acquired practice as it “exists only by virtue of someone enacting it via a cultural practice that allocates visual attention in a particular way.” (Hutchins 2011:441). Moreover, navigation on a ship can be viewed as a distributed group effort between crew-members on-board and technical-environmental conditions (Hutchins 1995:117-9). It is the collective interrelation between environmental markers, technology, political agendas and people’s activities which develops perceptions of navigation and the coastal landscape. In this way, these different types of representations play an enactive role through elements of movement and orientation, which become a familiar reference point in a mental network and are transferred across generations. Implicit throughout the ancient geographic treatises and *periploi* is an ability of people in the past to distinguish, memorise and categorise particular objects, features and places useful for navigating and mapping the landscape, as well as adding cultural meaning to these reference markers (toponyms, boundary-markers, safeguarding, religious connotations, political power).

In light of all the discussions presented, although determining the thought-process of these ancient authors is a complex issue, through a multidisciplinary approach we can reach a step closer to bridging the gaps and better understanding the connections translated from the stories they told, whether real or conceptual. Clear patterns were identified in the Levant case-study, with parallels found throughout the Eastern Mediterranean. Overall, these ancient texts reveal the chaotic nature of their manuscript traditions, the predominant use of second-hand sources and the political influences inherent in their representations of the *oikoumene*. Nonetheless, the ancient authors generally show an awareness of the landscape and serve as a reliable source as long as we take into account the nature and purpose of their works, as well as the geopolitical factors influencing the region and their ideologies. Ultimately, they clearly all show the great importance the environment and politics played in shaping these ideas along with the meaning inherent in the landmarks and features.

The argument set forth here that, in antiquity, people did not solely envision journeys and the landscape through linear, hodological perspectives has been strengthened by this multidisciplinary approach towards the ancient authors. People moved and interacted within a maritime cultural landscape, and thus perceived this space in multi-faceted ways, dependent on a multitude of environmental and political-cultural determinants. The evidence presented demonstrated the multivalent nature of the perceptions and representations of the coastal landscape in antiquity. They varied on large-scales across regions, as well as on a smaller more local scale, within particular communities, sites or individual people/authors. However, there was not a linear progression of knowledge. Perceptions were influenced by the social and hierarchical sphere the individual/group was associated with. On one hand, many known ancient geographers came from elite, academic or military backgrounds and circles, which undoubtedly influenced their mindsets and access to information. On the other hand, mariners, fishermen and merchants could include illiterate people with limited or no access to such sources, with a potentially different way of perceiving the *oikoumene.* However, as pointed out at the start, mariners' practical experience and mental-mapping has acted as a building-block for the development of geographic traditions and perceptions. In this way, these extremes co-existed across time and space, and influenced the conceptualisation of geography, navigation and spatial associations, directly and indirectly.

Regardless of whether these ancient authors travelled to these places or not, they are able to successfully grasp and apply the amalgamated information in a way that paints an overall picture of the *oikoumene,* its shape and significance. They share a common approach of arranging their works in the style of a journey, moving the reader through space based on reference points and networks for orientation and spatial associations as a means of conceptualising a place, region, and, ultimately, the *oikoumene* as a whole. This consequently emphasises the need to seek new modes of perceiving and interpreting ancient worldviews of the landscape. This will in turn improve our knowledge of past perceptions of the maritime cultural landscape and the dynamic relationship between people and the sea, from both a mariner's and an armchair geographer's perspective. These two perspectives are intertwined, with mariners' practical knowledge rooted within geographers' notions of spatial constructs. Therefore, from the 'scientific scholars' and 'common sense geographers' to the mariners, merchants and travellers, Roman perceptions would have entailed multi-faceted worldviews which co-existed and advanced based on the dynamics between coastal and inland communities along with the nature of these interactions and their geopolitical sphere.

Bibliography

Ancient Sources:

Acts of the Apostles = The Holy Bible (1984). New International Version. Grand Rapids:Zondervan House

Aelius Aristides = Behr, C.A. (trans.) (1981–86). *The Complete Works.* Leiden: Brill.

Anaximander = Graham, D.W. (trans., comm.) (2010). *The Texts of Early Greek Philosophy: The Complete Fragments and Selected Testimonies of the Major Presocratics*, 2 vols. Cambridge, MA

Anonymous. *Periplus Maris Erythrae* = Casson, L. (ed., trans.) (1989) *The Periplus Maris Erythraei: Text with Introduction, Translation and Commentary*. Princeton: Princeton University Press.

Anonymous (Antoninus Placentius). *Itinerarium* = Geyer, P. (ed.) (1965). *Itineraria et Alia geographica,* CCSL 175. Turnout: Brepols, 129-153.

Anonymous. *Stadiasmus Maris Magni* =

Arnaud, P. (trans.) *Stadiasmus sive periplus Maris Magni: ΑΝΩΝΥΜΟΥ ΣΤΑΔΙΑΣΜΟΣ ΗΤΟΙ ΠΕΡΙΠΛΟΥΣ ΤΗΣ ΜΕΓΑΛΗΣ ΘΑΛΑΣΣΗΣ*. (forthcoming).

Bauer, A. (1905). *Die Chronik des Hippolytos im Matritensis Graecus 121* (Texte und Untersuchungen zur Geschichte der *altchristlichen Literatur 29 = n.s. 14/1). Leipzig*

_______(1929). *Hippolytus. Werke, 4. die Chronik* (die griechischen christilichen Schriftsteller der ersten drei Jahrhunderte, 36). Leipzig, 95-139.

Bauer, A. and Helm, W.O. (eds.) (1955). *Hippolytus Werke. Vol. IV, Die Chronik, 2nd edition CGS 46.* Berlin: Akademie Verlag, 43-69.

Cuntz, O. (1905). *Der Stadiasmus maris magni.* In: A. Bauer. *Die Chronik des Hippolytos im Matritensis Graecus 121* (Texte und Untersuchungen zur Geschichte der altchristlichen Literatur 29= n.s. 14/1). Leipzig, 243-276.

Ermatinger, J. and Helmer, R. (trans.). *Anonymous Stadiasmus or Periplus of the Great Sea.* (forthcoming).

Helm, R. (ed.) (1955). *Hippolytus. Werke, 4. die Chronik* (die griechischen christilichen Schriftsteller der ersten drei Jahrhunderte, 46). Berlin, 43-69 (§ 240-613).

Kiesling, B. and Isaksen, L. (trans.) (2014). *Stadiasmus of the Great Sea*.

Müller, C. 1985. *Geographes Greci Minores I,* 427–514.

Appian = White, H. (trans.) (1912-1913). *Roman History*, I-IV, Cambridge, MA / London (LCL)

Apollonius = Race, W.H. (trans.) (2008). Apollonius Rhodius. *Argonautica.* Cambridge, MA (LCL).

Aristotle = Lee, H.D.P. (trans.) (1962). *Meterologica***.** London.

_______Rackham, H. (trans.) (1950). *Politics*. London.

Arrian = Brunt, P.A. (ed., trans.) (1989). *Anabasis*, 2 vols. London (LCL).

_______Liddle, A. (trans.) (2003). *Periplus Ponti Euxini* (*Periplus of the Black Sea*). London.

Avienius = Murphy, J.P. (trans.) (1977). *Ora Maritima*. Chicago.

Caesar = Handford, S.A. (trans.) (1951). Julius Caesar. *Bellum Gallicum.* Harmondsworth, Middlesex.

Codex Theodosianus/ Theosodian Code = Pharr, C. (trans.) (2001). *The Theosodian Code and Novels and the Sirmondian Constitutions.* Union, NJ: Lawbook Exchange.

Cicero = Baily, D.R.S. (trans.) (1999). Letters to Atticus, vol. II. Cambridge, Mass.

_______ Keyes, C.W. (trans.) (1994). *De re publica*; *De legibus*. Cambridge, Mass.

Dicaearchus = Fortenbaugh, W. and Schütrumpf, E. (trans.) (2001). *Dicaearchus of Messana: Text, Translation, and Discussion*. New Brunswick.

Dio Cassius = Cary, E. and Foster, H.B. (ed., trans.) (1914-27). *Roman History.* 9 vols. London (LCL).

Dio Chrysostom = Cohoon, J.W. and Crosby, H.L. (1932-51). Orations, 5 vols. London.

Diodorus Siculus = Oldfather, C.H., Walton, F.R. and Geer, R.M. (trans.) (1933-67). *Library of History, 12 vols*. London (LCL).

Dura-Europos = Arnaud, P. (1989). Une deuxième lecture du bouclier de Doura- Europos. *Comptes rendus des seances, Academie des Inscriptions et Belles-Lettres*, 373– 89.

Eratosthenes = Roller, D.W. (ed., trans.) (2010). *Eratosthenes' Geography: Fragments Collected and Translated, with Commentary and Additional Material*. Princeton.

Eusebius = Lake, K. (ed., trans.) (1926). *Ecclesiastical History.* Vol I: Books 1-5. Cambridge, MA (LCL); Oulton, J.E.L. (ed., trans.) (1932). *Ecclesiastical History.* Vol II: Books 6-10. Cambridge, MA (LCL).

FGrHist = Jacoby, F. (1923-59). *Die Fragmente der Griechischen Historiker,* 3 vols. Berlin: Weidmann.

Forma Urbis = Carettoni, G., Colini, A.M., Cozza, L. and Gatti, G. (1960). La Pianta Marmorea di Roma Antica. Rome: Comune di Roma. - http://formaurbis.stanford.edu/

Gratian = Pharr, C. (trans.) (1952). *Theosodian Code and Novels and the Sirmondian Constitution.* NJ.

GGM = Müller, C. (1855-1861). *Geographi Graeci Minores.* 3 vols. Paris: Firmin Dido.

Hecataeus = Jacoby, F. (ed.) (1923). *Die Fragmente der griechischen Historiker.* Leiden.

Herodotus = Godley, A.D. (trans.) (1920-25). *The Histories,* 4 vols. London and Cambridge, MA (LCL).

Hesiod = Most, G.W. (trans.) (2006-7). *Extant Works and Fragments*, 2 vols. Cambridge, MA (LCL).

Hipparchus = Dicks, D.R. (1960). *The Geographical Fragments of Hipparchus*. London.

Homer = Murray, A.T. (trans.) (1924-25). *Iliad*. London: Heinemann.

______(trans. A.T. Murray). 1995. *Odyssey*. Cambridge, MA: Harvard University Press.

Isidore = Barney, S.A. (trans.) (2006). *Etymologiae*. Cambridge: Cambridge University Press.

Itinerarium Antonini = Cuntz, O. (ed.) (1929) *Itineraria Romana*, Vol. 1, Itineraria Antonini Augusti et Burdigalense. Leipzig: Teubner. [Reprint 1990. Stuttgart: Teubner].

Jerome = Donalson, M.A. (trans., comm.) (1996). *Chronicon*. Lewiston: Mellen University Press.

Julius Pollux = Bethe, E. (ed.) (1900-37). *Pollucis Onomasticon***.** Leipzig. (repr. Stuttgart 1967).

Josephus = Thackeray, H. St. J (trans.) (1926-65). *Antiquitates Judaicae*. London: Heinemann.

_______Thackeray, H. St. J (trans.) (1926-65). *Bellum Judaicum*. London: Heinemann.

Livy = Sage, E.T. (trans.) (1965). *A History of Rome*. Vol. 10. Cambridge, MA.

Lucian =

Davis, D. (trans.) (2009) Lucian, *Navigium* 7-9. In: *Commercial Navigation in the Greek and Roman World* (Ph.D. Thesis). University of Texas at Austin, 297-307 (appendix B).

Husson, G. (trans., comm.)(1970). *Lucien, Le Navire ou les Souhaits*. 2 vols. Paris: Belles Lettres.

Kilburn, K. (1968). Reprint. *Lucian*. 6 vols. Cambridge, MA: Harvard University Press (LCL).

Madaba Mosaic Map = Avi-Yonah, M. (1954). The Madaba Mosaic Map. Jerusalem: Israel Exploration Society. - http://www.christusrex.org/www1/ofm/mad/index.html.

Marcian of Heraclea. *Periplus Maris Externi* = Müller, C. (1985). *Geographes Greci Minores I,* 515–62.

Menippus of Pergamon. *Periplus* = Müller, C. (1985). *Geographes Greci Minores I,* 427-514.

Notitia Dignitatum = Fiarley, W. (trans.) (1899). *The Notitia Dignitatem or Register of Dignities*. Philadelphia: University of Pennsylvannia Department of History.

Pausanias. *Description of Greece* = Frazer, J.G. (1898). *Pausanias' Description of Greece, vol. 4*. London.

Peutinger Map = Talbert, R.J.A. (2013). *Rome's World: The Peutinger Map Reconsidered.* Cambridge and New York: Cambridge University Press. - http://peutinger.atlantides.org/

Philo = Smallwood, E.M. (ed., trans.) (1961). *Legatio ad Gaium.* Leiden.

Photius = Freese, J.H. (trans.) (1920). *The Library of Photius*. London and New York.

Pliny the Elder. *Naturalis Historiae =*

Ernout, A. (ed., trans.) (1949). Pline l'ancien. *Histoire naturelle livre XII.* Paris: Budé.

Rackham, H. (ed., trans.) (1962). *Natural History.* London.

_______(ed., trans.) (1942). *Natural History*, vol. II (Book III-VII). London and Cambridge (LCL).

Rackham, H., Jones, W.H.S. and Eichholz, D.E. (ed.) (1947-1969). *Natural History,* 10 vols. London and Cambridge, MA (LCL).

Plutarch = Perrin, B. (trans.) (1959-62). *Parallel Lives,* 11 vols. London (LCL).

Polybius = Paton, W.R. (trans.) (2010-12) *The Histories*, 6 vols. Cambridge: Mass.

Pomponius Mela. *De Chorographia =*

Brodersen, K. (ed., trans.) (1999). *Kreuzfahrt durch die Alte Welt.* Darmstadt

Parroni, P. (ed., comm.) (1984). *Pomponii Melae De chorographie Mela. Chorographie.* Paris.

Silberman, A. (ed., trans., comm.) (1988). *Pomponius Mela. Chorographie.* Budé. Paris: Sociéte D'édition Les Belles Lettres.

Romer, F.E. (ed., trans.) (1998). *Pomponius Mela's Mela's Description of the World.* Ann Arbor.

Pseudo-Skylax = Shipley, G. (ed., trans.) (2011). *Pseudo-Skylax's Periplous, The Circumnavigation of the Inhabited World: Text, Translation and Commentary*. Exeter.

Pseudo-Scymnus = Diller, A. (ed.) (1952). *The Tradition of the Minor Greek Geographers*. New York.

Ptolemy. ***Geographike Hyphegesis =***

Berggren, J.L. and Jones, A. (ed.) (2010). Ptolemy's Geography: An Annotated Translation of the Theoretical Chapters. Princeton.

Nobbe, C.F.A. (ed.) (1966). *Claudii Ptolemaei Geographia, with an introduction by A. Diller.* Hildesheim: G. Olms.

Stückelberger, A. and Grasshoff, G. (eds.) (2006). *Ptolemaios. Handbuch der Geographie.* Basel.

Solinus = Mommsen, T. (ed.) (1895). *Iulii Solini Collectanea rerum memorabilium*. Berlin.

Sozomenos = Bidez, J. and Hansen, G.C. (1995). *Ecclesiastical History. Die griechischen christlichen Schriftsteller*. Berlin

Stephanus Byzantinus = Meineke, A. (ed., trans.) (1992). *Ethnikōn: A Geographical Lexicon on Ancient Cities, Peoples, Tribes and Toponyms.* Chicago.

Strabo. ***Geographia =***

Jones, H.L. (ed., trans.) (2001). Strabo. *Geography*. London (LCL).

_______(ed., trans.) (1944-49). *Geography,* 8. vols. London: Heinemann (LCL).

Radt, S. (ed.) (2005). *Strabons Geographika, Band 4, Buch XIV-XVII: Text und Übersetzung*. Göttingen: Vandenhoeck and Ruprecht.

_______(2003). *Strabons Geographika, 1. Prolegomena, Buch V–VIII: Text und Übersetzung*. Göttingen: Vandenhoeck and Ruprecht.

Thucydides = Smith, C.F. (trans.) (1920-28). *The History of the Peloponnesian War*, 4 vols. London (LCL).

Varro = Hooper, W.D. (trans.) (1934). *Rerum Rusticarum Libri III.* London: Heinemann.

Vegetius = Milner, N.P. (1996). *Epitome of Military Science.* Liverpool.

Vitruvius = Rowland, I.D. (trans.) (1999). *De Architectura.* Cambridge: Cambridge University Press.

Xenophon = Brownston, C.L. and Todd, O.J. (trans.) (1918-22). *Anabasis and Hellenica.* London (LCL).

Modern Sources:

Abel, F. M. (1938). *Géographie de la Palestine II*, 244-45.

Aberg, A. and Lewis, C. (eds.) (2000). *The Rising Tide: Archaeology and Coastal Landscapes*. Oxford: Oxbow.

Abulafia, D. (2011). *The Great Sea: A Human History of the Mediterranean*. London: Allen Lane.

_______(2003). What is the Mediterranean? In: D. Abulafia (ed.) *The Mediterranean in History*. London: Thames & Hudson, 11-30.

Adams, J. (2006). Editorial article: From the water margins to the centre ground? *Journal of Maritime Archaeology* 1: 1-8.

Adams, C. and Laurence, A. (eds.) (2001). *Travel and Geography in the Roman Empire*. London: Routledge.

Adkins, L. and Adkins, R.A. (1994). *Handbook to Life in Ancient Rome*. London: Facts on File.

Agouridis, C. (1997). Sea Routes and Navigation in the Third Millennium Aegean. *Oxford Journal of Archaeology* 16: 1-24.

Aharoni, Y. (1966). *The Land of the Bible. A Historical Geography*. London.

Alcock, S.E. (2002). *Archaeologies of the Greek Past. Landscape, monuments, memories*. Cambridge.

_______ (1993). *Graecia Capta. The Landscapes of Roman Greece*. Cambridge.

Al-Maqdissi, M., Badawy, M., Bretschneider, J., Hameeuw, H., Jans, G., Vansteenhuyse, K., Voet, G. and Van Lerberghe, K. (2008). The Occupation Levels of Tell Tweini and Their Historical Implications. In: R. Biggs, J. Myers and M. Roth (eds.) *Proceedings of the 51st Rencontre Assyriologique International*. Chicago, 341-350.

Aly, W. (1983). *Index verborum Strabonianus.* Manuskript zur Vorbereitung der Strabon-Ausgabe auf der Grundlage der Editio Maior von G. Kramer (1844-1852). Bonn: Habelt.

_______(1957). *Strabon von Amaseia. Untersuchungen über Text*. Aufbau und Quellen der Geographica. Bonn.

Anschuetz, K. Wilshusen, and R. Scheick, C. (2001). An Archaeology of Landscapes: Perspectives and Directions. *Journal of Archaeological Research* 9: 157–211.

Apostolopoulos, G., Pavlopoulos, K., Goiran, J.-P, and Fouache, E. (2014). Was the Piraeus peninsula (Greece) a rocky island? Detection of pre-Holocene rocky relief with borehole data and resistivity tomography analysis. *Journal of Archaeological Science* 42: 412-421.

Arnaud, P. (2016a). Entre mer et rivière: les ports fluvio-maritimes de Méditerranée ancienne. Modèles et solutions. In: C. Sanchez and M.-P. Jézégou (eds.) *Les ports dans l'espace méditerranéen antique. Narbonne et les systèmes portuaires fluvio-lagunaires. Colloque à l'espace Capdeville, Montpellier 22/23 mai 2014*, 1-23. (forthcoming)

_______(2016b). Mallos, Antioche du Pyrame, Magarsus: toponymie historique et aléas politiques d'un "hellenistic settlement". In: P. Roetjen (ed.) *In Memoriam Getzel Cohen,* 1-24. (forthcoming).

_______(2014). Ancient mariners between experience and common sense geography. In: K. Geus and M. Thiering (eds.) *Features of common sense geography: implicit knowledge structures in ancient geographical.* Berlin: LIT Verl, 39-68.

_______(2012). La mer, vecteur des mobilités grecques. In : L. Capdetrey (ed.) *Mobilités grecques.* Bordeaux.

_______(2011a). Ancient maritime trade and sailing routes in their administrative, legal and economic contexts. In: D. Robinson and A. Wilson (eds.) *Maritime archaeology and ancient trade in the Mediterranean*. Oxford Centre for Maritime Archaeology: Monograph 6, 59–78.

_______(2011b). La mer dans la construction de l'image grecque du monde. In: J.S. Yanguas and B. Díaz Ariño (eds.) *Los griegos y el mar* (Revisiones de Historia Antigua 6). Vitoria Gasteiz, 129-153.

_______(2010). Notes sur le Stadiasme de la Grande Mer (2): Rose des vents, systèmes d'orientation et Quellenforschung. *Geographia antiqua* 19: 157–162.

_______(2009). Notes sur le Stadiasme de la Grande Mer (1): La Lycie et la Carie. *Geographia Antiqua* 18: 165-193.

_______(2007-2008). Texte et carte de Marcus Agrippa: Historiographie et données textuelles. *Geographia Antiqua* 16–17: 73–126.

_______(2007). Diocletian's prices edict: the prices of seaborne transport and the average duration of maritime travel. *Journal of Roman Archaeology* 20: 321-336.

_______(2005). *Les routes de la navigation antique: itinéraires en Méditerranée*. Paris.

_______(1998). La navigation hauturière en Méditerranée antique d'après les données des géographes anciens: quelques exemples. In: E. Rieth (ed.) *Méditerranée antique: pêche, navigation, commerce*. Paris, 75-87.

_______(1993). De la durée à la distance: l'évaluation des distances maritimes chez les géographes anciens. *Histoire et Mesure* 8: 225–247.

_______(1992). Les relations maritimes dans le Pont-Euxin d'après les données numériques des géographes anciens (pseudo-Skylax, Strabon, Pomponius Mela, Pline, Arrien, Anonyme de 500, Marcien d'Héraclée). *Revue des Etudes Anciennes* 94: 57-77.

_______(1989). Une deuxième lecture du bouclier de Doura- Europos. *Comptes rendus des seances, Academie des Inscriptions et Belles-Lettres*, 373– 89.

_______(1988). L'origine, la date de rédaction et la diffusion de l'archétype de la Table de Peutinger. *Bulletin de la société nationale des antiquaires de France*: 302-21.

Artzy, M. (2015). What is in a Name? 'Akko - Ptolemais - 'Akka - Acre. *Complutum* 26 (1): 205-212.

_______(2012). Return to Tel Akko, Its Anchorages, Harbor, and Surroundings. *Recanati Institute for Maritime Studies News*: 5-14.

Aubet, M.E. (1993). *The Phoenicians and the West: Politics, Colonies and Trade,* trans. M. Turton. Cambridge: Cambridge University Press.

Aujac, G. (1987). The foundations of theoretical cartography in archaic and classical Greece. In: J.B. Harley and D. Woodward (eds.) *Cartography in prehistoric, ancient, and medieval Europe and the Mediterranean.* Chicago/London, 130–147.

_______(1966). *Strabon et la science de son temps: Les sciences du monde.* Paris: Les Belles Lettres.

Aupert, P. (1984). Les Auteurs Anciens. In: P. Auper and M.-C. Hellmann (eds.) *Amathonte I. Testimonia 1, Auteurs anciens, monnayage, voyageurs, fouilles, origines, géographie.* Paris, 11-55.

Aupert, P. and Hellmann, M.-C. (eds.) (1984). *Amathonte I. Testimonia 1, Auteurs anciens, monnayage, voyageurs, fouilles, origines, géographie.* Paris.

Austin, M. (2004). From Syria to the Pillars of Herakles. In: M.H. Hansen and T.H. Nielsen (eds.) *An Inventory of Archaic and Classical Poleis.* Oxford: Oxford University Press, 1233-1249.

Baladié, R. (1980). *Le Péloponnèse de Strabon*. *Étude de géographie historique.* Paris: Les Belles Lettres.

Ball, J. (1942). *Egypt in Classical Geographers.* Cairo.

Barker, E., Bouzarovski, S., Pelling, C. and Isaksen, L. (eds.) (2016). New Worlds from Old Texts: Revisiting Ancient Space and Place. Oxford: Oxford University Press.

_______(2010). Mapping an ancient historian in a digital age: the Herodotus Encoded Space-Text-Image Archive (HESTIA). *Leeds International Classical Studies* 9: 1-36.

Barker, G. and Lloyd, J. (eds.) (1991). Roman Landscapes. Archaeological Survey in the Mediterranean Region. Archaeological Monographs of the British School at Rome, 2, London: British School at Rome.

Bass, G. F. (1972). The Earliest Seafarers in the Mediterranean and the Near East. In: G.F. Bass (ed.) *A History of Seafaring Based on Underwater Archaeology*, 1-36.

Bass, G.F. and van Doorninck, F.H. (1971). A Fourth-Century Shipwreck at Yassi Ada. *American Journal of Archaeology* 75(1): 27–37.

Bauer, A. (1905). *Die Chronik des Hippolytos im Matritensis Graecus 121,* Leipzig.

Bauer, E., Fischer, L., Kühn, H. J., Maluck, M. and Meier, D. (2001). The Schleswig-Holstein Wadden Sea Region. *Wadden Sea Ecosystem* 12: 119-218.

Bauzou, T. (2000). La Gaza romaine (69 avant J.-C. – 403 après J.-C.), 47 – 69. In: J.-B. Humbert (ed.) *Gaza Méditerranéenne. Histoire et archéologie en Palestine*. Paris: Éditions Errance.

Bekker-Nielsen, T. (2014). Hard and Soft Space in the Ancient World. In: K. Geus and M. Thiering (eds.) *Features of common sense geography: implicit knowledge structures in ancient geographical.* Berlin: LIT Verl, 131-146.

Bender, B. (ed) (1993). *Landscapes: Politics and Perspectives.* Oxford: Berg Publishers.

Beresford, J. (2013). The Ancient Sailing Season*. Mnemosyne Supplements, History and Archaeology of Classical Antiquity,* No. 352. Leiden: Brill.

Berggren, J.L. and Jones, A. (2000). *Ptolemy's Geography: An Annotated Translation of the Theoretical Chapters.* Princeton: Princeton University Press.

Bintliff, J. (2013). *The Hellenistic To Roman Mediterranean: A Proto − Capitalist Revolution?*

_______(2008). The Peloponnese in Hellenistic and Early Roman Imperial Times: The Evidence from Survey and the Wider Aegean Context. In *Le Péloponnèse D 'Épaminondas À Hadrien*. Paris, 21–400.

Bintliff, J. and Snodgrass, A. (1985). The Boeotia survey, a preliminary report: The first four years*. Journal of Field Archaeology*, 12: 123-161.

Bird, E.F.C. (2000). *Coastal Geomorphology.* New York: John Wiley and Sons.

_______(1985)*. Coastal Changes: a global review*. Chichester: Wiley.

Blackman, D.J. (1982). Ancient harbours in the Mediterranean. Part 2. *International Journal of Nautical Archaeology and Underwater Exploration,* 11(3): 185-211.

_______(1973). Evidence of sea-level change in ancient harbours and coastal installations. *Colston papers*, 32:115–139.

Blue, L. (1997). Cyprus and Cilicia: The Typology and Palaeogeography of Second Millenium Harbors. In: S. Swiny, R. Hohlfelder and H. Swiny (eds.) *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity. Proceeding of the Second International Symposium "Cities on the Sea" Nicosia. Cyprus. October 18-22. 1994. Cyprus American Archaeological Research Institute Monograph Series*, 1: 31-43. Atlanta-Georgia: Scholars Press.

_______(1995). *A Topographical Analysis of the Location of Harbours and Anchorages of the Eastern Mediterranean in the Middle Bronze Age and Late Bronze Age and their Relation to Trade* (D.Phil. Thesis). Pembroke College, Oxford: University of Oxford Press.

Bloom, L.A. (1998). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms.* New Jersey.

Bodard, G. (2009). Digital Classicist: Re-use of Open Source and Open Access Publications in Ancient Studies. *Digital Humanities 2009 Conference Abstracts*: 2.

Bodard, G.and Garcés, J. (2009). Open Source Critical Editions: A Rationale. In: *Text Editing, Print and the Digital World*. Burlington, VT: Ashgate Publishing, 83-98.

Bonnier, A. (2008). Epineia Kai Limenes: The Relationship between Harbours and Cities in Ancient Greek Texts. *Opuscula 1*: 47–61.

Bounni, A., Lagarce, E., Lagarce, J. and Saliby, N. (1978). Rapport préliminaire sur la deuxièmecampagne de fouilles (1976) à Ibn Hani (Syrie*). Syria* 55: 233 – 301.

Bowerock, G.W. (1983). *Roman Arabia*. Cambridge. Massachusetts.

Braidwood, R. J. (1940). Report on two sondages on the coast of Syria, south of Tartous. *Syria* 21: 183-221.

Brands, G. and Meyer, C. (2006). Antioch-on-the-Orontes and Seleucia Pieria 2004: Preliminary Results of the Geophysical Survey. *Arkeometri Sonuçları Toplantısı* 21: 149–154.

Braudel, F. (1972). *The Mediterranean and the Mediterranean world in the age of Philip II*. London: Collins.

Breman, J. (2003). Marine Archaeology Goes Underwater with GIS. *Journal of GIS in Archaeology* 1:23-32

British Admiralty charts/handbook (1987). *Ocean Passages for the World.* NP136, 4th ed.

Brodersen, K. (2004). Mapping (In) the Ancient World. *Review article in Journal of Roman Studies* 94: 183-90.

_______(2001). The Presentation of Geographical Knowledge for Travel and Transport in the Roman World: Itineraria non tantum adnotata sed etiam picta. In: C. Adams and A. Laurence (eds.) *Travel and Geography in the Roman Empire*. London: Routledge.

_______(1995). Terra Cognita. *Studien zur römischen Raumerfassung.* Hildersheim: Olms, 221-24.

Brody, A.J. (2008). The Specialized Religions of Ancient Mediterranean Seafarers. *Religion Compass* 2 (4): 444–454.

_______(1998). Each Man Cried out to His God: The Specialized Religion of Canaanite and Phoenician seafarers. Atlanta: Scholars Press.

Broodbank, C. (2006). The origins and early development of Mediterranean maritime activity. *Journal of Mediterranean Archaeology*, 19 (2):199-230.

Brown, L.A. (1949). *The Story of Maps.* New York.

Bunbury, E. (1932). A History of Ancient Geography. New York.

Burke, A. (2010). The Archaeology of the Levant in North America: The Transformation of Biblical and Syro-Palestinian Archaeology. In: T. E. Levy (ed). *Historical biblical archaeology and the future: the new pragmatism*. London: Equinox, 81–95.

Buşilă, A.-M. (2012). Greek and Latin Harbor Terminology in Ancient Texts: a case study of harbors of the Levantine coast. *Tyragetia* 6 (1): 233-244.

Butcher, K. (2004). *Coinage in Roman Syria. Northern Syria, 64 BC-AD 253*. London.

_______(2003). *Roman Syria and the Near East.* London: British Museum Press.

Camp, J. McK II (2000). Walls and the Polis. In: P. N. Flensted-Jensen, T. H. Nielsen and L. Rubinstein (eds.) *Polis and Politics*: *Studies in Ancient Greek History*. Copenhagen, 41–57.

Campbell, B. (2012). Rivers and the power of ancient Rome. *Studies in the History of Greece and Rome.* Chapel Hill: University of North Carolina Press.

Campbell, P. A Roman Type IVB Wooden Anchor Found in the Corfu Channel, Albania. *International Journal of Nautical Archaeology* 41(2): 411-16.

Carayon, N. (2012). Les ports phéniciens du Liban. Milieux naturels, organisation spatiale et infrastructures. *Archaeology and History in Lebanon* 36/37: 1-137.

_______(2008). *Les Ports Phéniciens et Puniques. Géomorphologie et Infrastructures,* Thèse de Doctorat en histoire 1, 1–1384.

_______(2005). Le cothon ou port artificial creusé. Essai de définition. *Méditerranée* 104: 5-13.

_______(2003). L'île de Ziré à Saïda: nouvelles données archéologiques. *Archaeology and History in Lebanon* 18: 95-114.

Carayon, N., Marriner, N. and Morhange, C. (2011). Geoarchaeology of Byblos, Tyre, Sidon and Beirut. *Rivista di Studi Fenici* 39 (1): 45-56.

Carayon, N., Morhange, C. and Marriner, N. (2011-2012). Sidon's Ancient Harbour: Natural Characteristics and Hazards. *Archaeology & History in Lebanon* 34/35: 433-459.

Carmody, F.J. (1976). Ptolemy's Triangulation of the Eastern Mediterranean. *Isis* 67 (4): 601-609.

Carpenter, R., Bon, A. and Parsons, A.W. (1936). *Corinth, Vol. 3, Part 2: The Defences of Acrocorinth and the Lower Town.* Cambridge MA.

Casson, L. (1995). *Ships and seamanship in the ancient world*. 2nd edition. Baltimore and London: Johns Hopkins University Press.

_______(1994a). Travel in the ancient world. Baltimore and London: Johns Hopkins University Press.

_______(1994b). *Ships and seafaring in ancient times*. London: British Museum Press.

_______(1991). *The ancient mariners: seafarers and sea fighters of the Mediterranean in ancient times*. Princeton. N.J: Princeton University Press.

_______(1989). *The Periplus Maris Erythraei*. Princeton: Princeton University Press.

_______(1971) *Ships and seamanship in the ancient world,* 1st edition. London

_______(1951) *Speed Under Sail of Ancient Ships*. *TAPA* 82:136–48.

Cavaleri, L. (2005). *The wind and wave atlas of the Mediterranean Sea — the calibration phase Advances in Geosciences (ADGEO).*

Charlin, G., Gassend, J-M. and Lequement, R. (1978). L'Épave Antique de la baie de Cavalière. *Archaeonautica* 2: 9–93.

Chiai, G.F. (2014). The Mediterranean Islands and the Common Sense Geography. In: K. Geus and M. Thiering (eds.) *Features of common sense geography: implicit knowledge structures in ancient geographical.* Berlin: LIT Verl, 89-114.

CIL = Mommsen, T. (1862-1956). *Corpus Inscriptiorum Latinarum. Consilio et auctoritate Academiae litterarum regiae Borussiae, I-XVI*. Berlin.

Clarke, D. L. (ed.) (1977). *Spatial Archaeology.* New York: Academic Press.

Clarke, K. (1999). *Between Geography and History: Hellenistic Constructions of the Roman World.* Oxford: Oxford Classical Monographs.

Clarke, J.T. and Steel, L. (2000). Report on the Gaza Research Project 1998. *Palestine Exploration Quarterly* 132: 189 – 91.

_______(1999). The Gaza Research Project. *Levant* 31: 311.

Clarke, J.T., Steel, L. and Sadeq, M. (2004). *Gaza Research Project: 1998 Survey of the Old City of Gaza.*

Cline, E. H. (2003). Trade and Exchange in the Levant. In: *Near Eastern Archaeology: A Reader*, 360-366.

_______(1994). *Sailing the Wine-Dark Sea: International Trade and the hate Bronze Age Aegean*. Oxford: Tempus Reparatum.

Cohen, G.M. (2006). *The Hellenistic settlements in Syria, the Red Sea Basin, and North Africa.* Berkeley: University of California Press.

Cole, S.G. (2010). Geography and difference in the early Greek world. In: K.A. Raaflaub and R.J.A. Talbert (eds.) *Geography and Ethnography: Perceptions of the World in Pre-Modern Societies*. Malden, 236-51.

Constantakopoulou, C. (2007). *The Dance of the Islands*. Oxford: University Press.

Conwell, D.H. (2008). *Connecting a city to the sea: The history of the Athenian Long Walls (Mnemosyne Supplementum 293).* Leiden and Boston: Brill.

Cosgrove, D.E. (2001). *Apollos eye: A Cartographic Genealogy of the Earth in the Western Imagination.* Baltimore: The Johns Hopkins University Press.

_______(1998) *Social Formation and Symbolic Landscape*. Madison: University of Wisconsin Press.

Cosgrove, D.W. and Daniels, S. (eds.) (1988). *Introduction to the Iconography of Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments.* Cambridge.

Counillon, P. (1998). 'Λιμὴν ἔρημος'. In: P. Arnaud and P. Counillon (eds.) *Geographica Historica. Ausonius Études 2*. Bordeaux and Nice: Ausonius, 55-67.

Crampton, J. W., and J. Krygier. (2005). An introduction to critical cartography. *ACME: An International e-Journal for Critical Geographies* 4 (1): 11–33.

Crawford, M. (1992). *The Roman Republic.* 2nd Edition. London: Fontana Press.

Cronin, H.S. (1905). Ptolemy's Map of Asia Minor: Method of Construction. *The Geographical Journal* 25(4): 429-44

Cumont, F. (1926). *Fouilles de Doura Europos (1922 – 1923)*. Paris: P. Geuthner.

_______(1925). Fragment de bouclier portant une liste d'étapes. *Syria* 6 (1): 1-15.

Cuntz, O. (1905). Der Stadiasmus Maris Magni. In: A. Bauer (ed.) *Die Chronik des Hippolytos im Matritensis Graecus 121*. Texte und Untersuchungen zur Geschichten der altchristlichen Literatur 29.1. Leipzig: J.C. Hinrichs, 243–76.

Cuttler, R., Gaffney, V., Goodchild, H., Rossiter, J. and Sears, G. (2006). *Cyrene Archaeological Project Field Survey, GIS And Assessment 2006.* Birmingham Archaeology Report PN.1320. http://www.cyrenaica. org/CAP_report_2006_rev.pdf.

Dagron, G., and Rougé, J. (1982). Trois horoscopes de voyages en mer. *Revue des Etudes Byzantines* 40: 117–33.

Dalongeville, R., Laborel, J., Pirazzoli, P., Sanlaville, P., Arnold, M., Bernier, P., Evin, J. and Montaggioni, L. (1993). Les variations récentes de la ligne de rivage sur le littoral syrien. *Quaternaire* 4: 45-53.

Dan, A. (2014). Xenophon's *Anabis* and the Common Greek Mental Modelling of Spaces. In: K. Geus and M. Thiering (eds.) *Features of Common Sense Geography: Implicit Knowledge Structures in Ancient Geographical Texts*. Berlin: LIT Verlag, 157-198.

Daniels, S., DeLyser, D., Entrikin, J.N. and Richardson, D. (2011) *Envisioning Landscapes, Making Worlds: Geography and the Humanities.* London: Routledge.

Daoud, S. and Ghazi, H. (2004–2005). Étude géoarchéologique de Ras Ibn Hani. *Annales Archéologiques Arabes Syriennes* 47–48: 43–54 [Arabic].

Davies, S.H. (2012). *Rome, International Power Relations, and 146 BCE.* (PhD Thesis). University of Texas.

Davis, D.L. (2009). *Commercial Navigation in the Greek and Roman World*. (Ph.D. Thesis). University of Texas at Austin.

_______(2002). Maritime Space and Night Time Sailing in the Ancient Eastern Mediterranean. *Tropis 7*: 219–309.

_______(2001). *Navigation in the Ancient Eastern Mediterranean.* (M.A. Thesis). Texas A&M University.

Dear, M., Ketchum, J., Luria, S. and Richardson, D. (2001). *GeoHumanities: Art, History, Text at the Edge of Place*. London: Routledge.

Defense Mapping Agency Hydrographic/Topographic Center. (1991). Sailing Directions (Planning Guide) for the Mediterranean. Pub. 130, 5th ed. Betheda, MD.

De Graauw, A (2013). *Ancient Ports and Harbours, The Catalogue.* 3rd ed. Port Revel. http://www.ancientportsantiques.com/docs-pdf/

De Graauw, A. et al. (2013) *Geodatabase of Ancient Ports and Harbors.* DARMC Scholarly Data Series. Data Contribution Series 2013-2. DARMC. Cambridge: Center for Geographic Analysis, Harvard University.

Della Dora, V. (2010). *Mapping Metageographies: The Cartographic Invention of Italy and the Mediterranean. California Italian Studies* 1 (1).

Dell, H.J. (1967). The Origin and Nature of Illyrian Piracy. *Historia: Zeitschrift Für Alte Geschichte* 16 (3): 344-58.

De Souza, P. (1999). *Piracy in the Greco-Roman World*. Cambridge: University Press.

_______(1992). *Piracy in the Ancient World: from Minos to Mohammed.* University College (PhD Thesis).

Dever, W.G. (2001). *What Did the Biblical Writers Know and When Did They Know It? What Archaeology Can Tell Us about the Reality of Ancient Israel*. Grand Rapids: Eerdmans.

Detlefsen, D. (1908). *Die Geographie Afrikas bei Plinius und Mela und ihre Quellen - Die Formulæ Prouinciarum, eine Hauptquelle. (Quellen un Forschungen zur alten Geschichte und Geographie* 14). Berlin.

Di Napoli, V. (2005). The Theatres of Roman Arcadia, Pausanias and the History of the Region. In: E. Østby (ed.) *Ancient Arcadia: Papers from the Third International Seminar on Ancient Arcadia, held on Norweigian Institute at Athens, 7-10 May 2002*. Oxbow, 509-20.

Dicks, D.R. (1960). *The Geographical Fragments of Hipparchus. London: Athlone Press.*

Dilke, O.A.W. (1987). The Culmination of Greek Cartography in Ptolemy, in J.B. Harley and D. Woodward, *The History of Cartography, volume one. Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean.* Chicago: University of Chicago Press, pp.177-200.

_______(1985). *Greek and Roman maps: Aspects of Greek and Roman Life.* London: Thames and Hudson.

_______(1984). Geographical Perceptions of the North in Pomponius Mela and Ptolemy. *Artic* 37 (4): 347-351.

Diller, A. (1975). The Textual Tradition of Strabo's Geography. Amsterdam: Hakkert.

_______(1966). De Ptolemaei Geographiae codicibus editionibusque. In: C.F.A. Nobbe (ed.) *Claudii Ptolemaei Geographia edidit*. Hildesheim: Olms, X–XV.

_______(1952) *The Tradition of the Minor Greek Geographers.* New York [Repr. 1986, Amsterdam].

Dini, A. Alessandro, C. Innocenti, F. Rocchi, S. and Westerman, D.S. (2007). Sooty sweat stains or tourmaline spots? The Argonauts on the Island of Elba (Tuscany) and the spread of Greek trading in the Mediterranean Sea. In: Piccardi, L. and Masse, W. B. (eds.) *Myth and Geology. Geological Society.* London: Special Publications, 273–243.

Doody, A. (2001). Finding facts in Pliny's encyclopedia: the *summarium* of the Natural History. *Ramus* 30: 1-22.

Dorsey, D.A. (1991). *The Roads and Highways of Ancient Israel.* Baltimore and London.

Dothan, M., and Freedman, D. N. (1967). Ashdod I: The First Season of Excavations, 1962. *ʿAtiqot* 7.

Dueck, D. (2012). *Geography in Classical Antiquity.* Cambridge: Cambridge University Press.

_______(2010). The Geographical Narrative of Strabo of Amasia. In: K.A. Raaflaub and R.J.A. Talbert (eds.) *Geography and Ethnography: Perceptions of the World in Pre-Modern Societies*. Malden: 236-51.

_______(2005). The Parallelogram and the Pinecone: Definition of Geographical Shapes in Greek and Roman Geography on the Evidence of Strabo. *Ancient Society* 35: 17-55.

_______(2003). The Augustan Concept of 'An Empire Without Limits'. *Göttinger Beiträge zur Asienforschung* 2-3: 211-227.

_______(2002). *Strabo of Amasia: A Greek Man of Letters in Augustan.* Routledge: Rome/ London.

Dueck, D., Lindsay, H. and Pothecary, S. (eds.) (2005). *Strabo's Cultural Geography: The Making of a Kolossourgia.* Cambridge.

Dunand, M. and Saliby, N. (1985). Le Temple d'Amrith dans la Pérée d'Aradus. Paris: Librairie orientaliste Paul Geuthner.

_______(1961) Le sanctuaire d'Amrit. Rapport preliminaire. *Annales Archeologiques de Syrie* 11-12:2-12.

Dunand, M., Saliby, N. and Khirichian, A. (1954-55). Les fouilles d'Amrit en 1954. *Annales Archeologiques de Syrie* 4-5: 189-204.

Dussaud, R. (1927). Topographie historique de la Syrie antique et médiévale. *Bibliothèque Archéologique et Historique* 4. Paris: Geuthner.

Duyrat, F. (2005). *Arados hellénistique: étude historique et monétaire.* Beyrouth: Institut Français du Proche-Orient.

Dyke, R.M.V. and Alcok, S.E. (2003). *Archaeologies of Memory*. Blackwell.

Edney, M. H. (1997). *Mapping an Empire: The Geographical Construction of British India, 1765-1843*. Chicago: Chicago UP.

Elgavish, J. (1994). *Shiqmona: On the Sea Coast of Mount Carmel.* Tel Aviv.

_______(1968). *Archaeological Excavations at Shikmona: The Levels of the Persian Period*, Seasons 1963–1965. Haifa.

Elliott, T. and Gillies, S (2009). Digital Geography and Classics. *Digital Humanities Quarterly* 3.

Emery, K.O. and Neev, D. (1960). Mediterranean beaches of Israel. *Bulletin Geological Survey of Israel* 26: 1-24.

Engels, D.W. (1985). The Length of Eratosthenes' Stade. *American Journal of Philology* 106(3): 298–311. The Johns Hopkins University Press.

_______(1978). *Alexander the Great and the Logistics of the Macedonian Army*. Berkeley/ Los Angeles.

Haykal 1996:74-103; Elayi 2000:333-334

Ermatinger, J. (2008). Stadiasmus Maris Magni: armchair geography or sailor's manual? *Electronic abstracts for the 2008 American Philological Association Annual Meeting in Chicago.*

Ermatinger, J. and Helmer, R. (trans.). *Anonymous Stadiasmus or Periplus of the Great Sea.* (forthcoming).

Espelosin, F.J.G.. (2000). *El descubrimiento del mundo: Geografia y viajeros en la antigua Grecia.*

Evans, G. (1971). The Recent Sedimentation of Turkey and the Adjacent Mediterranean and Black Seas: A Review. In: A.S. Campbell (ed.) *Geology and History of Geology and history of Turkey.* Petroleum Exploration Society of Libya, 13th Annual Field Conference: 385-406.

Evans, G., Murray, J. W., Biggs, H. E., Bate, R. and Bush, P. R. (1973). The oceanography, ecology, sedimentology and geomorphology of parts of the Trucial Coast barrier island complex, Persian Gulf. In: Purser, B.H. (ed.) *The Persian Gulf, Holocene Carbonate Sedimentation in a Shallow Epi-continental Sea*, pp 233–278. New York. Springer-Verlag.

Farr, H. (2006). Seafaring as Social Action. *Journal of Maritime Archaeology* 1: 85-99.

Ferguson, R.J. (2005). *Rome and Parthia: Power Politics and Diplomacy across Cultural Frontiers.* Australia: University School of Humanities and Social Sciences, Bond University.

Finley, M.I. (1973). *The Ancient Economy.* London: Chatto & Windus

Firth, A. (1995). *Three Facets of Maritime Archaeology*. University of Southampton.

Fischer, M. (2007). Marble Imports and Local Counterparts: Luxury Business in Roman Palestine. *Topoi Supplément* 8: 249–69.

_______(2005). The Archaeology and History of Yavneh-Yam. In: M. Fischer (ed.) *Yavneh, Yavneh-Yam and Their Neighborhood. Studies in the Archaeology and History of the Judean Coastal Plain*. Tel Aviv, 173−208.

_______(2002). The excavations at Yavneh-Yam (Israël): East Mediterranean settlements and their relationships with Aegean world. In: *Pont Euxin et commerce: la genèse de la "route de la soie".*

Actes du IXe Symposium de Vani (Colchide, 1999). Besançon: Institut des Sciences et Techniques de l'Antiquité, 45-56. (Collection « ISTA », 853).

Fischer, M. and Taxel, I. (2014). Yavneh-Yam in the Byzantine–Early Islamic Transition: The Archaeological Remains and Their Socio-Political Implications. *Israel Exploration Journal* 64(2): 212-242.

_______(2008) Rural Settlement in the Vicinity of Yavneh in the Byzantine Period: A Religio-Archaeological Perspective. *Bulletin of the American Schools of Oriental Research* 350: 7-35.

_______(2007) Ancient Yavheh – Its History and Archaeology. *Tel Aviv* 34: 204–84.

_______(2006). Yavne, Survey Map. *Hadashot Arkheologiyot - Excavations and Surveys in Israel* 118. [www.hadashot-esi.org.il].

Fischer, M., Roll, I. And Tal, O. (2008). Persian And Hellenistic Remains at Tel Ya'Oz.*TEL AVIV* 35: 123-63.

Fitzgerald, D.M., Fenster, M.S., Argow, B.A. and Buynevich, I.V. (2008). Coastal impacts due to sea level rise. *Annual Review of Earth and Planetary Sciences*, 36:601-647.

Fitzpatrick, S.M.and Erlandson, J.M. (2006): The archaeology of islands and coastlines. *Journal of Island & Coastal Archaeology,* 1 (1), 1-3.

Flanagan, J.W. (2001). Mapping the Biblical World: Perceptions of Space in Ancient Southwestern Asia. In: J. Murray (ed.) *Mappa Mundi: Mapping Culture, Mapping the World.*Windsor, Ont.: Humanities Research Group: University of Windsor. 1-18.

Flemming, N.C. (1980). Cities under the Mediterranean. In: K. Muckelroy (ed.) *Archaeology Underwater: An Atlas of the World's Submerged Sites 1980*. New York: McGraw-Hill Book Company, 162-167.

_______(1979-1980). Archaeological indicators of sea level. *Oceanis 5*: 149–166. (Hors-Série).

_______(1978). Holocene eustatic changes and coastal tectonics in the northeast Mediterranean: implications for models of crustal consumption. *Philosophical Transactions of the Royal Society of London. Series A, Mathematical and Physical Sciences 289* (1362): 405–458.

_______(1972). Eustatic and tectonic factors in the relative vertical displacement of the Aegean coast. In: D.J. Stanley (ed). *The Mediterranean Sea: A Natural Sedimentation Laboratory.* Stroudsburg: Dowden, Hutchinson and Ross, Inc., 180-201.

_______ (1971). *Cities in the Sea*. New York: Doubleday.

Flemming, N.C. and Webb, C.O. (1986). Tectonic and eustatic coastal changes during the last 10,000 years derived from archaeological data. *Z. Geomorph. NF Suppl. Bd.* 62: 1-29.

Foucault, M. (1973). *The Order of Things: An Archaeology of the Human Sciences.* New York.

Ford, B. (ed.) (2011). *The archaeology of maritime landscapes: When the Land meets the Sea.* Springer.

Frankel, R. and Getzov, N. (1997). *Archaeological Survey of Israel: Map of Akhziv (1) and Map of Hanita (2)*. Jerusalem: Israel Antiquities Authority.

Fraser, P. (1996). Ptolemaic Alexandria: The Cities of Alexander. Vol. 3. Oxford.

Frazer, J.G. (1898). *Pausanias' Description of Greece, vol. 4*. London.

Frost, H., (2005). Archaeology, history and the history of archaeology connected with Tyre's harbours. *Bulletin d'Archéologie et d'Architecture Libanaises* 2: 45–52 (Hors série)

_______(1995). Harbours and proto-harbours. Early Levantine Engineering. In: V. Karageorghis, and D. Michaelides (eds.) *Proceedings of the International Symposium 'Cyprus and the Sea'.* University of Cyprus, Nicosia, 1–21.

_______(1972). Ancient harbours and anchorages in the eastern Mediterranean, 95-114. In: *Underwater Archaeology. A nascent discipline*. Paris: UNESCO.

Funke, P. (1999). Peraia: Einige Überlegungen zum Festlandbesitz Griechischer Inselstaaten. In: V. Gabrielsen, P. Bilde, T. Engberg-Pedersen, L. Hannsetad and J. Zahle (eds.) *Hellenistic Rhodes: Politics, Culture, and Society*. Aarhus: Aarhus University Press, 55–75.

Gabrielsen, V. (1997). The Naval Aristocracy of Hellenistic Rhodes. *Studies in Hellenistic Civilization 6.* Aarhus: Aarhus University Press.

Galili, E. (1986). Historical sea level changes and seafaring along the southeastern Mediterranean Coast. Cities on the sea, past and present. *Proceedings of the 1st International Symposium on harbors, city ports and coastal topography. University of Haifa, Technion-Israel institute of Technology, Haifa*: 69-73.

Galili, E., Oleson, J.P. and Rosen, B. (2010). A Group of Exceptionally Heavy Ancient Sounding Leads: New Data Concerning Deep-Water Navigation in the Roman Mediterranean. *Mariner's Mirror* 96: 136-48.

Galili, E., Raban, A., and Sharvit, J. (2002). Forty years of marine archaeology in Israel. *Tropis* 7: 927–961.

Galili, E. and Rosen, B. (2008). Fishing Gear from a 7th-Century Shipwreck off Dor, Israel. *International Journal of Nautical Archaeology,* 37(1): 67–76.

_______(2007). One Armed Anchors from Israel. *Archaeologia Maritima Mediterranea* 3: 99–114.

Galili, E., Rosen, B., Boaretto, E., Tzatzkin, S. (2007). *KursiBeachFinalReport.* HA-ES, 119. http://www.hadashot-esi.org.il/report_detail_eng.asp? Id = 508&mag.id = 112.

Galili, E., Rosen, B. and Zviely, D. (2009). Ancient Sounding-Weights and Navigation along the Mediterranean Coast of Israel. *International Journal of Nautical Archaeolog,* 38(2): 343–68.

Galili, E., and Sharvit, J. (2000). Underwater archaeological heritage of Israel: nature, policy and management of endangered resource. *Schutz des Kulturerbes unter Wasser Beiträge zum Internationalen Kongreß für Unterwasserarchäologie (IKUWA 99'), 18–21 Februar 1999, Sassnitz auf Rügen*, 555–561.

_______(1994). Classification of Underwater Archaeological Sites along the Mediterranean Coast of Israel: Finds from underwater and coastal archaeological research. In: Angelova, C., (ed.) *Actes du Symposium International Thracia Pontica V: 1991.* Sozopol, Bulgaria, 269-296.

Galili E., Sharvit J. and Nagar A. (1998). Neve-Yam - underwater survey, Excavations and Surveys in Israel, vol. 18 (English edition of Hadashot Arkheologiyot, 106, 1996). *Archaeological Newsletter of the Israel Antiquities Authority, Jerusalem* 54-56: 35-36.

Galili, E. and Weinstein-Evron, M. (1985). Prehistory and Palaeoenvironments of submerged sites along the Carmel coast of Israel. *Paléorient* 11(1): 37-52.

Gardner, P. (1887). *BMC Peloponnesus*. London.

Gardosh, M.A., Garfunkel, Z., Druckman, Y. and Buch-binder, B. (2010). Tethyan Rifting in the Levant Region and Its Role in Early Mesozoic Crustal Evolution. *Geological Society of London* 341: 9-36.

Garfunkel, Z., (1998). Constrains on the origin and history of the eastern Mediterranean basin. *Tectonophysics* 298: 5–35.

Garlan, Y. (1999). Production et commerce des amphores: contribution à l'étude du territoire des cités grecques. In: M. Brunet (ed.) Territoires des cite´s grecques. *Suppléments au Bulletin de Correspondance Hellénique* 33: 371–85. Paris.

Garland, R. (1987). *The Piraeus: from the fifth to the first century B.C.* London.

Gaspar, J.A. (2010). *From the Portolan Chart of the Mediterranean to the Latitude Chart of the Atlantic: Cartometric Analysis and Modelling.* Dissertation. Universidade Nova de Lisboa. Lisbon.

Gasse, F., Vidal, L., Develle, A.-L. and Van, E. (2011) Hydrological variability in the Northern Levant: a 250ka multiproxy record from the Yammouneh (Lebanon) sedimentary sequence. *Climate of the Past* 7: 1261–1284.

Gassend, J-M., Liou, B. and Ximénès, S. (1984). L'Épave 2 de L'Anse des Laurons (Martigues, Bouches-Du-Rhone). *Archaeonautica* 4: 75–105.

Gatier, P-L. (2008). Héraclée-sur-mer et la géographie historique de la côte syrienne. *Studi ellenistici* 20: 269-283. Pisa-Roma.

Geus, K. (2014). A "Day's Journey" in Herodotus' *Histories.* In: K. Geus and M. Thiering (eds.) *Features of common sense geography: implicit knowledge structures in ancient geographical.* Berlin: LIT Verl, 147-156.

_______(2003). Space and Geography. In: A. Erskine (ed.) *A Companion to the Hellenistic World.* Oxford and Malden: Mass, 232-245.

Geus, K. and Thiering, M. (eds.) (2014). *Features of common sense geography: implicit knowledge structures in ancient geographical texts*. Berlin: LIT Verlag.

_______(2012). Common Sense Geography and Mental Modelling: Opening the Stage. In: K. Geus and M. Thiering (eds.) *Common Sense Geography and Mental Modelling*. Preprints. vol. 426. Berlin. Max Planck Institute for the History of Science, 2-10.

Gillings, M., Mattingly, D. and van Dalen, J. (1999). Geographical Information Systems and Landscape Archaeology. *The Archaeology of Mediterranean Landscapes* 3. Oxford: Oxbow, 13-22.

Glare, P.G.W. (ed.) 1976. *Oxford Latin Dictionary.* Oxford.

Glicksman, K. (2005). Internal and External Trade in the Roman Province of Dalmatia. *Opuscula Archaeologica* 29(1): 189-230.

Glucker, C.A.M. (1987). The City of Gaza in the Roman and Byzantine Periods. *British Archaeological Reports International Series.* Oxford, 325.

Goiran, J.P., Marriner, N., Morhange, C., Abd el-Maguib, M.M., Espic, K. and Bourcier, M. (2005). Évolution de la géomorphologie littorale à Alexandrie (Egypte) au cours des six derniers millénaires. *Méditerranée* 104: 61–64.

Goiran, J. P., Pavlopoulos, K.P., Fouache, E., Triantaphyllou, M. and Etienne, R. (2001). Piraeus, the ancient island of Athens: evidence from Holocene sediments and historical archives. *Geology* 39: 531–534.

Goitein, S.D. (1999). *A Mediterranean Society. An Abridgement in One Volume: revised and edited by Lassner J.* Berkeley and Los Angeles: University of California Press.

Goitein, S.D. (1967). *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza. Vol. 5*. Berkley, CA: University of California Press.

Goodchild, R.G. (1968). Graeco-Roman Cyrenaica. In: E.T. Barr (ed.) *Geology and archaeology of northern Cyrenaica. Libya.* Tripoli, 23-40.

_______(1953). The Roman and Byzantine limes in Cyrenaica. *Journal of Roman Studies* 43: 65-76.

_______(1952) Mapping Roman Libya. *The geographical Journal* 118 (2): 142-52.

_______(1950). Roman Milestones in Cyrenaica. *Papers of the British School at Rome,* 18:83-91.

Gould, P. and White, R. (1986). *Mental Maps.* Boston: Allen & Unwin.

Graham, S. (2006) Networks, Agent-Based Models and the Antonine Itineraries. *Journal of Mediterranean Archaeology* 19 (1): 45-63.

Graham-Campbell, J. (ed.) (1997). Riverine Archaeology. *World Archaeology,* 29(1).

Grainger, J.D. (2004). *The Cities of Seleukid Syria*. Oxford: Clarendon Press (reprint of 1990 original ed.).

_______(1991). *Hellenistic Phoenicia*, 52-53.

Greene, K. (1986). *The Archaeology of the Roman Economy.* University California Press.

Grenon, M., and Batisse, M. (eds.) (1989). *Futures for the Mediterranean Basin: The Blue Plan***.** Oxford: Oxford University Press.

Grossmann, E. (1994). Sounding Lead from Apollonia Israel. *International Journal for Nautical Archaeology* 23: 247–53.

Grote, G. (1987). History of Greece: From the Earliest Period to the close of the Generation Contemporary with Alexander the Great.

Guckelsberger, K. (2014) The Achievements of Common Sense Geography. In: K. Geus and M. Thiering (eds.) *Features of common sense geography: implicit knowledge structures in ancient geographical.* Berlin: LIT Verl, 229-243.

Hall, L. J. (2004). *Roman Berytus: Beirut in Late Antiquity*. London: Routledge.

Hansen, M.H. (2006). *Polis: An Introduction to the Ancient Greek City-State*. Oxford

Hansen, M.H. and Nielsen, T.H. (2004). *An inventory of archaic and classical poleis.* Oxford: Oxford University Press.

Harris, W. V. (ed.) (2005). *Rethinking the Mediterranean.* Oxford: Oxford University Press.

Harley, J.B. (1992). Deconstructing the map. In: T.J. Barnes and J.S. Duncan (eds.) *Writing Worlds: Discourse, Text and Metaphor in the Representation of Landscap*e. London: Routledge, 231-247.

_______(1988). Maps, Knowledge, and Power. In: D. Cosgrove and S. Daniels (eds.) *The Iconography of Landscape*. Cambridge, 227-312.

Harley, J. B. and Woodward, D. (eds). (1987). *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*. *The History of Cartography.* Vol. 1. Chicago and London: University of Chicago Press.

Harris, W.V. (ed). (2013). *The Ancient Mediterranean Environment between Science and History.* Brill.

Hartog, F. (2001). *Memories of Odysseus: Frontier Tales from Ancient Greece*. Edinburgh.

Harvey, P. D. A. (1999). *The Madaba Map Centenary*. Jerusalem, 103-107.

_______(1980). *The History of Topographical Maps: Symbols, Pictures and Surveys*. London: Thames and Hudson.

Healy, J. F. (1999). *Pliny the Elder on Science and Technology*. Oxford: Oxford University Press.

Heikell, R. (2012). *The Mediterranean Cruising Handbook*, 3rd edition. London.

_______(1994). *Greek Waters Pilot*. London: Imray Lorie Norie & Wilson Ltd.

Heilporn, P. (2000). 77 Registre de navires marchands. In: H. Melaerts (ed.) *Papyri in honorem Johannis Bingen Octogenarii (P. Bingen)*. Leuven, 339-359.

Hezser, C. (2011). Jewish Travel in Antiquity. Tuebingen: Mohr-Siebeck. *Texts & Studies in Ancient Judaism,* 144.

Hirsch, E. (1995). Landscape: Between Place and Space. In: E. Hirsch and M. O'Hanlon (ed.) *The Anthropology of Landscape: Perspectives on Place and Space.* Oxford: Oxford University Press, 1-30.

Hitti, P.K. (1957). *Lebanon in History*. London and New York: Macmillan.

Hodder I. and Orton C. (1976). *Spatial Analysis in Archaeology*. Cambridge: Cambridge University Press.

Honigmann, E. (1930). *Marinos von Tyros Geograph und Kartograph*, *RE XIV*: 1767-1796.

Horden, P. (2004). History and Anthropology Mediterranean Excuses: Historical Writing on the Mediterranean since Braudel. *History and Anthropology*, 1-8.

Horden, P. and N. Purcell, N. (2000). *The Corrupting Sea: A Study of Mediterranean History.*

Houston, G.W. (1988). Ports in perspective: Some comparative materials on Roman merchant ships and ports. *American Journal of Archaeology* 82(4): 553–64.

Howitt-Marshall, D. (2003). Cyprus Underwater Project – The Maritime Cultural Landscape. *Nautical Archaeology,* (1):4-5.

Hughes, J.D. (2005). *The Mediterranean: An Environmental History*. Santa Barbara: ABC Clio.

_______ (1998). *"Land and Sea" in Civilization of the Ancient Mediterranean: Greece and Rome*. Michael Grant and Rachel Kitzin (eds). New York:Charles scribers sons. P. 10-103.

Hughes, P.D., Gibbard, P.L., and Woodward, J.C. (2006). Quaternary glacial History of the Mediterranean Mountains. Progress in Physical Geography. Sage Publications.

Huntingford, G.W.B. (trans. & ed.) (1980). *The Periplus of the Erythraean Sea by an unknown author; with some extracts from Agatharkhides 'On the Erythraean Sea'.* London: Hakluyt Society. 2nd Series, 151.

Hutchins, E. (2011). "Enculturating the Supersized Mind", Philosophical Studies, 152 (3), 437–446.

_______(1995). *Cognition in the Wild*. Cambridge, MA: MIT Press.

_______(1983). Understanding Micronesian navigation. In Gentner, D. and Stevens, A. S. (eds.), *Mental models*. Hillsdale, NJ, 191–225.

Ilyushechkina, E., Görz, G. and Thiering, M. (2014). Towards a Cognitive-linguistic Reconstruction of the Spatial Orientation in Ancient Texts – The Example of Dionysius Periegetes. In: K. Geus and M. Thiering (eds.) *Features of common sense geography: implicit knowledge structures in ancient geographical.* Berlin: LIT Verl, 245-264.

Ingold, T. (2000). The Perception of the Environment: Essays on Livelihood, Dwelling and Skill. *The perception of the Environment, Essays on livelihood, dwelling and skill*. London: Routledge, 172–88.

_______(1993) The temporality of the landscape, World Archaeology, 25(2), pp. 152–174

Inman, D.K. (1983). Application of Coastal Dynamics to the reconstruction of paleoclimates in the vicinity of la jolla, California. In P.M. Masters and N.C. Flemming (eds) *Quaternary Coastlines and Marine Archaeology.* Academic Press, Inc, USA, 1-49.

Irby-Massie, G.L. (2012). Mapping the World: Greek Initiatives from Homer to Eratosthenes. In: R.J.A. Talbert. *Ancient Perspectives: Maps and Their Place in Mesopotamia, Egypt, Greece, and Rome.* Chicago University Press, 81-108.

_______(2006). Mapping the earth by the stars: teaching greek astro-mathematical geography in the undergraduate classroom. *The occasional papers of the american philological association's committee on ancient history. Vol. 3.* Philadelphia, Pennsylvania: The American Philological Association.

Irby-Massie, G.L. and P. Keyser (eds.) (2002). *Greek Science of the Hellenistic Era: A Sourcebook*. London and New York: Routledge.

Isaac, B. (1991). A Seleucid Inscription from Jamnia-on-the-Sea: Antiochus V Eupator and the Sidonians. *Israel Exploration Journal* 41: 132-144.

_______(1986). The Greek Settlements in Thrace until the Macedonian Conquest. Leiden.

Isaksen, L. (2013). 'O what a tangled web we weave' – towards a practice that does not deceive. In: C. Knappett. *Network Analysis in Archaeology: New Approaches to Regional Interaction.* Oxford: Oxford University Press.

_______(2012). Ptolemy's Geography and the Birth of GIS. Lecture. In: *Proceedings from Digital Humanities July 16–22 2012*. University of Hambur: Hamburg University Press, 236-239.

_______(2011). Lines, Damned Lines and Statistics: Unearthing Structure in Ptolemy's *Geographia.* 6th International Workshop on Digital Approaches In Cartographic Heritage. The Hague, The Netherlands

_______(2008). *The application of network analysis to ancient transport geography: A case study of Roman Baetica.* Digital Medievalist 4. http://www.digitalmedievalist.org/journal/4/isaksen/

_______(2007). Network analysis of transport vectors in Roman Baetica. In J.T. Clark and E.M. Hagenmeister (eds.) *Digital discovery: exploring new frontiers in human heritage. Proceedings of the 34th CAA Conference,* Fargo, 2006. Budapest: Archaeolingua, 76 – 87.

Jacob, C. (2006). *The Sovereign Map: Theoretical approaches in cartography throughout history*. Translated by T. Conley and edited by E. H. Dahl. Chicago: University of Chicago Press.

_______(1999). Mapping in the Mind: The Earth from Ancient Alexandria. In: D. Cosgrove (ed.) *Mappings*. Reaktion Books Ltd. London, 24-49.

_______(1987). Géographie et culture en grèce ancienne: Essai de lecture de la description de la terre habitée de Denys d'Alexandrie (PhD Thesis). Ecole des Hautes Études en Sciences Sociales, Paris.

Janni, P. (1998). Cartographie et art nautique dans le monde ancien. In: P. Arnaud and P. Counillon (eds). *Geographica Historica. Ausonius Études 2*. Bordeaux and Nice: Ausonius, 41-53.

_______(1996). *Il Mare degli Antichi.* Bari.

_______(1984). *La mappa e il periplo: cartografia antica e spazio odologico.* Roma: Università di Macerata

Johnson, F.S. (2012). *The Oxford handbook of Late Antiquity.* Oxford: Oxford Handbooks.

Jones, A. (2012). Ptolemy's Geography: Mapmaking and the Scientific Enterprise. In: R.J.A. Talbert (ed.) *Ancient Perspectives: Maps and Their Place in Mesopotamia, Egypt, Greece, and Rome.* Chicago University Press.

_______(2010). Ptolemy in Perspective: Use and Criticism of his Work from Antiquity to the Nineteenth Century. (Archimedes 23). London-New York.

_______(2011). *A survey of the Almagest.* New York: Springer.

Jones, H.L. (1917-1932). *The Geography of Strabo*, Loeb Classical Library.

Jurisic, M (2000). Ancient Shiipwrecks of the Adriatic: Maritime transport during the first and second centuries AD. *BAR International Series*, 828. Archaeopress.

Kahanov, Y., Cvikel, D., Wielinski, A. and Israeli, E. (2008). Dor Underwater Excavation – Report of the 2008 Season. *Recanati Institute for Maritime Studies Newsletter* 34: 15-18.

Kaplan, J. (1957). Archaeological Survey of the Jibne District. *Bulletin of the Israel Exploration Society*, 21: 199–207.

Keyser, P.T. and Irby-Massie, G.L. (eds.) (2008). *The Encyclopedia of Ancient Natural Scientists: the Greek Tradition and its Many Heirs*.

Klotz, A. (1906). Quaestiones plinianae geographicae. In: W. Sieglin (ed.) *Quellen und Forschungen zur alten Geschichte und Geographie*. Berlin, 11.

Kowalski, J.M. (2012). *Navigation et géographie dans l'Antiquité gréco-romaine.* Paris.

Kowalski, J.M., Claramunt, C., and Zucker, A. (2007). Thalassographein - Representing Maritime Spaces in Ancient Greece. In: S. Winter and B. Kuijpers (eds.) *Conference on Spatial Information Theory (COSIT '07),* Melbourne, Australia, LNCS 4736, 47-60.

Knapp, A.B. (1990). Entrepreneurship, ethnicity, exchange: Mediterranean inter±island relations in the late Bronze Age. *Annual of the British School at Athens,* 85:115-153.

Knapp, A.B. and Blake, E. (2005). Prehistory in the Mediterranean: the connecting and corrupting sea. In: E. Blake and A.B. Knapp (eds.) *The archaeology of Mediterranean prehistory.* Oxford, 1-23.

Knappett, C. (2013). *Network Analysis in Archaeology: New Approaches to Regional Interaction.* Oxford: Oxford University Press.

Knappett, C., Evans, T. and Rivers, R. (2008). Modelling maritime interaction in the Aegean Bronze Age. *Antiquity* 82: 1009–1024

Kraeling, C.H. (1962). *Ptolemais: City of the Libyan Pentapolis.* Chicago.

Kraft, J.C., Aschenbrenner, S.E. and Rapp, G.Jr. (1977). Palaeographic reconstructions of coastal Aegean archaeological sites. *Science* 195: 941-947.

Kraus, N.C. (1996). *A Collection of Papers on the History of Coastal Engineering in Countries Hosting the International Coastal Engineering Conference 1950-1996*, American Society of Civil Engineers.

Krebber, B. (1972). Naustologoi bei Strabon: ein neues Papyrusfragment (P. Colon. inv. nr. 5861). *Zeitschrift für Papyrologie und Epigraphik 9*, 204-221 and Plate 6b.

Kriz, K., Cartwright, W. and Humi, L. (eds) (2010). *Mapping Different Geographies.* Springer.

Laborel, J., Morhange, C., Lafont, R., Le Campion, J., Laborel- Deguen, F., and Sartoretto, S. (1994). Biological evidence of sea-level rise during the last 4500 years on the rocky coasts of continental southwestern France and Corsica. *Marine Geology*, 120, 203–223

Lacroix, W.F.G. (1998). *Africa in Antiquity: A Linguistic and Toponymic Analysis of Ptolemy's map of Africa, Together With a Discussion of Ophir, Punt and Hanno's Voyage.*

Lagarce, J. and Lagarce, E. (1987). Découvertes archéologiques à Ras Ibn Hani près de Ras Shamra: un palais du roi d'Ugarit, des tablettes inscrites en caractères cunéiformes, un établissement des peuples de la mer et une ville hellénistique. *Comptes Rendus des Séances de l'Académie des Inscriptions et Belles-Lettres* 122: 44–65.

Lahanas, M. (2005). *Measurements.* University of Heidelberg and Frankfurt. [http://www.mlahanas.de/Greeks/Measurements.htm]

Lambeck, K. (1996). Sea-level change and shoreline evolution in Aegean Greece since Upper Palaeolithic time. *Antiquity,* 70:588-611.

_______ (1995). Late Pleistocene and Holocene sea-level changes in Greece and south-western Turkey: a separation of eustatic, isostatic and tectonic contributions. *Geophysical Journal International,* 122:1022-44.

Lambeck, K. and Chappell, J. (2001). Sea level change through the last glacial cycle. *Science,* 292:679–686.

Lambeck, K. and Purcell, A. (2005). Sea-level change in the Mediterranean Sea since the LGM: model predictions for tectonically stable areas. *Quaternary Science Reviews 24, 1969–1988*

Lambeck K., Antonioli F., Anzidei ,M. Ferranti L., Leoni G., Schicchitano, G., et al. (2010). *Sea level change along the Italian coast during the Holocene and projections for the future.* Quat. Int.

Lambeck, K., Anzidei, M., Antonioli, F., Benini, A., and Esposito, A., (2004). Sea level in Roman time in the Central Mediterranean and implications for recent change. *Earth and Planetary Science Letters,* 224, 563–575.

Laronde, A. (1996). Apollonia de Cyrénaïque: archéologie et histoire. *Journal des Savants Janvier-Juin*, 3-49.

_______(1987). Recherches sous-marines dans le port d'Apollonia d Cyrénaïque. Bulletin de la Société Nationale des Antiquaires de France, 322–330.

Lawrence, A. W. (1979). *Greek Aims in Fortifications*. Oxford.

Lazaridis, D. (1971). *Thasos and its Peraea*. Athens.

Lefebvre, H. (1991). *The Production of Space.* Oxford: Blackwell.

Lehmann-Hartleben, K. (1923). *Die antiken Hafenanlagen des Mittelmeeres. Beiträge zur Geschichte des Städtebaues im Altertum.* Leipzig.

Leidwanger, J. (2013). Modeling distance with time in ancient Mediterranean seafaring: a GIS application for the interpretation of maritime connectivity. *Journal of Archaeological Science* 40: 3302-8.

_______(2005). The underwater survey at Episkopi Bay: a preliminary report on the 2004 field season. *Report of the Department of Antiquities Cyprus*, 269–77.

Lemprière, J. (1822). A Classical Dictionary containing a full Account of all the Proper Names mentioned in Ancient Authors; with the value of coins, weights, and measures, used among the Greeks and Romans; and a chronological table. 3rd American edition. Philadelphia: James Crissy.

Leonard, J.R. (1997). Harbour Terminology in Roman Periploi. In: S. Swiny, R.L. Hohlfelder and S.H. Wylde (eds.) *Res Maritimae. Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity.* Proceedings of the Second *International Symposium 'Cities on the Sea'. Nicosia, Cyprus, October 18-22, 1994*. Atlanta, 163-200.

Levy, T.E. (ed). (2010) *Archaeology in the New Biblical Archaeology: From Text to Turf*. London: Equinox.

Lewis, M. J. T. (2001). *Surveying Instruments of Greece and Rome.*

Lewis, D. (1994). *We, the Navigators: The Ancient Art of Landfinding in the Pacific.* 2nd ed. Honolulu.

Lewis, M. and Wigen, K. (1997). *The Myth of Continents: A Critique of Metageography*. Berkeley: University of California Press.

Liddle*,* A. (2003). *Arrian, Periplus of the Black Sea.* London: Bristol Classical Press.

Liddell, H.G. and Scott, R. (eds.) (1996). *Greek-English Lexicon with a Revised Supplement*. Oxford.

Lipiński, E. (ed.) (1992). *Dictionnaire de la civilization phénicienne et punique*. Turnhout.

Linder, E. (1989). The Ma'agan-Michael Shipwreck Excavation - First Season 1988. *University of Haifa Center for Maritime Studies News*, 16: 6-8.

Lindsay, W.S. (2006). *History of Merchant Shipping and Ancient Commerce.* Adamant Media Corporation.

Lionello, P. (2012). The Climate of the Mediterranean Region: From the Past to the Future. Elsevier

Lipinski, E. (2004). *Itineraria Phoenicia*. Studia Phoenicia 18. Leuven: Peeters.

Livieratos, E., Tsorlini, A., Boutoura, C. and Manoledakis, M. (2008). Ptolemy's Geographia in Digits. *e-Perimetron,* 3 (1):22-39.

Lloyd, G.E.R. 1970. *Early Greek Science: Thales to Aristotle*. London: Chatto & Windus.

Locher, A. (1986). The structure of Pliny the Elder's Natural History. In: R. French and F. Greenaway (eds.) *Science in the Early Roman Empire: Pliny the Elder, his Sources and Influence*. London: Croom Helm.

Lopez, E.S. (2015). An Examination of Maritime Navigation of the Roman Epirus Seascape: A Hypothetical Journey through the Corfu Strait. (Unpublished MSc Thesis). Southampton, UK: Centre for Maritime Archaeology, University of Southampton.

Long, A.J. and Roberts, D.H. (1997). Sea level change. In: Fulford, M., Champion, T. and Long, A. England's Coastal Heritage. A survey for English Heritage and the RCHME. *English Heritage Archaeological Report*, 16:25-49. London: English Heritage.

Loring, W. (1890). A New Portion of the Edict of Diocletian from Megalopolis. *IHS* 11: 299-342.

Lowe, R. and Inman, D.L. (1983). Wave parameters, Abu Quir Array, Egypt. *Center for Coastal Studies, Scripps Inst. of Oceanography*, 5.

Lukermann, F. (1961). The Concept of Location in Classical Geography, *Annals of the Association of American Geographers*, 51.2, 194-210.

Macklin, M.G., Lewin, J. and Woodward, J.C., (1995). Quaternary fluvial systems in the Mediterranean basin. In: Lewin, J., Macklin, M.G., and Woodward, J.C. (eds.), *Mediterranean Quaternary River Environments.* Balkema, Rotterdam. 1–25.

Malkin, I. (2005). Mediterranean Paradigms and Classical Antiquity. *Special issue of Mediterranean Historical Review*. London: Routledge.

Manolava, T. (2011). *Travels on the wine-dark sea: trans-regional networks in the Eastern Mediterranean during the Early Iron Age (c.1200 – 700)*. MA thesis. Montreal: McGill University.

Manoledakis, M. and Livieratos, E. (2007). *On the digital placement of Aegea, the first capital of ancient Macedonia, according to Ptolemy's Geographia*. e-Perimetron, Vol.2, (1):31-41.

Marcotte, D. (2000). *Géographes grecs. Tome I. Introduction générale. Ps.- Scymnos. Circuit de la terre.* Paris: Les Belles Lettres.

Marcus, E. (2002). Early seafaring and maritime activity in the southern Levant from prehistory through the third millennium BCE. In: Van den Brink, E.C.M., and Levy, T.E. (eds.). Egypt and the Levant Interrelations from the 4th through early 3rd millennium BCE. *New Studies in Anthropological Archaeology*. UK: Leicester University Press/Continuum International Publishing Group, 403–417.

Marriner, N. (2009). Geoarchaeology of Lebanon's Ancient Harbours. *BAR International Series 1953.* Oxford.

_______(2007). *Paleoenvironnements littoraux du Liban a l'Holocene. Geoarcheologie des ports antiques de Beyrouth, Sidon et Tyr. 5000 ans d'interactions nature-culture.* Universite de Provence Cerege. Aix-en-Provence. thesis.

Marriner, N. and Morhange, C. (2007). Geoscience of ancient Mediterranean harbours. *Earth-Science Reviews*, 80: 137–194.

_______(2006a). Sidon's Ancient Harbours. *Archaeology & History in Lebanon*, 24: 138-149.

_______(2006b). Geoarchaeological evidence for dredging in Tyre's ancient harbour. *Levant Quaternary Research,* 65, 64–171.

Marriner, N., Morhange, C. and Doumet-Serhal, C. (2006). Geoarchaeology of Sidon's ancient harbours, Phoenicia. *Journal of Archaeolical Science* 33: 1514–1535

Marriner, N., Morhange, C. and Goiran, J.-P. (2010). Coastal and Ancient Harbour Geoarchaeology. *Geology Today*, 26 (1): 21–27.

Marriner, N., Morhange, C. and Saghieh_Beydoun, M. (2008). Geoarchaeology of Beirut's ancient harbour, Phoenicia. *Journal of Archaeological Science,* 35, 2495-2516.

Marriner, N., Morhange, C., Kaneiski, D. and Carayon, N. (2014). Ancient harbour infrastructure in the Levant: tracking the birth and rise of new forms of anthropogenic pressure. *Scientific Reports* 4: 555.

Marriner, N., Goiran, J.P. and Morhange, C. (2008). *Alexander the Great's tombolos at Tyre and Alexandria, eastern Mediterranean.*

Marriner, N., Morhange, C. and Carayon, N. (2008). Ancient Tyre and its harbours, 5000 years of human–environment inter- actions. *Journal of Archaeological Science,* 35: 1,281–310.

Marriner, N., Morhange, C. and Doumet-Serhal, C. (2006). Geoarchaeology of Sidon's ancient harbours, Phoenicia. *Journal of Archaeological Science,* 33 (11): 1,514–35.

Marriner, N., Morhange, C., and Meulé, S. (2007). Holocene morphogenesis of Alexander the Great's isthmus at Tyre in Lebanon. *Proceedings of the National Academy of Sciences*, 104 (22):9218-9223.

Marriner, N., Goiran, J.-P., Geyer, B., Matoïan, V., al-Maqdissi, M., Leconte, M., Carbonel, P. (2012). Ancient harbours and Holocene morphogenesis of the Ras Ibn Hani peninsula (Syria). *Quaternary Research,* 78:35-49.

Marx, C. (2011). On the precision of Ptolemy's geographic coordinates in his Geographike Hyphegesis. *History of Geo- and Space Sciences,* 2(1): 29-37.

Mattern, S. (1999). Rome and the Enemy: Imperial Strategy in the Prin- cipate. Berkeley: University of California Press.

Mattingly, D.J. (1996). 'Introduction' and 'Directory' to Map 38 (Cyrene). In: R.J.A., Talbert. 2000. *Barrington atlas of the Greek and Roman world: map-by-map directory,* Vol.1.

Mattingly, D.J. and Hitchner, R.B. (1995). Roman Africa: An Archaeological Review. *Journal of Roman Studies* 85: 165-213.

Mattern, S. 1999. *Rome and the Enemy*. Berkeley.

Matvejević, P. 1999. *Mediterranean: a cultural landscape* (trans. by M.H.Heim). Berkeley and London: University of California Press.

McCormick, M., Buntgen, U., Cane, M., Cook, E., Harper, K., Huybers, P., Litt, T., Manning, S.W., Mayewski, P.A., More, A.M., Nicolussi, K., and Tegel, W. (2012). Climate change under the Roman Empire and its successors, 100 BC – 800 AD. A First Synthesis Based on Multi-Proxy Natural Scientific and Historical Evidence. *Journal of Interdisciplinary History,* 43.2:169-220.

McCormick, M. (2001). *Origins of the European Economy: Communications and Commerce, A.D. 300–900.* Cambridge.

McCormick, M., Huang, G., Gibson, K.L., and Polk, M. (eds). (2010). *Digital Atlas of Roman and Medieval Civilizations (DARMC).* http://darmc.harvard.edu/.

McGrail, S. (2008). Sea transport, part 1: ships and navigation. In: J.P. Oleson (ed.) *Engineering and Technology in the Classical World*. New York: Oxford University Press, 606–37.

_______(2006): *Ancient Boats and Ships.* Shire Publications. Buckinghamshire.

_______(2004). Boats of the World. Oxford.

_______(2001). *Boats of the World, from the Stone Age to Medieval Times*. Oxford University Press.

_______(1993). Prehistoric seafaring in the Channel. In: Scarre, C. and Healy, F. (eds.) *Trade and Exchange in Prehistoric Europe*. Oxford: Oxbow monograph, 33, 199-210.

_______(1991). Early sea voyages. *International Journal of Nautical Archaeology,* 20: 85-93.

_______(1987)*. Ancient Boats* in *N.W. Europe*: *the Archaeology of Water Transport to AD 1500.* London: Longman.

McKee, E. (1983). *Working boats of Britain. Their shape and purpose.* London: Conway Maritime Press.

McNiven, I. (2003). Saltwater People: Spiritscapes, maritime rituals and the archaeology of Australian indigenous seascapes. *World Archaeology,* 35:329-349.

McQuiggan*,* R. (2006-7). Roman Geography and Spatial Perception in the Republic*.* In: *Hirundo 5*, 77–98.

Meece, S. (2006). A bird's eye view - of a leopard's spots. The Çatalhöyük 'map' and the development of cartographic representation in prehistory. *Anatolian Studies* 56: 1–16.

MedAtlas Group. (2004). Wind and Wave Atlas of the Mediterranean Sea. In: Electronic Atlas, v. 7.0. Western European Armaments Organization Research Cell.

National Geospatial-Intelligence Agency 2011, 199. Winds and changing wind patterns.

Medas, S. (2011). Il carattere portolanico dello Stadiasmus Maris Magni. In: W.V. Harris and K. Iara (eds). Maritime Technology in the Ancient Economy. Ship Design and Navigation. *Journal of Roman Archaeology, Portsmouth, Rhode Island. Supplementary Series* 84: 161-177.

_______(2009-10). Il più antico testo portolanico attualmente noto: Lo Stadiasmos Htoi Periplous Ths Megalhs Qalasshs - Stadiasmo o Periplo del Mare Grande. *Mayurqa. Revista del Departament de Ciènces Històriques i Teoria de les Arts – Universitat de les Illes Balears* 33: 333-364.

________(2008). Le atrezzature veliche nel mondo antico. La vela a tarchia, la vela latina e altre tipologie minori. In: J. Pérez Ballester and G. Pascual (eds). Comercio, redistribución y fondeaderos. *La navegación a vela en el Mediterráneo*. Valencia, 79–111.

_______(2004a). "*De rebus nauticis": L'arte della navigazione nel mondo antico*. Roma.

_______(2004b). *Nautica tradizionale e navigazione antica. Atti del 2° Convegno Nazionale di Etnoarcheologia*. *Mondaino, 7-8 giugno 2001,* Rimini: 170-178.

Meinig, D.W. (1979). *The Interpretation of Ordinary Landscapes*. Oxford: Oxford University Press, 195-244.

Menze, B.H., Ur, J.A. and Sherratt, A.G. (2006). Detection of Ancient Settlement Mounds: Archaeological Survey Based on the SRTM Terrain Model. *Photogrammetric Engineering & Remote Sensing* 72: 321-327.

Meteorological Office (1962). *Weather in the Mediterranean.* 2nd edition, 2 vols. London.

Millar, F. (1993). *The Roman Near East.* Cambridge, MA: Harvard University Press.

Miller, J. I. (1969). *The Spice Trade of The Roman Empire: 29 B.C. to A.D. 641*. Oxford University Press.

Milliman, J.D., Jeftic, L. and Sestini, G. (1992). The Mediterranean Sea and climate change – an overview. In: L. Jeftic, J.D. Milliman and G. Sestini (eds.) *Climatic Change and the Mediterranean*. London: Edward Arnold, 1–14.

Misch-Brandl, O. (ed.) (1985). *From the Depths of the Sea: Cargoes of Ancient Wrecks from the Carmel Coast. Catalogue No. 263.* Israel Museum: Jerusalem.

Mittenhuber, F. (2010). The Tradition of Texts and Maps in Ptolemy's Geography. In: A. Jones (ed.) *Ptolemy in Perspective: Use and Criticism of his Work from Antiquity to the Nineteenth Century*. New York: Springer, 95-119.

Moneim, A.A.A. (2005). Overview of the geomorphological and hydrogeological characteristics of the Eastern Desert of Egypt*. Hydrogeology Journal 2005*, 13, 416-425.

Monmonier, M. (2005). Lying with Maps. Institute of Mathematical Statistics. *Statistical Science,* Vol. 20, No. 3, 215–222.

Mionnet, T. E. (1806-1837). *Description de Medailles antiques Grecques et Romaines*, 2. Paris.

Morhange, C. (ed.) (2000). Ports antiques et paléoenvironnements littoraux. *Méditerranée,* (94): 1–112.

Morhange, C., Carayon, N. and Marriner, N. (2011). Sidon's ancient harbour: natural characteristics and hazards. *Archaeology and History in Lebanon* 34–35: 433–459.

Morhange, C., Goiran, J.-P. and Marriner, N. (eds.) (2005). Environnements littoraux méditerranéens, heritages et mobilité/Coastal geoarchaeology of the Mediterranean. *Méditerranée* 104: 1–140.

Morhange, C., Marriner, N., Laborel, J., Todesco, M. and Oberlin, C. (2006a). Rapid sea-level movements and noneruptive crustal deformations in the Phlegrean Fields caldera, Italy. *Geology* 34: 93–96.

Morhange, C., Pirazzoli, P., Marriner, N., Montaggioni, L.F., Nammour, T. (2006b). Late Holocene relative sea-level changes in Lebanon, Eastern Mediterranean. *Marine Geology* 230: 99–114.

Morley, N. (2010). *The Roman Empire: Roots of Imperialism*. London and New York: Pluto Press.

Mörner, N.-A. (2005). Sea level changes and crustal movements with special aspects on the eastern Mediterranean. *Zeitschrift für Geomorphologie N.F.* 137: 91–102.

Morris, I. 2005. The growth of Greek cities in the first millennium BC. *Princeton/Stanford Working Papers in Classics.* Stanford University, 1-29.

Morton, J. (2001). *The role of the physical environment in ancient Greek seafaring*. Leiden-Boston-Köln: Brill.

Morton, R.A. (2004). An Overview of Coastal Land Loss: With Emphasis on the Southeastern United States. U.S. *Geological Survey Center For Coastal and Watershed Studies*. Open File Report 03-337. http://pubs.usgs.gov/of/2003/of03-337/landloss.pdf.

Morton, R.A., Paine, J.G. and Gibeaut, J.C. (1994). Stages and durations of post-storm beach recovery, southeastern Texas coast. *USA. Journal of Coastal Research*, 10(4): 884-908.

Moser, S. and Smiles, S. (2004). *Envisioning the past: archaeology and the image.* Oxford: Blackwells.

Müller, K. (1855). *Geographi graeci minores. E condicibus recognovit, preolegomenis, annotatione, indicisque instruxit, tabulis aeri indisis illustravit* Paris: Didot, 427-514.

Murphy, T. (2004). *Pliny the Elder's Natural History. The Empire in the Encyclopaedia.* Oxford: Oxford University Press.

Murray, W. M. (1995). Ancient sailing winds in the eastern Mediterranean: the case for Cyprus. In: V. Karageorghis and D. Michaelides (eds), *Proceedings of the International Symposium Cyprus and the Sea, Nicosia*, 33–44.

_______(1987). Do modern winds equal ancient winds? Mediterranean Historical Review 2(2): 139-67

Naas, V. (2011). Imperialism, mirabilia and Knowledge: Some Paradoxes in the Naturalis Historia. In: R.K. Gibson and R. Morello (eds.). *Pliny the Elder: Themes and Contexts*. Leiden: Brill, 57-70.

_______(2002). *Le projet encyclopédique de Pline l'Ancien.* Rome: école francaise de Rome.

Neev, D., (1975). Tectonic evolution of the Middle East and the Levantine Basin (easternmost Mediterranean). *Geology* 3: 683-686.

Neev, D., Almagar, G., Arad, A., Ginzburg, A. and Hall, J.K. (1976). The Geology of the Southeastern Mediterranean. *Geological Survey of Israel Bulletin* 68: 1-51.

Neev, D. and Bakler, N. (1978). Recent tectonic activity along the Israeli coastline. *Hofve-Yam*: 9-30.

Neev, D., Bakler, N. and Emery, K.O. (1987). *Mediterranean coasts of Israel and Sinai - Holocene tectonism from geology, geophysics and archaeology*. New York/ London: Taylor & Francis.

Nicolet, C. (1991). *Space, Geography, and Politics in the Early Roman Empire*. University of Michigan Press.

_______(1988). *L'inventaire du monde: Geographie et politique aux origines de l'Empire Romain.*

Nir, Y. (1996). The city of Tyre, Lebanon and its semi-artificial tombolo. *Geoarchaeolog*y 11: 235–250.

_______(1982). Asia, Middle East coastal morphology: Israel and Sinai. 86-99. In: M. L. Schwartz (ed.) *The Encyclopedia of beaches and coastal environments*.

Nitschke, J. L., Martin, S. R. and Shalev, Y. (2011). Between Carmel and the Sea - Tel Dor: The Late Periods. *Near Eastern Archaeology* 74(3): 132-154.

Norie, J.W. (1831). *New piloting directions for the Mediterranean sea, the Adriatic, or Gulf of Venice, the Black sea, Grecian archipelago, and the seas of Marmara and Azof: written to accompany the new chart of the Mediterranean sea*. Oxford University.

Norwich V.J.J. (2010). *The Middle Sea: a History of the Mediterranean.* New York: Random House.

Oakley, H.C. 1962. The Greek and Roman Background of the New Testament. *Vox Evangelica* 1: 7-23.

Oleson, J.P. (2008). Testing the Waters: The Role of Sounding-Weights in Ancient Mediterranean Navigation. pp. 119-76. In: R.L. Hohlfelder (ed.) *The Maritime World of Ancient Rome*. *Memoirs of the American Academy in Rome, Suppl. 6.* Ann Arbor: University of Michigan Press.

_______(2006). Herodotus, Aristotle, and Sounding Weights: The Deep Sea as a Frontier in the Classical World. pp. 32-48. In: T. P. Tassios and C. Palyvou (eds.). *Ancient Greek Technology: Proceedings of the 2nd International Congress*. Athens: Technical Chamber of Greece.

_______(2000). Ancient Sounding-weights: a contribution to the history of Mediterranean navigation. *Journal of Roman Archaeology* 13: 293-310.

Oleson, J.P., Brandon, C., Cramer, S., Cucitore, R., Gotti, E. and Hohlfelder, R.L. (2004). The ROMACONS project: a contribution to the historical and engineering analysis of hydraulic concrete in Roman maritime structures. *International Journal of Nautical Archaeology* 33: 199-229.

Ortiz, S. and Wolffe, S. (2012). Guarding the Border to Jerusalem: The Iron Age City of Gezer. *Near Eastern Archaeology* 75(1): 4–19.

Palmer, C. (2009). Windward sailing capabilities of ancient vessels. *International Journal of Nautical Archaeology* 38.2: 314-330.

_______(1986). Measuring Sailing Rig Performance. In: O. Crumlin-Pedersen and M. Vinner (eds.) Sailing into the Past. *Proceedings of the International Seminar on Replicas of Ancient and Medieval Vessels, Roskilde 1984*, 178–93.

Pamir, H. (2005). The Asi Delta Survey. In: K. Yener (ed.) *The Amuq Valley Regional Projects V.1 Surveys in the Plain of Antioch and Asi Delta, Turkey 1995-2002.* Chicago: *The Oriental Institute Publications*: 67-98.

Parker, A. J. (2001). Maritime landscapes. *Landscapes* 1: 22-41.

_______(1995). Maritime cultures and wreck assemblages in the Graeco-Roman world. *International Journal of Nautical Archaeology* 24: 87–95.

_______(1992). Ancient Shipwrecks of the Mediterranean and the Roman Provinces. *British Archaeological Reports International Series* 580. Oxford.

Patai, R. (1998). *The Children of Noah: Jewish Seafaring in Ancient Times.* Princeton University Press.

Petritaki, M. (1996). Kleitor: A City of the Arcadian Azania. *Technes and archaiologia* 61:81-88.

Phillips, T. (1993). Seascapes and landscapes in Orkney and Northern Scotland. *World Archaeology* 35: 371-384.

Pirazzoli, P.A. (2005). A review of possible eustatic, isostatic and tectonic contributions in eight late Holocene relative sea-level histories from the Mediterranean area. *Quaternary Science Reviews* 24: 1989–2001.

Pirazzoli, P.A. (1996). Sea-level changes. The last 2000 years. New York: John Wiley & Sons.

_______(1991). World Atlas of Holocene Sea-Level Changes, *Elsevier Oceanography Series 58*. Amsterdam: Elsevier.

Poidebard, A. (1939). *Un grand port disparu, Tyr Recherches aériennes et sous-marines*. Paris: Librairie orientaliste Paul Geuthner.

Poiss, T. (2014). Looking for Bird's Eye-View in Ancient Greek Sources. In: K. Geus and M. Thiering (eds.) *Features of Common Sense Geography: Implicit Knowledge Structures in Ancient Geographical Texts*. Berlin: LIT Verlag, 69–88.

Poulos, S.E., Ghionis, G. and Maroukian, H. (2009). Sea-level rise trends in the Attico–Cycladic region (Aegean Sea) during the last 5000 years. *Geomorphology* 107: 10-17.

Pomey, P., Kahanov, Y. and Rieth, E. (2012). Transition from Shell to Skeleton in Ancient Mediterranean Ship - Construction: Analysis, Problems and Future Research. *International Journal of Nautical Archaeology* 41: 235-314.

Pothecary, S. (2002). Strabo, the Tiberian author: past, present and silence in Strabo's Geography. *Mnemosyne,* 55/4: 387-438.

_______ (1997). The expression 'our times' in Strabo's Geography. *Classical Philology* 92: 235-46.

_______(1995). Strabo, Polybios and the stade, *Phoenix,* 49(1): 49-67.

Pretzler, M. (2009). Travel and travel writing. In: G.R. Boys-Stones, B. Graziosi and P. Vasunia (eds.). *The Oxford Handbook of Hellenic Studies*. Oxford, 352–63.

_______(2007). Pausanias: Travel Writing in Ancient Greece. *Classical Literature and Society*. London: Duckworth.

_______(2005). *Comparing Strabo with Pausanias: Greece in context vs. Greece in depth.*

Price, D. de Solla. (1974). Gears from the Greeks. The Antikythera mechanism – A calendar computer from ca. 80 BC. *Transactions of the American Philosophical Society, 64, Part 7*. NS. Philadelphia.

Pritchett, W.K. (1982). *Studies in Greek Topography: Part IV.* California: University of California Press

Prontera, F. (2013). Timosthenes and Eratosthenes: sea routes and Hellenistic geography. In: K. Buraselis, M. Stefanou and D.J. Thompson (eds.) *The Ptolemies, the Sea and the Nile: Studies in Waterborne Power*. Cambridge, 207–217.

_______(2011). *Geografia e storia nella Grecia antica.* Biblioteca di Geographia antiqua 4. Firenze: Leo S. Olschki Editore.

_______(1992). *Periploi: sulla tradizzione della geografia nautica presso i Greci.* In: L'uomo e il mare nella civiltà occidentale: da Ulisse a Cristoforo Colombo. Atti del Convegno Genova, 1–4 giugno 1992. *Atti della Società Ligure di Storia Patria*, n.s. 32.2. Genova, 25–44.

_______(1984-1986). Prima di Starbone: materiali per uno studio della geografia antica comme genere letterario. In: Prontera, F. (ed.) *Strabone. Contributi allo studio della personalità e dell' opera*. Vol. 1 (Perugia), 189–256.

_______(1984). *Strabone: Contributi allo studio della personalità e dell'opera I.* Perugia: Università degli Studi.

Pryor, J.H. (1987). Geography, Technology, and War. *Studies in the Maritime History of the Mediterranean.* Cambridge: Cambridge University Press, 649-1571.

Pujades, R.J. (2007). *Les cartes portolanes. La representaciò medieval d'una mar solcada.* Barcelona: Institut Cartogràfic de Catalunya.

Raban, A. (1995). The heritage of ancient harbour engineering in Cyprus and the Levant. In: V. Karageorghis and D. Michaelides (eds.) *Proceedings of the International Symposium 'Cyprus and the Sea'.* Nicosia: University of Cyprus, 167–168.

_______(1995a). The heritage of ancient harbour engineering in Cyprus and the Levant. In: V. Karageorghis, D. Michaelides (eds.) *Proceedings of the Third International Symposium 'Cyprus and the Sea'*. Nicosia: University of Cyprus, 139-189.

_______(1995b). Dor-Yam: Maritime and Coastal Installations at Dor in their Geomorphological and Stratigraphic Context. In: E. Stern (dir.). Excavations at Dor, Final Report. Volume I A. Areas A and C: Introduction and Stratigraphy (Qedem Reports, 1). Jerusalem: The Hebrew University of Jerusalem. The Israel Exploration Society, 285-365.

_______(1991). Minoan and Canaanite Harbours. In: R. Laffineur and L. Basch (eds.) Thalassa: L'Egée Préhistorique et la Mer. *Aegaeum* 7: 129-146.

_______(1988). The constructive maritime role of sea peoples in the Levant. In: M. Heltzer and E. Lipinski (eds.) *Society and Economy in the Eastern Mediterranean (c.1500-1000 BC)*, 261-94.

_______(1987). *Guide to Sebastos. The ancient harbour of Caesarea maritime*.

_______(1985). The ancient harbors of Israel in biblical times. In: Raban, A., (ed.) Harbour Archaeology. Proceedings of the first international workshop on ancient Mediterranean harbors. Caesarea Maritima. Publication No.1. Haifa University. *BAR International Series* 257: 11-44.

_______(1983). Recent maritime archaeological research in Israel. Centre For Maritime Studies at the University of Haifa. *The International Journal of Nautical Archaeology and Underwater Exploration* 12(3): 229-251.

Raban, A. and Artzy, M. (1982). Dor Yam (Sea and Coastal Dor, 1980). *IEJ* 32: 145-259**.**

Raban, A. and Galili, E. (1985). Recent maritime archaeological research in Israel. A preliminary report. *IJNA* 14(4): 321-356.

Raban, A. and Holum, K. (eds) (1996). *Caesarea Maritima, a retrospective after two millennia*. Leiden: Brill.

Raban, A and Linder, E. (1993). Maritime ‘Atlit. In: E. Stern (ed.) *The New Encyclopedia of Archaeological Excavations in The Holy Land*. New York: Simon & Schuster, 117-20.

Radt, S. (ed.). (2005). *Strabons Geographika, Band 4, Buch XIV-XVII: Text und Übersetzung*. Göttingen: Vandenhoeck and Ruprecht.

_______(2003). *Strabons Geographika, 1. Prolegomena, Buch V–VIII: Text und Übersetzung*. Göttingen: Vandenhoeck and Ruprecht.

_______(2002-11). *Strabons Geographika*. Vols. 1-10, containing Books 1-17.

Raveh, K. (1988/89). Tel Dor Maritime Archaeology: North Bay. *Excavations and Surveys in Israel* 7/8: 50.

Rawlins, D. (1982). Eratosthenes’ geodesy unravelled: was there a high-accuracy hellenistic astronomy? *ISIS* 73: 259–265.

Reinhardt, E.G., Patterson, R.T. and Schroeder-Adams, C.J. (1994). Geoarchaeology of the ancient harbor site of Caesarea Maritima, Israel; evidence from sedimentology and paleoecology of benthic foraminifera. *Journal of Foraminiferal Research* 24: 37-48.

Renz, T. (2000). Proclaiming the Future: History and Theology in Prophecies Against Tyre. *Tyndale Bulletin* 51(1): 17-58.

Rey-Coquais, J.P. (1978a) Syrie romaine de Pompée à Dioclétien. *Journal of Roman Studies* 68: 44-73.

_______(1978b). *Inscription grecque découverte à Ras Ibn Hani:* Stèle des mercenaires lagides sur la côte syrienne. *Syria* 55: 313–325

_______(1977). Arados et régions voisines. *Inscriptions grecques et latines de la Syrie.* Paris.

_______(1974). *Arados et sa pérée aux époques grecque, romaine et byzantine*. Paris.

_______(1970). Inscriptions grecques et latines de Syrie. VIL Arados et régions voisines. Paris.

Reynolds, D.W. (1996). Forma Urbis Romae: The Severan Marble Plan and the Urban Form of Ancient Rome. (Ph.D. Thesis). University of Michigan.

Reynolds, J. (1986). The Elder Pliny and his times. In: R. French and F. Greenaway (eds.). *Science in the early Roman Empire: Pliny the Elder, his sources and influence*. London: Croom Helm, 1–10.

Reynolds, P. (2003). Amphorae in Roman Lebanon 50 BC to AD 250. *Archaeology and History in Lebanon* 17: 120-130.

_______(1995). *Trade in the Western Mediterranean, AD 400–700: The ceramic evidence*. Oxford.

Reynolds, L.D. and Wilson, N.G. (1991). *Scribes and Scholars: A Guide to the Transmission of Greek and Latin Literature*. 3rd edition. Oxford: Clarendon Press.

Rice, C. (2011). Ceramic assemblages and ports. In: D. Robinson and A. Wilson (eds). *Maritime Archaeology and Ancient Trade in the Mediterranean.* Oxford Centre for Maritime Archaeology. Monograph 6: 11–30.

Rickman, G.E. (1988). The archaeology and history of Roman Ports. *The International Journal of Nautical Archaeology and Underwater Exploration* 17(3): 257-267.

Richards, C. (2008). The substance of Polynesian voyaging. *World Archaeology* 40(2): 206-23.

Rival, M. (1991). *La charpenterie navale romaine.* Paris.

Rizakis, A. D. (1998). Achaie II: la cité de Patras – épigraphie et histoire. Athens.

Robert, L. (1960). Ports grecs. *Hellenica*: 11-12.

Roberts, O.T.P. (1995). An explanation of ancient windward sailing- some other considerations. *International Journal of Nautical Archaeology* 24(4): 307-315.

Roberts, C.H., and Turner, E.G. (eds.). (1952). *Catalogue of the Greek and Latin Papyri in the John Rylands Library Manchester IV.* Manchester: Manchester University Press, 627-38.

Robinson, P. (2009). Towards a Scholarly Editing System for the Next Decades. Sanskrit Computational Linguistics. *Lecture Notes in Computer Science*. Vol. 5402. Berlin, Heidelberg: Springer, 346-357.

Robinson, D. and Wilson, A. (2011). Introduction: Maritime archaeology and the ancient economy. In: D. Robinson and A. Wilson (eds.) *Maritime Archaeology and Ancient Trade in the Mediterranean.* Oxford Centre for Maritime Archaeology. Monograph 6: 11–30.

Rochberg, F. (2012). The Expression of Terrestrial and Celestial Order in Ancient Mesopotamia. In: R.J.A. Talbert. *Ancient Perspectives: Maps and Their Place in Mesopotamia, Egypt, Greece, and Rome.* Chicago University Press, 9-46.

Rohl, D.J. 2012. Chorography: History, Theory and Potential for Archaeological Research, *TRAC 2011: Proceedings of the Twenty-first Annual Theoretical Roman Archaeology Conference*, edited by F. McIntosh, M. Duggan and D.J. Rohl, Oxford: Oxbow Books.

Romer, F.E. (1998). *Pomponius Mela's Description of the World (De Chorographia).* University of Michigan Press.

Romm, J.S. (2010). Continents, Climates, and Cultures: Greek Theories of Global Structure. In: K.A. Raaflaub and R. J. A. Talbert (eds.) *Geography and Ethnography: Perceptions of the World in Pre-Modern Societies*. Malden, MA/ Oxford, UK: Wiley-Blackwell, 215–35.

_______(1992). *The Edges of the Earth in Ancient Thought.* Princeton: Princeton University Press.

Ronen, A. (1983). Late Quaternary sea levels inferred from coastal stratigraphy and archaeology in Israel. In: P.M. Masters and N.C. Flemming (eds.) *Quaternary coastlines and Marine Archaeology: Towards the prehistory of land bridges and continental shelves*. London: Academic Press, 121-134.

Rostovtzeff, M.L. (1957). *The Social and Economic History of the Roman Empire,* 2nd edition. Oxford.

Rougé, J. (1966). *Recherches sur l'organisation du commerce maritime sous l'empire romain.* Paris: S.E.V.P.E.N.

_______(1981). *Ships and Fleets of the Ancient Mediterranean*. Middletown CT.

_______(1975). *La marine dans l'Antiquité*. Paris: Presses universitaires de France.

_______(1952) La navigation hivernale sous l'Empire romain. *Revue des Etudes Anciennes* 54: 316-25.

Roy, J., Lloyd, J.A. and Owens, E.J. (1988). Megalopolis under the Roman Empire. In: S. Walker and A. Cameron (eds.) *The Greek Renaissance in the Roman Empire, Papers from the 10th British Museum Classical Colloquium*. *BICS Suppl.* 55: 146-50.

Sader, H. (2000). La 'route de la mer' en Phénicie. In: A. Lemaire (ed.) *Les routes du Proche-Orient. Des séjours d'Abraham aux caravanes de l'encens.* Paris: Le Monde de la Bible-Desclée de Brouwer, 67-85.

Safrai, Z. (2005). Temporal layers within Strabo's description of Coele Syria, Phoenicia and Judaea. In : D. Dueck, H. Lindsay and S. Pothecary. 2005 (eds) *Strabo's Cultural Geography: The Making of a Kolossourgia.* Cambridge

_______(2000). The gentile cities of Judea: between the Hasmonean occupation and the Roman liberation. In: G. Galil and Weinfeld, M. *Studies in Historical and Biblical Historiography, Presented to Zacharia Kallai*. Leiden, 63-90.

Salmon, J. (1984). *Wealthy Corinth: A History of the City to 338 BC*. Oxford.

Salway, B. (2012). Putting the World in Order: Mapping in Roman Texts. In: R.J.A Talbert (ed.) *Ancient Perspectives: Maps and Their Place in Mesopotamia, Egypt, Greece, and Rome.* Chicago University Press: Chicago, 193–234.

_______(2005). The Nature and Genesis of the Peutinger Map. *Imago Mundi: The International Journal for the History of Cartography* 57 (2): 119–35.

_______(2004). Sea and River Travel in the Roman Itinerary Literature. In: R.J.A Talbert and Brodersen, K. (ed.) *Space in the Roman World: Its Perception and Presentation*. Münster: LIT Verlag: Antike Kultur und Geschichte, Bd. 5, 43–96.

_______(2001). Travel, Itineraria and Tabellaria. In: C. Adams and A. Lawrence (eds.), *Travel and Geography in the Roman empire*. London/ New York.

Sanlaville, P. (1978). Notes sur la géomorphologie de la presqu'île d'Ibn Hani. *Syria* 55: 303–305.

Sanlaville P., Dalongeville R., Bernier P. and Evin, J. (1997). The Syrian coast: a model of Holocene coastal evolution. *Journal of Coastal Research* 13 (2): 385-396.

Sauer, C. (1952). The Morphology of Landscape. *University of California Publications in Geography* 2: 19-53.

Sauvaget, J. (1934). Le plan de Laodicée-sur-Mer. *Bulletin d'Etudes Orientales* 4: 81-114.

Safadi, C. (2015). Wind and wave modelling for the evaluation of the maritime accessibility and protection afforded by ancient harbours. *Journal of Archaeological Science: Reports* 5: 348–360.

Scheidel, W. (2014). Orbis: the Stanford geospatial network model of the Roman world. In: N.W. Bernstein and N. Coffee (eds.) *Word, Space, and Time: Digital Perspectives on the Classical World*. E-volume Anvil Academic (forthcoming).

_______(2013). The Shape of the Roman World. *Princeton/Stanford Working Papers in Classics.* Stanford University.

_______(2009). In search of Roman economic growth. *Journal of Roman Archaeology* 22: 46-70.

Schlichter, H. (1891). Ptolemy's Topography of Eastern Equatorial Africa. *Proceedings of the Royal Geographic Society and Monthly Record of Geography.*

Schörle, K. (2011). Constructing port hierarchies: harbours of the central Tyrrhenian coast. In: D. Robinson (ed.) *Maritime archaeology and ancient trade in the Mediterranean*. Oxford.

SDEEM (2005). National Geospatial-intelligence Agency. Sailing Directions (Enroute) for the Eastern Mediterranean. Pub. 132. 11th edition. Annapolis, MD: Lighthouse Press.

Seidman, D. (2001). *Sailing*: *A Beginner's Guide*. London.

Semple, E.C. (1927). The Templed Promontories of the Ancient Mediterranean. *The Geographical Review* 17(3): 353–86.

_______(1932). The Geography of the Mediterranean region: Its relation to ancient History, London.

_______(1916). Pirate Coasts of the Mediterranean Sea. *Geographical Review* 2(2): 134-151.

_______(1908). Coast peoples. Part I. *The Geographical Journal* 31(1): 72–90.

Seyrig, H. (1964). Monnaies hellénistiques, 12, Questions aradiennes. *Revue Numismatique*: 7-67.

_______(1952). Antiquites Syriennes, Le phare de Laodicee. *Syria* 29: 54–9.

Schoff, W.H. (1912). *The Periplus of the Erythraean Sea. Travel and trade in the Indian Ocean by a merchant of the first century* (reprinted 2001). Delhi: MunshiramManoharlal.

Schultze, C. (2011). In: R.K. Gibson and R. Morello (eds.) *Pliny the Elder: themes and contexts*. Leiden: Brill, 167-186.

Schupp, C.A., McNinch, J.E. and List, J.H. (2006). Shore-oblique bars, gravel outcrops and correlation to shoreline hotspots. *Marine Geology* 233: 63-79.

Sharon, D. and Kutiel, H. (1986). The distribution of rainfall intensity in Israel, its regional and seasonal variations and its climatological evaluation. *Journal of Climatology* 6: 277-291.

Shaw, G. (2006). Networks, Agent-Based Models and the Antonine Itineraries: Implications for Roman Archaeology. *Journal of Mediterranean Archaeology* 19(1): 45-64.

Shaw, J. W. (1990). Bronze Age Aegean Harboursides. *Thera and the Aegean World* III, 49-74.

Shcheglov, D.A. (2014). The error in Ptolemy's Geography revisited. In: The British Cartographic Society (ed.) *The Cartographic Journal*: 1-12.

_______(2007). Ptolemy's Latitude of Thule and the Map Projection in the pre-Ptolemaic Geography. *Antike Naturwissenschaft und ihre Rezeption (AKAN)*: 132-139.

Shea, J.J. (2003). The Middle Paleolithic of the East Mediterranean Levant. *Journal of World Prehistory* 17(4): 316.

Shipley, G. (2011). *Pseudo-Skylax's Periplous: The circumnavigation of the inhabited world. Text translation and commentar.* Exeter.

_______(2008). Pseudo-Skylax on the Peloponnese. In: C. Gallou et al. (eds), *Dioskouroi: Studies presented to W. G. Cavanagh and C. B. Mee*. Oxford: Archaeopress, 281–91.

Sibella, P. (1997). Light from the Past: The 1996 Tantura Roman Lamp. *Institute of Nautical Archaeology Quarterly* 24(4): 16-18.

Silberman, A. (1989). Le premier ouvrage latin de geographie: la Chorographie de Pomponius Mela et ses sources grecques. *Klio* 71(2): 571-581.

_______(trans.) (1988). *Pomponius Mela: Chorographie.* Collection des universités de France.

_______(1986). *Les sources de date romaine dans la 'Chorographie' de Pomponius Mela*. Rph, 112.

Sivan, D., Lambeck, K., Toueg, R., Raban, A., Porath, Y., Shirman, B. (2004). Ancient coastal wells of Caesarea Maritima, Israel, anindicator for relative sea level changes during the last 2000 years. *Earth and Planetary Science Letters,* 222, 315–330.

Sivan, D., Schattner, U., Morhange, C. and Boaretto, E. (2010). What can a sessile mollusk tell about neotectonics? *Earth and Planetary Science Letters 296:* 451–458.

Sivan, D., Wdowinski, S., Lambeck, K., Galili, E., Raban, A. (2001). Holocene sea-level changes along the Mediterranean coast of Israel, based on archaeological observations and numerical model. *Palaeogeography, Palaeoclimatology, Palaeoecology,* 167, 101-117.

Smith, G.A. (1895). *The historical geography of the Holy Land.* London.

Soja, E. (2000). *Postmetropolis: critical studies of cities and regions.* Malden, MA: Blackwell.

_______(1996). *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*. Oxford: Blackwell.

_______(1989). *Post-modern geographies: the reassertion of space in critical social theory*. London: Verso.

Stager, L.E. (2001). Port and power in the Early and the Middle Bronze Age: The organization of maritime trade and hinterland production. In: S.R. Wolff (ed). Studies in the archaeology of Israel and neighboring lands in memory of Douglas L. Esse. *The oriental Institute of the University of Chicago Studies in Ancient Oriental Civilization* 59. Chicago: University of Chicago Press, 625–638.

Stanley, D.J., (2002). Configuration of the Egypt-to-Canaan coastal margin and north Sinai byway in the Bronze Age. In: E.C.M. Van den Brink and T.E. Levy (eds.). *Egypt and the Levant.* Leicester University Press, 98–117.

Stanley, J.D., Bernasconi, M.P. and Jorstad, T.F. (2008). Pelusium, an Ancient Port Fortress on Egypt's Nile Delta Coast: Its Evolving Environmental Setting from Foundation to Demise. *Journal of Coastal Research* 24: 451-462.

Stanley, D.J. and Wezel, F.-C. (eds.) (1985). *Geological Evolution of the Mediterranean Sea*. Heidelberg: Springer-Verlag.

Steffy, J.R. (1985). The Kyrenia Ship: An Interim Report on Its Hull Construction. *American Journal of Archaeology* 89(1): 71–101.

Steinhauer, G.A. (2000). Ancient Piraeus: The city of Themistocles and Ippodamus. In: Steinhauer, G.A., et al., eds., *Piraeus: Centre of shipping and culture: Athens, Greece, Ephesus*, 9–123.

Stern, E. (2000). *La Via Maris*. In : A. Lemaire (ed.) *Les routes du Proche-Orient,* 59-65.

_______ (1994). *Dor – Ruler of the Seas*. Jerusalem.

_______(1993). *The New Encyclopedia of Archaeological Excavations in the Holy Land*. Jerusalem, 368-371.

Stern, E., Berg, J., Gilboa, A., Guz-Zilberstein, B., Raban, A., Rosenthal-Heginbottom, R. and Sharon, I. (1995). *Areas A and C: Introduction and Stratigraphy.* Vol. 1A of *Excavations at Dor, Final Report. Qedem Reports 1.* Jerusalem: Institute of Archaeology and the Hebrew University of Jerusalem in cooperation with the Israel Exploration Society.

Stevenson, E.L. 1932. *Geography of Claudius Ptolemaeus.* New York: New York Public Library.

Stewart, I. and Morhange, C. (2009). Coastal Geomorphology and Sea-Level Change. In: J.C. Woodward (ed.) *The physical geography of the Mediterranean.* Oxford: Oxford University Press, 385-413.

Stieglitz, R.R. (2006). *Tel Tanninim: Excavations at Krokodeilon Polis 1996-1999*. Boston: American Schools of Oriental Research.

Strang. A. (1998). *The Analysis of Ptolemy's Geography: Great Britain and Ireland only, final map in Ptolemy's projection.*

Stückelberger, A. and Grasshoff, G. (eds.) (2006). *Ptolemaios. Handbuch der Geographie, 2 vols.* Basel.

Sturt, F. 2006. Local knowledge is required: a rhythmanalytical approach to the late Mesolithic and early Neolithic of the East Anglian Fenland, UK. *Journal of Maritime Archaeology* 1: 119-139.

Syme, R. (1969). Pliny the Procurator. *Harvard Studies in Classical Philology,* 73:201- 236.

Talbert, R.J.A. (2013). *Rome's World: The Peutinger Map Reconsidered.* Cambridge - New York: Cambridge University Press.

_______(2012). *Ancient Perspectives: Maps and Their Place in Mesopotamia, Egypt, Greece, and Rome.* Chicago University Press.

_______(2010). The Roman Worldview – Beyond Recovery? In: R. Talbert and K. Raaflaub (eds.) *Geography, Ethnography, and Perspectives of the World in Pre-Modern Societies.* West Sussex: Wiley-Blackwell.

_______(2007). A Forgotten Masterpiece of Cartography for Roman Historians: Pierre Lapie's Orbis Romanus ad Illustranda Itineraria (1845). In: H. M. Schellenberg, V. E. Hirschmann, and A. Krieckhaus (eds). *A tribute to the man from Northumberland.* Heidelberg-Duesseldorf, 180-190.

_______(2000). *Barrington atlas of the Greek and Roman world: map-by-map directory,* Vol.1.

Talbert, R.J.A. and Brodersen, K. (eds.) (2004). *Space in the Roman world: its perception and presentation.* Münster.

Talbert R.J.A. and Unger, R.W. (2008). *Cartography in antiquity and the Middle Ages: fresh perspectives, new methods*. Leiden; Boston: Brill.

Tammuz, *O*. (*2005)*. Mare Clausum? Sailing Seasons in the *Mediterranean* in Early Antiquity. *Mediterranean Historical Review*, 20(2): 145-162.

Taub, L. (2011). Greco-Roman Meteorology and Navigation. In: W.V. Harris and K. Iara (eds.) Maritime technology in the Ancient Economy. Ship-design and Navigation. *Journal of Roman Archaeology Supplementary.* Series 84, Portsmouth.

Taylor, E. G. (1971). *The Haven Finding Art.* London.

Taxel, I. (2013). The Byzantine-Early Islamic Transition on the Palestinian Coastal Plain: A Re-evaluation of the Archaeological Evidence. *Semitica et Classica* 6: 73-106.

Tchernia, A. (2011). *Les Romains et el commerce.* Rome.

_______(1997). Le commerce maritime dans la Méditerranée romaine. In: P. Pomey (ed.) *La navigation dans l'antiquité*. Aix-en-Provence, 116–45.

Tilley, A. (1994a). Sailing to windward in the ancient Mediterranean. *International Journal of Nautical Archaeology* 23(4): 309-313.

Tilley, C. (2004). *The Materiality of Stone: Explorations in Landscape Phenomenology*. London: Blackwell.

_______(1994b). *A Phenomenology of Landscape: Places, Paths and Monuments.* Oxford: Berg.

Thiering, M. (2014). Implicit Knowledge Structures as Mental Models in Common Sense Geography. In: K. Geus and M. Thiering (eds.) *Features of Common Sense Geography: Implicit Knowledge Structures in Ancient Geographical Texts*. Berlin: LIT Verlag, 265–318.

_______(2012). Spatial Mental Models. In: K. Geus and M. Thiering (eds.). *Common Sense Geography.* Preprints, Vol. 426. Berlin: Max Planck Institute for the History of Science, 11–44.

TLG = *Thesaurus Linguae Graece* - https://www.tlg.uci.edu.

Toghil, J. (1994). *A Manual of Heavy Weather Sailing*. Chatswood, New South Wales.

Tomber, R. (2008). *Indo-Roman Trade: From Pots to Pepper*. London: Duckworth.

_______(2007). Rome and Mesopotamia: importers into India in the first millennium AD. *Antiquity* 81, 972-88.

Toomer, G. J. (1984). *Ptolemy's Almagest*. London: Duckworth.

Tozer, H. F. (1897). *History of ancient Geography.* Biblo and Tannen, New York. 2nd ed. with additional notes by M. Cary.

Tsorlini, A. (2011). *Claudius Ptolemy Γεωγραφική _φήγησις 2 (Geographia): Digital analysis, evaluation, processing and mapping the coordinates of Greece, the Mediterranean and the Black Sea, based on 4 manuscripts and 15 printed editions, from Vaticanus Urbinas Gr. 82 (13th cent.) until today. The new Catalogue "GeoPtolemy- θ"*. Dissertation, Aristotle University of Thessaloniki, Greece.

_______(2009). Higher Order Systematic Effect in Ptolemy's Geographia Coordinate Description of Iberia. *e-Perimetron, 4(2):*117-130.

Tsafrir, Y., Di Segni, L., and Green, J. (eds) (1998). *Tabula Imperii Romani: Iudaea-Palestina:* Eretz Israel in the Hellenistic, Roman and Byzantine Periods. Jerusalem: Israel Academy of Sciences and Humanities.

Turnbull, D. (1989). *Maps Are Territories, Science Is an Atlas: A Portfolio of Exhibits*. Geelong: Deakin UP.

US Navy, Hydrographic Office (1943). *Table of distances between ports via the shortest navigable routes*.

Uggeri, G. (2006). Seleucia Pieria: Il Porto Di Antiochia Sull' Oronte. *Journal of Ancient Topography* 16: 143–76.

_______(1996). Stadiasmus Maris Magni: un contributo per la datazione. *L'africa romana. Atti dell'XI Convegno di Studi.* Cartagine, *15-18. dicembre 1994. Ozieri,* 277-285.

Van der Noort, R. and O'Sullivan, A. (2006). *Rethinking wetland archaeology.* London: Gerald Duckworth.

Van Dommelen, P. and Knapp, A.B. (eds.) (2010). *Material connections in the ancient Mediterranean: mobility, materiality and Mediterranean.* London.

Van Paassen, C. (1990). L'eredita della geografia greca classica: Tolomeo e Strabone. In: F. Prontera (ed.) *Geografia e geografi nel mondo antico: Guida storica e critica.* Biblioteca Universale Laterza, 229-273.

_______(1957). *The classical tradition of geography.* Groningen/Djakarta: J.B. Wolters.

Veron, A., Goiran, J.P., Morhange, C., Marriner, N. and Empereur, J.Y. (2006). Pollutant lead reveals the pre-Hellenistic occupation and ancient growth of Alexandria, Egypt. *Geophysical Research Letters* 33: 1-4.

Vidal, J. (2006). Ugarit and the Southern Levantine Sea-Ports. *Journal of the Econonic and Social History of the Orient* 49: 269–79.

Vieweger, D. and Häser, J. (2010). Das "Gadara Region Project". *Der Tell Zerā'a in den Jahren 2007 bis 2009. ZDPV,* 126(1): 1–28.

Vilatte, S. (1991). *L''insularité dans la pensée grecque.* Paris.

Yener, K.A., Edens, C. Harrison, T.P., Verstraete, J. and Wilkinson, T.J. (2000). The Amuq Valley Regional Project, 1995-1998. *American Journal of Archaeology* 104(2): 163-220.

Yon, M. (2006). *The City of Ugarit at Tell Ras Shamra.* Ann Arbor, Michigan: Eisenbraun.

Young, G. (2001). *Rome's Eastern Trade: International Commerce and Imperial Policy, 31 BC- AD 305*. London: Routledge.

Warmington, E. H. (1995). *The Commerce between the Roman Empire and India.*

Wachsmann, S. (2005). The Graveyard of Ships: Tantura Lagoon, Israel. In: G.F. Bass (ed). *Beneath the Seven Seas*. New York and London, 98-99.

Wachsmann, S. (1998). *Seagoing Ships and Seamanship in the Bronze Age Levant*. London.

Wachsmann, S., Kahanov, Y. and Hall, J. (1997). The Tantura B Shipwreck: The 1996 INA/CMS Joint Expedition to Tantura Lagoon. *Institute of Nautical Archaeology (INA) Quaterly* 24 (4):3-15.

Wachsmann, S. and Raveh, K. (1984). A Concise Nautical History of Dor/Tantura. *International Journal of Nautical Archaeology* 13: 223 – 41.

Walker, H.J. (1990). The coastal zone. In: B.L. Turner, W.C. Clark, R.W. Kates, J.F. Richards, J.T. Mathews and W.B. Meyer (eds.) *The earth as transformed by human action: Global andregional changes in the biosphere over the past 300 years.* Cambridge: Cambridge University Press with Clark University.

Walkup, N. (2005). *Eratosthenes and the Mystery of the Stades.* The MAA Mathematical Sciences Digital Library.

Walter, R.C., Buffler, R.T., Bruggemann, J.J., Guillaume, M.M.M., Berhe, S.M., Negassi, B., Libsekal, Y., Cheng, H., Edwards, R.L., von Gosel, R., Neraudeau, D. and Gagnon, M. (2000). Early human occupation of the Red Sea coast of Eritrea during the Last Interglacial. *Nature* 405: 65–9.

Walsh, K. (2014). *The Archaeology of Mediterranean Landscapes: Human-Environment Interaction from the Neolithic to the Roman period.* Cambridge: Cambridge University Press.

Waters, D.W. (1958). *The Art of Navigation in England in Elizabethan and Early Stuart Times*. New Haven, CT: Yale University Press.

Weller, C.H. (1906). The Extent of Strabo's Travel in Greece. *Classical Philology* 1(4): 339-356

Westerdahl, C. (2006). The relationship between land roads and sea routes in the past – some reflections. *Deustsches Schifffahrtsarchiv* 29: 59-114.

_______(1992). The maritime cultural landscape. *International Journal of Nautical Archaeology* 21(1): 5-14.

_______(1991a). Norrlandsleden: The maritime cultural landscape of the Norrland sailing route. In: C.Pedersen (ed.) Aspects of Maritime Scandinavia AD 200-1200. *Proceedings of the Nordic Seminar on Maritime Aspects of Archaeology*, 13-15th March 1989. Roskilde.

_______(1991b). En kulturgrans ur maritim synpunkt. In: V. Nurmi (ed.) Bottnisk Kontakt. *Conference of maritime history in 1990*, Raumo: 33-38.

_______(1990). The maritime itinerary of the tax register of King Valdemar Sejr of Denmark (1202-1241). *Deutsches Schifuhrtsarchiv* 13: 325-75. Bremerhaven.

_______(1989). Norrlandsleden I. Sources of the maritime cultural landscape. A handbook of marine archaeological survey. With a summary. *Arkiv for norrlandsk hembyghforskning, XXIV 1988-89.* Harnosand.

_______(1980a). On oral tradition and place names. *International Journal of Nautical Archaeology* 9(31): 1-29.

_______(1980b). Nagot om aldre maritim kultur. In: *Meddelande XLI-XLII 1978-80*. *Vhterbottens norra fornminnesforening*. *Skellefted museum:* 7-2 I. Skelleftea.

_______(1978). *Marinarkeologisk inventering med utgdngspunkt frdn eft norrlandrkr exempel. C-uppsats, arkeologi*. (Unpublished graduation thesis, 103). University of Stockholm.

White, D. (1966). Excavations at Apollonia, Cyrenaica: Preliminary Report. *American Journal of Archaeology* 70(3): 259-266.

Whitfield, P. (1998). *New Found Lands: Maps in the History of Exploration*. New York: Routledge.

Whitewright, J. (2012). Technological Continuity and Change: The Lateen Sail of the Medieval Mediterranean. *Al-Masaq: Journal of the Medieval Mediterranean*, 24:1, 1-19.

_______(2011a). The potential performance of Ancient Mediterranean sailing rigs. *International Journal of Nautical Archaeology* 40(1): 2-17.

_______(2011b). Efficiency or Economics? Sail Development in the Ancient Mediterranean. In: W.V. Harris and K. Iara (eds.) Maritime Technology in the Ancient Economy: Ship design and navigation. *Journal of Roman Archaeology Supplementary.* Series No. 84, Portsmouth, Rhode Island, 89–102.

_______(2008). *Maritime Technological Change in the Ancient Mediterranean: The invention of the lateen sail* (Unpublished PhD Thesis), University of Southampton.

_______(2007). How fast is fast? Technology, trade and speed under sail in the Roman Red Sea. In: J. Starkey, P. Starkey, and T. Wilkinson (eds.) Red Sea III: Natural resources and cultural connections of the Red Sea. *BAR International Series*, 1661. Oxford, 77-88.

Whittaker, C. R. (2004). *Rome and Its Frontiers: The Dynamics of Empire*. London, Routledge.

_______(1994). Frontiers of the Roman Empire. A social and economic study. Baltimore/London.

Wigley, T.M.L. and Farmer, G. (1982). Climate of the eastern Mediterranean and Near East. In: J.L. Bintliff and W. van Zeist (eds.) Paleoclimate, Paleoenvironment and Human Communication in the Eastern Mediterranean Region in Later Prehistory. *BAR International Series* 133: 37.

Will, E. (1949). La tour funéraire de la syrie et les monuments apparentés. *Syria 25:* 258-312.

Wilson, A. (2011). Developments in Mediterranean shipping and maritime trade from the Hellenistic period to AD 1000. In: D. Robinson and A. Wilson (eds). *Maritime Archaeology and Ancient Trade in the Mediterranean.* Oxford Centre for Maritime Archaeology, Monograph 6, 33–60.

Wood, D. (1992). *The Power of Maps*. New York: The Guilford Press.

Wylie, J. (2007). *Landscape*. London and New York: Routledge.

Zohary, M. (1973). The Geobotanicalfoundations of the Middle East. Stuttgart: Gustav Fisher.

Appendix i: Database of Coastal Sites

Levant Coastal Sites (Ancient & Modern)	**Strabo, *Geographia***	**Mela, *De Chorographia***	**Pliny the Elder, *NH***	**Ptolemy, *GH***	**Anon., *Stadiasmus***	**Modern Locations**	**Latitude (N)**	**Longitude (E)**
Cilician Gates/ Cilicia	Cilicia, 16.2.1	Cilicia, 1:69, p54	Cilicia, 5.18.21	Cilicia, 15.1	Cilician Gates, 153 & 156	near Sarıseki/ Tahsin LÖK terminal/ Gülek Bogazi, S Turkey	36.912445	36.001731
Mount Amanus	Mt. Amanus, 16.2.1	Mt. Amanus, 1:69, p54	Mt. Amanus, 5.18.21	Amanus Mt. 5.15.1	Amanican Gates, 157	Nur Dağları, S Turkey	36.75	36.333333
Issos	Issus, 16.2.1, 8			Issos, 15.2	Issus, 155	near Dörtyol/near Yeniyurt, S Turkey	36.850904	36.140128
Fano					Fano, SMM 154	near Dörtyol, S Turkey	36.808399	36.170425
Baiae (mod)						Payas, S Turkey	36.755579	36.182055
Karayilan (mod)						Karayilan, S Turkey	36.707511	36.185619
Alexandria ad Issum				Alexandria bei Issos, 15.2	Alexandria ad Issus, 152	Indicatte, Iskenderum, S Turkey	36.601555	36.175648
Myriand(r)os		Myriandros, 1:69, p54	Myriandros, 5.18.21	Myriandros, 15.2	Myriandrus, 151	near Büyükdere, S of Indicatte, S Turkey	36.539501	36.034993
Rhosos / Antioch of Pieria	Rhosos, 16.2.8	Rhosos, 1:69, p54	Rhosos, 5.18.21	Rhosos, 5.15.2	Rhosus Bay, 150	Arsuz near Uluçinar, S Turkey	36.416177	35.888873
Rhossic Rock/Mts			Rhosian Mts.. 5.18.21	Rhossic Rock, 15.2		Hinzir Burun, S Turkey	35.783333	36.316667
Burunlu (mod)						Burunlu, S Turkey	36.381387	35.855103
Georgia/Georgiis					Georgia, 149	near Kale, S Turkey	36.283342	35.784272
Pieria Mons	*Piera (Mt.),* 16.2.8					Kızıl Dağ, S Turkey	unknown	unknown
Coryphaeus Mons						Musa Dağ, S Turkey	unknown	unknown
Hypatos (& its river)		Hypatos/river 1:69, p54				Unknown	unknown	unknown
Seleuceia Pieria/ Hydatos Potamoi	Seleuceia Pieria, 16.2.4, 8	Seleucia, 1:69, p54	Seleucia Pieria, 5.67.2	Seleukeia of Pieria, 15.2	Seleucia, 148	Kapisuyu. Port of Antioch of Daphne, S Turkey	36.119233	35.922155
Orontes R	Orontes mouths 16.2.7-8	Orontes 1:69, p54	river Orontes, 5.18	Orontes mouth, 15.3	Orontes River, 147	Nahr el-Asi/Al-Mina, at outlet of R Orontes	36.046472	35.957756
Bytyllion (mod)						near Meydan, S Turkey	36.034456	35.964365
Nymphaion	Nymphaeum (a cove), 16.2.8				Nymphaem, 146	Samandagi Plaji, S Turkey	36.010704	35.976123
Macra Longa (isl)					Macra island, 145	Isle al Hamam ?, Syria	35.904380	35.886299
Damouras/Tamyras R						Kara Douran Dağ	unknown	unknown
Sidonia, Sidon					Sidon, 143	2 km from the isle of Macra, Syria	35.884476	35.880743

Posidium/ Posideion	Poseidium, 16.2.8, 12		Posidium, 5.18	Poseidion, 15.3	Posidium, 142	Ras al Basit, Syria	35.852815	35.826264
Charadrus/ Charadropolis	Charadrus, 14.4.3		Charadrus, 5.18		Chaladropolis, 144	Wadi Qandil/Kara Douran?, Syria	35.727501	35.827005
Polia (cape)					Polia (cape), 141	*Unknown*	unknown	unknown
Pasieria					Pasiera, 140	outlet near Al Shamiyah ?, Syria	35.630980	35.777227
White Harbour/ Leukos Limen					White harbour, 139 & 140	Minet el-Beida, Syria	35.591082	35.746834
Herakleia	Heracleium, 16.2.8, 12		Heraclea, 5.18	Herakleia, 15.3	Heraclea (cape) 138	Ras ibn Hani, Syria	35.609150	35.772124
Laodicea	Laodiceia, 16.2.4, 9, 12, 18	Laodicea, 1:69, p54	Laodicea, 5.18	Laodikeia*, 15.3	Laodicea Ad Mare (& prom.), 137	Latakia, Syria	35.513174	35.769889
Navigable river (?)	Lycus, 12.8.17	Lycos, 1:69, p54	river Lycos, 5.17.20		navigable river, 136	Nahr el-Kalb?/between Jableh and Latakia, Syria	35.436845	35.888249
Tell Tweini (mod)						Tell Tweini, Syria	35.371841	35.935174
Bargylos/Emblonos Mt Mountains			Bargylus, 5.17			Jebel Ansariye, Syria	unknown	unknown
Gabala	Gabala, 16.2.12		Gabale, 5.18	Gabala, 15.3	Gabala, 135	Djebele/Jablé, Jablah, Syria	35.345556	35.922008
Shuksi, Tel Soukas/ Pelleta? (mod)						Tell Sukas, Syria	35.305783	35.918714
small harbour on seashore					small harbour on seashore, 134	unknown	unknown	unknown
Palteni					Palteni, 133	unknown	unknown	unknown
Paltos	Paltus, 16.2.12		Paltos, 5.18	Paltos, 15.3	Paltos (& prom), 130- 132	Arab el-Mulk, at outlet of Nahr es-Sinn, Syria	35.264370	35.924594
Chrysorroas R.						Unknown/ Nahr Barada?, Syria	unknown	unknown
Balanea/ Balanea promontory	Balanea, 16.2.12		Balanea, 5.18	Balaneai, 15.3	Balanea (& prom), 129	Baniyas, Syria	35.188020	35.939962
Maraccas (mod)						near Marqueh, Syria	35.032009	35.891396
Carnus/ Carne	Carnus (arsenal) 16.2.12-3		Carne, 5.18		Carnus, 128	Carné, Tell Qarnum, Syria	34.949830	35.882903
Antarados				Antarados, inland, 15.16	(=Carnus?), 128	Tartous, Syria	34.902661	35.849143
Arados (island)	Aradus, 16.2.13, 15	Parabos/ Arados, 2:90	Arados (island), 5.17.20	Arados (isl), 15.27	Aradus, 128	Arwad, Ruad, Syria	34.858745	35.861896
Enydra	Enydra, 16.2.12					Tell Ghamqe, Syria	34.869970	35.875118
Marathos	Marathus (ruins), 16.2.12-3	Marathos, 1:67, p54	Marathos, 5.17.20	Marathos (inland) 15.16		Amrit, Syria	34.832554	35.908894
islet el-Habbes (mod)						islet of el-Habbes (modern)	34.823364	35.873490

islet Machroud (mod)						islet of Machroud (modern)	34.782959	35.886772
Simyra	Simyra (district), 16.2.12	Simyra, 1:67, p54	Simyra, 5.17.20	Simyra, 15.4		Sumra, Tabbat el-Hammam, Syria	34.747835	35.930044
Tell Kazel, ancient Simyra, Sumur?						river port on Nahr el-Abrache R, Syria	34.737688	35.963915
Cheik Zennad (mod)						Cheik Zennad, Lebanon	34.605007	35.985359
Orthosia	Orthosia, 16.2.12		Orthosia, 5.17.20	Orthosia, 15.4		Ard Arthusi, Lebanon	34.511203	35.952744
Eleutheros R	R. Eleutherus, 16.2.12		R. Eleutheros, 5.17.20	Eleutheros mouth, 15.4		Nahr el-Kebir mouth, Lebanon	34.6281243	36.0743639
Tripolis	Tripolis, 16.2.15	Tripolis, 1:67, p54	Tripolis, 5.17.20	Tripolis, 15.4		Tarabulus/Tripoli, Lebanon	34.458094	35.816817
islet el-Baqar (mod)						Tripoli, islet of el-Baqar	34.457207	35.809198
Tripoli, S bay (mod)						Tripoli, south bay	34.447052	35.814166
Kalamos			Calamos, 5.17.20			Al Qalamoun, Lebanon	34.390131	35.782359
Trieres	Trieres, 16.2.15		Trieris, 5.17.20			Enfé, Lebanon	34.360883	35.729176
Shigata?						Chekka	34.328488	35.723493
Theou Prosopon Pr.	Theoposopon, 16.2.15, 18	Pt. Theuprosopon 1:67, p54		Theuprosopon, 15.4		Ras es-Shaqqa, Lebanon	34.278393	35.660492
Gigarta	Gigartus, 16.2.18		Gigarta, 5.17.20			Zgharta near Tripoli, Lebanon	34.277	35.693911
Botrys	Botrys, 16.2.18	Botrys, 1:67, p54	Botrys, 5.17.20	Botrys, 15.4		Batrun, Lebanon	34.254883	35.655445
Byblos	Byblus, 16.2.18	Byblos, 1:67, p54	Byblos, 5.17.20	Byblos, 15.4		Djubail, Jbeil, Lebanon	34.121477	35.643299
Adonis R	river Adonis, 16.2.19		river Adonis, 5.7.20	Adonis R., 15.4		Nahr Ibrahim mouth, Lebanon	34.0695116	35.6574705
Mountain Climax	Mt. Climax, 16.2.19					Ras en-Naqura, Lebanon	unknown	unknown
Palaibyblos	Palae-Byblys, 16.2.19		Palaebyblos, 5.17.20	Palaebyblos (inland), 15.21		near Jounieh, S of Adonis river, Lebanon	33.985886	35.628705
Berytus/ Col. Iulia Augusta Felix	Berytus, 16.2.18, 22	Berytos, 1:69, p54	Col. Berytus, 5.17.20	Berytos, 15.5		Beyrouth, Beirut, Lebanon	33.899231	35.505065
Leontes R	Leontopolis (town), 16.2.22		Leontos (town), 5.7.20	*Leon mouth,* 15.5		Unknown	unknown	unknown
Balmarchodes (mod)						Deir el-Qal'a, Lebanon	33.857075	35.590020
Magoras R			R. Magoras, 5.17.20			NahrBayrut, Lebanon	33.8683181	35.5313198
Heldua						Khalde, Lebanon	33.820327	35.474910
Damouras/Tamyras R	River Tamyras, 16.2.22					Nahr ed-Damur, Lebanon	unknown	unknown
Porphyrean Polis						near Jiyeh, Lebanon	33.663524	35.413973

Meriyat R						*Uknown*	unknown	unknown
Alsos Asklepiou	grove of Asclepius, 16.2.22					near Hababiye, Lebanon	33.588754	35.382028
Bostrenos/ 'Ascleipeus' R						Nahr Bisri, Lebanon	unknown	unknown
Isle of Zire (mod)						Isle of Zire, Lebanon	33.572761	35.368021
Sidon/Col. Aurelia Pia	Sidon,16.2.15,22, 17.2	Sidon, 1:66, p53-4	Sidon, 5.7.19	Sidon, 15.5	Sidon(ia), 143	Saïda, Lebanon	33.566305	35.370394
Tell el-Bourak						Tell el-Bourak, Lebanon	33.480624	35.319700
Sarepta			Sarepta, 5.7.19			Ras es Shiq near Sarafand, Leb.	33.463644	35.291853
Ad Nonum/ Ornithon Polis (?)	Ornithopolis, 16.2.24		Ortithon, 5.7.19			Adloun, Lebanon	33.412312	35.265542
Litas R	river emptied near Tyre, 16.2.24					Nahr Litani, Lebanon	33.3170681	35.3414298
Tyros/ Tyre/ Col. Septima Severa	Tyre, 16.2.15, 22-24	Tyre, 1:65, p53	Tyre (former isl) 5.7.19	Tyros (isl), 15.5, 15.27		Sur/ Sour, Lebanon	33.276017	35.195344
Palaetyros	Palæ-tyrus, 16.2.24		Palaetyrus, 5.7.19			Ras el-'Ain, Lebanon	33.252904	35.206480
Sinde						near Mansouri, Lebanon	33.179990	35.189762
Album Pr						Ras el-Abyad, Lebanon	unknown	unknown
Alexandroschene						Iskandarouna, Lebanon	33.165814	35.175435
Hammon						South of Iskandarouna, Lebanon	33.145624	35.156751
Misrefot-Yam						at the border of Lebanon-Israel	33.082137	35.100120
Ekdippa			Ecdippa, 5.7.19	Ekdippa, 15.5		Achziv/Akzib, Israel	33.048836	35.099452
Geato R						Unknown	unknown	unknown
Nea Come?						near Shavei Tsion, Israel	32.984838	35.078552
Evron (mod)						Tell Acco, Israel		
Ake/Ptolemais with ancient lighthouse	Ptolemais/ Ace, 16.2.25		Ptolemais/ Ace, 5.7.19	Ptolemais, 15.5		Akko/Acre/islet of Tower of Flies, Israel	32.918629	35.072046
Belus R			river Pacida, or Belus, 5.7.19			Nahar Na'aman, Israel	unknown	unknown
Tel abu Hawam						Haïfa, near R Kishon, Israel	32.793418	35.026763
Sykamina	Sycaminopolis (ruins), 16.2.27		Sycaminon (deserted), 5.17.75	Sykaminon, 15.5		Shiqmona, Haïfa West, Israel	32.815129	34.951176
Tel Megadim (mod)						Tel Megadim, Israel	32.739975	34.947017
Boukolonpolis, with ancient lighthouse	Bucolopolis (ruins), 16.2.27					Athlit, Israel	32.706433	34.934998

Carmel Mons	Mt. Carmel, 16.2.27		Mt. Carmelus, 5.17	Karmelos Mt, 15.5		Hor Carmel, Israel	unknown	unknown
Dor(a)			Dorum (deserted), 5.17	Dora, 15.5		Dor/Burj et Tantura, Nahsholim bay, Israel	32.615948	34.916826
Chorseos R				Chorseas mouth, 15.5		Nahr Daliya/Nahr ed-Difle/Nahr ez-Zerka, Israel	undetermined	undetermined
SYNA M.						near Shuni, Israel	32.531205	34.931769
Krokodeilonpolis	Crocodeilopolis (ruins), 16.2.27		Crocodilon (deserted), 5.17			Tel Tannimin near Tel Mevorach, Israel	32.540124	34.899905
Crocodilon R			Crocodilon river, 5.17			Nahal Tanninim, Israel	32.5487145	34.917413
Caesarea Maritima/ Stratonos Pyrgos	Tower of Strato, 16.2.27		Tower of Strato/ Caesarea, 14.5	Caesarea Stratonis*, 16.2		Qaisariye, Caesarea Maritima, Israel	32.503433	34.888132
Burgatha Port (?)						Giv'at Olga, Israel	32.444345	34.876328
Tel Mikhmoret (mod)						Tel Mikhmoret, Israel	32.402318	34.866152
Natapia near Netanya						Natapia near Netanya, Israel	32.356584	34.853340
Apollonia/ Sozousa			Appolonia, 14.5.14	Appolonia, 16.2		Tel Aviv/Jaffa, Israel	32.195808	34.805914
Tel Michal & Tel Makmish (modern)						near Herzliya Marina, Israel	32.161549	34.790184
Ioppe/ Joppe	Joppe, 16.2.28	Iope, 1:64, p53	Joppe, 14.5.14	Ioppe, 16.2		Yavneh, Israel	32.054303	34.756943
Iamneia Paralios			Jamnia, 14.5.14	Iamnitarum Harbour, 16.2		Yavneh Yam/Minet Rubin, Israel	31.929643	34.696549
Iamneia	Iamneia, 16.2.28		Jamnia (inland), 14.5.14	Iamneia (inland, after Gaza) 16.3		Yibna, Israel	31.878068	34.732257
Gadara/ Gadaris	Gadaris (on the coast), 16.2.29			Gadara (inland), 16.22		Umm Qeis/Tell Jadur near esSalt, Jordan	32.0223409	35.716993
Azotos(Mesogeios)/ Azotos Paralios	Azotus, 16.2.29	Port Azotus, 1:61, p52	Azotus, 14.5.14	Azotos, 16.2		Tel Ashdod/ Minet el Qal'a, Israel	31.771811	34.615269
Maioma Ascalontis						Barnea, near Ashkelon, Israel	31.671562	34.547180
Ascalon	Ascalon, 16.2.29	Ascalon, 1:64, p53	Ascalo, 14.5.14	Askalon*, 16.2		Ashkelon, Israel	31.658725	34.539878
Anthedon			Anthedon (inland) 14.5.14	Anthedon (after Gaza), 16.2		Teda/ Khirbet Teda, S of Gaza, Israel	31.552390	34.452906
Harbour of Gazaei/ Gazaeorum Harbour	harbour of the Gazæi, 16.2.30			Gazaeorum Harbour, 16.2		Port thought to be 4km South of Gaza City	31.499829	34.405132
Gaza	Gaza (inland), 16.2.30	Gaza, 1:64, p53	Gaza (interior), 14.5.14	Gaza (after Rapheia), 16.3		el Ghazze/Gaza, Israel	31.510975	34.458046
Raphia	Raphia, 16.2.31		Raphea (inland) 14.5.14	Rapheia, 16.3		Rafah, Israel	31.329532	34.210501

Table i Database of key coastal sites/features in the case-study region: the Levant. Legend: (mod) = modern, i.e. sites according to modern sources.

Appendix ii: Ancient Authors

	Author	Work	Date	Focus Region	Route(s)
GREEK	**Anonymous**	**Stadiasmus Maris Magni**	3rd/4th AD (c.250-300) But only preserved as 10th AD manuscript	Asia Minor & Africa	1. Alexandria to Pillars of Hercules (i.e. westward along the North African coastline to Libya, where there is a lacuna). 2. Alexandria anti-clockwise to Hellespont, then W to Pillars of Hercules (i.e. after lacuna [Utica], picks up on Levant coast (at Tyre), then round Asia Minor to islands of Aegean, Cyprus, Crete before end.
	Anonymous	Voyage of Hanno	1st half of 6th BC	West African coast	Anticlockwise route of Atlantic coast of ancient Libya (Africa) beyond Pillars of Herakles.
	Anonymous	Periplus Maris Erythraei	c. 1st-mid 3rd AD	Erythraean Sea	Circumnavigation of the Erythraen Sea (encompassing regions of the Red Sea, East Africa, Arabian Gulf and Indian Ocean).
	Agathemerus	A Sketch of Geography in Epitome	1st-3rd AD	Oikoumene	Account of various forms assigned to the earth by earlier writers, treats of the divisions of the earth, seas, islands, winds, and length and shortness of the days; and then lays down the most important distances on the inhabited part of the earth, in stadia.
	Agatharchides	On the Erythraean Sea	before 100 BC	Eryhtraean Sea	African and Arabian coasts of the Red Sea and Yemen.
	Arrian of Nicomedia	Periplus of the Euxine Sea/ Periplous of the Black Sea	uncertain (c. 130s AD)	Black Sea	1. Report of the Author's own Voyage from Trapezus to Dioscurias. 2. Account of the Distances of Places from Byzantium to Trapezus. 3. Distances from Dioscurias, round N. and W. Coasts, to Byzantium.
	Claudius Ptolemy	**Geographike Hyphegesis**	Mid-2nd AD	Oikoumene	Geographic treatise and catalogue of the oikoumene, categorised into separate regions, grouped into three continents, roughly ordered north-west to south-east.
	Cosmas	Christian Topography	c. AD 550	Oikoumene	The Mediterranean, the Nile Valley, Sinai, Palestine, the Persian Gulf, Ethiopia, Eritrea and Socotra, and as far as India and Sri Lanka.
	Dicaerchus	Circuit of the Earth	c. 300 BC	Oikoumene	The *oikoumene* (known world), with explanation of geographic maps
	Dionysius	Description of Greece	2nd AD?	Greece	*Periegetes/* geographical poem as a survey of geography of the *oikoumene*.
	George of Cyprus	Description of the Roman World	7th AD (c. 600–610)	Oikoumene	Begins with Italy, moves anti-clockwise along Mediterranean, from Africa, Egypt and Oriens. NB: fragmented - Balkans are excluded.
	Isidore of Charax	Stations of Parthia	1st BC	Levant & India	Overland caravan route from Antioch (Levant) to borders of India.
	Marcian of Heraclea	Periplus of the Outer Sea	c. 400 AD	Coasts beyond the Mediterranean	Coasts beyond the Mediterranean, including Britain to the west (book 2) and Sri Lanka to the east (book 1), the Indian and Atlantic Oceans.
	Menippus	Periplus of the Euxine Sea	AD 300?	Black Sea (extant)	Mediterranean coast, from N. African coast sailing westwards from Alexandria , and Asiatic portions of the Black Sea.
	Pausanias	Description of Greece	2nd AD	Peloponnese & Greece	Traveller's account of historical and cultural sights in Peloponnese and central Greece. Comprehensive catalogue of temples and shrines in the region; myth and cult practices.
	Pseudo-Scymnus	Circumnavigation of the Earth	c. 90 BC	Oikoumene	Coasts of the Mediterranean, Black Sea and Erythraen Sea regions.
	Pseudo-Skylax	Periplus of Pseudo-Scylax	mid-4th BC	Mediterranean & Black Sea coasts	Begins in Iberia and ends in West Africa, beyond Pillars of Hercules, including Mediterranean, Black Sea and Atlantic coast of N. Africa.

	Strabo	**Geographia**	c. 64/3 BC - AD 23	Oikoumene	*Whole world* clockwise from Spain through Europe to Black Sea - then southward through Asia to end in Africa.
LATIN	Anonymous	Antonine Itineraries	~ AD 280-290 (c. 300 AD)	Roman Empire	From the Straits of Gibraltar to Britain, i.e. from the western extreme of Africa to the northwestern fringe of Europe. NB: an anticlockwise periplus of the Mediterranean from Mauretania to Spain is found in the Antonine Itinerary.
	Anonymous	Bordeaux Itineraries	AD 333	Bordeaux-Jerusalem	1. Clockwise - Distances recorded in leagues (2.22 km) from Bordeaux as far as Toulouse, then in Roman miles (1.48 km). 2. Anti-clockwise à Clockwise - Another itinerary attached to this records a journey from the Holy Land to Chalcedon (Kadikoy), in Asia Minor opposite Constantinople, and back via Nicomedia (Izmit), Ancyra (Ankara), Tarsus, and Tyre. 3. Anti-clockwise - from Heraclea Pontica, via Macedonia, Albania, and E. coast of Italy.
	Anonymous	Dimensuratio Provinciarum	4th/5th AD	Oikoumene	Lists of lands and islands in Roman *oikumene* (their length and width in Roman miles).
	Anonymous	Divisio Orbis Terrarum	4th/5th AD	Oikoumene	Lists of lands and islands in Roman *oikumene* (their length and width in Roman miles).
	Anonymous	Notitia Dignitatum	c. AD 400	Roman Empire, E & W	Anticlockwise geographic order from Africa to Europe (Aegyptus, Oriens, Asiana, Pontica, Thracia), but this structure is not consistently applied.
	Anonymous	Peutinger Map	c. 4th AD ?	Roman Empire	World known to the Romans, with a North orientation, ending with India and Sri Lanka at the right, and likely starting from Britain and the Atlantic coast of mainland Europe and Africa at the left, the side which corresponds to the lost section of the extant map (the surviving far left shows SE England and SW France).
	Anonymous	Ravenna Cosmography	7th/8th AD	Oikoumene	List of c. 5,000 localities/towns in the *oikoumene* (with stops, land journeys, distances).
	Anonymous	Vicarello Goblets	between 1st BC - 1st AD	Gades/Cadiz to Rome	Clockwise from Gades to Rome, with distances in miles 59.
	Avienus	Ora Maritima	4th / 6th BC	Iberia & parts of Gallia	Poem (4th C) based on a journal *Massaliote Periplus* (6th C) – Massaliote travel journey of the coasts of the Iberian Peninsula and parts of the coast of Gallia.
		Dura Parchment (fragmentary)	mid-3rd AD	Black sea coast	Shield decoration depicting a maritime itinerary along the Black Sea - clockwise from Odessos at the top, to Arta at the bottom. NB: distances in mil(ia), i.e. Roman miles.
	Pliny the Elder	**Natural History**	AD 23-79	Oikoumene	1. Anticlockwise of Europe along its Mediterranean and Black Sea shores, before heading up the Danube and down the Rhine. 2. Anti-clockwise periplus of southern and eastern coast of Mediterranean and Aegean around to Black Sea and across to Persia. 3. Clockwise periplus of Oceanus back around to west Africa. NB: Other provinces anti-clockwise, even in W. Mediterranean such as Hispania Baetica.
	Pomponius Mela	**Chorographia**	c. AD 43	Oikoumene	Anticlockwise periplus of Mediterranean from the Pillars of Hercules (Straits of Gibraltar), followed by a clockwise periplus of the outer ocean back to the Pillars. Cf. Mela – the anticlockwise *periplous* of the Mediterranean from Mauretania to Spain is found in the Antonine Itinerary.

Table ii. List of key ancient Greek & Roman authors dealing with geographic and navigational aspects of the *oikoumene.*

Appendix iii: Glossary of Cartographic Terminology -cf.Ch.3.3

- **'Periploi' – Maritime Itineraries**

The Greek *periplous* (περίπλους or *periplus* in Latin) means 'sailing around' or 'circumnavigation'.[252] They were analogous to the later land itineraries*,* but instead referred to records of coastal voyages and followed the natural order of the coastline of a particular route, or an imagined journey. They served as guidebooks of sea journeys, with accounts including useful information on place-names and distances between ports, harbours and anchorages on maritime trade routes, as well as visible landmarks and available shelter to facilitate navigation. Such descriptions could include information about winds, sailing seasons and potential dangers encountered while sailing, as well as the geography and ethnography of the littoral regions (e.g. towns and tribes by the coast or along banks of navigable rivers or islands) and sometimes descriptions on trade products, local resources, and hinterland and inland regions. Islands were often referenced at the end of each regional description. The majority of extant *periploi* documents provide the reader mostly with distances, rather than directions (Berggren and Jones 2000), which were generally measured in stades, or sometimes in days of sail. The style and function of these itineraries varied depending on particular needs, targeted audience, and their spatial-temporal setting. The extant examples of this genre of *periploi* all focus on a particular maritime unit suitable to the geographical scope of the time: the coasts of the Mediterranean Sea (Inner Sea/ Great Sea); Atlantic Ocean (Outer Ocean); Black Sea (Euxine); and Erythraean Sea (i.e. Red Sea, Persian Gulf and Indian Ocean).

[252] Diller 1952 (1986):102-46; Janni 1984: esp. 41-9, 120-30; Dilke 1984:112-144; Casson 1989; Prontera 1992.

- **'Itineraria' – Land Itineraries**

The Latin *itinerarium* (pl. *itineraria*), derived from the word *iter* meaning 'journey', were linear reports for travellers, including military soldiers, which contained descriptions regarding stations en-route and the distances between them (see 4.4.5).[253] They reflect a different view and way of understanding space in comparison to Ptolemy's 'top-down' perspective (Salway 2001:34, 46; Isaksen 2013:60). *Itineraria* generally recorded information about routes linked to this standard imperial road system, with the start and end points and intervening stages en-route listed with the appropriate mileages between stages indicated. They served various purposes, used for legal records, strategic/military documents, scholarly research, and as a guide planning routes for those travelling within the Roman Empire (Dilke 1987:252-57).

- **'Maps'**

There was no explicitly defined word for map in antiquity (Cole 2010:204). The word 'chart' derives from the Latin *carta*, corresponding to a formal document, which originates from the Greek χάρτης (chartes, or 'papyrus'). The word 'map' is derived from the Latin *mappa*, which means tablecloth or napkin (Harley and Woodward 1987: xvi). In ancient Greek, the word *pinax* is generally used to designate a 'map'. A *pinax* refers to "a tablet (of wood, metal, or stone), then the "plate" (in the bibliographical sense, meaning a "plate" of papyrus or parchment) on which forms are drawn, painted, or engraved" (Jacob 2006:18). The wooden plaques were often used for public exhibitions, placed in walls of monuments or porticos for display (Aujac 1987:135). The *pinax* is often interpreted, depending on the context, as a writing tablet and/or a geographical map (Jacob 2006:18). The Latin language adopts the Greek *pinax* (or its translation), in the form of the word *tabula*. Latin also uses terms *orbis terrarium* or *forma orbis terrarium*, whereby *forma* represents the visual configuration or contour, while *orbis* refers to the globe, representing totality and order (Jacob 1987:19). Scholars generally accept the definition of maps as "graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world" (Harley and Woodward 1987:1),[254] encompassing aspects of celestial cartography and cosmography. This definition will be adopted throughout this thesis.

---

[253] For contributions regarding itineraries, see Arnaud (1988:302-321; 1993:33-47; 2005); Bauer (1905); Brodersen (2001:7-21; 2003); Campbell 2000; Adams and Laurence (2001:67-94); Harley and Woodward (1987); Salway (2001:22-66, 2004:43-96, 2005:119-135); Talbert (2007:256-270, 353-366, 221-230, 2010); Talbert and Unger (2008).
[254] Overview of cartography advances: J.B. Harley and D. Woodward (1987)'s *The History of Cartography,* with a focus on ideological contexts of geographical knowledge by reading 'between the lines of the map' (Harley 1992).

➢ **'Chorography' vs. 'Geography'**

Chorography is a cartographic tradition[255] and the origin of its Greek name χωρογραφία (*chorographia*) is a combination of χώρα (*chora* = country) or χῶρος (*choros* = space/place) with γραφια (*graphia*/*graphein* = to write, record, draw, describe).[256] It is commonly defined as a regional representation of space, though in practice this is inconsistent, as illustrated next.

Geography (*geographia*), in literal terms, is defined as a written/drawn (*graphia*) description of the world (*ge* = earth).[257] In ancient terms, geography is distinguished by Ptolemy (*GH* 1.1) as dealing with the known world as an overall single entity, including general outlines and borders such as gulfs, countries, noteworthy cities, peoples, and rivers. While chorography addresses the world on a regional level, requiring landscape drawings and close attention to "even the most minute features" of individual localities and features (Ptol., *GH* 1.1):

> "**Regional cartography [chorography] deals above all with the qualities** rather than the quantities of the things that it sets down; it attends everywhere to likeness, and not so much to proportional placements. **World cartography [geography], on the other hand, [deals] with the quantities** more than the qualities, since it gives consideration to the proportionality of distances for all things, but to likeness only as far as the coarser outlines [of the features]… [Chorography] has no need of **mathematical method**...**[in geography] this element takes absolute precedence**"

World geography is essentially a drawn reproduction of the known world and its connected features. It is also worth drawing out some apparent contradictions in these definitions. For instance, if chorography and geography is about producing imagery, why are the works of Mela and Strabo presented in textual form? It seems in antiquity different people used these terms in different ways. For some authors, the use and applications of the terms are more clearly laid out, while with others it is less apparent. Therefore, through a closer examination of the range of sources, it seems the term *chorographia* was also used in relation to works addressing the whole *oikoumene* (Arnaud 2014:38; Nicolet 1988), and, hence, "the difference is not to be sought in the object but in the pattern of presentation (Arnaud 2014:38).

---

[255] This tradition is preserved, though not explicitly, in classical works: e.g. Homer, Hippocrates, Herodotus, Plato, Artistotle, Strabo, Polybius, Pliny, Pausanias and Ptolemy - also in fragments of less known/lost sources (Rohl 2012).
[256] Rohl (2012)'s '*Chorography: History, Theory and Potential for Archaeological Research*'.
[257] Though both chorographic and geographic notions of space are said to date as far back as Homer (Lukermann 1961:194-210), the best extant definitions of these terms are preserved in the works of Strabo and Ptolemy.

➢ Ancient vs. Modern Conceptions of Geography

It is worth noting that the actual term 'geography' was not clearly defined in antiquity and there were no specialised 'geographers' as we perceive them today.[258] Geographical notions and discussions were addressed by a range of authors, from educated historians, philosophers and astronomers, to poets and travellers. However, an academic discipline of geography in our modern sense did not develop in the West until the nineteenth century (Dueck 2012:2). The terms for 'geography' and 'map' were often integrated within other branches of Greek learning, such as *mythos* (myth), *historia* (history), or *physiologia* (natural science). Therefore, when using the terms 'geography' and 'geographers' it is important to be aware of this and differentiate between their modern and ancient meanings. These ancient authors focused on studying solely the inhabited territories, because uninhabited or deserted parts of the world were not considered significant (nor accessible) and were thus excluded from the framework of the known world, which 'geographers' classified as *oikoumene* (*oikia,* 'habitation') (Dueck 2012:4-5; Cole 2010:203). Although they did not possess advanced technological tools, ancient 'geographers' developed complex theories and calculations to measure, represent and understand the world known to them. Ancient texts written during the Roman period generally classified as geographies, such as Strabo and Ptolemy's works, tended to include the following range of topics in their discussions: topographical descriptions, lists of places and geographic features (with their coordinates/distances between them), land and sea itineraries, reports from merchants and mariners, as well as theories of cartography, geography and the relationship between mapping the heavens and the terrestrial regions. Certain 'geographers' (e.g. Ptolemy), through a combined knowledge of astronomy, mathematics and geography, focused on determining the shape, extent and size of the *oikoumene* and its continents, the measurements, positions and distances of geographic locations/features, and the theories of map-making, projections and climatic zones (Dueck 2005). In general (as Strabo makes clear), geography may occasionally be the focus of a particular treatise, but it is rarely more than the temporary focus of a particular author.

As there seems to have been no clear definition in antiquity for map or geographer (nor cartographer/mapmaker), context is key. Taking all this into account, in this thesis the term 'geographers' refers to ancient authors involved in geographic thought and dealing with geographic and navigational matters of the *oikoumene*.

[258] Clarke (1999) discusses the difficulty of defining geography in the past. Another insightful source is Nicolet 1991, discussing a range of sources that reflect the various perceptions regarding geography during the Roman period.

Appendix iv: Ancient Authors' Passages of the Levant

A. STRABO OF AMASIA's *GEOGRAPHIA* (cf.Ch.4.1.2)

SYRIA: Natural Boundaries (Geog. 16.2)

"On the north by Cilicia and the mountain Amanus…on the east…by the Euphrates…on the south, by Arabia Felix and Egypt; on the west, by the Egyptian and Syrian Seas as far as Issus." (16.2.1).

"…the whole of the country above the territory of Seleuceia, extending approximately to Aegypt and Arabia, is called Coele-Syria, but peculiarly the tract bounded by Libanus and Antilibanus, of the remainder one part is the coast extending from Orthosia as far as Pelusium, and is called Phœnicia, a narrow strip of land along the sea; the other, situated above Phœnicia in the interior between Gaza and Antilibanus, and extending to the Arabians, called Judæa." (16.2.1).

Strabo's Coastline Description of Syria:

SELEUCIA IN PIERIA (16.2.8):

"[Seleucia]…a Tetrapolis, owing to the outstanding cities in it, for it has several. But the largest are four: Antiocheia near Daphnê, Seleuceia in Pieria, and also Apameia and Laodiceia; and these cities, all founded by Seleucus Nicator, used to be called sisters, because of their concord with one another… to the Tetrapolis, Seleucis was also divided into four satrapies, as Poseidonius says, the same number into which Coelê-Syria was divided, though Mesopotamia formed only one satrapy. Antiocheia is likewise a Tetrapolis, since it consisted of four parts" (*Geog.* 16.2.3-4). Antiochia is said to be the largest of these and the metropolis of Syria (*Geog.* 16.2.5).

"After these places, near the sea, are Seleuceia and Pieria, a mountain continuous with the Amanus and Rhosus, situated between Issus and Seleuceia. Seleuceia formerly had the name of Hydatopotami (rivers of water). It is a considerable fortress, and may defy all attacks; wherefore Pompey, having excluded from it Tigranes, declared it a free city."

NYMPHAEUM, CASIUM, POSEIDIUM & HERACLEIA (16.2.8):

"Still further on from Seleuceia are the mouths of the Orontes, then the Nymphæum, a kind of sacred cave, next Casium, then follows Poseidium a small city, and Heracleia."

LAODICEIA (16.2.9):

"Then follows Laodiceia, situated on the sea; it is a very well-built city, with a good harbour; (…). The whole mountain overhanging the city is planted almost to its summit with vines. The summit of the mountain is at a great distance from Laodiceia, sloping gently and by degrees upwards from the city; but it rises perpendicularly over Apameia."

POSEIDIUM, HERACLEIUM & GABALA (16.2.12):

"…the small cities, Poseidium, Heracleium, and Gabala."

PALTUS, BALANEA, CARNUS, ENYDRA, MARATHUS & SIMYRA (16.2.12):

"…the maritime tract [παρ̣αλία] of the Aradii, where are Paltus, Balanea, and Carnus, the arsenal of Aradus, which has a small harbour; then Enydra, and Marathus, an ancient city of the Phœnicians in ruins. The Aradii divided the territory by lot. Then follows the district Simyra."

ORTHOSIA & Eleutheros River (16.2.12):

"Continuous with these places is Orthosia, then the river Eleutherus, which some make the boundary of Seleucis towards Phœnicia and Cœle-Syria."

ARADUS (16.2.13):

"Aradus is in front of a rocky coast without harbours, and situated nearly between its arsenal (Carnus) and Marathus. It is distant from the land 20 stadia. It is a rock, surrounded by the sea, of about 7 stadia in circuit, and covered with dwellings. The population even at present is so large that the houses have many stories. It was colonized, it is said, by fugitives from Sidon."

TRIPOLIS (16.2.15), including Theoprosopon and Trieres:

"After Orthosia and the river Eleutherus is Tripolis, which has its designation from the fact of its consisting of three cities, Tyre, Sidon, and Aradus. Contiguous to Tripolis is Theoprosopon, where the mountain Libanus terminates. Between them lies a small place called Trieres."

"…lying nearly parallel to each other; the commencement of the ascent of both these mountains, Libanus and Antilibanus, is a little way from the sea; Libanus rises above the sea near Tripolis and Theoprosopon, and Antilibanus, above the sea near Sidon. They terminate somewhere near the Arabian mountains (…)" (16.2.16).

BOTRYS & GIGARTUS (16.2.18):

"Botrys and Gigartus and the caves by the sea and the castle that was erected on Theoprosopon"

BYBLOS & BERYTUS (16.2.18-9), including Adonis R., Climax Mt., Palae-Byblus, Lycus R.

"Byblus, the royal seat of Cinyrus, is sacred to Adonis. Pompey delivered this place from the tyranny of Cinyrus, by striking off his head. It is situated upon an eminence at a little distance from the sea."

"After Byblus is the river Adonis, and the mountain Climax, and Palæ-Byblus, then the river Lycus, and Berytus."

"…a large portion of the territory of Massyas, as far as the sources of the Orontes. These sources are near Libanus, the Paradeisus, and the Egyptian Fort near the district of Apameia. These places lie near the sea."(16.2.19).

PHOENICIA[259]

"Having described Cœle-Syria properly so called[260], we pass on to Phœnicia, of which we have already described the part extending from Orthosia to Berytus." (16.2.22).

SIDON (16.2.22):

"Next to Berytus is Sidon, at the distance of 400 stadia. Between these places is the river Tamyras, and the grove of Asclepius and Leontopolis. …Sidon is situated upon a fine naturally-formed harbour on the mainland."

TYRE (16.2.22-3):

"Next to Sidon is Tyre, the largest and most ancient city of the Phœnicians. This city is the rival of Sidon in magnitude, fame, and antiquity, as recorded in many fables." (12.3.33) / "Tyre is wholly an island, built nearly in the same manner as Aradus. It is joined to the continent by a mound, which Alexander raised, when he was besieging it." (16.2.23)

Ortnithopolis, unnamed river, & Palae-Tyrus (16.2.24):

"Tyre is distant from Sidon not more than 200 stadia. Between the two is situated a small town, called Ornithopolis, (the city of birds); next a river which empties itself near Tyre into the sea. Next after Tyre is Palae-tyrus (ancient Tyre), at the distance of 30 stadia."

PTOLEMAIS/ACE (16.2.25):

"Then follows Ptolemaïs, a large city, formerly called Ace… Between Ace and Tyre is a sandy beach, the sand of which is used in making glass."

---

[259] It is worth noting that Strabo's account of the coast of Phoenicia is far more correct than that of the interior.
[260] This seems to implicitly suggest that the wider region was informally called Coele-Syria.

TOWER OF STRATO (16.2.27):

"After Ace one comes to the Tower of Strato, which has a landing-place for vessels…Between the two places is Mt. Carmel, as also towns of which nothing more than the names remain—I mean Sycaminopolis, Bucolopolis, Crocodeilopolis, and others like them. And then one comes to a large forest." (16.2.27)

JUDAEA

JOPPE, including the village Iamneia (16.2.28):

"Joppe, where the coast of Egypt, which at first stretches towards the east, makes a remarkable bend towards the north. In this place, according to some writers, Andromeda was exposed to the sea-monster." / "It is sufficiently elevated; it is said to command a view of Jerusalem, the capital of the Jews, who, when they descended to the sea, used this place as a naval arsenal. … Carmel, and the forest, belonged to the Jews. The district was so populous that the neighbouring village Iamneia, and the settlements around, could furnish forty thousand soldiers."

GADARIS, AZOTUS & ASCALON (16.2.29):

"In the interval is Gadaris, which the Jews have appropriated to themselves, then Azotus and Ascalon. From Iamneia to Azotus and Ascalon are about 200 stadia." (16.2.29)

HARBOUR OF THE GAZAEI (16.2.30):

"Next and near Ascalon is the harbour of the Gazæi…was once famous, but was razed by Alexander, and remains uninhabited." (16.2.30). / "Jerusalem is near the sea, which, as we have said, may be seen from the arsenal of Joppa. These districts (of Jerusalem and Joppa) lie towards the north" (16.2.34).

RAPHIA & RHINOCOLURA (16.2.31):

"Next to Gaza is Raphia, where a battle was fought between Ptolemy the Fourth and Antiochus the Great. Then Rhinocolura, so called from the colonists, whose noses had been mutilated."

BORDER REGION:

"The whole country from Gaza is barren and sandy, and still more so is that district next to it, which contains the lake Sirbonis, lying above it in a direction almost parallel to the sea, and leaving a narrow pass between, as far as what is called the Ecregma. The length of the pass is about 200, and the greatest breadth 50 stadia. The Ecregma is filled up with earth. Then follows another continuous tract of the same kind to Casium, and thence to Pelusium." (16.2.32)

B. POMPONIUS MELA's *DE CHOROGRAPHIA* (cf.Ch.4.1.3)

"Asia's coast descends in banks with the bed of the Nile River into the sea, and for a long time it stretches out its shores in conformity with that sea's advance. Then the coastline directly confronts the sea as the sea approaches. The shoreline extends, for the first time, in a curve with a huge sweep. After that, it again curves obliquely to the Bosphorus. …" (Mela 1:10, p36). / "Arabia, with its narrow coastline, is contiguous with the shores that follow. From there, as far as that bend we described above, is Syria. On that very bend is Cilicia, but in addition, Lycia and Pamphylia, Caria, Ionia, Aeolis, and the Troad all the way up to Hellespont." (Mela 1:14, p38).

AZOTOS (1:14)

"On this side, except where it is heightened by Mt. Casius [El Kas], Arabia is flat and barren and admits Port Azotus [Ashdod] as a trading place for their own wares."

SYRIA

"Syria holds a broad expanse of the littoral, as well as lands that extend rather broadly into the interior, and it is designated by different names in different places. For example, it is called Coele, Mesopotamia, Judaea, Commagene, Sophene" (1:62, p52).

PALESTINE

"It is Palestine at the point where Syria abuts the Arabs, then Phoenicia, and then – where it reaches Cilicia – Antiochia, which was powerful long ago and for a long time, but which was most powerful by far when Semiramis held it under her royal sway" (1:63, p52).

GAZA (1:63)

"In Palestine, however, is Gaza, a mighty and very well fortified city. This is why the Persians call it their treasury (and from that fact comes the name)…" (1:63, p52)

ASCALON (1:63)

"Ascalon is no less important a city." (1:63, p52)

IOPE (1:63)

"Iope was founded, as they tell it, before the flood. Ioppe is where the locals claim that Cepheus was king, based on the proof that particular old altars – altars with the greatest taboo – continue to bear an inscription of that man and his brother Phineus… they even point out the huge bones of the sea-monster as a clear reminder of Andromeda, who was saved by Perseus." (1:63, p52)

PHOENICE

TYRE (1:65)

"In Phoenicia is Tyre [Sour], once an island, but now tied to the mainland, because siegeworks were thrown up by Alexander, who at one time assailed it" (1:65, p53).

SIDON (1:66)

"Villages occupy the upper coast, along with still-wealthy Sidon, the most important of all the maritime cities before it was captured by the Persians" (1:66, p53-54).

BYBLOS & BORTRYS (1:67)

"From it to Point Theuprosopon [Grk. Face of God; Cape Madonna/Ras es-Saq'a] there are two towns, Byblos [Jbail] and Botrys [Batroun]" (1:67, p54).

TRIPOLIS (1:67)

"Farther on there were once three towns, each separated from the next by a single stade, now the place is called Tripolis [Grk., Three-Cities; Trablous] from the number of those towns."

SIMYRA & MARATHUS (1:68)

"Then comes Simyra, a military post, and Marathos, a not obscure city." / "From then on, Asia is no longer sideways to the sea, but runs directly into it. Asia forms a tremendous gulf with the unbent extension of its littoral. Wealthy peoples live around the gulf, and the location makes them rich, because the fertile district, perforated by navigable riverbeds, exchanges and combines, in a ready traffic, the diverse riches of sea and land" (1:68, p54).

ARADOS (2:90)

"Parabos [Arados] in Phoenice est parva et quantum patet tota oppidum, frequens tamen, quia etiam super aliena tecta sedem ponere licet." (2:90).

ANTIOCHA

SELEUCIA, HYPATOS, BERYTOS, LAODICEA, RHOSOS (1:69)

"On the gulf is the remainder of Syria, to which the name of Antiocha applies, and on its shore are the cities Seleucia [Kabousi], Hypatos, Berytos [Beyrouth/Beirut], Laodicea [Al Ladhiqiyah/Latakia], and Rhosos, as well as the rivers that go between these cities, the Lycos [Kelb], the Hypatos, and the Orontes [Asi]; then comes Mt. Amanus [Elma Dagi] and, right after it, Myriandros and the Cilicians" (1:69, p54).

C. PLINY THE ELDER'S *NATURALIS HISTORIAE* (cf.Ch.4.1.4)

Coastline Description: Syria

"Syria occupies the coast, once the greatest of lands, and distinguished by many names; for the part which joins up to Arabia was formerly called Palæstina, Judæa, Cœle, and Phœnice. The country in the interior was called Damascena, and that further on and more to the south, Babylonia. The part that lies between the Euphrates and the Tigris was called Mesopotamia, that beyond Taurus Sophene, and that on this side of the same chain Comagene. Beyond Armenia was the country of Adiabene, anciently called Assyria, and at the part where it joins up to Cilicia, it was called Antiochia. Its length, between Cilicia and Arabia, is 470 miles, and its breadth, from Seleucia Pieria, to Zeugma, a town on the Euphrates, 175. Those who make a still more minute division of this country will have it that Phœnice is surrounded by Syria, and that first comes the maritime coast of Syria, part of which is Idumæa and Judæa, after that Phœnice, and then Syria. The whole of the tract of sea that lies in front of these shores is called the Phœnician Sea." (*NH* 5.14).

PALESTINA

"…Ostracine, at a distance of sixty-five miles from Pelusium, is the frontier town of Arabia. After this, at the point where the Sirbonian Lake becomes visible, Idumæa and Palæstina begin."

RHINOCOLURA, RAPHEA, GAZA, ANTHEDON (5.14)

"The towns are Rhinocolura, and, *in the interior*, Rhaphea, Gaza, and, *still more inland,* Anthedon: there is also Mount Argaris." (5.14; cf.Ch.6.2.3-4)

ASCALO, AZOTUS, TWO JAMNIAE, JOPPE (5.14)

"Proceeding along the coast we come to the region of Samaria; Ascalo, a free town, Azotus, *the two* Jamniæ, one of them in the interior and Joppe, a city of the Phœnicians, which existed, it is said, *before the deluge* of the earth. It is situated on the slope of a hill, and in front of it lies a rock, upon which they point out the vestiges of the chains by which Andromeda was bound. Here the fabulous goddess Ceto is worshipped." (5.14; cf.Ch.6.2.4)

APOLLONIA, TOWER OF STRATO/CAESAREA (5.14)

"Next to this place comes Apollonia, and then the Tower of Strato, otherwise Cæsarea, built by King Herod, but now the *Colony of Prima Flavia*, established by the Emperor Vespasianus: this place is the *frontier town* of Palæstina, at a distance of 188 miles from the confines of Arabia; after which comes Phœnice." (5.14).

PHOENICE

CROCODILON, DORUM, SYCAMINON (5.17)

"We must now return to the coast and to Phœnice. There *was formerly a town [oppidum]* here known as Crocodilon; there is still river of that name: Dorum and Sycaminon are the names of cities *of which the remembrance only exists*. We then come to the Promontory of Carmelus, and, upon the mountain, a town of that name, formerly called Acbatana." (5.17; Ch.6.2.3-4)

RIVER PACIDA/BELUS (5.17)

"…river Pacida, or Belus, which throws up on its narrow banks a kind of sand from which glass is made: *this river flows from the marshes of Cendebia*, at the foot of Mount Carmelus." (5.17)

PTOLEMAIS, ECDIPPA, WHITE PROMONTORY (5.17)

"Close to this river is Ptolemais*, formerly called Ace, a colony* of Claudius Cæsar; and then the town of Ecdippa, and the promontory known as the White Promontory." (5.17)

TYRE & PALAETYRUS (5.17)

"We next come to the city of Tyre, *formerly an island, separated from the mainland by a channel of the sea*, of great depth, 700 paces in width, *but now joined* to it by the works which were thrown up by Alexander when besieging it,—the Tyre so famous in ancient times for its offspring, the cities to which it gave birth, Leptis, Utica, and Carthage… At the present day, all her fame is confined to the *production of the murex and the purple*. Its circumference, including therein Palætyrus, is nineteen miles, the place itself extending twenty-two stadia." (5.17)

SAREPTA, ORNITHON, SIDON (5.17)

"The next towns are Sarepta, and Ornithon, and then Sidon, famous for its manufacture of glass, and the parent of Thebes in Bœotia. In the rear of this spot begins the chain of Libanus, which extends 1500 stadia, as far as Simyra; this district has the name of Cœle Syria. Opposite to this chain, and separated from it by an intervening valley, stretches away the range of Antilibanus, which was formerly connected with Libanus by a wall. Beyond it, and lying in the interior, is the region of Decapolis, and, with it, the Tetrarchies …and the whole expanse of Palaestina." (5.17)

FROM BERYTUS TO ARADOS (5.17)

"On the coast, again, and lying beneath Libanus, is the river Magoras, the colony of Berytus, which bears the name of *Felix Julia,* the town of Leontos, the river Lycos, Palæbyblos, the river Adonis, and the towns of Byblos, Botrys, Gigarta, Trieris, Calamos, Tripolis, inhabited by the Tyrians, Sidonians, and Aradians; Orthosia, the river Eleutheros, the towns of Simyra and Marathos; and opposite, Arados, a town seven stadia long, on an island, distant 200 paces from the mainland. After passing through the country in which the before-named mountains end and the plains that lie between, Mount Bargylus is seen to rise." (5.17)

FROM CARNE TO POSIDIUM (5.18)

"The towns are, Carne, Balanea, Paltos, and Gabale; then the promontory upon which is situate the free town of Laodicea; and then Diospolis, Heraclea, Charadrus[261], and Posidium**"** (5.18)

SYRIA ANTIOCHIA

"We then come to the Promontory of Syria Antiochia. In the interior is the free city of Antiochia itself, surnamed Epidaphnes, and divided by the river Orontes." (5.21)

SELEUCIA (5.22)

"On the *promontory* is Seleucia, called Pieria, *a free city*. Beyond it lies Mount Casius, a different one from the mountain of the same name which we have already mentioned. *The height of this mountain is so vast*, that, at the fourth watch of the night, you can see from it, in the midst of the darkness, the sun rising on the east; and thus, by merely turning round, we may at one and the same time behold both day and night" (5.22)

RHOSOS & MYRIANDROS (5.22)

"Upon this coast there is the river Orontes, which takes its rise near Heliopolis, between the range of Libanus and Antilibanus. The towns are, Rhosos, and, behind it, the Gates of Syria, lying in the space between the chain of the Rhosian mountains and that of Taurus. On the coast there is the town of Myriandros, and Mount Amanus, upon which is the town of Bomitæ. This mountain separates Cilicia from Syria." (*NH* 5.22)

[261] Pliny incorrectly positions Charadrus in Syria, when it was in fact in Cilicia, between Platanus and Cragus.

D. CLAUDIUS PTOLEMY'S *Geographike Hyphegesis* (cf.Ch.4.1.5)

SYRIA (*GH* 5.15)

***In Syria* (5.15.2-3)**: Alexandreia by Issus/Iskenderum; Myriandrus/Ada Tepe; Rhosos/Uluçinar; Rhossic Rock/Hinzir Burun; Seleukeia of Pieria/Kapisuyu; mouth of Orontes/Nahr el-Asi; river sources; Poseidion/Bassit; Heracleia/Ugarit; Laodikeia/Latakia; Gabala/Djebele; Paltos/Arab el-Mulk; Balaneai/Baniyas.

Next follows Phoenice, which according to Ptolemy, extended from the mouth of the Eleutheros River as far as the mouth of the Chorseus River beyond Mount Carmel and Dora.

***In Phoenicia* (5.15.4-5):** mouth of the Eleutheros/Nahr el-Kebir; Simyra/Sumra; Orthosia/Ard Arthuşi; Tripolis/Tarabulus; Kap Theuprosopon/Ras es-Saqqa; Botrys/Batrun; Byblos/Djubail; mouth of the Adonis/Nahr Ibrahim; Berytos/Beirut; mouth of the Leon; Sidon/Saida; Tyros/Sur; Ekdippa/Achziv; Ptolemais/Akkon; Sykaminon/Haifa; Carmel Mountain/Hor Karmel; Dora/Nasholim; mouth of the Chorseas/Nahr ez-Zerka.

***Islands near Syria* (5.15.27):** Arados/Ruad; and near the mainland, Tyrus/Sur.

***Inland towns in Casiotis* (5.15.16):** Antiocheia* on the Orontes/Antakya on the Nahr el-Asi; Daphne/Harbiye; Bakatailloi/Urde; Lysia (Audia)/Qalaat Burzey; Seleukeia in Belos/Sqelebiye; Larissa/Shaizar; Epiphaneia/Hamah; Raphanaeai/Rafniya Legio III 'Gallica'; Antarados/Tartuş; Marathos/Amrit; Mariame/Marjamin; Mamuga (see Ch.7.2.2.2 for further discussion).

PALESTINA - JUDAEA (*GH* 5.16)

***In Palestina-Judaea* (5.16.2):** Caesarea Stratonis/Qaisariye; Appolonia/Herzliyya; Ioppe/Tel Aviv; Iamnitarum harbour/Yavneh; Azotos/Asdod; Askalon*/Ashkelon; Gazaeorum harbour/ Gazza; Anthedon/Teda. He then lists rivers briefly (5.16.3).

Inland towns (subdivisions): in Galilaea (5.16.4); Samaria (5.16.5); Judaea, to the west of the River Jordan (5.16.6-8); Judaea, to the east of the Jordan River (5.16.9); in Idumaea (5.16.10), all of which is west of Jordan River. In Judaa, west of the River Jordan (5.16.6), Ptolemy lists towns such as Rapheia (Rafiah), Gaza (Gaza) and Sebaste (Sebastiya).

E. ANONYMOUS' *STADIASMUS MARIS MAGNI* (cf.Ch.4.1.6)

Coasts of Syria and Asia Minor

SYRIA

ARADUS TO CARNAE (*SMM* 128)

"[From Aradus?] to Carnae 24 stades; it has an open anchorage; there are berths for small ships; put in carefully."

CARNAE TO BALANEA (*SMM* 129)

"From Carnae to Balanea promontory as it is called, 200 stades. [From Balanea] to village [of Balanea * stades.]"

BALANEA TO PALTUM (*SMM* 130-132)

"From Balanea promontory to Paltum promontory 90 stades. From Paltum promontory rounding the Rocky promontory is 10 stades. From the Balanea cape straight to Paltum, 200 stades."

TOTAL: PTOLEMAIS TO PALTUM (*SMM* 132)

"The total distance from Ptolemais as you sail by the shore to Paltum is 2000 stades."

SYRIA COELE

PALTUM, PALTENI, UNAMMED HARBOUR (*SMM* 133-134)

"From Paltum to the village of Palteni 30 stades. From Palteni to the harbor on the seashore, where there is a gorge, 20 stades."

GABALA TO NAVIGABLE RIVER (*SMM* 135-136)

"From Palteni to Gabala 30 stades. From Gabala to the navigable river which is called * 40 stades"

NAVIGABLE RIVER TO LAODICEA (*SMM* 137)

"From the navigable river to the cape, upon which lies the city Laodicea 200 stades. From that river to Balanea 70 stades. From Balanea to Laodicea cutting straight toward the NE under a south wind, 200 stades."

LAODICEA TO HERACLEA (*SMM* 138)

"From Laodicea to Heraclea 20 stades."

HERACLEA TO WHITE HARBOUR (SMM 139-141).

"Rounding the promontory there is the harbor called Leukos (White), 30 stades. From White harbor to the town called Pasieria, 30 stades. From that town to the cape called Polia, 120 stades."

HERACLEA TO POSIDIUM (SMM 142)

"From Heraclea to Posidium, by the short way, 100 stades."

POSIDIUM TO SIDON (*SMM* 143)

"From the cape at Posidium to the city Sidon 300 stades. Above that is a high mountain called Thronus."

SIDON TO CHALADROPOLIS (*SMM* 144)

"From the city of Sidonia to the place bounding Casium, called Chaladropolis, 60 stades.**"**

MACRA LONGA, NYMPHAEUM, ANTIOCHIA (*SMM* 145-147)

"From Chaladron to the island called Macra 10 stades. / From Macra island to Nymphaeum 50 stades. The whole voyage from Casium is rugged. Sail past this place keeping 20 stades from land. / From Nymphaeum to the city Antiochia, having an emporium and the river called Orontes alongside, 400 stades. The river is 15 stades away."

RIVER ORONTES TO SELEUCIA (*SMM* 148)

"From the river to Seleucia 40 stades. From Posidium taking the short way to Seleucia by means of the west wind, 110 stades."

SELEUCIA TO GEORGIA (*SMM* 149-150).

"From Seleucia to Georgia 142 stades. From Georgia to Rhosus Bay 300 stades. From the Poseidium promontory to the bay with a very fair wind, 200 stades. [From the Gulf to Rhosus, 80 stades]"

"From Rhosus Terdniae to the city Myriandrus 90 stades. From Myriandrus to Alexandria at Issus, 120 stades. From Alexandria to the Cilician Gates, 200 stades." (*SMM* 151-153)

TOTAL: PALTUM TO CILICIAN GATES (*SMM* 153)

"All in all from Paltum to the Cilician Gates, 2500 stades."

Appendix v: Ancient Measurements & Travel Distances -cf.Ch.7.3.1

What is a Stade?

The Roman measuring system developed from the ancient Greek methods and units of distance, which were primarily based on the Egyptian techniques.[262] In classical geography, measured linear distances between sites were commonly expressed in stades, the standard unit of terrestrial distance (Berggren and Jones 2000:14). However, as there was no International Bureau of Standards in the ancient world, it is probable measures such as the stade fluctuated slightly from region to region (see Dicks 1960:42-46; Pothecary 1995). Thus, there is much disagreement amongst scholars with regards to the actual length of the stade. According to Herodotus, 1 stade is equal to 600 feet. However, there were several different lengths of "feet", depending on the country of origin and time period. The scholar Lehmann-Haupt believes that there were approximately six different stades (*ibid*: 43). In contrast, astronomer and historian Rawlins believes that ***"****1 stade = 185 meters* (*almost exactly 1/10 nautical mile***)** *is well established" (Rawlins 1982:211). Although this is debatable,* the 185 meter stade is in fact the most commonly accepted figure for the length of the stade (*ibid: 211;* Walkup 2010:12). Frequently, when determining which value of the stade to use, an effective method is to compare how this measurement equates to other ancient units of length. An array of references from different authors from the first century CE onward state the following: 1 Roman mile equates to 8 stades; 1 Roman mile equates to 5000 Roman feet (each just short of the English foot); thus, if 1 Roman foot is equal to approximately 11.65 English inches, then one Roman mile is equal to approximately 1479 meters. Finally, 1/8 of this Roman mile gives the length of 1 stade as approximately 184.8 meters (Walkup 2010:11-12). This length of 185 metres corresponds to one of Lehmann-Haupt's six stades. He refers to this stade as the "Italian" (or "Attic") stade (Dicks 1960 1960:42-44). Conversely, according to Schoff (1912:54), "three stadia were in use in the Roman world during the time, namely the Phileterian of 525 to the degree, the Olympic of 600", and that of Eratosthenes, of 700. He believes that "the stadium of the Periplus seems to be that of Erastothenes. Generally speaking, 10 stadia of the Periplus to the English statute mile would be a fair calculation." (*ibid*). In light of this, it is important to note that all distances are approximations and generally given in round numbers. Consequently, the value chosen for the length of the stade affects the interpretation of ancient texts.

---

[262] For ancient Egypt, *Schoinos* were used**,** which Strabo says had no fixed value, "in some parts of Egypt it was equal to 30 stades, in other areas 40 or 60" (*Geogr.* 17.1.24). For the roads of the Parthian Empire, *parasang* was used.

Stade Value for the Earth's Circumference

The stade was the unit of measurement used to calculate the Earth's circumference. Different authors used different values, which affected their degree of accuracy. Marinos used a zero meridian at the Isles of the Blessed (Canary Islands or Cape Verde Islands) for measurements of longitude, and the parallel of Rhodes for measurements of latitude (Berggren and Jones 2000:14-15). Marinos' estimation of the parallel of Rhodes was of 90,000 stadia, and, thus, he calculated the value for the earth's circumference to be 33,300 km (approximately 17% less than the actual value, though both numbers are dependent on the stade value chosen). Erastothenes' estimation of the Earth's circumference was 252,000 stades, which was much closer to the actual value of 249,020 stades. Subsequently, Poseidonius calculated the Earth's circumference to be approximately 180,000 stades (around one sixth of its actual measure). Interestingly, Ptolemy opted for Poseidonius' less accurate value for his estimation of the Earth's circumference. He adopted Hipparchus' method of dividing the equator and other great circles into 360 degrees, which resulted in making every degree only 500 stades, whereas Erastothenes and Hipparchos made every degree 700 stades. The true computation is 600 stades to every degree (Tozer 1897:341). As mentioned, Hipparchus divided the equator of the earth into 360 degrees and 60 minutes. These values were approved by Ptolemy, who noted that much of what was known from travellers and texts was to be taken with caution in regards to accuracy, reflecting how "Ptolemy's aims and methods were rigorous and scientific, but his materials were not equal to the demands he placed on them" (Whitfield 1998:11).

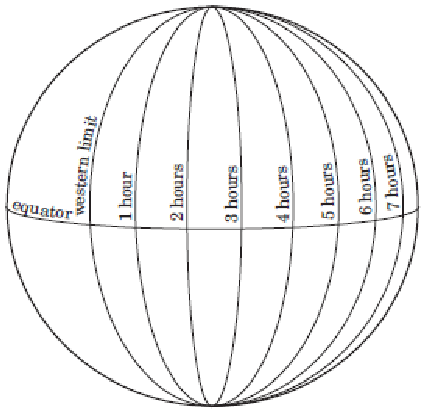


Figure iii. Main meridians defined by local time (Berggren and Jones 2000:11, fig. 5)

Ptolemy' Coordinates in Geographike Hyphegesis *(cf.Ch.4.1.5)*

Ptolemy separated the *oikoumene* into approximately 80 districts[263], grouped into three continents (Europe, Libye and Asia), roughly ordered north-west to south-east (Berggren and Jones 2000:40). Each district (called 'provinces' or 'satrapies' by Ptolemy), contained the lists of geographic points. These points refer to geographic sites (e.g. cities, towns, mountain, river mouths, capes, and islands) and their geographic coordinates (in fractions of arc, up to 1/12 of

[263] Berggren and Jones (2000:40): "It is not always obvious whether Ptolemy considers certain groupings of districts to belong together or not, so that the chapter divisions and the total number of districts are not definitely fixed."

a degree).[264] From his different sources and observations of the longest hours of daylight, Ptolemy was able to calculate the latitude of certain sites with considerable accuracy in contrast to the longitudinal values. The relative longitudes were established by the difference in local time using the hour of an astronomical event, e.g. lunar eclipse, which proved more complicated to determine in comparison to latitudinal values, due to challenges associated with measuring time (Tsorlini 2009:247). On lesser known places:

> "The coordinates of the places that have not been so travelled…have been estimated according to their proximity to the more trustworthy determined positions or relative configurations, so that none of the places that are included to make the *oikoumene* complete will lack a defined position" (*GH* 2.1).[265]

Using Marinos' framework, Ptolemy develops his own original treatise, and adopts a set of coordinates based on time (length of day) to create grids. However, there are several debates on the reliability of his dataset, due to numerous errors in latitudinal and longitudinal values and calculations. This was largely a result of his erroneous estimation of the Earth's circumference of approximately 180,000 stades (*GH* 7.15),[266] around 1/6 of its actual measurement, adopted from Poseidonius' (or specifically from Marinos, who likely adopted it from Posidonius), rather than the more reliable 252,000 stades by Eratosthenes (Berggren and Jones 2000:21). Due to the lack of information on the lesser known areas, if as we progress further east or south, Ptolemy's calculated longitudinal values become more distorted and more errors exist. All Ptolemy's coordinates are assigned to a degree or a fraction of a degree, and results reflect a mixture of levels of precision within the dataset. Research studies have presented the scale of the differences between Ptolemy's longitudinal and latitudinal values compared with today's values, through systematic geodetic approaches in the Mediterranean (e.g. Livieratos et al. 2008; Tsorlini 2011, 2009). Although there are inaccuracies in his calculations, his work has provided us with invaluable information reflecting notions of ancient cartography, as well as the development of trade centres (*emporia*) in the first and second centuries AD (Casson 1995:361–370). Finally, the seventh and eighth book consists of further theoretical discussions and a series of captions. Certain versions of the manuscripts seem to have possessed maps linked to these captions, though it is debated whether they originated with Ptolemy or are simply later reconstructions.

---

264 Berggren and Jones 2000:41; Dilke 1985, Livieratos et al. 2008:23-25; Tsorlini 2009:249.
265 He states he may note "some bit of current knowledge [that] calls for a brief and worthwhile note." (*GH* 2.1)
266 Greek *stadia*: a form of measurement where 1 degree corresponds to 500 stadia. In antiquity, there were various *stadia* used, each of a different length. The generally accepted value for 1 stade is approximately 185m.

How many stades in a "run" (a day's sail)?

According to Casson, a "run" (*dromoi*) equates to a day's sail (Casson 1989:278). Different authors assign different values to a run, or day's sail. Giving distances according to "day's sail" was common practice in antiquity (e.g. Pliny *NH* 19.1; Marinos in Ptolemy, *GH* 1.17.5; Marcian of Heraclea, Müller, *GMM I*: 567-568; Ps.-Skylax 69). When analysing these seaborne distances, it is essential to know the start and finish positions of a journey, as well as any stops made en route, as this affects the total timings for the distance covered, "the duration of voyages is rarely measured with accuracy greater than half a day. When a voyage was recorded as taking '2–3 days', a compromise figure of 2 1/2 days may be used." (Whitewright 2010:5). Moreover, the weather conditions and sea-state were also very influential factors when estimating measurements of travel. Strabo (13.163.613) attributes a value of 700 stades for an average day's sail, whereas Aristides (48.111) states 1200 stades in a day's sail, though this was with strong winds (cf. Pritchett 1982:238).

Above all, it is important to distinguish whether a 'day's sail' means 12 hour or 24 hour time-periods. Determining this is extremely important as it has a direct effect on the expected 24-hour speeds and distances. A possible solution for this would be to determine whether the journey was undertaken in a daylight period, or a day and night period, by calculating the given distances back around the expected performance (pers.comm. J. Whitewright 2016). Then by analysing a range of data for different voyages from historic records (in conjunction with experimental data from vessel replicas; e.g. the *Kyrenia* ship), it is possible to calculate a more reliable average measurement for a day's sail. According to Whitewright, based on data from replica square-sail vessels (2012:11): "The records of reconstructed historical vessels indicate that, in optimum conditions of calm seas and light/moderate wind, a close-hauled heading of c.60°–65° could be achieved. These sources, in conjunction with the historical data suggest that a maximum potential Vmg of two knots could be achieved when sailing to windward in such conditions. In less favourable conditions, the same combination of sources paints a picture of vessels struggling to sail to windward and consequently to maintain their position in a seaway. On other courses, the square sail is a strong performer"[267] (Tables iii and iv, below).

[267] See Whitewright 2008:136 on sailing performance and technological change; Palmer 1986, on using data from full-scale vessels for measuring sailing rig performance; and Palmer 2009, on capabilities of vessels sailing windward.

Potential Square Sail Performance	
Possible maximum heading angle (close-hauled)	60°–65°
Maximum Vmg to windward	2 knots
Likely average speed range on reaching and running courses	4–6 knots
Maximum speed on reaching and running courses	12+ knots

Table iii. Potential performance of ancient Mediterranean square-sail vessels (Whitewright 2012:11).

	Square-sail voyages		
1	Lilybaeum to Anquillaria	Caesar, *Civil Wars,* 2.23	mid-1st c. BC
2	Myos Hormos to Leuke Kome	Casson, 1989, *Periplus Maris Erythraei,* 19	1st c. AD
3	Puteoli to Ostia	Philostratus, *Life of Apollonius,* 7.16	early-3rd c. AD
4	Alexandria to Marseilles	Sulpicius Severus, *Dial.* 1.1.3	late-4th c. AD
5	Gaza to Byzantium	Mark the Deacon, *Life of Porphyry,* 26	AD 398
6	Caesarea to Rhodes	Mark the Deacon, *Life of Porphyry,* 34	AD 401
7	Rhodes to Byzantium	Mark the Deacon, *Life of Porphyry,* 37	AD 401
8	Sea of Azov to Rhodes	Diodorus Siculus, 3.34.5–35	mid-1st c. BC
9	Rhodes to Alexandria	Diodorus Siculus, 3.34.5–35	mid-1st c. BC
10	Utica to Caralis	Caesar, *African War,* 98	mid-1st c. BC
11	Rhegium to Puteoli	*Acts* 28.13	mid-1st c. AD
12	Ganges to Sri Lanka	Pliny, *Natural History,* 6.82 (1942)	mid-1st c. AD
13	Messina to Alexandria	Pliny, *Natural History,* 19.1 (1950)	mid-1st c. AD
14	Puteoli to Alexandria	Pliny, *Natural History,* 19.1 (1950)	mid-1st c. AD
15	Gades to Ostia	Pliny, *Natural History,* 19.1	mid-1st c. AD
16	Corinth to Puteoli	Philostratus, *Life of Appolonius,* 7.10	early-3rd c. AD
17	Puteoli to Tauromenium	Philostratus, *Life of Appolonius,* 8.15	early-3rd c. AD
18	Alexandria to Ephesus	Achilles Tatius, 5.15–17	late-3rd c. AD
19	Byzantium to Gaza	Mark the Deacon, *Life of Porphyry,* 27	AD 398
20	Byzantium to Rhodes	Mark the Deacon, *Life of Porphyry,* 54–55	AD 401

Table iv. Summary of key routes of ancient square-sail voyages (Whitewright 2010:4).

Marcian of Heracleia (Müller, *GGM* 1.567-568), comes across inconsistencies in units of distance between locations within the *periplorum scriptores.* Marcian claims that there is a general consensus that a ship could cover 700 stades in day's sail, with favourable weather conditions, and even 900 stades in optimum conditions. While Pseudo-Scylax, conversely, calculates a day's sail to be 500 stades (Pritchett 1982:238). Marinos, in Ptolemy's *Geographike Hyphegesis* (1.17.5), is quoted as achieving only 400-500 stades, but this under particularly unfavourable weather conditions. Herodotus states a very generous, but acceptable, estimation for the distance travelled in four days and nights, with a steady wind astern, with an average of 1300 stades for a day and night's sail. His calculations are critiqued by Bunbury (1883:176-177), who explains that "it is no doubt possible that a Greek merchant vessel should, *under favourable circumstances,* accomplish as much as 700 stadia (70 [Greek] miles) in a day, and 600 in the night; but it was great mistake to take this as the distance performed *on average*. The ordinary estimate of later geographers is 500 stadia a day, and the same for a night". Land and sea voyages were seldom made in a straight line, as there were many deviations en route (*ibid*: 26-27; Whitewright 2008, 2012; Arnaud 2014; Leidwanger 2013; Davis 2009). Thus, it is vital to determine the nature and extent of the deviation, the weather conditions, and to reduce the number of stades in order to achieve a straight course.

Another important point to consider is that many of these estimations of distance covered in a day's sail were highly dependent on the regions and their conditions, as well as the type of vessel used (a wide range of different sail-forms and rigs were used in the Mediterranean, influenced by different socio-economic, technological and environmental determinants and adaptations – see Whitewright 2012). For example, in the Mediterranean basin, it would be correct to consider the 500 stade figure as an acceptable average. However, if dealing with other environmental contexts, such as the Red Sea/Indian Ocean region, for example. In this case, the monsoon winds can be extremely advantageous when sailing down the Red Sea during favourable months, hence, facilitating the sail and increasing the distance-time travelled. Ships sailing down the Red Sea should be able to, using the monsoon winds, achieve on average approximately 800 stades in a day's sail (pers. comm. Julian Whitewright). Whitewright's article on "The Potential Performance of Ancient Mediterranean Sailing Rigs" (2010) provides a valuable and detailed insight into the relative performance of vessels, by analysing factors such as speed, distance-travelled, and time-taken in various different voyages, with close consideration to regional weather and sea conditions. Moreover, contrary to traditional views, ships would have almost certainly taken advantage of night sailing, thus, reducing the number of stops and time-taken to reach their final destination. In reality, it was easier to navigate by night, guided by the stars, and also safer, as often anchoring can be dangerous due to reefs and corals, etc. Moreover, it was time-effective and more economic.

Based on the evidence, it seems acceptable to calculate the distance travelled in day's sail as approximately 72 nautical miles (12 hours x 6 knots), and, thus, for a night and day's sail (24 x 6 knots) equals around 144 nautical miles. Moreover, even with these established figures, it is important to attempt to collate as much information as possible from a given journey in order fill the gaps and reach more accurate and reliable conclusions.

Appendix vi: Photographs of Archaeological Sites (cf.Ch.6 & 8)

(i) DOR/TEL DOR (cf.Ch.6.2.3.1): Archaeological remains and topographic features.

Fig.i. (a) western side of Tel Dor (photo: Dr A. Gilboa, co-director of excavation); (b) on southern side, acropolis on the mound [http://www.biblewalks.com/Sites/Dor.html)

Fig.ii. (a) area D, south of the Tel site, comprised mostly harbour storerooms or other public houses, with remains dating from Roman, Hellenistic and Iron Age periods; (b) Area E, on northern side, above rock-cut boat slips, remains of a large Roman bathhouse (c) Area F and H, with Phase 1 retaining wall cutting through Phase 2 (early Roman) houses; (d) Area H, on western side, remains of large Roman temple (partially submerged); ([photos: http://www.biblewalks.com/Sites/Dor.html].

(ii) Piraeus, Greece: Modern Landscape (cf.Ch.8.1.1.2: i)

Ancient Piraeus was enclosed by three enclosed deep-water harbours Kantharos, Zea and Munychia. In modern Piraeus, these sites are still active and used as harbours (Fig.iii, iv).

Fig.iii. View from Kastella of Mikrolimano harbour (ancient Munychia), the smallest harbour in Piraeus, Greece, the hill of Ymtitos/Mt. Hymettos (Photograph courtesy of E. Kartaki, 2015).

Fig.iv. View of Pasalimani harbour (ancient Zea), the second largest harbour in Pireaus, Greece (Photograph courtesy of E. Kartaki, 2015).

Appendix vii: Timeline - Key Political & Historical Events

This timeline provides a general overview of the political framework and key events in the Roman period within the Mediterranean region to contextualise their role in relation to maritime societies and their perceptions of the changing geopolitical landscape.

Timeline of Key Political & Historical Events in the Roman Mediterranean
250-150 BC: PUNIC WARS: Three successive wars ensued between Rome and Carthage, 'Punic wars', largely incited by commercial rivalry between these two cities (Wilson 2011:9). The Carthaginians were renowned for their maritime trade, with ports across central-western Mediterranean, Spain and North Africa. However, Rome created a strong military and naval army and eventually succeeded, gaining control over the western Mediterranean sea and becoming "a leading sea power" (Norwich 2010:28).
AFTER 150 BC: EXPANSION: Following the wars, the trading system of the Roman imperial period was achieved under more stable conditions (Wilson 2011:9). Rome extended its boundaries into the regions of Spain and Gaul, and in the 1st century BC, expanded further east, across the regions of Asia Minor, Syria, Judaea and Egypt. The *provincia* were the basic pattern for Rome's imperialistic policies in Asia, western Europe and northern Africa. The founding of colonies abroad tended to be positioned on the coast or by rivers at strategic locations, and allowed certain cities to become allies and function more independently (Davies 2012:35). This led to the rise in movement and migration throughout the empire (van Dommelen and Knapp 2010:56) greatly influenced by cultural exchanges with Greece.

c.27 BC- 180 AD: Pax Romana: Between around 27 BC and 180 AD, a period of political and military peace and stability was imposed throughout the Mediterranean, known as *Pax Romana,* along with the wealth and stability of the Roman economy (Cline 2003; Grainger 1991; Millar 1993; Scheidel 2009, 2013). The beginning of this period coincided with the reign of Octavian, who in the years following 31 BC transformed the Roman political system into an imperial one after defeating Marc Antony and Cleopatra at the naval battle of Actium (Abulafia 2011), marking the transition from the Late Republic period to the Roman Empire. Octavian received the honorary title of Augustus and a position as *princeps,* in 27 BC. According to Norwich, "the golden age of the Roman empire extended from 98 to 180 AD (Norwich 2007:48). The empire's on-going expansion reached its peak under Trajan (98-117), who extended the boundaries to include Dacia and Arabia Petraea. By 117 AD, the Mediterranean Sea came under the control of a single political unit and became referred to by the Romans as '*Mare Nostrum'* ('our sea'), emphasising the maritime perception of this region. The Empire dominated the full extent of the Mediterranean region, as well as gaining control over Gaul, parts of Germania and Britannia, the Balkans, Dacia, Asia Minor, the Caucasus and Mesopotamia. Furthermore, with the political unification and decrease in piracy, internal and external maritime exchange and communication across the Mediterranean was facilitated, developing a thriving, well-structured maritime trading system (Abulafia 2011:2; de Souza 1999: 195-210), with "a common set of legal institutions, a single currency (except for Egypt), and further facilitated the spread of the two main *linguae francae,* Latin and Greek" (Robinson and Wilson 2011). Towards the end of the 1st century AD, the Roman Empire forced its control further north into Britain, settled its frontiers in Germany and extended its conquest further into central Europe, close to the Danube. Eastward, its dominion expanded into Armenia, parts of Arabia and, only temporarily, northern Mesopotamia (Ferguson 2005). Subsequently, the 2nd century AD (96-180) sees Rome's interest shift towards the east, with the Eastern Mediterranean becoming a thriving region. Trade flourished in this period, particularly between 200 BC and 100 AD, which witnessed the peak of ancient maritime trade in the Mediterranean (Parker 1992:1–33; Arnaud 2011; Greene 1986; Robinson and Wilson 2011; Tchernia 2011; Casson 1959:121).
c.180 AD-300 AD: The spread of eastern cults and religions (among them Christianity) dominate this period. Successive "barbarian" raids threaten the frontiers. Thus Emperors, such as Septimius Severus (193-211) and Diocletian (284-305) moved towards further centralisation (with the emperor now regarded as *dominus,* or master). Diocletian introduced the tetrarchy system (286 AD), distributing the Empire among four co-rulers. Subsequently, the 3rd century crisis saw a collapse of trade, political instability and reduction in maritime activity.

Table v. Timeline of Key Political & Historical Events in the Roman Mediterranean.