UNIVERSITY OF SOUTHAMPTON

FACULTY OF HUMANITIES

Archaeology

The Maritime World of the Early Bronze Age Levant through Space and Time

by

Crystal El Safadi

Thesis for the Degree of Doctor of Philosophy

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ABSTRACT

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This thesis focuses on the maritime signature of the Early Bronze Age (EBA) period on the Levantine coast. It assumes the sea as the common denominator that bridges the southern, central and northern coastal Levantine sub regions. Maritime activities and their subsequent role in EBA developments are rarely acknowledged in EBA scholarship. This thesis aims to rectify this imbalance by investigating how maritime space was lived and exploited during the EBA on the Levantine coast. It does so by establishing a theoretical framework that bridges land and sea, and is flexible to adapt to variable spatial and temporal scales. The theoretical framework at the basis of this thesis is a relational and lived space and time that is heterogeneous and of manifolds. Space and time in this research are a mode of engagement with the archaeological record, manifesting practically through the methodology of thirding-as-othering with mapping, in other words, mediation with mapping.

The methodology unfolds in three intertwined and connected themes of mapping land, mapping maritime activities and mapping the sea. Each one of these themes reveals folds and manifestations of the lived maritime space and time during the EBA on the coastal Levant. Mapping land interrogates the distribution of EBA coastal sites, in space and time, to show the recursive relationship between people and space through various space-time analyses. Mapping maritime activities consolidates a database of EBA maritime-related material culture and potential indicators for maritime activities. This database establishes the extant of available data and what can be derived from it. Mapping maritime activities incorporates the material record to reflect on the distribution of activities in space and time along the coastal Levant and the potential maritime connections. Mapping the sea draws on the rhythms and performance of sailing during the EBA to mediate via mapping the space and time of sailing. It proposes a model for conceiving of the maritime space-time of seafaring, distorting space according to time in such a way that Cartesian representations lose ground and space takes on new forms.

Through the methodology employed in this thesis and the threefold themes of mapping land, mapping maritime activities and mapping the sea, the many folds and rhythms of the lived maritime space of the EBA coastal Levant emerge. This thesis demonstrates that the geo-political divisions of the Levant (southern, central and northern) are rigid boundaries that do not reflect EBA coastal sites interaction and distribution when rhythms of movements are accounted for. Furthermore, this thesis proves the existence of a maritime baseline of human engagement with the sea during the EBA through various activities of fishing, gathering shells, usage of coastal rocks, etc. These maritime activities form bundles across space and time that partake in interactions and developments taking place during the EBA. The potential indicators for maritime activities along with the space-time models of seafaring indicate the presence of a facilitated network of interconnectivity that bridges internally the whole of the Levantine littoral, and externally binds it with Egypt, Cyprus and Anatolia. Hence, the maritime signature of the EBA Levant transpires, not only through the various folds of the lived space and time, but also through its influence on complexity and urbanisation during the EBA. This thesis ultimately re-institutes the role of maritime space in EBA narratives.

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ACADEMIC THESIS: DECLARATION OF AUTHORSHIP

I, Crystal El Safadi

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.

The Maritime World of the Early Bronze Age Levant through Space and Time

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

Signed: Crystal El Safadi

Date: 12/04/2018

DEDICATION

It may be no surprise that I was a somewhat odd child and although my parents may not have always understood me, their faith has been the cornerstone of my achievements. I often reminisce my mother's affirmation: "Crystal knows what she's doing". In truth, I often did not and/or do not know what I am doing in entirety but it is her words that enable the determination to succeed.

As such, I would like to dedicate this thesis to my parents, Souad Nakfour and Emile el Safadi. I would not be here today had it not been for their love, care and support; and if they were here today I hope they would be proud.

AKNOWLEDGEMENTS

I wish to express my deepest gratitude for all those who have had a hand in the fruition of this thesis. Firstly, I must thank my supervisors, Dr Fraser Sturt and Dr Lucy Blue, who inspired, directed and pushed me to explore the full potential of my research. I deem myself lucky to have had such an excellent supervisory team, always supportive and always understanding. I say with confidence that this thesis would be far from a comprehensive project had it not been for their advice.

I must also recognise the colleagues, researchers and friends, who have enabled me to develop my research through various discussions and feedback. A big thank you must go to Dr. Julian Whitewright, for his insights and expertise in ancient sailing performance without which I would not have known where to begin. Also to Dr. Helen Farr for her thorough and helpful comments and edits on an earlier version of this work. To Dr. David Wheatley for grounding me in spatial analysis, GIS and computational approaches in archaeology five years ago and whose support ever since endured. To Dr. Lucy Semaan for her local knowledge of Lebanon's archaeology and emotional support throughout my years of study. To Dr. Thomas Dhoop who first directed me towards spatial thinkers and philosophers. To ArtasMedia director, Grant Cox, for his assistance in the 3D digital animation model of the time space distortions.

I have been fortunate to receive funding for a Masters in Maritime Archaeology and a Ph.D in Archaeology at the University of Southampton from the Honor Frost Foundation. It is with immense gratitude that I thank the foundation and its board of trustees, especially Ms Alison Cathie, for trusting in me and giving me the opportunity to accomplish my drive in maritime archaeology. Throughout my years of study at the University of Southampton, I have had substantial support from the foundation that extended to trainings and courses invaluable to my career. I hope this thesis will be my first of many projects that resonate with foundation's mission and contribute to eastern Mediterranean archaeology.

Finally, this work would not have come to light had it not been for hours on end discussing theory, philosophy and archaeology with my dear friend Julieta Flores. The support of my wife, who listened to my relentless chattering and drove me to work when I least wanted to. My family in Lebanon, who always believed in me.

CHAPTER I: INTRODUCTION

Urbanism, social complexity, centralisation and integration are all terms profusely used to describe the Early Bronze Age (hereon EBA) in the Levant. This chronological period (c. 3600 BC to 2000 BC), is recognised for marking the first urban period in the southern Levant (Greenberg 2013, 2002; de Miroschedji 2013, 2009, 1989; Joffe, 1993; Esse, 1991), and the 'second urban revolution' in the northern Levant (Akkermans and Schwatrz, 2003; Mazzoni, 1991). It is characterised by significant changes, primarily a shift from village-like communities towards an urban mode of life (Greenberg, 2013; Genz, 2012; de Mirsochedji, 2009; Akkermans and Schwatrz, 2003).

The Levantine littoral, particularly in the north, is known to have played a major role during the mid-third millennium BC, when maritime connections mainly with Egypt became vital (Oren 1989: 404; Ben-Tor 1991: 5; Stager 1992: 40). This has been considered one of the instigators of urban development. Numerous hypotheses have attempted to explain the rise of social complexity and urbanism, and several models have been proposed to understand the EBA socio-economic life (e.g. Ben-Tor, 1992; Esse, 1991; Chesson and Philip, 2003; Chesson, 2015). However, most of the archaeological narratives fail to consider the totality of the space over which change occurred during the EBA, and appraise the Levantine littoral in its full potentiality as a seamless space of sea and land.

The coastal Levant, extending from the Amanus Mountains in the north to the Sinai Desert in the south, is a region historically and archaeologically recognised for its environmental and cultural diversity. Key to this region's multi-faceted identity is a long and instilled tradition of connectivity. Nevertheless, the conception of the modern-day Levant greatly impinges on archaeological scholarship, which mainly divides this region into a southern, northern and central Levantine area of study/focus (Genz, 2013; Steiner and Killebrew, 2013). This taxonomy may reflect archaeological patterns of the past, yet reduced to a framework devoid of a critical appraisal, it affects research agendas and interpretations of the archaeological data.

Bordered to the west by the eastern Mediterranean Sea, the Levantine coast is first and foremost a Mediterranean zone, and herein lies the common denominator to the southern, central and northern Levantine historical divisions: the sea. Conceived of in such a way, the Levantine littoral regains its ephemeral unity, and its archaeology is re-contextualised within the broader narrative that it belongs to: the narrative of land and sea, sea and land. This perspective allows us to side-step this issue of Levantine scholarly tradition, and reflect equitably on archaeological data.

Henceforth, taking on the sea as the common denominator for the region, this research aims to re-consider the value of maritime space for the study of the EBA Levantine littoral, in the intention that such an analysis will better inform us on the nature of EBA communities and the grand narrative of EBA urbanisation. The EBA Levantine littoral is thereby re-contextualised within sea and land, and within its Mediterranean setting.

In order to fulfil this overarching aim, this research poses the question:

- ***How was maritime space lived and exploited during the EBA on the Levantine coast?***

In order to address this ambitious overarching question, a series of sub-questions have been identified:

- What is the current state of knowledge of Levantine EBA and to what extent are maritime activities incorporated in the narratives?
- What framework can we propose to approach the lived maritime space of the EBA Levant?
- How was the maritime environment exploited on the Levantine littoral?
- How can we conceive of the maritime space of seafaring of the Levantine Basin?
- Are the divisions of a southern, central and northern Levant further corroborated or refuted based on the evidence of human engagement with the sea and environmental rhythms?
- What does the investigated maritime space inform us about EBA communities, social complexity and the grand narratives of connections, e.g. with Egypt and Mesopotamia.

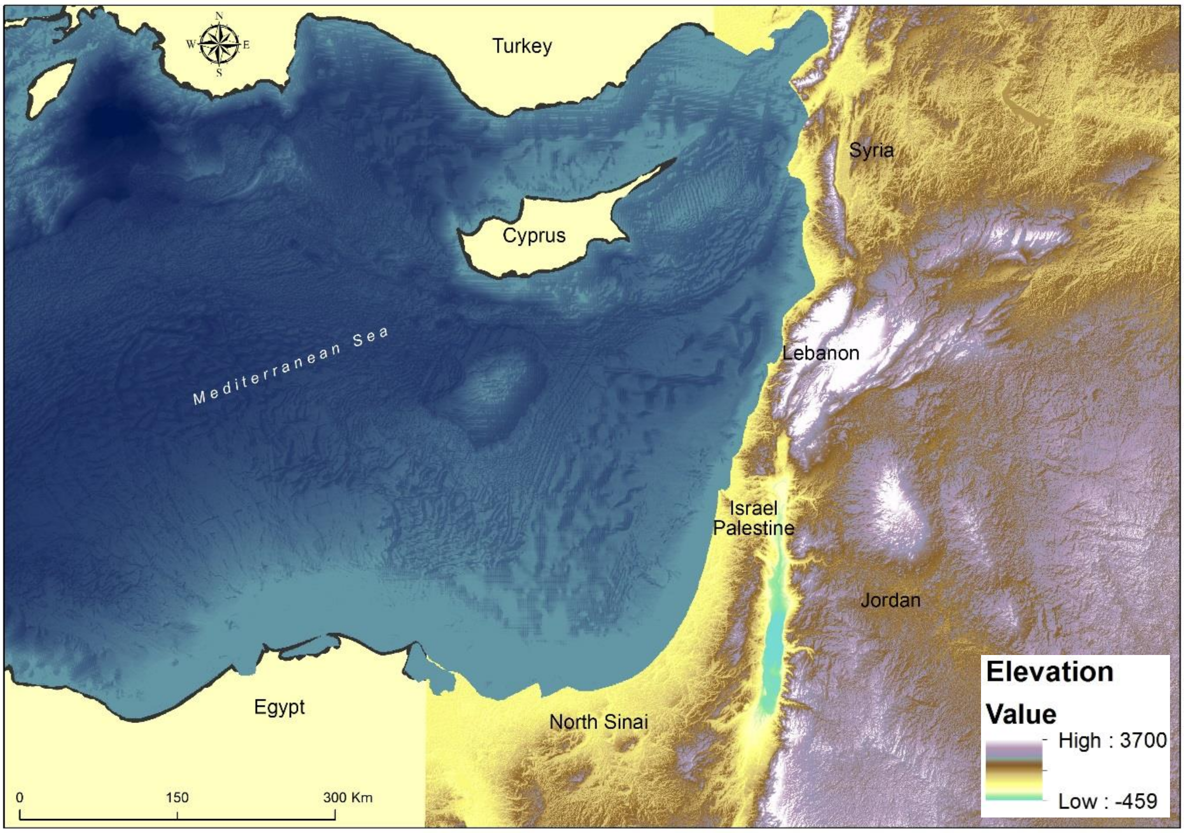
This thesis establishes a framework of research that builds on notions of an emergent, lived and relational space that is grounded in practices. Hence, the lived maritime space of the EBA Levant is investigated via an analysis of engagements related to seafaring and coastal activities. The essence of this work transpires on three levels.

On the first level, this research transcends the separation between the southern, central and northern Levant by taking as a study area of research the Levantine coast as a whole (Map 1.1). In such a way, despite perceived differences between the southern, central and northern Levant, in terms of material culture and societal developments during the EBA, the sea acts as a unifying agent. Moreover, the littoral zone is re-instituted as unique in its capacity for allowing both land and sea access. This research, however, does not claim uniformity on the Levantine coast during the EBA. Rather, by shifting perspectives toward the sea, it emphasises and recognises the importance of relations with the sea during the EBA, without which our understanding of EBA coastal communities is limited.

On the second level, small-scale and everyday maritime activities are brought into light through the consolidation of an EBA database of maritime-related material culture from the coastal Levant. Thence, this research counter-balances the generic narratives regarding EBA maritime activities that mainly consider broad events, neglecting rhythms of coastal life.

Finally, on a third level, this research explores maritime space of the Levantine Basin via alternative spatial representations that reflect human variables. These representations build on the established understanding of seafaring during the EBA, and aim on the one hand to get closer to the perception of maritime space by ancient seafarers, and on the other hand to offer a platform for reflecting on maritime space in new and innovative ways.

The thesis is divided into seven chapters of varying lengths. The second chapter introduces the Levant as a geographical area in its contemporary political division into the southern Levant, central Levant and northern Levant. It presents Levantine chronology and reviews the EBA period, focusing on the coastal area, highlighting terrestrial and maritime dynamics, and the lack of maritime induced narratives. Chapter II thus presents EBA Levantine scholarship and highlights the main gaps in archaeological works. The third chapter institutes the theoretical framework of this thesis, which rests on the notion of a relational, lived space-time, non-totalising and fluid, that eludes the land and sea contractual division, and establishes the methodological approach of thirding-as-othering (mediation) with mapping whereby mapping here is imaginative and experienced rather than an objective representation of truth. This methodology branches out into three pillars: mapping land, mapping activities and mapping the sea. The fourth chapter brings in archaeological data sources incorporated in this thesis in order to evaluate the lived maritime space on the littoral Levant based on the archaeological record. It offers preliminary space-time mappings of the distribution of EBA sites. Hereafter, Chapter V maps the extant evidence of maritime activities; it puts forth a consolidation of all EBA sites on the Levantine coast, yet it targets the maritime signature of those sites in order to explore small-scale maritime activities, and every-day life on the littoral zone of the Levant. Evidence for maritime activities relies on several factors, mainly adequate excavations and recording techniques, as well as the preservation of the archaeological record. Subsequently, Chapter VI proposes a model for mapping and mediating the Levantine Basin according to the performance of seafaring. This feeds into evaluating the maritime connectivity of the Levantine coast during the EBA, and delivers an alternative platform for engaging with maritime space. Finally, Chapter VII evaluates critically the information laid in the previous chapters, mainly the three folds of mapping land, mapping activities and mapping the sea. Whilst these folds may not fully overlap, this thesis does not aim to provide a totalising account of how maritime space was lived and exploited during the EBA on the littoral Levant. Rather, its substantial contribution rests in the interlinks and connections that bind and relate the different parallel space-time folds investigated. Within these delicate connections, important observations and interpretations are generated. Most crucially, this thesis sets a baseline for understanding maritime space and activities of the EBA Levant. The approach and methods employed have been purposefully chosen in order to break from static narratives and representations of the EBA Levantine coast. After all, it is with an archaeological imagination that the past is illuminated; imagination is ever-flowing.



Map 1.1- Map of the Eastern Mediterranean showing the Levant in relief. ASTER GDEM V2 Elevation model.

CHAPTER II: THE LEVANT DURING THE EARLY BRONZE AGE

2.1 Overview

The archaeology and history of the Levant, from prehistory to modern-day, is an intricate subject of study. The diverse and varied geography, environments, cultures, communities, politics, foreign relations and economy, to say the least of the Levant, blend together at every stage through time. A summary of this region's archaeology and history will always be far from conclusive, yet perhaps its convoluted nature draws scholars into the depth of interactions that unfolded within its space.

The Levant, bordered to the west by the Mediterranean Sea (Map 1.1), is in fact, a Mediterranean region. Levantine archaeological studies concord with the basis of Mediterranean studies, i.e. Braudel (1972), and Horden and Purcell (2000). In the *Corrupting Sea*, a work that presented an original model of Mediterranean history, Horden and Purcell (2000) identify three ecological and behavioural patterns that underpin Mediterranean history. According to Broodbank (2011: 28), the first of these patterns is the prevalence of fragmented micro-ecologies. The second pattern is environmental and climatic uncertainties, e.g. rainfall and winds. The third pattern is the level of connectivity throughout Mediterranean history, particularly by sea. These three Mediterranean behavioural and ecological patterns find correspondence in Levantine archaeological studies.

The micro-ecologies of the Mediterranean resonate with Leon Marfoe's work on the Levant. Marfoe (1978, 1979) proposed a model that became influential in the studies of the evolution and devolution of early social communities. He emphasised the micro-environmental niches of the Levant, arguing that the fragmentation of the landscape made it conductive for the development of small-scale social and political organisations. These micro-ecological niches henceforth would play a major role in the level of integration between groups and communities (see Greenberg 2002: 3; Marcus 1998: 11; Joffe 1993:60). The second factor that underpins Mediterranean studies, environmental uncertainties, has gained much attention over the last two decades in Levantine archaeology, chiefly when investigating the decline and collapse of ancient societies. For instance, the collapse during the Early Bronze Age IV (or the Intermediate Bronze Age) in the southern Levant was considered by some scholars as the result of a climatic crisis (e.g. de Miroschedji 2009: 116; Rosen, 2001; Richard, 1980). Whether this indeed was the case or not, the influence of environmental uncertainties on social structures is considerable. This is not to say that communities are bound by the environment, but that the environment is one factor in a complex assemblage of processes. As Nunn (2003: 70) argues "*it is no longer sufficient to portray the environment as an unchanging backdrop to the unfolding human drama. Rather it was a dynamic and shifting stage to which the human actors had to adjust almost continuously and, sometimes, even abandon their play together*". The third pattern identified by Horden and Purcell is the level of connectivity of the Mediterranean. Indeed, the Levantine coast, the eastern limit of the Mediterranean basin has been a conduit of activities. Its maritime connectivity is openly discussed and little doubted, particularly during the second and first millennium BC with sites such as Byblos, Ugarit, Tyre, Sidon and Ashkelon engaging in a Mediterranean maritime network along the coast (Broodbank, 2013; Anderson *et al.,* 2010; Redford, 1992). The Levant, additionally, constitutes a corridor in a terrestrial network that bridges Anatolia in the north with Egypt in the south, and the Mediterranean in the west with Mesopotamia in the east.

Henceforth, any archaeological study of the Levant, particularly of the coastal Levant, must be grounded in Mediterranean studies. Nonetheless, this is not always reflected in Levantine archaeological scholarship of the EBA, particularly in terms of maritime connectivity. This thesis targets this imbalance in Chapters IV, V and VI. Prior to that endeavour however, an understanding of the current state of knowledge of the EBA Levant is required. This chapter puts forth a review of the EBA Levant as investigated and understood thus far by scholars. A literature review of the EBA Levant is essential in order to highlight the strengths and weaknesses in EBA archaeological narratives, which in turn determines the basis of this research and how it develops. However, as stated earlier, the Levant is of a convoluted nature, which makes the mediation of its archaeology during the EBA not a straightforward task. Although the following account of the EBA Levant is immense in its breadth, it is nonetheless fundamental in order to contextualise the contribution of this research within EBA Levantine scholarship.

The EBA is known for marking the first urban period in the southern Levant and the 'second urban revolution' in the northern Levant (Akkermans and Schwartz 2003: 233). This chronological period (c. 3600 BC to 2000 BC) marks a drastic change from the Chalcolithic period[1]. It is a time when dispersed populations came together in permanent villages and settlements. Many Chalcolithic settlements were abandoned and new settlements emerged. The EBA people in the Levant led a sedentary and semi-sedentary life, focusing on agriculture, horticulture and herding. This period witnessed the rise of social complexity, of fortified settlements and greater craft specialization (Greenberg, 2013; Genz, 2012; de Mirsochedji, 2009; Akkermans and Schwatrz, 2003). During the third millennium BC, urbanised settlements emerged in almost all parts of the Levant.

[1] The Early Bronze Age I in the southern Levant begins at an earlier date than in the northern Levant. This chronological difference is addressed in Section 2.3.

Notwithstanding, the truly urban nature of these EBA settlements has been questioned (Chesson and Philip, 2003) since they are dissimilar to the contemporaneous urbanised states of Egypt and Mesopotamia and to urban centers from the second millennium BC (Marcus, 1998; Ilan, 1995; Dever, 1987). The term 'urbanisation', however, remains in use by scholars for settlements from the EBA period, and is deemed appropriate given the developments that took shape during this period (See Section 2.6; Genz 2012: 614; Falconer and Savage, 1995; de Miroschedji, 1989).

An introduction to the region and to problems in regional definitions is presented, followed by an overview of Levantine EBA chronology and chronological divisions. A full account of the EBA in the Levant will be divided into the EBA of the northern, central and southern Levant in order to keep consistency with scholarly work on Levantine archaeology.

2.2 The Levant: defining the region

2.2.1 Terminology

Whilst the term Levant corresponds generally to the area encompassing modern-day Lebanon, Syria, Palestine, Israel and Jordan, the extensive use of the term in archaeological literature and the political difficulties faced by researchers interested in the whole region veils its historicity, the regions it signifies and its geographical boundaries.

The Levant is a geographical and historical term, used to denote the territories adjacent to the eastern Mediterranean littoral. The name is derived from the Latin *Levātiō*, meaning elevation, whilst *Levante* in Medieval Italian, Spanish and Portuguese was used as a noun to refer to the point where the sun rises, i.e. the east. In the thirteenth and fourteenth centuries AD, *Levante* was employed as a term for Italian maritime commerce in the eastern Mediterranean. Eventually, *Levante* designated the countries of the eastern Mediterranean littoral, as well as Egypt (Graf 2010: 248). During the French Mandate (c. 1920-1946), the term Levant implied a specific geographical region represented by the territories of Syria, Lebanon, Palestine, Israel and Jordan, along with Cyprus (Graf 2010: 248). Henceforth, the Levant came to denote the Roman Near East, stretching between the Taurus Mountains in the north, the Red Sea in the south, the Euphrates in the east and the Mediterranean Sea in the west (Rossi 1951: 9). Conversely, Levantine archaeology has come to be used synonymously with Syria-Palestine, Syro-Palestinian or north Syria archaeologies (Dever 1997: 147; Esse 1989; Silberman 1982: 123)[2].

[2] Although 'Syro-Palestinian archaeology' is sometimes employed, it is scarcely used by specialists in Syria (Akkermans and Schwarts 2003: 2).

The Levant broadly consists of a stretch of southwestern Asia encompassing three prominent components west to east: the Mediterranean, the Syro-African Rift and the desert to the east (Suriano 2013: 9; see Map 2.1 for the principal geographical areas mentioned in this text).

2.2.2 General boundaries

The northern boundary of the Levant rests in the Amuq Plain, the northernmost part of the Syro-African Rift, south east of Turkey's Amanus Mountains (Richard 2003: 4). The Levant extends south to Wadi al-Arish, along the northern Sinai coast. Its eastern boundaries are marked by the Euphrates, Jebel el-Bishri and the Syrian Desert. This eastern boundary stretches south, marked by Transjordan's highlands and desert regions. The Litani River draws the limit between the southern and northern Levantine regions (Suriano 2013: 9). However, this specific geographical limit, between the southern and northern Levant, is seldom mentioned in scholarly works. De Miroschedji (2009: 101) defines the southern Levant as the southernmost tip of the western Fertile Crescent; whilst the northern Levant as described by Genz (2012: 607), is limited by the Amanus and Taurus Mountains to the north, the Mediterranean Sea to the west and the Syrian Desert to the southeast. Its southern and north-eastern borders are ambiguous. According to Genz (2013: 607), the limit between the northern and southern Levant is an artificial one, based on contemporary political configurations rather than on cultural or geographical aspects. Furthermore, although the Levant's northeastern boundary is drawn by the Euphrates, the river by no means was a rigid border. Henceforth, the limits of the Levant, especially the northeast (the Euphrates), and the boundaries between the southern and northern Levant, are controversial.

2.2.3 Levantine northern and southern sub regions

The demarcation of regions and study areas is crucial for archaeological studies, since it delineates the space (although Cartesian) that archaeological investigations cover, therefore impinging on the process and results of research. Given that the Levant encompasses a large geographical extent, it is recognised to have sub regions based on environmental and topographical differences. From west to east, the northern Levant can be subdivided into different zones. Bordering the Mediterranean is the coastal plain that ranges from 1.5km to 10km in width. East of this coastal plain is the north-south mountain chain that incorporates Jebel Ansariyah and Mount Lebanon (Akkermans and Schwatrz 2003: 2-7; Genz, 2012: 607). East of these mountains is a north-south valley, part of the Great Rift Valley. It comprises the Ghab Valley in Syria and the Beqa'a Valley in Lebanon. Further east from these valleys is another range of mountains: Jebel Zawiyah and Anti-Lebanon Mountains. The land gradually descends east of these mountains to the plain of Aleppo in the north and the Syrian Desert to the south (Genz, 2012: 608; Marfoe, 1998: 21-37; Akkermans and Schwartz, 2003: 2-7).

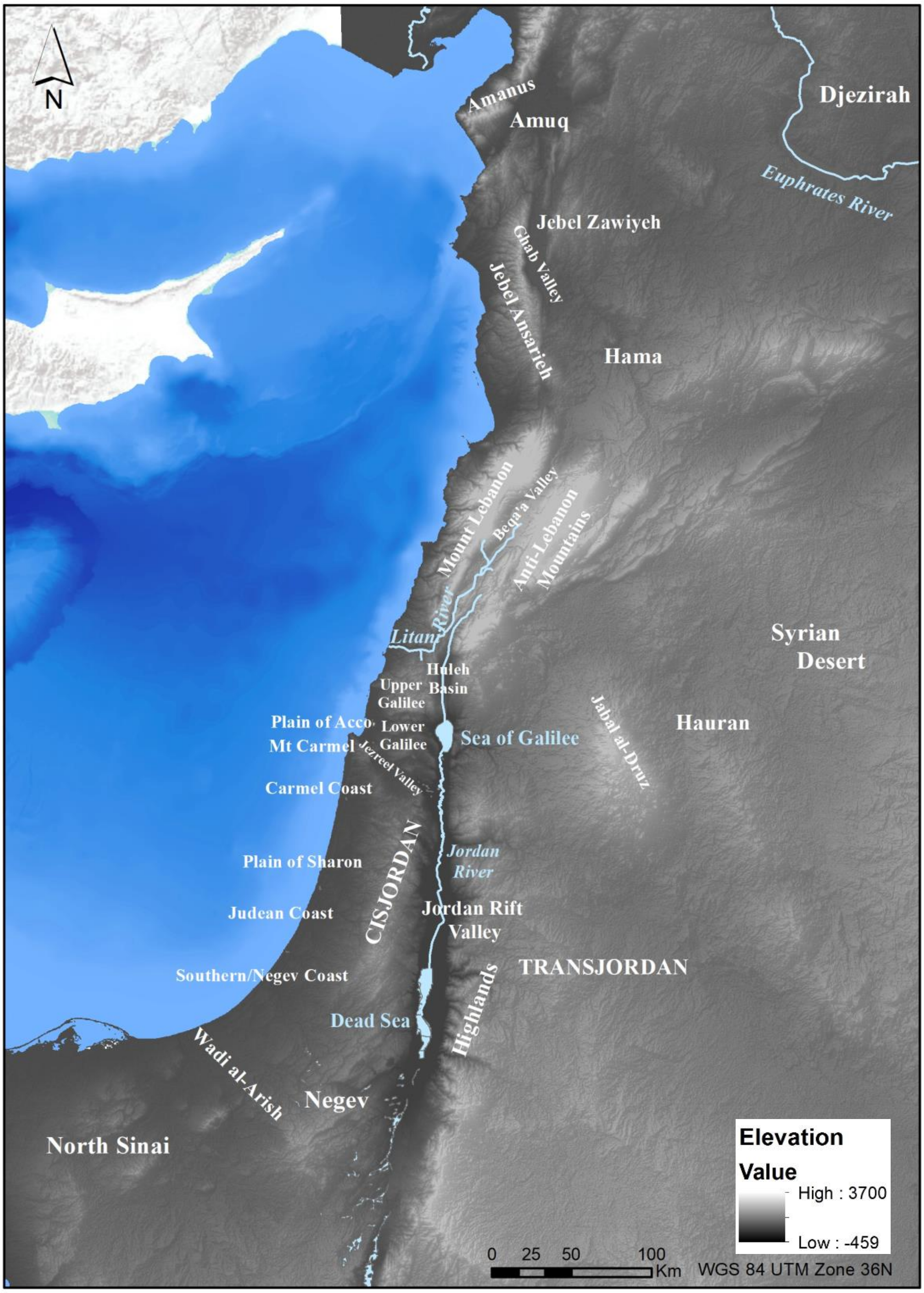
As for the southern Levant, its coastal region is much more extensive than that of the northern Levant, and the Great Rift Valley constitutes a significant geographical feature since it divides the southern Levant into two halves: Cisjordan to the west and Transjordan to the east. The elevation of the Great Rift changes markedly between the northern and southern Levant. In the northern Levant, it is marked by the Beqa'a Valley at 1313m asl, whilst in the southern Levant it is marked by lowland valleys and the Huleh Basin at 100m asl. Cisjordan can further be roughly divided west to east into the coastal plain(s), the Highlands and the Jordan Rift Valley (Orni and Efrat 1964: 5ff). The coastal plain of the southern Levant begins south of Tyre in Lebanon, covering the plain of Acco. The promontory of the Carmel Mountain marks the southern limit of this plain. The coastal strip continues south and widens at the Plain of Sharon. In the north, east of these coastal plains are the Galilee Mountains that are divided into upper (including south of Lebanon today) and lower Galilee (Steiner and Killebrew 2013: 9; Orni and Efrat 1964: 5ff), a division known from Roman sources (Josephus, *War* 3.3.1). The valley of Beth-hakkarem running east-west separates the upper and lower Galilee. South of the Galilee Mountains is the Jezreel Valley that connects the coastal plain to the Great Rift Valley. Further south are the Central Highlands that rise and fall southward towards the Negev Desert and northward forming the Carmel Ridge and a patchwork of inland valleys. Transjordan on the other hand is a series of plateaus and highlands, limited by the Great Rift Valley to the west, the eastern desert expanse, and the Hauran Plains to the northeast (Steiner and Killebrew 2013: 10).

Although the southern Levant is distinct from the northern Levant in its geographical forms and zones, general similarities can be identified: the coastal strip, the mountains, the valleys and the plains. Moreover, the distinction between the southern and northern Levant may be currently valid according to modern and political configurations, however, there is not necessarily a cultural distinction. Even though the southern and northern Levant gave rise to different communities and cultures at distinct points in time such as the Phoenicians and the Philistines, spatially delineating the southern from the northern Levant is bound by temporal depth, i.e. the chronological period under investigation, and the archaeological record itself.

However significant are the Levantine broad boundaries, and those within it between the southern and northern Levant, an archaeological analysis of the land/seascape cannot furnish an interpretative model for understanding ancient dynamics without moving beyond spatial and temporal margins. As Broodbank (2011: 28) states in a response to world-systems analysis, "*we need to recognise that margins were not passive places, or slates to be wiped clean, and that we need to know much about the agency and impact of lineages of actors initially beyond but later within the* *system, because only this will help us to explain why the world morphed and transformed in the precise ways that it did*".

Studies of regional developments are countless in the archaeological sphere, both for the Mediterranean and the Levant (e.g. Greenberg, 2002; Marcus, 1998; Marfoe, 1978). Yet some of these studies have fulfilled no purpose other than to produce regionalism itself, offering no sufficient distance to construct or perceive a bigger picture. Indeed, the complexity of the Levant and that of the Mediterranean, and the diversity in social trajectories call for regional studies in order to pull components apart. Yet this diversity and this deconstructing process can only work in contrast to a complementary reconstructive process that places it, according to Broodbank (2011: 29), against a background of common denominators. In a response to this trend in archaeological scholarship, Broodbank (2011: 29) suggests that what we need is a broader set of processes and concepts, and a greater sensitivity to how these locally worked and stimulated change. In other words, we must recognise space as multi-scalar and employ methods sufficiently flexible to address the entire spatial spectrum. Henceforth, there are many ways in which the Levant can be defined, sub-divided and constructed. However, as archaeologists, our task is to follow the tendrils of connectivity that help to define and explain interaction, social commonalities and differences. It is for this reason that this thesis covers in its breadth the southern and northern Levantine littoral, transcending thus projected and constructed boundaries within the Levant in order to evaluate equitably the archaeological record for maritime activities.

This research focuses on the EBA littoral Levant. Therefore, the region of interest is the whole coastal strip of the Levant (see Chapter III, Section 3.2). Notwithstanding, there will be reference in this research to the northern and southern Levantine coastal strips, chronological divisions and developments. This distinction only aims to sustain consistency with scholarly research on the Levant, and will be contextually discussed where necessary. It is with the intention of fostering a holistic approach to the Levant that the southern and northern Levantine regions are studied under the same lens. The northern limit of the coastal strip study area is defined for this purpose as the Amuq Plain. Its southern limit is Wadi al-Arish, along the northern Sinai coast. The Mediterranean Sea defines the western limit. As for the eastern boundary of the study area, as mentioned previously, the Levantine coast is delimited to the east by a series of mountains that restrict the coastal zone. However, since the coastal strip is wider in the southern Levant than in the northern Levant, a limit of 20km inland was chosen as the eastern boundary of the study area (see chapter IV, Section 4.2). Despite these specific geographical margins of the Levantine littoral zone, Chapter IV, Section 4.2 provides a thorough analysis of different ways of defining the study area, particularly the eastern limit.



Map 2.1- The Levant's topographic features. ASTER GDEM V2 Elevation model.

2.3 Chronology

The nature of the vast extent of the Levant, its many sub regions and its uneven state of knowledge and archaeological research, prevents the establishment of a unified chronology and corresponding terminology for the southern and northern Levant. The situation becomes even more complex with chronological subdivisions. The focus of this section is on the EBA chronology. It will highlight the main subdivisions of the period and differences in terminology between sub regions.

The EBA period in the Levant, extending from the mid-fourth to the end of the third millennium BC, has no historical chronology, i.e. absence of written records. Hence, traditionally, there was a great reliance on the historical chronology of neighbouring regions, particularly that of Egypt for the southern Levant and that of Mesopotamia for the northern Levant, as well as on developments in pottery assemblages and relative chronologies for the northern Levant. Moreover, the EBA chronology of the northern Levant differs from that of the southern Levant. It is thence a challenge to address the chronology of the Levant cohesively. Providing that this research concentrates on the littoral zone of the Levant, it is imperative to lay a baseline chronology (Figure 2.1) and define the EBA chronological divisions in the southern and in the northern Levant in order to contextualise maritime activities and distinguish diverging or converging patterns along the coast.

The EBA of the northern Levant is divided into the EBI, EBII, EBIII and EBIV. These chronological terms are originally adapted from the southern Levant. Some archaeologists advise against their use for the northern Levant, as well as against the employment of Mesopotamian chronology, e.g. Uruk, Early Dynastic I-IIII. For instance, Akkermans and Schwartz (2003) state that although the use of Mesopotamian and Palestinian (southern Levantine) chronological terms by archaeologists, e.g. EBI-IV, is widespread for the northern Levant, the EBA chronology of the latter differs from that of the southern Levant. The argument of Akkermans and Schwartz (2003) stands on the fact that the EBA in the northern Levant begins at a later date than in the southern Levant, and the material culture types that define the EBA periods are either dissimilar or are widespread at different times (Akkermans and Schwartz 2003: 13). Therefore, Akkermans and Schwartz relied on local sequences for their chronological discussions and attempted to establish a local periodization especially for the fourth and third millennium BC (see also Matthiae, 1981). Despite criticism, the Palestinian chronological terms of EBI to EBIV are not only profusely used, but they also provide a uniform framework, particularly since this research covers both the southern and northern Levant; terminological inconsistencies would only prevent an understanding of the EBA on the coast.

A re-evaluation of Levantine and Near Eastern chronology has recently began by the Ancient Regional Chronologies of the Ancient Near East (ARCANE) project[3]. The ARCANE chronology, based on preliminary results, divides the EBA of the Levant (southern, central and northern) into four Early Levantine general phases, ELI, ELII, ELIII and ELIV (Figure 2.2). Within these divisions are regional phases and sub-phases. Unfortunately, this chronology has not yet been employed in practice; hence, it cannot be incorporated in this research. Worth to note however, the organisation of this chapter accounts for temporal lags and chronological inconsistencies between the northern and southern Levant, e.g. the difference in the beginning date for the EBA (Section 2.4 presents the contemporaneity of developments and events during the EBA divided according to temporal ranges, e.g. late half of the fourth millennium BC).

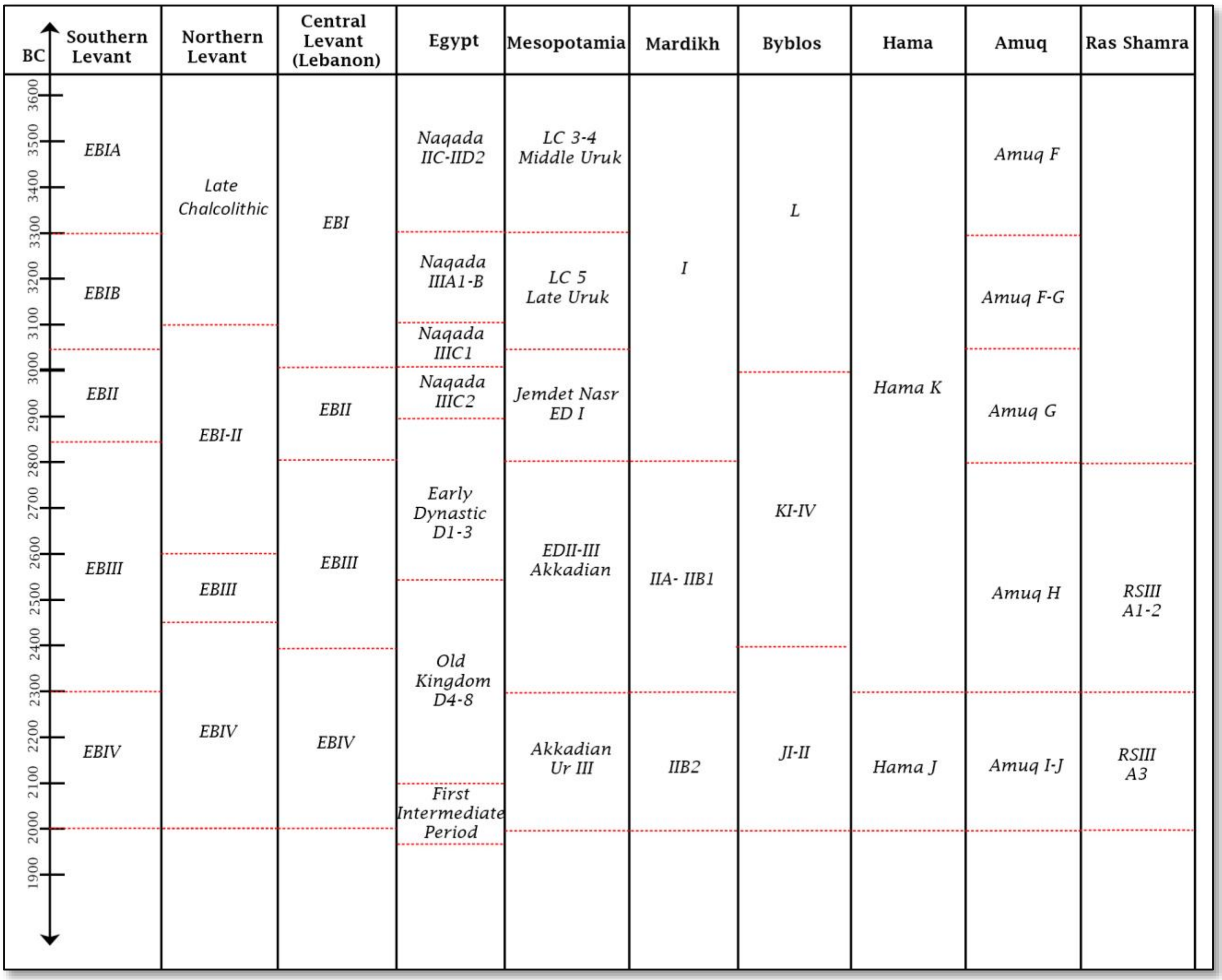


Figure 2.1- Absolute dates are conventional dates based on the references in the text. Correlations adhere to Hendrickx (1999, 2006), and Levy and van den Brink (2002) for Egypt; Saghieh (1983) for Byblos; Algaze *et al*. (1998), based on Greenberg (2002) for Mesopotamia.

[3] The ARCANE project is available at http://www.arcane.uni-tuebingen.de. ARCANE aims to synchronise chronologies of the Eastern Mediterranean and the Near East for the third millennium BC.

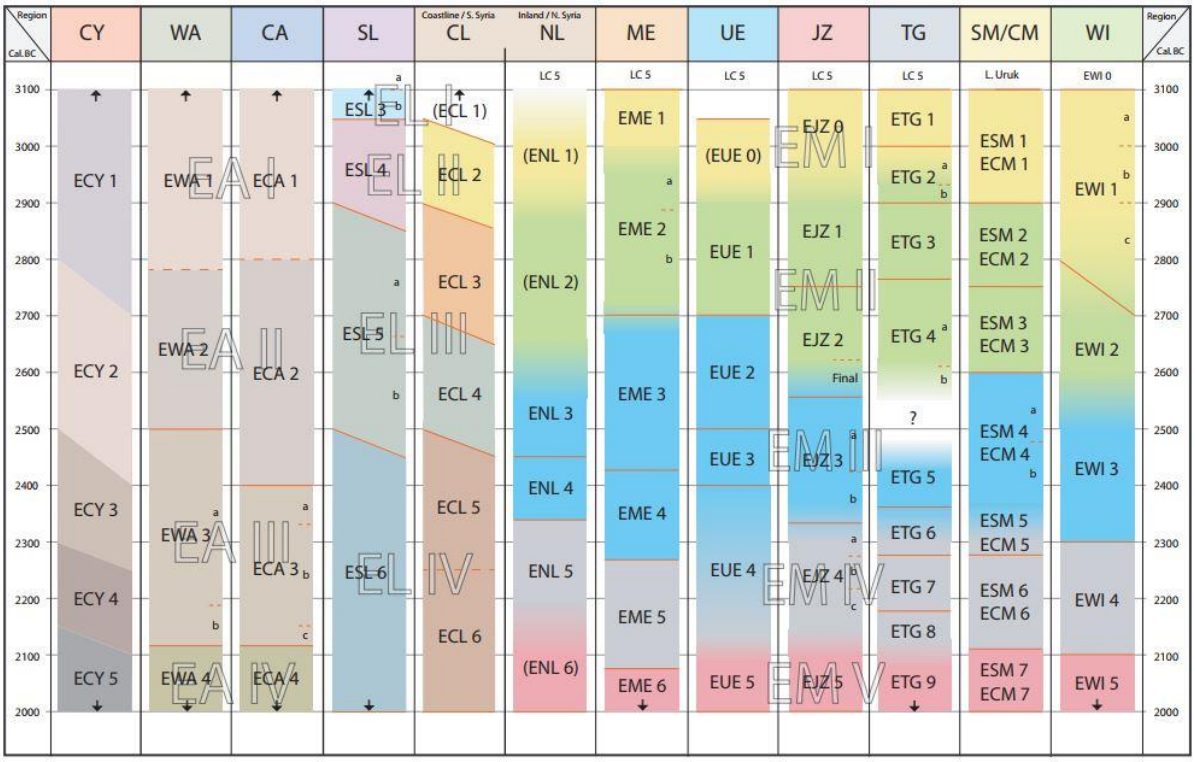


Figure 2.2- ARCANE general chronology showing regional phases and sub-phases. EL denotes Early Levantine, SL the Southern Levant, CL the Central Levant and NL the northern Levant (ARCANE, 2016)

The chronology of the EBA in the northern Levant is largely based on pottery assemblages from key sites that were occupied throughout the third millennium BC. The mound of Hama on the Orontes River revealed occupation layers as far back as prehistoric times, i.e. Neolithic, Halaf and Ubaid periods, and was settled until the medieval period. Its period of occupation K and J (Figure 2.1) represent most of the EBA (Cooper, 2013; Fugmann 1958: 24-85; Thuesen 1988: 186). The Amuq Plain also provided an important chronological sequence which is employed to synchronise with the northern Levant. The Amuq Plain was surveyed by Robert Braidwood in the 1930s. The excavations that followed his survey yielded pottery and other artefacts from which a chronological sequence was devised comprising Phases A-J, with Phases G to J corresponding to the EBA (Figure 2.1; Braidwood and Braidwood, 1960).

The beginning of the EBA in western Syria is around 3100 BC based on chronological findings from pottery sequences and radiocarbon dates from stratified contexts (Cooper 2013: 280). In general, the relative chronology of western Syria is not well understood. The sequences derive from soundings at sites (see Map 2.2) in the Euphrates Valley (Shiyukh Fawqani, Ahmar, Qara Quzaq, Habuba Kabira and Hadidi), in the Amuq Plain and in the Orontes Valley (Hama). Evidence south and southwest of Hama is very meagre. The absolute date for the EBI-EBII phase, c. 3100-2600/2500 BC, can be suggested from radiocarbon dates available from Habuba Kabira, from Tell Sukas on the coast and from subsequent phases to this period (Akkermans and Schwartz 2003: 224). The EBIII phase of the northern Levant dates to c. 2500/2600-2450 BC (Akkerman and Shwartz 2003: 246-247), and the EBIV to c. 2450-2000 BC (Cooper 2013: 278).

In the central Levant, which covers the region of modern-day Lebanon, the chronological terminology follows that of the southern Levant. The absolute dates for the chronological subdivisions of the EBA from Lebanon conform to those of the southern Levant except for the EBIV, which seems to have begun at an earlier date (Thalmann 2006: 15). Table 2.1 summarises radiocarbon dates from the sites of Byblos, Sidon, Tyre, Tell Arqa and Tell Fadous-Kfarabida on the Lebanese coast.

The EBA in the southern Levant is divided subsequently into EBI, EBII, EBIII and EBIV phases. The EBI phase however, is sometimes divided into three sub-phases based on local stratigraphy or pottery typologies: EBIA, EBIB and Final EBIB[4] (Amiran, 1969; Richard, 1987; Mazar, 1992; Stager, 1992; see also Braun, 2012). The EBIV is designated in different terminological systems as Intermediate Bronze Age, EB-MB or MBI. Nonetheless, the EBIV designation will be used in this thesis.

Table 2.1-Summary of available radiocarbon dates from Lebanon (Based on Genz 2013: Table 21.2).

Site	**Sample No.**	**BP date**	**BC date (two sigma range)**	**Material**	**Source**	**Period**
Tell Arqa, Level 15A	LY 5749	3600 ± 50	2112-1884	Seeds	Thalmann 2006: 230	EBIV
Tell Arqa, Level 16A-B	VERA 2278	3804 ± 29	2340-2130	Seeds	Thalmann 2006: 230	EBIV
Tell Arqa, Level 16A-B	VERA 2277	3842 ± 28	2410-2190	Seeds	Thalmann 2006: 230	EBIV
Tell Arqa, Level 16D	LY 2988	3609 ± 164	2448-1577	Charcoal	Thalmann 2006: 230	EBIV
Tell Arqa, Level 16D-E	LY 2987	3883 ± 169	2851-1919	Charcoal	Thalmann 2006: 230	EBIV

[4] There will be reference in this thesis to the EBIA and EBIB when material culture is specifically assigned to those subdivisions.

Tell Arqa, Level 16E	LY 2968	4205 ± 173	3305-2328	Charcoal	Thalmann 2006: 230	EBIV
Tell Fadous-Kfarabida Phase IV	KIA 40115	3955 ± 25	2567-2522; 2498-2436; 2421-2403; 2379-2349	Olive pit	Genz *et al.* 2009: 82	EBIII
Tell Fadous-Kfarabida Phase IV	KIA 40113	4065 ± 25	2839-2814; 2677-2557; 2555-2550; 2537-2491	Olive pit	Genz *et al.* 2009: 82	EBIII
Tell Fadous-Kfarabida Phase III	KIA 37205	4101 ± 23	2858-2810; 2750-2723; 2700-2576	Olive pit	Genz *et al.* 2009: 82	EBIII

The chronological framework of the southern Levant traditionally relied on Egyptian chronology. This reliance depended chiefly on the exchange of pottery that can be historically dated in Egyptian contexts (Amiran, 1969; Wright, 1971; Ben-Tor, 1991; Mazar, 1992; Braun, 2011). The correlation between southern Levantine and Egyptian contexts nevertheless is limited to the EBI and EBII periods which correspond to the end of Dynasty 0 (also referred to as Protodynastic Period, or Naqada III) and Dynasty I. Notwithstanding, extensive excavations in the southern Levant yielded a significant database of material culture. Along with radiocarbon dating, this database enables the construction of a chronological sequence for the EBA of the southern Levant, independently from Egypt. The recent work by Regev *et al.* (2012), as part of the ARCANE project, is an example of such an endeavour. They assembled 420 C14 dates and re-evaluated the dates according to their archaeological context using Bayesian modelling. Their research details the chronological sequence of the southern Levant and the transitional phases. Regev *et al.*'s (2012) study demonstrates the need to revise the traditional chronological division of the EBA of the southern Levant, taking into account that transitions did not occur simultaneously at all sites.

The suggested dates for the EBI in the southern Levant are 3500-3050 BC (de Miroschedji 2006: Table 1) and 3500-3150/2950 BC (Braun and Gophna, 2004). A higher beginning date of 3800 BC has also been suggested for the EBIA (Golani, 2004). According to Regev *et al*. (2012), the differences in EBI chronology are due to the association of C14 dates with archaeological contexts and to the Egyptian chronology in use. The EBI-II transition is placed around the thirty-first century BC (Amiran, 1965; Regev *et al*., 2012). The EBII lasted for at least two centuries until c. 2900/2850 BC (Regev *et* *al.*, 2012). The EBIII phase paralleled the Egyptian Old Kingdom until conventionally the reign of Pepi I, c. 2300 BC (Mazar, 1992; de Miroschedji, 1999); however, the date of Pepi's reign is disputed (Ramsey *et al.*, 2010). The EBIV phase or the Intermediate Bronze Age is correlated with the First Intermediate period in Egypt and the later part of the EBIV in Syria, ascribed to 2300/2250-2000 BC (Mazar, 1992), while Richard (1980: 26) favoured a span of 2400/2300-2000/1950 BC.

Since chronology underpins archaeological studies, it is crucial to establish an accurate sequence of events and to synchronise chronologies in order to evaluate and understand the development of societies and their interactions. Since the 1960's, with the advent of C14 dating, extensive data have been accumulated. These data have substantially modified the Bronze Age chronology. In light of the EBA chronological phases in the northern, central and southern Levant, recent efforts, especially through the ARCANE project (ARCANE, 2016), are targeting the gaps in the so far established chronological frameworks. The ARCANE project aims to review all aspects of material culture alongside the historical and epigraphic records and artistic manifestations whilst incorporating varied methods of dating. This work is of substantial importance for the Levant when it comes to fruition. It has the potential to modify traditional conceptions of the southern and northern Levantine division, and enhance archaeological knowledge particularly for the coastal zone, as well as for areas that have thus far lacked considerable research such as the northern Levantine coast.

2.4 The Levant during the late fourth and third millennium BC

Based on the chronological framework discussed above and summarised in Figure 2.1, the discrepancies in EBA chronology of the northern and southern Levant become apparent. The start of the EBA in the northern Levant comes at a much later date than the EBA of the southern Levant. This research, however, covers the entirety of the Levantine coast during the EBA, an expanse that has rarely been addressed in its totality. As such, the contemporaneity of events is important to highlight. For this reason, the following sections will start with an overview on the late fourth millennium BC, therefore encompassing the EBI of the southern Levant and paralleled developments in the northern and central Levant within that time range. The section that follows covers the EBII and EBIII of the southern and central Levant and the EBI-II and EBIII of the northern Levant (early half and mid-third millennium BC). The last section gives an overview of the EBIV in the southern central and northern Levant (late half of the third millennium BC). In such a way, the contemporaneity of developments in absolute dates is, to a degree, preserved[5].

[5] General references to EBA subdivisions in this thesis, if otherwise not stated, follow the southern Levantine terminology, i.e. EBI, EBII, EBIII and EBIV.

2.4.1 The late half of the fourth millennium BC (EBI southern Levant, Late Chalcolithic northern Levant)

2.4.1.1 The Southern Levant

The late half of the fourth millennium BC marks a change from the late Chalcolithic period in the southern Levant. This change was rather abrupt except in the southern coastal plain where a smooth transition is indicated by the continuity of ceramic traditions and other commodities (Braun, 2011; see also Milevski, 2013a). During the beginning of the EBA, the EBI, different subsistence modes, settlement patterns, material culture, funerary practices and foreign relations emerged. The most striking innovations at this time are the development of horticulture (olive and wine) and the elaboration of an agrarian Mediterranean economy (de Miroschedji 1989: 69-10, 2013, 2009; Stager, 1985). Subsistence modes relied on an agropastoral economy, including horticulture, agriculture (legumes and cereals) and animal husbandry (sheep, goats and cattle). This intensification in the Mediterranean economy distinguishes the EBA from the Chalcolithic period (Ben-Tor 1989: 41). Along with a change in subsistence modes, the EBI marks a transition from semi-sedentary to sedentary societies as well a change in settlement pattern. Chalcolithic settlements were abandoned and new settlements were founded, signifying increasing sedentism. The foundation of new and larger settlements was coupled with a modification in settlement location. The hilly areas and central highlands, the highlands of Judea, Samaria and Galilee, previously uninhabited, became home to small settlements (de Miroschedji, 2013). The process of sedentarisation, however, was not uniform. Coastal settlements, which Levy (1983: Figure 2.4) identified as specialised pastoralist camps, were still occupied since specialised pastoralism was important for EBI societies (Esse 1989: 83). Moreover, in the Shephelah region, new settlements were founded, followed by abandonments and groupings of their inhabitants in fewer, larger sites (de Miroschedji 2013, 2009). Although the change from the Chalcolithic period is significant, and perceived as a cultural break (de Miroschedji 2009: 113), this shift did not occur in isolation. Similarities can be seen between the late Chalcolithic and the EBI in northern Palestine in ceramics, lithics and burial practices (Braun 1989: 23). The EBIA pottery from the sites of Nizzanim and Afridar indicate typological as well as technological continuity with the Chalcolithic (Gophna 1995 according to Braun and Gophna pers. Comm.). Gophna (1995: 272) infers that in the southern coastal plain and the southern Shephelah region, continuity and overlap is substantial between the Late Chalcolithic and EBIA.

The primary settlement type of EBIA-IB are villages not exceeding c. 5 ha with exceptions such as Yarmuth, Megiddo and Beth Yerah (Refer to Map 2.2 for all sites mentioned in this chapter). The hallmark of EBIA dwelling are the oval or elongated houses with apses (Figures 2.3 and 2.4; Braun, 1989). These houses are found in northern Israel, along the coast as far as Ashkelon, as well as in Lebanon. During the late EBIB, large cultic buildings emerge, e.g. Megiddo Stratum J4, and the first fortifications at Tell es-Sakan and Megiddo (Finkelstein and Ussishkin 2000: 38-55). In parallel to this type of EBI settlement, there remains a continuous occurrence of isolated tombs that suggests the persistence of a mobile population in the southern Levant, or at least the continuation in burial practices for some people (de Miroschedji 2009: 15).

The material culture of the EBI is generally distinct from that of the Late Chalcolithic. EBI pottery shows great diversity and local particularisms (Stager, 1992: 29-30; Braun, 2009a). Yet the pottery assemblage of the EBI is known for three categories of wares: red, painted and Grey Burnished. The Grey Burnished Ware (Figure 2.5), an enduring tradition of the EBI and one of the most widely discussed ceramic category (Wright, 1937; Kenyon, 1960; de Vaux, 1970; Goren and Zuckermann, 2000), is shared in the northern valleys and coastal plain, to which an external northern origin is sometimes attributed (e.g. Hennessy 1967: 35-6; Stager 1992: 29; Greenberg 2002: 42). The Grey Burnished Ware is thought to be local product of northern Israel, as attested through petrographic analysis, yet it may reflect a northern influence in its decoration, possibly Lebanese (Goren and Zuckermann 2000: 164).

On the other hand, Early Bronze I metallurgy became more widespread and common in contrast with the prestige-oriented productions during the Late Chalcolithic (de Miroschedji, 2013). Mining activities on the eastern border of the Aravah Valley, in the area of Feinan, witnessed an increasing activity in the exploitation and refining of copper. Meanwhile, the flint industry was reduced but it nonetheless retained importance through the so-called Canaanean blades (Figure 2.6) that mark the beginning of the EBA in the majority of the Near East (Rosen, 1997). Furthermore, funerary practices in the Mediterranean zone of the southern Levant consisted of artificial caves accessed through a shaft. Tombs were used for collective burials. By the end of the EBI, primary burials were in practice, especially at Jericho (de Miroschedji, 2013).

The whole of the Levant during the EBI demonstrates a growing adoption of the cylinder seal. Many scholars support the administrative implication of cylinder seals (Mazzoni 2008: 43; see also Joffe 2001: 361). A recent reappraisal of the seals suggests they acted as a form of ‘commodity branding’, hence reasserting their role within the economic organisation of complex societies (Wengrow, 2008). Byblos stands out in the cylinder seal tradition as it has the earliest group of seal impressions on jars (Mazzoni 2008: 44-45; Artin 2007: 78). The Byblos motifs show similarities to those from Late Chalcolithic Syro-Anatolian origin documented in the Amuq Valley; additional patterns show affinity with motifs from EBI Arad (Beck, 1984).

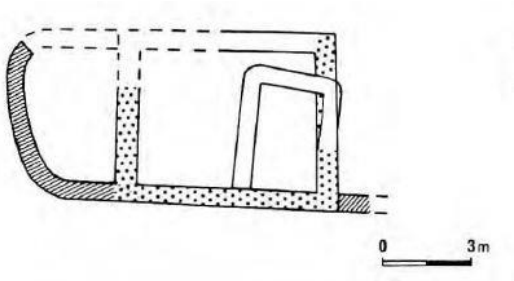


Figure 2.3- Plan of the 'apsidal' house at Byblos (from Dunand 1973: Figure 146).

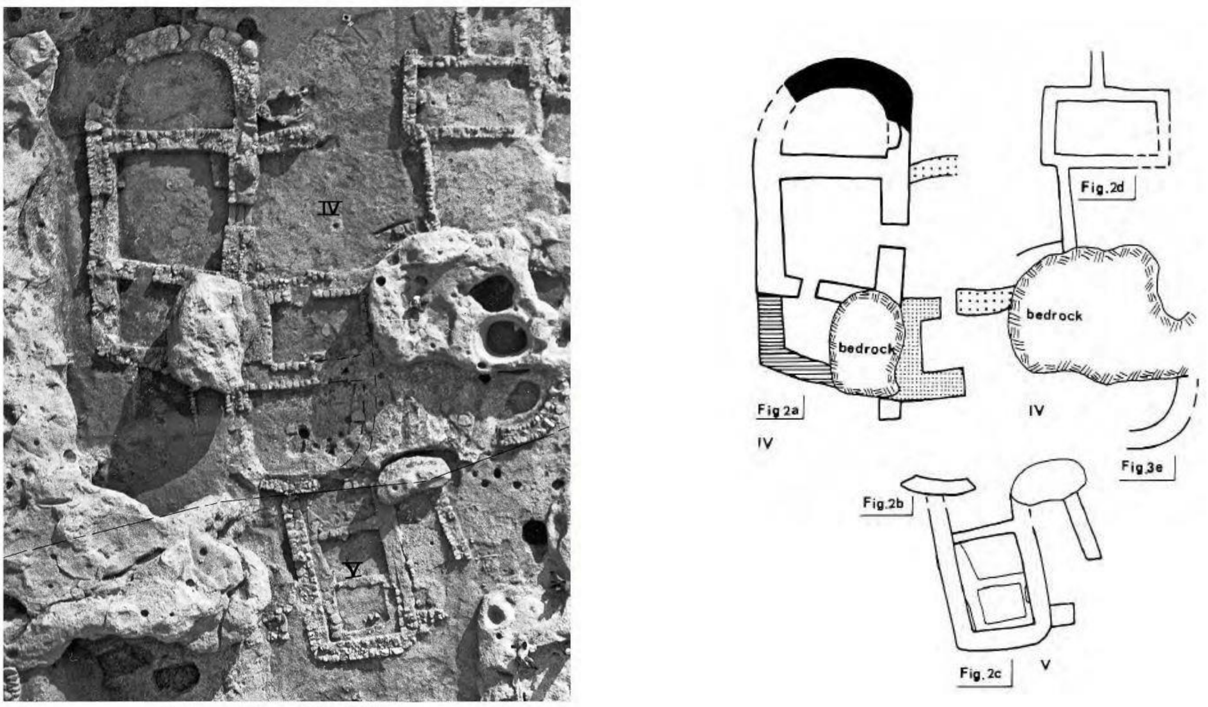


Figure 2.4- Left: Aerial photo of Megiddo showing an 'apsidal' house in Stage IV (from Braun 1989: Plate I). Right: Plan of Megiddo stages IV and V. Fig 2a shows the ‘apsidal’ house (from Braun 1989: Fig. 2).

Figure 2.5- Example of a Grey Burnished Ware incense burner from the EBI southern Levant (retrieved from the database of The Foundation for Archaeological Research of the Land of Israel).

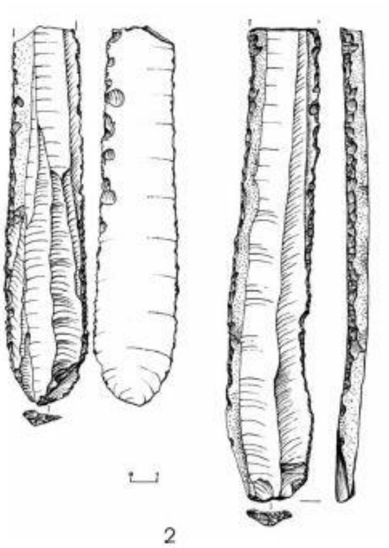
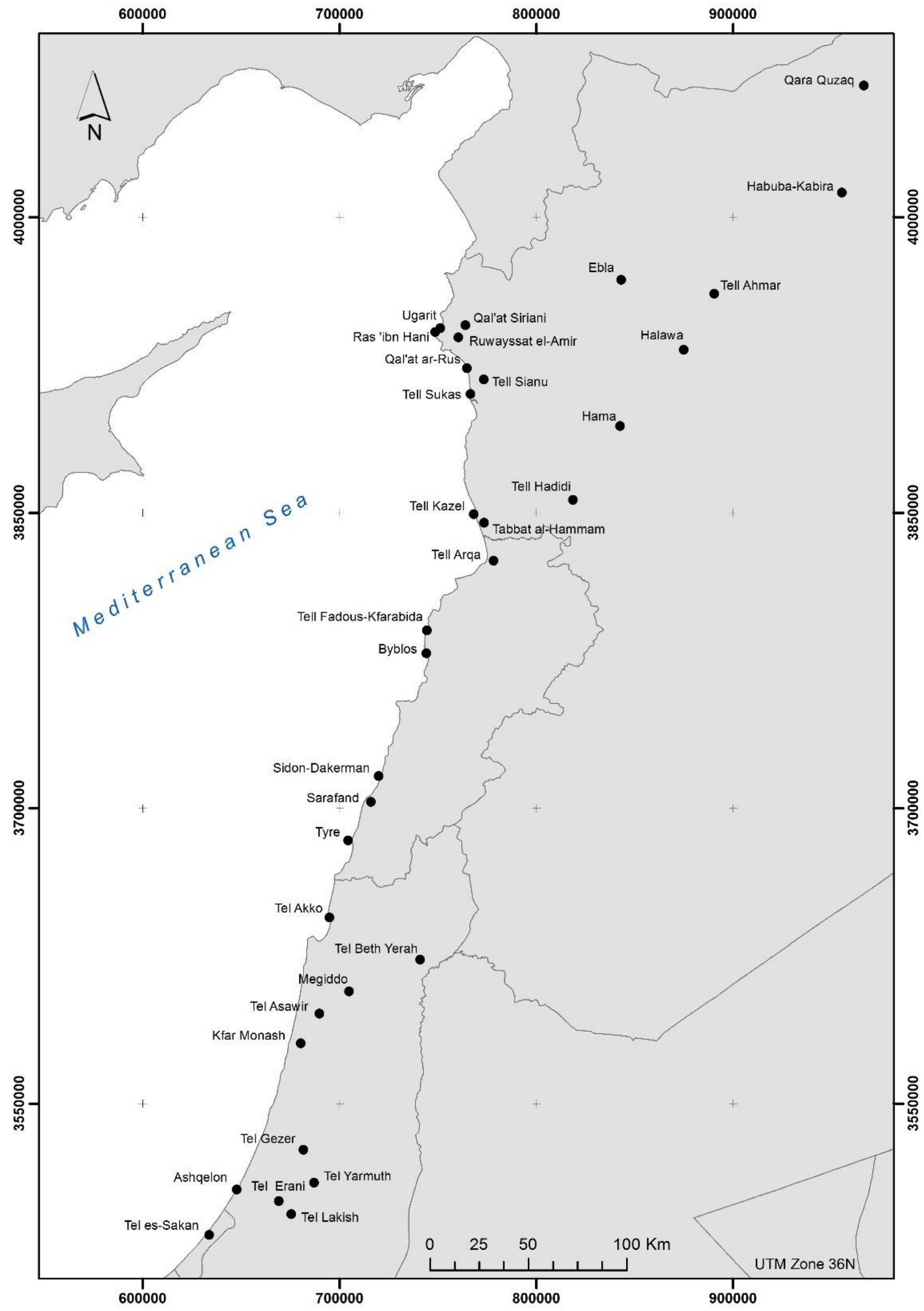


Figure 2.6- Canaanean blades from the site of Afridar, Area J (from Milevski 2013b: Figure 3).



Map 2.2- Map showing the location of the main sites mentioned in Chapter I.

2.4.1.2 Central Levant

The Early Bronze I in the central Levant or Lebanon is an ill-defined period. In the coastal region, the EBI follows the same line of development as in the southern Levant. This period is known as the Énéolithique Récent at Byblos (Artin, 2005), and the Chalcolithic at Sidon-Dakerman. Oval houses are found at the settlements of Byblos and Sidon-Dakerman and are a typical feature of the southern Levant (Braun, 1989). Moreover, there is a widespread use of Canaanean blades (Cauvin 1968: 182-185; Hours 1979: 65-72). The presence of a Grey Burnished bowl at Kamid el-Loz in the Beqa'a Valley, and the pottery from Byblos testify for cultural affinities with the southern Levant (Genz 2013; Dunand 1973: 268-301; Ben-Tor 1989: 45-50; Marfoe 1995: Fig. 44.5). Funerary practices in the central Levant, at the sites of Byblos (Dunand 1973: 24-5; Artin 2005), Sidon-Dakerman (Saidah 1979: 42) and Tell Fadous-Kfarabida (Badreshany *et al.*, 2005), are represented by burials in large jars. Two child burials were uncovered at Tell Fadous-Kfarabida, whereas at Byblos some burials contain rich inventories of silver and gold jewellery (Artin, 2005). Burial caves and extramural burial caves were discovered at Byblos and at Kafr Garr (Guiges, 1937).

2.4.1.3 Northern Levant

The situation in the northern Levant, Syria, is quite ambiguous firstly due to the lack of research and the limited number of sites that have been investigated, and secondly to terminological problems. The middle to late fourth millennium BC is generally attributed to the Late Chalcolithic period while the term EBA is used after the Uruk collapse in the late fourth millennium BC (Genz 2012: 615). During the middle to late fourth millennium BC, southern Mesopotamian-style material culture is copiously distributed across the Syrian landscape. In some cases, the entire repertoire of southern Mesopotamian architecture, pottery and other objects was replicated in the northern Levant, while in other cases Mesopotamian stylistic influences were only marginally evidenced or non-existent (Akkermans and Schwartz 2003: 181). The distribution of Mesopotamian material culture is not only limited to Syria but also documented in northern Mesopotamia, western Iran and southeastern Anatolia (Algaze, 1993). This phenomenon is labelled the 'Uruk expansion'. Whilst the Uruk expansion is notable in the Euphrates Valley, and as far west as Hama and the excavated sites of the Amuq Plain, Uruk influence has not been demonstrated elsewhere in western Syria[6]. The deep excavation pit at Tell Sukas on the Mediterranean coast revealed local Amuq F-G fourth millennium pottery (Oldenburg, 1991). The mid to late fourth millennium BC in western Syria is thus known based on the sites of Tell Sukas, levels M2 and M1 (Oldenburg, 1991), Ras Shamra Level IIIB

[6] See section 2.5.2 for further details on the Uruk phenomenon and material evidence related to the Uruk expansion.

(Schaeffer, 1962; de Contenson, 1982) and the site of Hama, Level K (Fugmann, 1958; Thuesen, 1988).

The Chalcolithic architecture at Ras Shamra comprises stone rectangular structures. At the site of Hama, rectangular houses are found, with mud-brick rooms (Cooper, 2013: 287). Funerary practices consist of jar burials reserved for children at Ras Shamra, while used for both children and adults at Hama, similar to practices at Byblos.

2.4.2 The early half and mid-third millennium BC (EBII, EBIII southern Levant and EBI-II, EBIII northern Levant)

2.4.2.1 Southern Levant

The transition from the EBI to the EBII-III in the southern Levant is manifested by the appearance of new pottery shapes, fortifications and changes in settlement patterns. Many EBI settlements were abandoned and several new fortified sites were founded. This shift in settlement pattern is considered a result of the urbanisation process taking place during the EBII (de Miroschedji, 1995). In fact, the transition from EBI to EBII is believed to be a transition from a non-urban to an urban society with many arguing that the EBII marks the first 'Urban Revolution' in the southern Levant (Gophna, 1995; Greenberg 2013, 2002; de Miroschedji 2013, 2009, 1989; Joffe, 1993; Esse, 1991; Childe, 1950). The result of change in settlement patterns is seemingly a hierarchy between the large fortified settlements, the medium-sized ones and the villages[7]. Nonetheless, considerable regional variation in the nature of settlements and their density persisted. Moreover, the presence of isolated tombs and burial sites indicate that a large segment of the population did not adhere to the EBII-III trends.

The fortification of settlements began during the EBII and continued in the EBIII when it underwent modification through the strengthening and addition of advanced defensive structures (de Miroschedji 1990: 58-60; Nigro, 2006). Amongst those erected, at the early stages of the EBII, some are impressive in size such as at Tel Yarmuth (Figure 2.7;. de Miroschedji 1990, 1999). During the EBII, the development of monumental architecture took place, although palaces in the strict sense are not verified prior to the EBIII. At Megiddo, a partially excavated palace was located close to the temple (Nigro, 1994 cited in Nigro, 2009). Megiddo, Tel Yarmuth and Beth Yerah's monumental

[7] This is largely based on scholarly works that advocate for a hierarchical organization of society. See Chapter II section 2.6 for further details.

granaries (Mazar, 2001) are considered to reflect full EBII-III city-states (de Miroschedji, 2013). On the contrary, the socio-political organisation in smaller cities is less complex and is at times compared to chiefdoms (Chesson, 2003). The EBII-III economy was similar to that of the preceding EBI, yet functioning on a large and more intensive scale. Horticulture was also more widespread as evidenced by the use of jugs and combed jars to transport or store oil and wine.

In terms of pottery, whereas the EBI pottery showed a strong regionalism, the EBII-III is characterised by standardised shapes and surface treatments, except between the north and south of the southern Levant (Greenberg in press cited in de Miroschedji, 2009). New shapes appear during the EBII-III, the most prominent of which are the carinated platters. Pottery workshops are corroborated by the frequency of potters' marks and the standardization in shapes. The EBII-III Northern Metallic Ware (NMW) is massively distributed in the northern part of the southern Levant and Transjordan. It is bracketed between the late EBI and EBIII (Greenberg 2002: 44-45). Conversely, the Abydos jar (Figure 2.8), which takes its name from the site in Egypt from where it was imported in great quantities during the EBII, consists of red burnished and painted jugs (Braun 2009b: 27-28). The EBIII period is also known for the Khirbet Kerak Ware- KKW (Figure 2.9). The distribution of this ware is commonly presumed to reflect a phenomenon distinct in character whereby immigrants from a northern origin introduced it to the southern Levant (de Miroschedji, 2000). This style of pottery lacks obvious antecedents and shows clear resemblance to material from eastern Anatolia (Philip, 1999)[8].

EBII-III funerary practices in the southern Levant follow late EBI tradition. Caves were used for collective burials in the Mediterranean zone. This practice is supposed to indicate the social integration of groups (de Miroschedji 2009: 36-38).

[8] The Khirbet Kerak Ware will be further elaborated upon in Section 2.5.3.

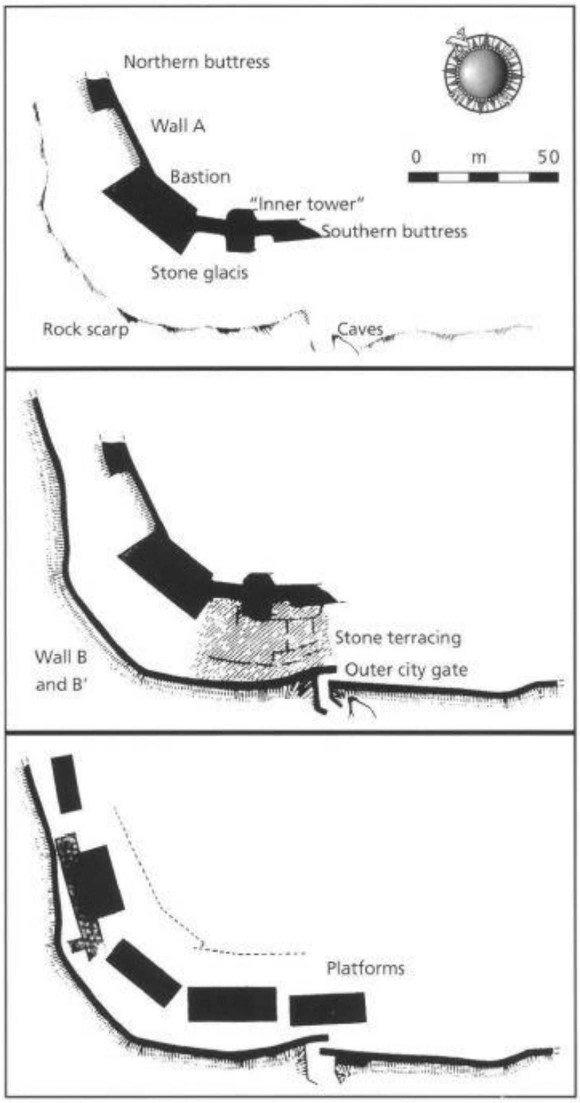


Figure 2.7- Plan of the changes in the EBA fortification system at Tel Yarmuth from the EBII (Wall A), late EBII early EBIII (Wall B), and phase III of the EBIII construction of the platforms (from de Miroschedji, 1999).

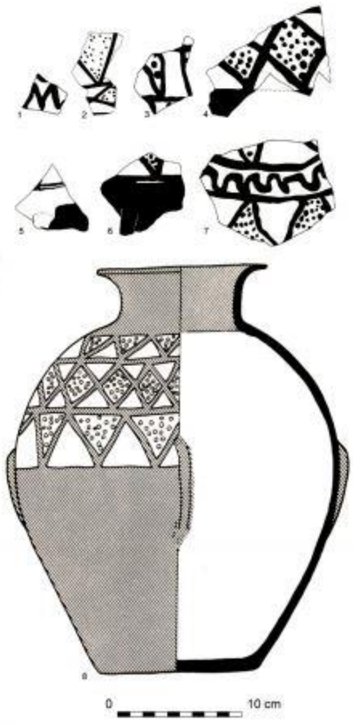


Figure 2.8-Abydos Ware painted pottery
from Arad (from Braun 2009: Fig. 7).

Figure 2.9-Khirbet Kerak Ware from the mid-third millennium BC, Tel Bet Yerah
(from Wengrow 2008-2009: Figure 4).

2.4.2.2 Central Levant

In the central Levant, the lack of thorough research and excavations hampers our understanding of the EBA. However, of the most important sites is Byblos with Phases KI to IV defining the EBII-III based on Saghieh's (1983) terminology. EBII-III architectural remains were uncovered at Tell Arqa (Thalmann, 2009), Tell Fadous-Kfarabida (Genz 2010: 104-108), Sidon (Doumet-Serhal, 2006), Beirut (Badre 1997: 14) and Tyre (Bikai, 1978). Fortifications that were widespread during this period in the southern Levant are only corroborated at the sites of Byblos and Tell Fadous-Kfarabida. Byblos was fortified at the beginning of EBII onwards (Lauffray 2008: 289). A typical feature of that period in domestic architecture is the use of column bases placed at the corners of the walls (Genz, 2013). Although limestone is copiously available on the coastal plain, the building material of EBII-III sites varied. Byblos and Tell Fadous-Kfarabida demonstrate the use of limestone, while at Sidon, mud-brick was the primary building material (Doumet-Serhal, 2006). Considering this scarcity in evidence from the coastal plain, little can be said regarding the organisation and hierarchy of settlements. Scholars of the central Levant tend to follow Marfoe's work on the Beqa'a valley further inland from the coast (Marfoe, 1998). Marfoe as well as Thalmann's (2006) survey of the Akkar Plain identified a tripartite hierarchy of settlements. However, a study by Safadi (2012) undertook a review of settlement patterns in the Beqa'a Valley. It relied on spatial analyses in order to highlight the variety of settlement patterns when viewed on multiple spatial scales, e.g. global and local point pattern analysis. It hence broke the trend in attributing a unanimous hierarchical structure to societies according to dubious site sizes.

Funerary practices during the EBII-III in the central Levant changed considerably. They consisted of rock-cut chambers such as those of Byblos (Baramki, 1973) and Lebea (Guigues 1937: 41-56). The number of grave goods suggest possible multiple interments. However, the limited number of tombs found and the lack of anthropological studies on the grave goods and the chambers hinder any further explanation and connection to societal organisation.

EBII-III pottery in Lebanon underwent a process of greater standardisation and mass production similar to that of the southern Levant. Regional variation in pottery production, however, endured. Notwithstanding, certain types, such as the two-handled combed storage jars and the one-handled red polished jars, are found throughout the Levant during the EBII-III, which testify to commercial regional and international networks (Genz, 2013).

In terms of the agricultural economy, Sidon and Tell-Fadous-Kfarabida indicate coherence with southern Levantine agricultural and horticultural economy, i.e. wheat, barley, grapes and olives (Badreshany *et al.* 2005: 84-88). In addition, the archaeozoological record from Tell Fadous-

Kfarabida and Sidon suggests the extensive use of marine resources through the means of fishing and gathering shells (See Chapter V, Sections 5.1.1 and 5.1.2; Doumet-Serhal, 2006; Genz *et al.,* 2009).

2.4.2.3 Northern Levant

By the beginning of the third millennium BC, Uruk colonies in Syria disappeared, leaving no traces in the northern Levant, except at Hama, Period K, where Uruk-related rimmed bowls are present in the early phases (Thuesen 1988: 181). The situation in western Syria, in its majority, testifies for the development of a local culture. Akkermans and Schwartz (2003: 211) term this time a period of ruralisation whereby the post-Uruk era was primarily dominated by small communities. Regardless, this understanding was questioned by Cooper (2006) in light of recent discoveries. Fortification walls are attested in the Middle Euphrates region at Halawa B and Tell Habuba Kabira. Public buildings of a religious nature are found at Halawa B and Qara Quzaq (Genz, 2012). A large number of tombs were discovered in the Euphrates region. Child burials underneath houses and in ceramic vessels are evidenced in Hama level K (Fugmann 1958: 26-27). Burial customs consisted of simple pits and *pithos* burials. Tomb L-12 at Qara Quzaq is one of the few indicators of monumental burial structure (Figure 2.10; Cooper 2006: 224-225). Although this evidence from the Euphrates region, at the sites of Halawa, Tell Habuba Kabira and Qara Quzak, including the evidence from Ebla where excavations revealed thick-walled storage room, is indicative of increasing socio-political complexity, according to Akkermans and Schwartz (2003:226), the available data from western Syria generally indicates the predominance of small-scale communities. We must acknowledge, however, that this understanding of western Syria is based on available evidence, much of which consists of small-scale soundings.

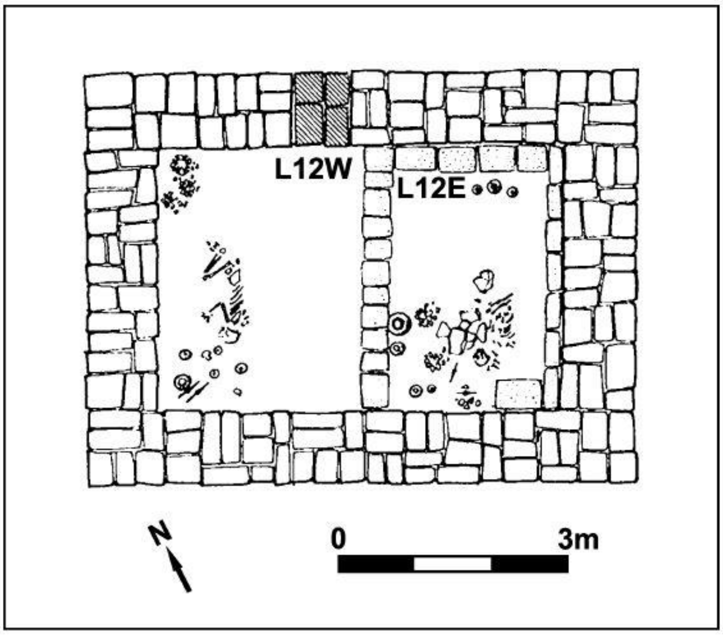


Figure 2.10-Qara Quzaq tomb L-12 (from Cooper 2006: Figure 9.8).

While large-scale public buildings are partially confirmed in Syria during the early third millennium BC, craft specialisation is better documented. Metallurgical evidence from the Euphrates Valley is robust. Large assortments of weapons and copper implements were found at Carchemish and the cemeteries at Birecik. Copper daggers and spearheads were discovered in burials at Tawi and Qara Quzaq (Genz, 2012). Moreover, at Tell Habuba Kabira North, Levels 2-3, excavators identified an 'industrial' zone devoted to pottery production (Strommenger 1980 cited in Akkermans and Schwartz 2003). This area was transformed to a workshop for the manufacture of shell and stone beads and animal amulets in Level 5.

Craft specialisation is further attested in mass-produced pottery (Mazzoni, 2002: 73; Akkermans and Schwartz, 2003: 228-229). The so-called Red-Black Burnished Ware, or the Khirbet Kerak Ware, appeared in western Syria by the beginning of the third millennium BC, at around 2800 Cal BC (Philip 1999: 32). On the northern Levantine coast, this ware is distributed at Ras Shamra and the nearby sites of Qal'at Siriani and Rousset el-Amir. It is also reported at Tell Sukas and Qal'at er-Rus (Philip, 1999). The significance of the distribution of this ware and its implication is discussed in Section 2.5.3.

The mid-third millennium BC in the northern Levant, the EBIII, marks the 'second urban revolution'. It is termed as such for two reasons according to Akkermans and Schwartz (2003: 233). First is the presumption that complex societies had appeared in the fourth millennium BC, during the period of the Uruk expansion, but they did not survive to the early third millennium. Second, the 'secondary' nature of the urbanisation is due to the likely influence of the 'primary' Mesopotamian urban societies that developed almost a millennium prior to Syria. Nonetheless, as mentioned previously, the origin of this urbanisation can be traced to the early third millennium BC. Of the important sites from this period is Ebla with an exceptional size of 60 ha (Akkermans and Schwartz 2003: 235). Ebla reveals the most impressive secular building, Palace G. This palace consisted of a large courtyard, a tower with a stairwell, storage rooms and administrative quarters. A wealth of material was uncovered from this building (Matthiae, 1981) including 17,000 cuneiform tablets. These tablets are of great importance in reconstructing the political, social and economic history of northern Syria.

Urban planning is demonstrated at most EBIII site such as at Qatna and al-Rawda (Castel and Peltenburg, 2007), also at Halwa A and Tell Hadidi (Cooper 2006: 106). Moreover, urban sites were fortified (Cooper 2006: 69-89) and temples and palaces were prominent. The *in antis*[9] (Figure 2.11) was the most common type of religious structure. It consisted of a rectangular room and an open foreroom. This type of architecture is confirmed at Halawa A, Tell Kabir, Qara Quzaq, etc. On the

[9] The *in antis* is characterised by a rectangular room and small front porch.

coast, occupation during this period is proven at many sites, e.g. Ras Shamra, Tell Sukas and Tell Sianu.

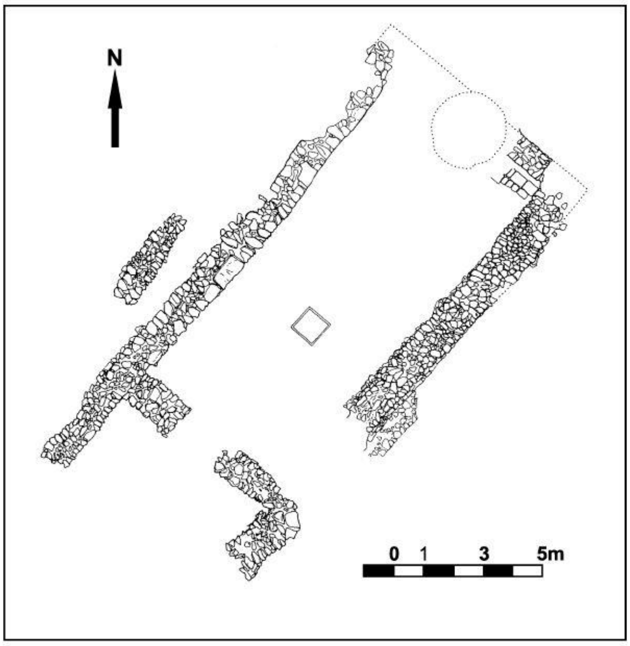


Figure 2.11- Example of *an antis* temple from Qara Quzaq, Syria (from Cooper 2006: Figure 7.9).

One feature of the EBIII period in northern Syria is monumental tombs, e.g. at Tell Hadidi, Tell Ahmar and Tell Banat (Cooper 2006: 225-239). Ordinary tombs persist nontheless in the Euphrates region. These are in the form of pit burials, cist graves, *pithos* burials, shaft graves and extramural cemeteries (Cooper 2006: 206-223; Akkermans and Schwartz 2003: 251-253). Metal objects gain importance during this period. Finds at the sites of Byblos and Tell Arqa in Lebanon testify to a strong influence of metalwork from northern Syria and northern Mesopotamia (Gernez, 2007)

In terms of pottery, apart from the Khirbet Kerak Ware, a distinctive pottery appears at the end of the EBII and during the EBIII in western Syria. This pottery is known as the Pattern Combed Ware, Metallic Ware or Cross-Combed Ware. The Cross-Combed Ware (Figure 2.12) is found on the northern Levantine coast at Tell Sukas, Tell Sianu and Tell Kazel (Bounni and al-Maqdissi 1994: 20-25 cited in Cooper 2013; Esse 1991: 114-123). This type of vessel, however, occurs in less abundance further inland in Syria, and is rare at Hama and Ebla, although it is evidenced at Tell Nebi Mend and its environs in the Orontes Valley. While some consider it to reflect a coastal phenomenon, Cooper (2013) provides many examples of its presence at inland sites. This ware is usually confused with the Northern Metallic Ware of the southern Levant that was widespread during the EBII prior to its popularity in the northern Levant. Greenberg (2002: 48) suggests that the difference between the Northern Metallic Ware and the one from the northern Levantine coast, the limited range of shapes in the northern Levantine assemblages and the chronological difference in the adoption of the ware in trade affirm the influence of north Canaan on the ceramic traditions of coastal Syria. Whatever the reason behind the discrepancy in the manufacture and production of this ware in the Levant, petrographic analyses have shown that these wares travelled beyond their place of production, suggesting the presence of a network of exchange (Cooper, 2013; Greenberg and Porat, 1996). Furthermore, it has been suggested that these jars were used in the production, transport and consumption of oil (Mazzoni 2002: 75), therefore becoming the hallmark of international trade in the EBIII (Stager 1992: 41).

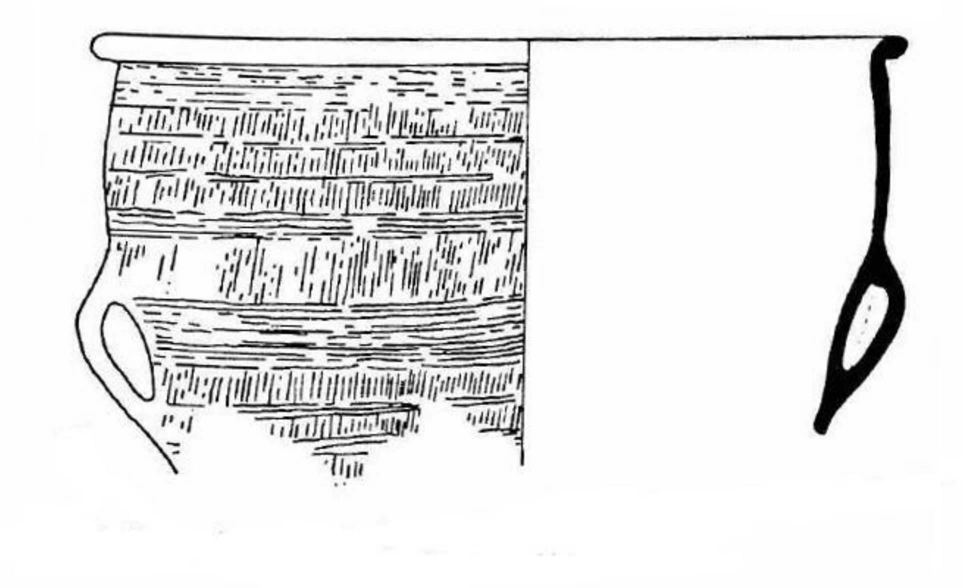


Figure 2.12- Example of a Combed Ware from Byblos (from Dunand 1952: pl.5).

2.4.3 The late half of third millennium BC (EBIV southern and northern Levant)

2.4.3.1 Southern Levant

The late half of the third millennium BC marks the EBIV in the southern Levant or the Intermediate Bronze Age (IBA). It is a time known for the collapse of EBA urbanisation, which was the pinnacle of EBII-III in the southern Levant. The EBIV is recognised as the 'Dark Age', whereby settlements and cities were deserted, and a structural collapse, that appears to have abruptly occurred, is witnessed in most south Levantine sites (de Miroshcedji 2009: 109). The collapse, however, is not the result of a violent conflagration. For instance, at Yarmuth, Palace B1 was in full use but it seems to have been abandoned by the EBIV. The typical settlement of this period is an open village, while palaces, public buildings and fortifications fell out of use. Pottery traditions reveal strong regionalism similar to that during the Late Chalcolithic and the EBI (Dever, 1980). Moreover, funerary practices underwent profound changes (de Miroschedji 2000: 40-44). Burials in caves and shaft-tombs are discovered nearby villages but they included a smaller number of interments. In general, the EBIV in the southern Levant shows a decline in urban structures and a return to village and rural societies comprised of agro-pastoralists living along with pastoral groups (de Miroschedji 2009: 15). This change, however, was not necessarily as abrupt according to Greenberg (2002:101). Athough the EBIV is widely considered a time of disruption in urbanisation, continuity and the presence of complex societies should not be discounted. Just as Cohen (2009: 8) explains, the use of the terms 'sedentary', 'pastoral, 'stratified and 'egalitarian' can be ascribed to a variety of societies and their organisation based on the presence or absence of certain traits. However, there can be various levels of urbanism depending on the region, pre-existing cultural expressions and external forces.

Models of explaining social change and transformation during the EBIV vary. External influences, such as pressure from Egypt, have been suggested, either in the form of Egyptian intervention during the 5th and early 6th dynasties, or due to the collapse in trade of wine and olive oil under the Egyptian 6th Dynasty (Prag 1974: 103). Other explanations take on a more intermediary view, involving environmental and political events (Prag 1971, 1974). Climate impact during this period is of central attention (Rosen 2007, 2001; Weiss *et al.* 1993). In southwest Asia, a global climate event of aridity culminated from approximately 2200 BC (Staubwasser and Wiess, 2006). Precipitation levels in the southern Levant fell by 20 to 30% (Bar-Mathtthews *et al*. 1997), thereby affecting EBA farming (Prag 1986: 63). Apart from climatic models for explaining social change during the EBIV, in more recent years, an indigenous process of social transformation has been accepted. Change has been attributed to a cyclical process of economic rise and fall, and cycles of specialisation and de-specialisation (LaBianca, 1990; Joffe, 1993).

Archaeological scholarship considered the Middle Bronze Age (MBA) as an age of re-urbanisation, thereby the transition from the EBIV to the MBA was seen as "*the most dramatic shift of settlement patterns in the history of Palestine*" (Dever 1987: 152). Many studies focused on the differences between the EBIV and the MBA by emphasising on the regionalism of the ceramic traditions of the EBIV in contrast to that of the MBA (Dever, 1980; Palumbo and Peterman, 1993) and by examining lifestyle patterns of the EBIV known to be pastoral and egalitarian, thus opposing the MBA urban and complex social organisation (Dever, 1973). Cohen (2009), however, re-examined evidence from the southern Levant and showed elements of continuity between the EBIV and MBA.

2.4.3.2 Central Levant

Whereas the EBIV in the southern Levant shows a decline in urban structures, the evidence from the central Levant presents a different narrative. Byblos during the EBIV continues to be settled and demonstrates the presence of urban structures including religious and public buildings (Saghieh 1983: 93-98). Settlement during the EBIV continues as well at Tell Arqa (Thalmann, 2006), Tell Fadous-Kfarabida (Badreshany *et al.* 2005: 47) and Tyre, although Tyre only reveals EBIV pottery with no architectural remains (Bikai 1978:6). In addition to these sites, the EBIV is much represented in Lebanon by burials such as at Bna'foul, Chhim and Sarafand. Genz (2010) identifies two regions during the EBIV. First is the southern Lebanon and the Beqa'a Valley, mainly characterised by tombs. Settlements in these areas consist of small villages or campsites. Second is the coastal plain, which draws a different picture. Byblos and Tell Arqa show clear indication of an uninterrupted urban life. A mould for jewellery was found at Tell Arqa in an EBIV layer, suggesting its use in the production of precious metals, i.e. gold and silver (Gernez, 2007).

2.4.3.3 Northern Levant

Towards the end of the third millennium BC, some parts of the northern Levant underwent a marked decline, though not as severe as that of the southern Levant. The western parts of Syria, however, do not seem to have been radically affected. Following the destruction of Ebla's Palace G in the twenty-fourth century BC, Ebla quickly recovered and remained an urban centre until the beginning of the MBA (Mazzoni 2003:178). Sites in western Syria were burned, e.g. Ebla, Qannas, Sweyhat, reduced to short-lived villages, e.g. Selenkahiye, or abandoned, such as Umm el-Marra and Hadid (Akkermans and Schwartz 2003:282).The Euphrates region, however, reveals a decline with sites such as Jerablus-Tahtani and Tell Banat abandoned, and other sites markedly reduced in size (Cooper 2006: 264-267; Akkermans and Schwartz 2003:282).

Considerable attention has been drawn to the EBIV period due to the interest in problems related to the decline and collapse of civilisations. Two different approaches were advanced in the case of the northern Levant. One perspective emphasised climatic changes (Weiss *et al.*, 1993; Weiss, 2013) whereby the late-third millennium exhibited episodes of aridity that would have exhausted the agricultural capacities of urban centres (Figure 2.13). This approach reintroduced climatic changes to the understanding of complex societies, which in itself is an important contribution (Akkermans and Schwartz 2003: 283). The alternative approach focused on environmental decline because of the intense activities carried out by urban societies. For instance, Wilkinson (1994) reinterpreted the meaning of sherd scatters as vestiges of manuring which was part of a maximising strategy of cultivation. However, as manuring fails to retain moisture, it renders the agricultural system vulnerable to aridity.

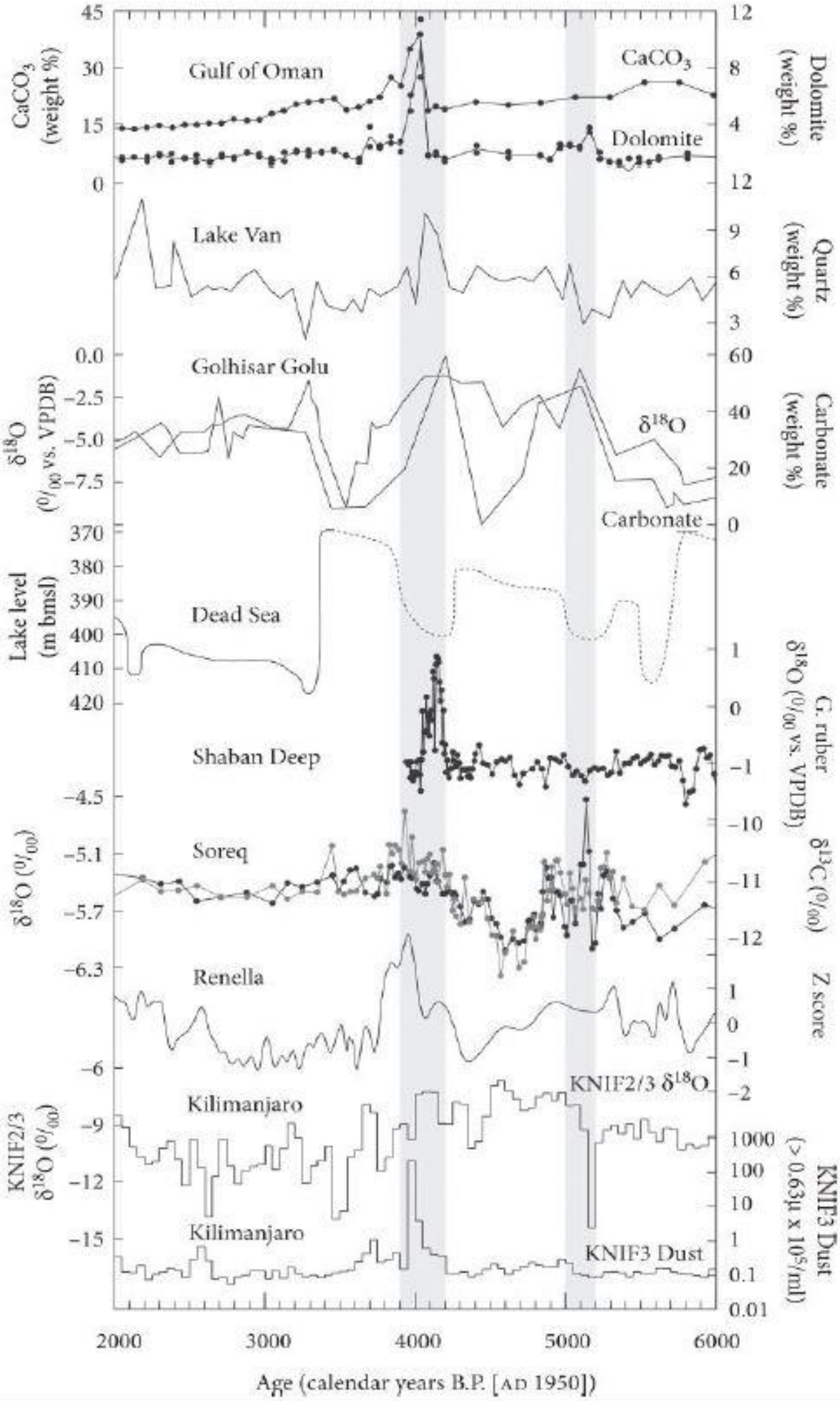


Figure 2.13- Multi-proxy stack of Mediterranean westerlies, displaying the 5.2 and 4.2 BP (corresponding to the EBIV) climatic change with glacial, marine, lake and speleothem records (from Weiss 2013: FIG. 25.1).

2.4.4 Summary of EBA developments

The above overview mediated EBA known characteristics in terms of pottery, architecture, burial practices, affinities, craft production, etc. Given the large expanse of the Levant, however, not all elements can be covered in depth. The southern and central Levant during the EBI show great similarities in respect to subsistence strategies and the development of horticulture and architectural features, e.g. oval houses. Furthermore, the widespread use of the Canaanean blades in the Levant and Near East at whole implies a degree of connectivity (Shimelmitz, 2009). During the EBII-III, a transformation takes place, at first in the southern and central Levant, then in the northern Levant during the mid-third millennium BC. This transformation is manifest in the fortification of settlements, the introduction of new pottery shapes as well as the standardisation of shapes and surface treatments. The agricultural and hotricultural economy persists, yet it sees a sharp intensification and growth. The distribution of pottery wares, such as the Combed Ware along the Levantine coast and the Khirbet Kerak Ware, corroborates the presence of a network of exchange and connectivity within the Levant extending towards Mesopotamia, Egypt and Anatolia. Contrary to this period of growth, the EBIV in the southern Levant marks the decline of these urbanised communities and a return to regionalism and village-like settlements. This decline, however, is not mirrored in entirety in the central and northern Levant.

The account presented thus far of the EBA Levant, based on archaeological literature, is undoubtedly incomplete and reveals issues in Levantine scholarship. There is disparity in the available evidence from the southern, central and northern Levant. Whilst the southern Levant benefits from extensive research, probably due to investment in archaeological excavations and surveys, EBA evidence from the northern Levant, especially from the coastal zone, is very limited (see Chapter IV, Section 4.1). Data regarding the EBA from the central Levant is sufficient but not extensive. This disparity inevitably influences the research presented here, as will be discussed in Chapter IV. Although this thesis acknowledges the disparity in Levantine archaeology, a disparity that only time and effort will adjust, it bids the question, can the archaeological record ever be complete. Henceforth, this research turns to the sea, to EBA maritime activities and space, which are largely overlooked and not incorporated into the narrative of EBA developments. The previous sections mediated the understanding in Levantine scholarship of EBA developments in respect to subsistence, urbanisation and affiliations. Yet this understanding fails to appraise maritime activities and connections which would have had a great impact on the nature of EBA processes, such as fostering exchange and trade and, potentially, urbanisation. It is this lacuna in the current state of EBA knowledge that this thesis hopes to fulfil. Furthermore, the coastal zone is unique in its capacity of land and sea access. However, divided between a southern, central and northern Levant, similarities and uniformity along the littoral zone may have gone unnoticed. The review above proposed possible coastal patterns such as in pottery (the distribution of the Combed Ware and the Khirbet Kerak Ware) and common burial practices and architectural features; however, an understanding of coastal processes during the EBA can only emerge when the elusive boundaries within the Levant, between the north and the south as discussed in Section 2.2, are contested. Hence, it is from this motivation that this research engages with the entirety of the coastal Levant as a study area (Chapter IV, Section 4.2).

2.5 Trade and foreign connections

The previous sections presented the particularities of the EBA Levant in respect to chronological divisions, changes in material culture and settlement patterns. It has also revealed a level of interaction and interconnection between communities. The EBA constitutes a critical time in the intensification of foreign relations and trade that peaked hereafter during the MBA, specifically in the second millennium BC (Dever, 1987; Ilan, 1995). Three particular topics, relating to trade and foreign relations are widely discussed in EBA scholarship. These are the connection between Egypt and the southern Levant during the EBI, the Uruk’s contact with the Levant and Egypt during the fourth millennium BC and the Khirbet Kerak Ware distribution and provenance. Apart from these main themes, trade and foreign relations in the Levant are known from various and scattered archaeological evidence. To start with, the predominant views on EBA relations will be introduced, along with a concise summary of the three main themes, which helps formulate a better understanding of the EBA Levant and highlight maritime connectivity as educed by scholars. The following sections incorporate broad scholarly assumptions regarding EBA trade and relations and specific archaeological details when they are available.

2.5.1 The EBI, Egypt and the southern Levant

The EBI of the southern Levant witnessed an increase in foreign contacts, both direct and indirect. Contacts between the southern and northern Levant, even though regarded as unclear, were nonetheless existent. Red burnished jugs from the EBIB period, found in northern Palestine, are vaguely similar in their morphological features to Urukian vessels from northern Syria (de Miroschedji, 2013). Moreover, vessels retrieved from graves at Tarsus imply the likelihood of occasional contacts (Henessey 1967: 38). This contact was not necessarily terrestrial; it may well have been maritime as suggested by the discovery of imported southeastern Anatolian vessels in an EBIB context at Tel Assawir on the south Levantine coast (Yannai and Braun, 2001). Marcus (2002: 406-407) advocates for maritime transport during this period. He summarises direct and indirect evidence of maritime-related activities from the fourth to third millennium BC in the southern Levant, which seems to support Gophna and Liphschitz (1996), and Gophna (2002), in their suggestion of maritime trade between the northern Levant, southern Levant and Egypt as early as the fourth millennium BC (see also Prag, 1986; Ben-Tor, 1989). Moreover, an Amuq F bowl found in an EBIA context at Taur Ikhbeineh implies but does not conclude the possibility of maritime connections given that both sites are coastal (Oren and Yekutieli 1992: 371 cited in Marcus 2002). Architecture, ceramic and glyptic similarities have also been drawn between the southern Levant and Byblos (Ben-Tor 1989; Braun 1989: 19). Yet these often-postulated ties, according to Genz (2013), are based on stylistic comparisons rather than actual imports. Genz notes, however, that the use of non-local material such as obsidian and metals demonstrates the far-reaching contacts of Byblos at this time. Furthermore, remains of charred wood of cedar and Turkey oak, both assumed to originate from Lebanon, north of the southern Levant, were found at two EBI sites located in the Ashkelon Troughs (Gophna and Liphschitz, 1996). This evidence and much more (e.g. Marcus 1998: 33) indicate a connection between the northern and the southern Levant. However, scholars' attention is mostly drawn towards the southern Levant's relation with Egypt during the EBI, with little effort dedicated to unravel any southern and northern Levantine connections, especially in the coastal area.

Of the most important relations during the EBI is Egyptians' involvement in the southern Levant. It is presumed that Egypt had established colonies on the southern coastal plain of Palestine (de Miroschedji, 2009; Porat 1992:635; Stager, 1985). Apart from northern Sinai, where the landscape is peppered with sites indicating its use as a land route from Egypt to Palestine (Oren, 1989; Oren and Yekutieli, 1992; Yekutieli, 2002; Stanley, 2002), the southern Levant shows connections with Egypt ever since the Late Chalcolithic (de Miroschedji 1999: 162) and the earliest phases of the EBI. Notably, when Canaan objects were attested at Maadi in Egypt (Amiran and Gophna 1992: 358; Kantor 1992: 13). The contact with Egypt in this earliest phase is mostly sporadic (Braun 2002: 174). The situation changes in the next phase of the EBI, when major sites begin to yield Egyptian material culture and indicate an Egyptian interaction with the local population. The wealth of this material led many to suggest an ethnic presence of Egyptians during the EBIB in the southern Levant (e.g. Gophna, 1976). Recent research on this topic coupled with new archaeological evidence is changing our understanding of southern Levant and Nile Valley interactions. Braun (2002:175) notes the evidence from Tell es-Sakan. The site is a likely candidate for the source of Egyptian material in the southern Levant, and possibility acted as a true Egyptian colony. That being said, however, Braun (2002) correctly emphasises the theoretical issues in determining the ethnicity of ancient populations through the interpretation of artefacts. Moreover, the archaeological record is insufficient in providing a clear explanation of the nature of Egypt's sojourn in Canaan. The earliest contacts were established at sites in the southern and south-central sector of Palestine, but the nature of interactions was not yet intense. The earliest evidence for royal Egyptian association with Canaan are the *serekhs*[10], found in the Soreq Basin. These *serekhs* hint at concentrated contact by the Egyptian crown following the end of Dynasty 0 (Braun 2002: 182). Moreover, these *serekhs* justify the view that advocates for an Egyptian rule through minority population in Palestine. There is no compelling reason to accept this interpretation, however, particularly when the meaning of *serekhs* on sherds is not well understood (Braun 2002: 182). It seems evident, regardless of any scenario put forth to explain Egyptian material culture and 'egyptianised' elements, that at the end of EBI, there is an increase in Egyptian material culture at sites in the southern Levant, including Tell es-Sakan which may have functioned as a colony of Egyptian settlers. Yet as Braun (2002: 182) comments, "*the degree to which these associations reflect historical and political realities is uncertain and any evaluation must await further excavation and publication"*. Congruently, the presence of an administrative network need not imply political hegemony. This is further supported by Bar-Yosef Mayer's (2002) research on two shell species: *Aspatharia Rubens* (from the Nile) and *Lambis truncate* (from the Red Sea). Bar-Yosef details the presence of these shells and their worked pendants in Egypt and in the Levant. *Aspatharia* was brought from Egypt and used as a raw material for pendants and fish scalers. It was also placed in graves in Palestine and in Egypt. This led Bar-Yosef (2002: 133) to point out that if we can speak of an Egyptian colonisation, it was by no means marked with animosity, since the locals would not have adopted Egyptian traditions of placing *Aspatharia* in graves.

In light of this Egyptian-southern Levantine connection and the North Sinai archaeological survey (Oren 1989; 1993), greater emphasis has been placed on the overland route that connected Egypt with Palestine, particularly to the southern area where most of the Egyptian-south Levantine evidence originates. Tracks of communications were sought in the confines of the principal area in the south of Palestine (de Miroschedji 2003: 40-44). Nevertheless, recent discoveries and efforts are highlighting the presence of a parallel sea route bridging Egypt, the southern Levant and the Syro-Lebanese coast. Underwater archaeological research along the Israeli coast (Galili *et al.*, 2013; Raban and Galili, 1985), along with settlement patterns on the coastal plain (Gophna, 1974) and maritime activity during the ensuing periods of the Middle and Late Bronze Age support a sea-borne communication route. Moreover, Gophna (2002) summarises evidence for a maritime route during the EBI, and points out particular sites on the coast that would have functioned as anchorages: Ashkelon and Tel Megadim, as well as other sites, which Gophna (2002) termed 'elusive', lacking any maritime archaeological imprints but that could have functioned as way-points given their ease of

[10]The *serekhs* are rectangular architectural abstractions, which alike the cartouche of later Egyptian periods, enclose hieroglyphic writing of the king's name (Rice 1990: 60).

reach of the coast by donkeys: Dor, Jaffa, Sakan, Michmaret. The importance of Gophna's (2002) work is that it highlights gaps in our knowledge, particularly in terms of assessing which sites might have potentially functioned as anchorages, knowing that the physiographic conditions of the Coastal Plain of Israel are considered quite unfavourable for anchorages.

2.5.2 The Uruk contact

Concomitant to the Egyptian-south Levantine connections, which were prominent during the late fourth millennium BC, a growing power was excercising its influence further north through the so-called phenomenon of the Uruk expansion. Research in the framework of World-System theory has long focused on the Uruk process of colonisation (Algaze, 1993; Stein, 1999), attributing a core role to the Uruk network in the fourth millennium BC 'world system', linking southwest Asia and Europe (Sherratt 1993: 15). The Uruk expansion is marked by the large quantity of south Mesopotamian material style documented at sites across northern Syrian, northern Mesopotamia and southeastern Anatolia (Algaze, 1993). The Uruk phenomenon has been regarded as the result and combination of a wide range of mechanisms including emulation, economic interaction and establishment within indigenous communities of 'implants', amongst other processes (Lupton, 1996). However, it remains quite surprising that this phenomenon had little impact on the Levant, especially in light of the Urukian influence on developments in Egypt in the late fourth millennium BC (Wilkinson, 2002), which is understood to have been mediated via the Euphrates Valley and the Levantine coast (Joffe, 2000; Wilkinson 2002: 244). Moreover, the lack of Mesopotamian contacts with western Syria contradicts with other aspects of shared material culture, particularly the chaff-tempered pottery, a characteristic pottery of fourth millennium BC in north Mesopotamia, southeast Anatolia, northeast Syria and northwest Syria (Mazzoni 2000: 98; Lupton 1996: 19). This gap in the archaeological record from the Levant led published discussions on developments during the fourth millennium BC to take on different approaches. According to Philip (2002: 208), one kind of publication focused on localised studies from the perspective of a particular site (e.g. Dunand, 1973; Stein, 2001). Another type of discussion took on a broader perspective, but can be divided between that focused on Mesopotamia and southeast Anatolia (e.g. Algaze, 1993; Lupton, 1996), and that focused on the southern Levant (e.g. Joffe, 1993).

In light of increasing datasets in the last two decades along with improved radiocarbon dating and published excavation data, Philip (2002) undertook a reconsideration of the evidence for the Uruk world in the fourth millennium BC focusing on inter-regional connections. The main problem that faces any Levant-wide study is the paucity of radiocarbon evidence from western Syria and Lebanon that makes correlations between the northern and southern Levant challenging. As mentioned above in Section 2.3, there is a great dependence on local relative chronologies for western Syria (and Lebanon to a degree), often based on fieldwork results from the first half of the twentieth century. Philip (2002) acknowledges these challenges, by revising the implications of the chronological gaps. He re-evaluates the evidence for the Uruk contact with the Levant, not only in ceramic traditions but also incorporating non-ceramic evidence (Philip 2002: Fig 1). His re-evaluation brings to the forefront several key points. Primarily, the regional differences in the ceramic assemblage between the southern (EBI mineral-tempered traditions) and northern (chaff-tempered) Levant, as well as the significant regional differences of the north. Second is the coastal ceramic assemblage, which developed towards the end of the fourth millennium BC, involving the northern and the southern Levantine littoral. Another key point brought about by Philip is the transmission of technological innovation and the distribution of raw materials that indicate regular contacts between the Levant and southeast Anatolia. With the availability of new radiocarbon dates, these connections appear to predate the Uruk phenomenon. Hence, Philip (2002: 223) suggests that the networks of the Uruk world might represent the continuation of an early maritime interaction focused on the Levantine coast, also evidenced in the circulation of obsidian (Cauvin, 1998). With the Levantine littoral acting as a mediator, whether maritime or terrestrially based, for connections between the Nile Delta and Uruk (Wilkinson, 2002; Moorey, 1990), the problem remains the same as to why communities of the western part of the Levant remained resistant to adopting Uruk ideas and elements of the material culture.

It is worth noting, however, that not all scholars agree on this mediatory role for the Levantine littoral within the Uruk world (e.g. Kantor, 1992). Akkermans and Schwartz (2003: 202) suggest, for instance, that the right bank of the Euphrates was the western border of the Uruk zone of expansion. They also de-emphasise the model of long distance trade attached to the Uruk phenomenon by exploring other venues of interpretation such as Johnson's (1989-9) focus on demographic crises, and Algaze *et al.* (1989) as well as McCorriston's (1997) suggestion of an economic specialisation, particularly sheep/goat pastoralism (see Akkermans and Schwartz 2002: 202-204). In his review, Philip (2002) accounts for the possibility of a marginal role for the Levantine littoral, and evaluates the likelihood of an Uruk contact through the Jordan steppe as implied by Joffe (1993: 55). However, in his evaluation he remarks that the evidence from eastern Jordan is slight compared to that from the Levantine coast. Moreover, Wilkinson (2002) appraises the possibility of a southern route from Mesopotamia to Egypt that would go through the Arabian Peninsula, up the Red Sea and along Wadi Hammamat towards Upper Egypt, as suggested by some scholars (e.g. Rice, 1990; Kantor, 1992). Wilkinson (2002: 244) found answers, however, that would overturn the points proposed by those advocating a southern route. If a southern route was indeed in use, we should expect to find most of the evidence for Mesopotamian influence concentrated in Upper Egypt associated with the political and economic power of the time. However, the archaeological evidence reveals Mesopotamian influence in Buto (Köhler 1998: pl 68), and Mesopotamian imports in Middle-Egypt. This suggest that material was travelling upstream towards Upper Egypt. In any case, the situation of Egypt indicates that Uruk elements were adopted in regions where elite dominated states were starting to emerge (Wilkinson, 2002). Cylinder seals were adopted as an administrative device in the 1st Dynasty Egypt rather than simple markers on the shoulders of jars as in the Levant (Joffe 2000: 116). Thence it appears that Mesopotamian practices were adopted by emerging elite groups in Egypt which, at the time, were not paralleled by the existence of elites in the Levant (Philip 2002: 225). This is corroborated by the regionalism and local variation in the material culture of the Levant during the late fourth millennium BC (Lupton 1996: 20).

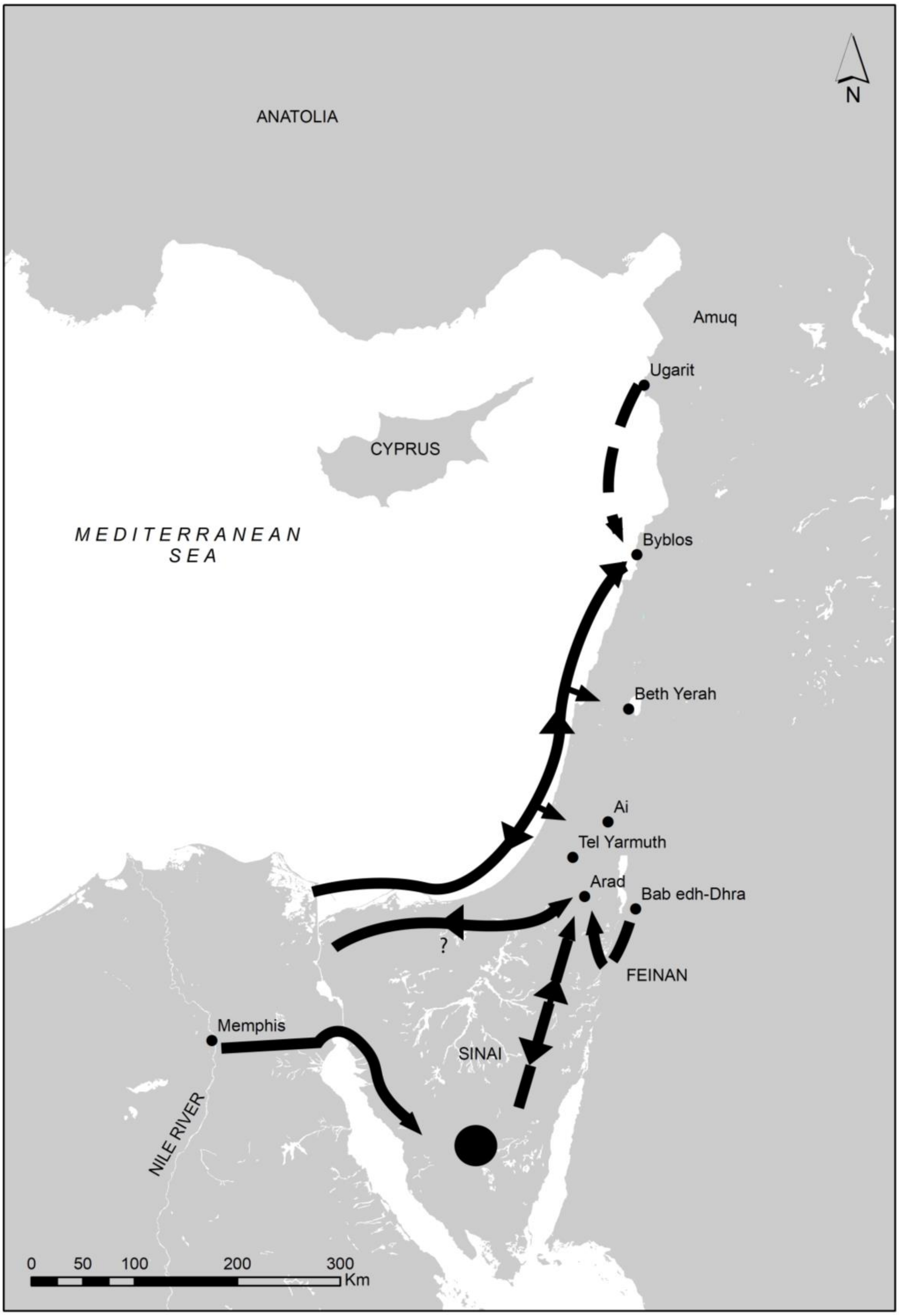
Therefore, there was not one single point of contact that mediated the role between Uruk and Egypt on the Levantine coast. Rather:

> "*we need to accept that knowledge of ideas and organizational practices originating in 'Greater Mesopotamia' may have been quite widely disseminated among communities involved in east Mediterranean networks. However, these were irrelevant, and perhaps poorly understood within most such societies"* (Philip 2002: 225).

It appears however, that despite the distinctions in ceramics between the northern and southern Levant during the late fourth millennium BC, communities in the northern Levant were more affiliated with the south than to 'Greater Mesopotamia'. While it remains speculative, it is an issue that should be further addressed (Philip 2002: 226).

The EBI was a period that witnessed endogenous as well as exogenous processes materialising in the Levantine region. The external influences acting upon the Levant were primarily understood as derivative of developments in Egypt and Mesopotamia. Hence, it comes as no surprise that any study of the Levant incorporates Mesopotamian and Egyptian references, either for tracing the origin of Levantine processes, or for comparison and evaluating regional impacts. Similarly, changes that occurred during the EBII were equally attributed and interpreted in relation to the states of Egypt and Mesopotamia. Of the most conspicuous occurrence during the EBII is the decrease in Egyptian finds in the southern Levant as opposed to their proliferation during the EBI. For many scholars, this signalled the end of Egyptian colonies in southwestern Palestine (e.g. de Miroschedji

2013, 2002). However, as described above, an Egyptian colonisation is not particularly proven. Along with the abandonment of 'Egyptian' settlements in the southern Levant, it is sometimes presumed that Egyptian-Canaanite contacts had ceased. This follows the view that at the beginning of the third millennium BC, Egyptians favoured direct maritime contacts with the northern Levant, precisely Byblos, instead of the overland caravan route through the northern Sinai (Oren, 1989: 404; Ben-Tor 1991: 5; Stager 1992: 40). The increasing use of maritime transport and the intimate cultural relations between Egypt and Byblos have attracted much interest (Ben-Tor, 1982; Saghieh, 1983; Prag, 1986; Stager, 1992). Yet these relations do not imply the end of contacts between Egypt and the southern Levant. In fact, there is plenty of evidence that suggests direct relations between Egypt and the southern Levant during the EBII and EBIII via both maritime and overland networks (Map 2.3; see de Miroschedji 2002: 46- 47; Greenberg and Eisenberg, 2002; Marcus 2002: 407-408). According to de Miroschedji (2002: 47), Egyptian-Canaanite contacts essentially changed in nature in that Egyptian emissaries were entering in direct contact with Palestinian city-states for the exchange of prestige items and local products. Meanwhile, The maritime route along the Levantine coast, known as the 'Byblos run' (Stager, 1992), served as the principal means of access to raw material and exotic resources (metals, woods, oils, resins) from the Levant, and indirectly from Anatolia (Broodbank, 2010; Wengrow 2006: 137-138; Marcus, 2002). Henceforth, Levy and van den Brink (2002: 25) suggest that Egypt's waning presence in the southern Levant resulted in a power vacuum that led to the establishment of fortified settlements. This occurred in concordance with seafaring developments that focused on the northern Levant during the EBII (Stager, 1992). Maritime connections with the northern Levant did not necessarily exclude the southern Levant, even though the actual archaeological evidence is meagre (de Miroschedji 2002: Figure 2.5; Marcus 2002: 109) and it has been suggested by some that the southern Levantine coast was abandoned (Raban 1985: 14). Needless to say, the lack of evidence does not necessarily correspond to its absence. During the EBI, evidence corroborates a growing exchange and communication network that peaks during the EBII-III particularly with the intensification of maritime relations between Egypt and Byblos (Sowada, 2009) for the procurement of wood. This will be discussed in Chapters V and VII.



Map 2.3- Early Bronze Age II direct and indirect transmission routes, showing the maritime route from Egypt to Byblos knows as the 'Byblos run' (based on Sowada 2009: Fig: 38).

2.5.3 The Khirbet Kerak Ware evidence

During the second quarter of the third millennium BC, marking the EBIII in the southern Levant, when Palestinian settlements underwent visible changes, the Khirbet Kerak Ware (KKW) started appearing in the ceramic repertoire. The KKW is characterised by a highly burnished red/black surface, and typical methods of production and firing along with peculiar vessel shapes (Figure 2.14. Nigro 2009:65-66; Amiran 1969:68-75; Henessy, 1967; de Miroschedji 2000: 260). It was identified as a distinct indicator of the period and associated with concomitant societal changes taking place. KKW is a special type of pottery that was found in many areas in the Levant including the Amuq, the Syrian littoral, the Orontes Valley and the north Jordan Valley (Figure *2.15*). The KKW features find parallels and similarities with the ceramic traditions of Anatolia and Transcaucasia, known as the Red-Black Burnished Wares (RBBW) or the Early Transcaucasian Culture (ETC) (Braidwood and Braidwood 1960: 518-519; Henessey 1967: 76-79; Esse 1991: 51-52). These similarities led scholars to attribute the appearance of the KKW in the Levant to immigrant groups from an Anatolian origin (Wright 1937: 72-73) whose migration, according to scholars, either took the form of a peaceful settling (Kenyon 1985; Mazar 1992; Stager 1992), a destructive and invasive relocation (Amiran, 1986; Burney 1989:336) or was limited to a small group of specialised craftsmen (Henessey 1967: 75; Ben-Tor 1992:111). The particularity of the KKW is that it lacks any local antecedents, although it is locally produced (Mirsochedji 2000: 260, Greenberg 2000: 51). Its spread along the Levantine coast and in Palestine corresponds to a period that falls between the ‘Uruk’ expansion during the fourth millennium BC and the establishment of a Mesopotamian-style, palatial system at Ebla in inland, western Syria around the mid-third millennium BC (Mazzoni 1991 cited in Philip 1999). The general consensus regarding the appearance of KKW suggests that groups of an east Anatolian origin migrated to north-west Syria in the early third millennium BC (around 2900 BC) to then spread southwards eventually settling (around 2700 BC) at the eastern Jezreel and Lake Tiberias. The eastern Jezreel holds the main KKW concentration in the southern Levant (Esse 1991: 139). Hence, the favoured migration route starts in the Amuq Plain, going through the Orontes Valley to Hama, and then reaches the Beqa’a valley in Lebanon where it continues to the Huleh Basin in northern Palestine at Tell Dan (Esse 1991: 139). Despite the rejection of migration theory to explain cultural change in archaeology in the 1960s, the supposition that the distribution of KKW is due to the migration of northerly groups is quite tenacious, as Philip (1999) explains. According to Philip (1991: 28-30), the problem with such migratory explanations for the KKW rests on several grounds, including the KKW chronology and distribution as well as the wider theoretical approach and methodological concerns. In Philip’s (1999: 30) opinion, “*discussion has concentrated upon the migration and its sources, rather than on its impact upon local communities, in particular upon the* *social context of the adoption, appropriation and reproduction of KKW"*. Philip attributes the tenacity of this mode of theoretical approach to the development of Levantine archaeology equating pots to peoples (e.g. Esse 1991: 171). Although migration can be a valid explanatory mechanism, its employment for the interpretation of KKW is ill-defined (Philip 1999: 39). In his research, Philip (1999) re-evaluates the chronological basis and distribution of the KKW. He concludes that there is little ground to support an overland movement of a northern group into the southern Levant. Additionally, he notes that the KKW represents an adoption and perhaps reworking of the RBBW. Henceforth, Philip puts forth a revised approach that builds upon notions of reworking and filtering implying the existence of diversity in the EBA society of the southern Levant. Philip emphasises the co-existence of communities and lifestyles during the EBA, which is usually not well explored given the presumed homogeneity of EBIII cultures and the distribution of the KKW. Philip offers two alternative approaches to the KKW appearance. First, through an analysis of social power in the EBA Levant, he suggests that the KKW symbolism may have been related to the adoption of certain behavioural patterns by groups that rejected an involvement with already established socio-economic structures (Philip 1999: 46)[11]. However, this alternative explanation does not rule out the possibility of a migration of northern groups. Hence, Philip returns to the idea of migration since it resonates with the KKW evidence. However, he takes on a different perspective, in accordance with Tilly's (1978) 'chain migration', and suggests that the apparent trail of the KKW spread falls in favour of seaborne connections. In such a way, the contemporaneity in KKW appearance in the Amuq and in Palestine, and the absence of evidence for an overland route (Philip 1999: 49) is accounted for. This elucidation of the distribution of KKW is particularly significant since it highlights connections between the northern Levant and northern Palestine. Moreover, seaborne connections would have built on pre-existing networks of communication, as seen above in the discussion on the Uruk contact, particularly elements of the coastal 'koine' which were already materializing by the end of the fourth millennium BC (Philip 2002: 225; Mazzoni 2008: 51) and would have facilitated a rapid dissemination of KKW.

[11] See also Batiuk (2013) for an exploration of Early Tanscaucasian Culture (ETC) post-migration economic situation.

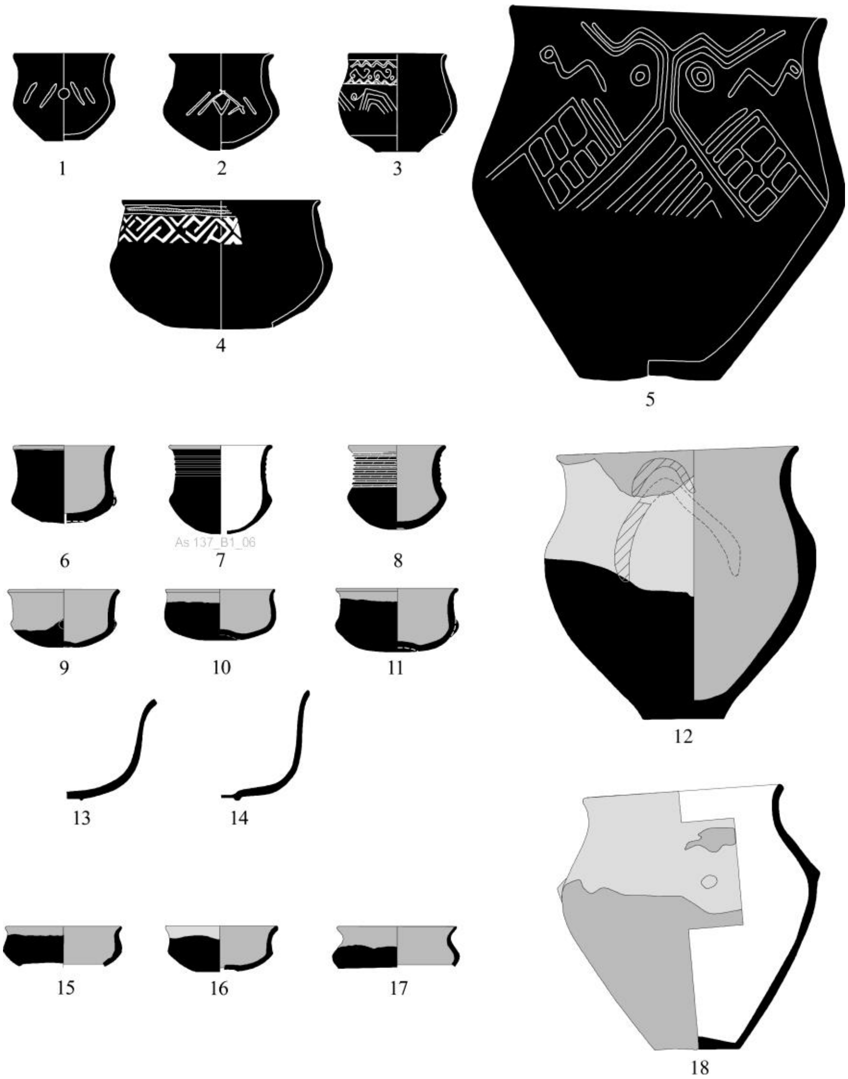


Figure 2.14- ETC (Early Transcaucasian Culture) material culture known as Khirbet Kerak Ware in the Levant, Red Black Burnished Ware in north-western Syria and Kura-Araxes Culture in Transcaucasia. The figure shows ETC Wine Kit from Anatolia/Georgia, the Amup and Palestine (from Batiuk 2013: Fig.5)

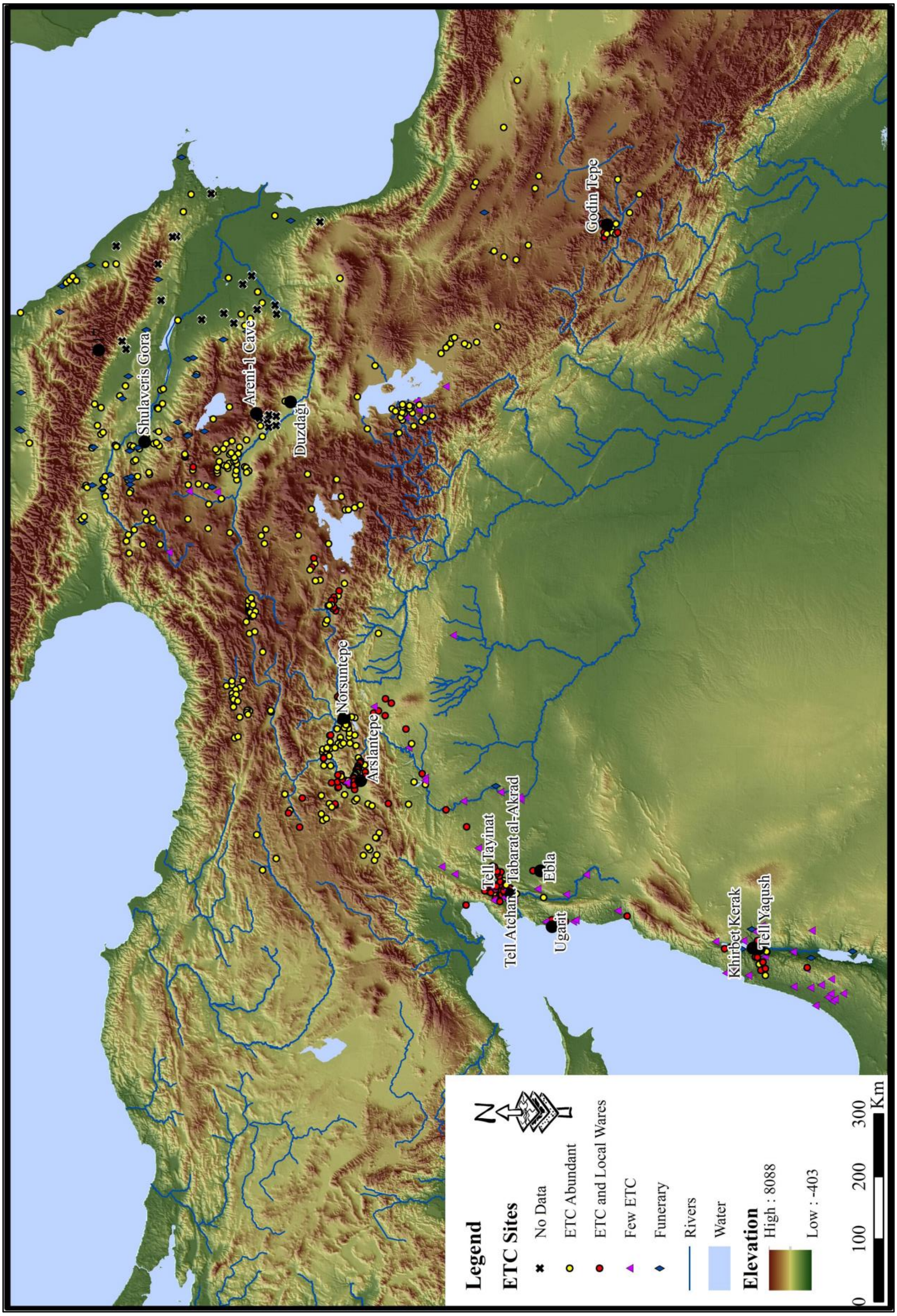


Figure 2.15- Distribution of Early Tanscaucasian Culture Ware in the Levant and the Near East (from Batiuk 2013: Fig.1)

2.5.4 Summary of EBA connections

This section highlighted Levantine relations and the Levantine role in mediating connections within the wider Near Eastern world of Egypt, Mesopotamia and Anatolia. There is evidence for contacts and shared material culture between the southern and northern Levant. During the EBI, Egyptian relations with the southern Levant may have not only have been facilitated by the overland Sinai route, but also by a maritime highway. The Levantine littoral potentially played an important role in facilitating relations between the Uruk world and Egypt, building on pre-existing maritime networks as suggested by Philip (2002: 223) and supported by the circulation of obsidian (Cauvin, 1998). During the EBII, Egypt turns towards the northern Levant, particularly Byblos, for the procurement of wood. In summary, the Levant during the EBA was vibrant with connections, movement of people and material culture. Maritime endeavours may have promoted this vibrancy, but they are only evoked, as this section has shown, in a marginal context, when other hypotheses fail to explain patterns. Furthermore, maritime connectivity is only discussed generically in EBA Levantine scholarship, without investigating maritime processes and rhythms that may or may not corroborate interpretations and foster relations.

The focus on main events of connectivity and practices is clear in archaeological research of the EBA Levant, such as the focus on relations with Egypt and Mesopotamia. This research, by turning to the sea, to the archaeological record of human engagement with the sea and to the rhythms of seafaring in space and time, brings to the forefront small-scale maritime activities as well as large-scale interactions. This is accomplished by consolidating a database of EBA maritime-related material culture (Chapters IV and V) that, as of yet, is lacking for the EBA Levant and mapping the space and time of seafaring (Chapter VI), both of which are of substantial importance for understanding the role of maritime space in EBA processes.

2.6 Early Bronze Age urbanisation and complex societies

The previous sections introduced archaeological scholarship regarding EBA developments and foreign connections. This section presents the theoretical frameworks within which the EBA Levant has been understood since this period stands out for the theories put forth in interpreting and evaluating how and why complex societies and urbanisation had emerged.

The EBA has been traditionally viewed within a broadly neo-evolutionary framework (Ben-Tor, 1992; Esse, 1991; Finkelstein, 1995; Mazar, 1992; Richard, 1987), which can be somehow deduced from the above overview on EBA developments. In such a framework, the EBA sequence represented a period of social complexity at its beginning during the EBI, which climaxed during the EBII-III with the appearance of a stratified society and urban fortified cities, to only decline and collapse during the

EBIV (de Miroschedji 2009: Table 1; Esse, 1989; Palumbo, 2008). The neo-evolutionary framework placed emphasis on local trajectories in demographic and economic growth, agricultural innovation and access to resources, which eventually resulted in local developments towards urbanisation, not necessarily homogeneous in all regions of the Levant. The EBII-III society was understood as composed of city-states based around a fortified urban centre. These city-states were sometimes considered peer-polities (Finkelstein, 1995).

The idea of EBA city-states as Philip (2008) points out was entrenched in the literature (e.g. Albright, 1956: 74) even before any material correlations and proper debates regarding the nature of stratified and urban societies began (Flannery, 1972; Wright, 1977). Thence, the notion of city-states, regional polities, elite control and administrative systems was simply assumed rather than demonstrated. Philip (2008) suggests that the idea of EBA city-states is based on two sources. First, EBA urbanism was a projection of the Middle and Late Bronze Age situation. Scholars have found a general equivalence between the EBA fortified settlements and the second millennium BC urban societies (Finkelstein, 1995; de Miroschedji 1999: 12). This equivalence is by no means valid, however, as these communities are separated in time, in itself a defining factor in our understanding. The second source for the entrenched idea of city-states is nothing but the alternative approach to the neo-evolutionary framework. The approach can be termed historicist (Greenberg 2002: 2); it associates Levantine urbanisation with Egyptian and Mesopotamian states. Core-periphery interactions between the Levant, Mesopotamia and Egypt, in such a framework, constituted a catalyst for Levantine urbanisation (Ben-tor 1992: 86; Esse, 1991; Finkelstein and Gophna, 1993; Kenyon, 1985). In both the neo-evolutionary and historicist frameworks, the notion of secondary urbanisation in the Levant persisted as it was assumed that elements of urbanisation in the Levant were derived from pre-existing ideas of state formation and urbanisation elsewhere. The importance of these approaches and earlier models to EBA urbanisation and complex societies lay in the introduction of a discussion that moved beyond the culture-historical emphasis that had dominated hitherto (e.g. Albright, 1956; Kenyon, 1985). Hence, the neo-evolutionary and the historical frameworks echoed changes taking place in archaeology at large, with the introduction of processual archaeology and the testing of the evidence against developing models (Chesson and Philip, 2003). One of the problematic methods within these approaches, however, is the emphasis, in the 1990s, on settlement patterns in terms of intensification and abatement which has failed, according to Harrison and Savage (2003), to consider functional relationships within and between communities. This emphasis has led to the establishment of hierarchical models of societies, at their core polities and city-states (e.g. Esse, 1991; Joffe, 1993; Finkelstein and Gophna, 1993; Gophna, 1995). Moreover, as Badreshany (2013) suggests, scholars were inclined to base their interpretations on selective archaeological sites in a general context of studies (e.g. Mazar, 1992; Akkermans and Schwarts, 2003).

Broader critiques of these approaches have developed recently, along with newer theoretical frameworks. The main change occurred by re-focusing attention on specific datasets, and re-evaluating traditional ideas regarding the political, social and economic organisation of EBA societies. The nature of EBA evidence, one of fragmentary and diverse sequences, as Greenberg (2003) argues, is inconsistent with the grand narrative of linear evolution. Congruently, de Miroschedji (1989: 73-74) stresses on diversity in the developments of trajectories in different parts of the southern Levant. Moreover, from a different scope/perspective, Chesson and Philip (2003) and Joffe (2004) argue that instead of seeking analogies with Mesopotamian and Egyptian states, the eastern Mediterranean, Crete, Cyprus and the Aegean provide better productive analogues for understanding EBA Levantine society. Regardless, the wealth of new data from the southern Levant particularly, offered a platform for scholars to re-evaluate recurrent themes in EBA urbanism such as public architecture, fortifications, administrative structures, storage facilities, political and settlement hierarchies, evidence of social growth and other forms of economic specializations. Levy and van den Brink (2002) for instance, propose to move beyond the strict cultural systems of processual approaches and apply interaction models to the archaeological record. They note the lack of evidence of an EBI-II archaic state in the southern Levant, and explain the presence of fortification walls, public buildings and gates by tracking down the earliest evidence of fortifications and associating the rise in fortified towns to a power vacuum caused by Egyptians' retreat from the northern Negev (Levy and van den Brink 2002: 27).

Several models were put forth as alternative interpretations to EBA urbanism, following an embracement of the heterogeneity of the Levant through regional studies (e.g. Keswani, 1996; Philip 2001, 2003; Greenberg, 2002; Harrison, 1997; Harrison and Savage, 2003; Chesson, 2003). Falconer (1994) suggests that the characteristics of EBA society are fundamentally rural complexity and autonomy, according to the low level of integration that EBA society demonstrates (Falconer and Savage, 1995). In this model, EBII-III fortified settlements reflect a rare experiment within a predominantly rural system. The corporate village is another potential model for explaining EBA communities. It entails that communities held land in a variety of forms, either within one family, or between many families as village lands (Chesson, 2003; Philip, 2008). In such a way, the internal structure of communities was based on houses, understood as corporate groups and constituted on the basis of kinship ties (Chesson, 2003). This would thus explain the lack of a centralized administration in the southern Levant since, according to Chesson and Philip (2003), in a kinship-based society, commodity flows are self-evident and require no systematic writing systems to record economic and political relationships.

Congruently, since the diversity of the archaeological record failed to support hierarchical models of societies, Crumley (1979, 1995), dissatisfied with pre-established ideas, challenges these earlier models and adopted the concept of heterarchy. Heterarchy was first used to define the organisation of cognitive structures, neurons, within the human brain (McCulloch, 1945). It denotes that related elements within a network are either unranked or equally ranked and have the potential to be ranked in various ways (Crumley 1979:144; 1995:3). In an archaeological context, a heterarchical society possesses many crosscutting boundaries whose nature can be social, administrative, geographical, commercial, etc. (Crumley 1995: 2). In addition, as per Crumley's, hierarchy and heterarchy are in a dynamic state of fluctuation whereby a heterarchical system at a particular temporal and spatial scale may be hierarchical at another scale.

Heterarchy provided an alternative framework for explaining the structure of complex societies. Several archaeologists advocated the heterarchical organisation of EBA communities (e.g. Harrison and Savage, 2003; Chesson, 2003; Philip, 2001; Keswani, 1996). Nonetheless, as Harrison and Savage (2003) propose, the heterarchical concept must not be considered as another classificatory system on the socio-political continuum trajectory from simple to complex, but as an abstract principle of organisation. When used in this manner, it permits the identification of causal factors between agents, social groups and institutions. Although the wholesale shift to a heterarchical paradigm for the EBA is a construct that offers new perspectives on society and stresses on the variability at regional and local levels, Richard (2013) finds the emphasis on diversity and variability one-sided. She notes that it understates the evidence for cultural uniformity, while the archaeological data lends to both urban and non-urban scenarios. Richard advocates that further research and theoretical models will eventually determine the degree of complexity and centralisation of EBA society in the southern Levant and Jordan. Conversely, Chesson (2015) maintains that the EBA evidence does not fit the definition of urbanism given the lack of three key elements: scale of differentiation, localised diversity and identity coherence and a rural and urban lifeways dichotomy. Chesson further recommends to drop arguments of secondary state formation, such as chiefdoms and city-states, and construct new ways of understanding EBA society by analysing and reconstructing it in terms of its own political, social and economic context. Chesson’s work is substantial since it offers fresh and new venues for understanding EBA society. Chesson’s contribution does not attend to certain aspects of human activity and does not formulate a theoretical framework, but rather, proposes to drop previous trends. However, it is significant as it defines an open-minded point of departure for further research on the topic.

In summary, the history of research in Levantine urbanisation shows a clear movement away from large-scale approaches and hierarchical models of societies and a shift towards regional analysis of the archaeological record through multi-scalar and integrative methods. While the EBA urbanisation and complex societies of the southern Levant have gained much interest, the northern Levant is regarded differently in its economic and political structures. Mass produced pottery, written documents, state-sponsored productions and large quantities of imported goods seem to characterise the northern Levant during the EBII-III (Chesson and Philip, 2003). This, however, is the case of an uneven comparison between the southern and northern Levant, since it focuses on evidence from inland Syria, particularly Ebla. A review of limited evidence from western Syria (Philip, 2002) suggests that, in fact, there is little evidence to indicate that settlements were more complex than in contemporary southern Levant in the early third millennium BC.

Interpretation and research in the northern Levant have long focused on the Uruk colonisation and the economic role it had on the on the distant peripheries (Algaze, 1993; Stein, 1999). Recently, however, this core-periphery model in Syria and Anatolia has been questioned, as evidence reveals native trends towards centralisation from the beginning of the fourth millennium BC (Stein, 2001; Rothman, 2001; Mazzoni, 2008: 39). New emphasis has therefore been placed on the role of native trajectories towards centralisation and social complexity (Philip, 2002; Mazzoni, 2006). This local and native model towards social complexity, as Mazzoni (2008: 40) states, reflects common traits that herald the EBI-II developments. Moreover, Mazzoni notes that despite documented regionalism in Levantine social complexity, settlement pattern, material culture and architecture, all point to a homogenous scenario in the Levant. Most significantly, Mazzoni (2008: 51) advocates that there is growing evidence for the emergence of an urbanised coastal landscape in the Late Chalcolithic that pinnacles in the EBA. This coastal urban increase was thereafter very important for the interior, intensifying their production and economy, and an instigator in the flourishment of a network of interconnected communities. Yet, when and how the emergence of a coastal and maritime involvement in the inter-regional network occurred, and how this can be correlated with the increase in social complexity, is still an issue that requires much consideration. Without this, our understanding of EBA social complexity is indeed demised by the very fact that we are dismissing the totality of space encompassing human activities on both land and sea, and how that space shaped human lives.

2.7 Implications for research

This chapter re-evaluated the EBA archaeological record in a broad context, pointing out differences and characteristics of regions and chronological subdivisions. The various sections of this chapter reflected issues in Levantine scholarship. The first is the lack of dating for the EBA period, a problem that lies outside of the scope of this project and is being addressed through recent works on the region (Section 2.3). Second are the presumptions regarding the direction/nature of EBA connectivity based on history of thought. This will be addressed in this thesis by putting forth a model for mapping maritime space and time that takes into consideration the archaeological record for maritime activities, as well as rhythms and variables influencing and generating connectivity. Third, the history of research on EBA social structures was governed by simple models that may underestimate what facilitated/drove communication. While Crumley's (1979, 1995) and Chesson's (2015) works open up new ideas to engage with, this research turns to space as a medium to think with, rather than to be explained (Chapter III).

The information mediated in this chapter has shown that the maritime component of EBA communities is a topic not yet widely discussed and studied. Without highlighting the nature of maritime activities and connectivity of the Levantine coast, our understanding of EBA society is partial. To this end, this research aims to explore how the maritime space was lived and exploited during the EBA on the Levantine coast. It assumes the sea, a unifying agent that bridges the northern, central and southern Levant, thereby constituting one stretch of land, seamlessly connected to the water. In such a way, the coastal Levant is re-instituted as a unique region in its capacity of land and sea access. Moreover, although this chapter shed insight on EBA developments within the southern, central and northern Levant, the definition of these sub-Levantine regions, as shown in Section 2.2, is primarily a political and modern one. Therefore, it is of high interest in this research to evaluate whether indeed the Levantine littoral region, as a whole, reveals archaeological evidence and patterns that can either further corroborate these regional definitions, or deny them based on a homogeneous pattern of maritime engagement.

Furthermore, our scholarly knowledge of the EBA maritime world relies on broad events (Section 2.5) such as Egypt's contact with Byblos and with the southern Levant, the Uruk contact and the distribution of particular wares such as the KKW. This sort of indirect evidence for maritime activities and connectivity, though very important, is difficult to ascertain. Nonetheless, evidence for maritime activities on the Levantine coast can take several forms, for instance remains of indicators of marine subsistence strategies, e.g. shells, fish bones, exploitation of coastal beach rocks, potential evidence for anchorages, evidence located offshore such as submerged artefacts, etc. Henceforth, this research aims to consolidate and appraise available EBA data from the coastal Levant, that is associated with maritime activities, regardless of its type (direct/potential) and nature. So far, such an endeavour, on a Levantine-wide scale, has not been the subject of research since it was either considered to lack substantial evidence, or was limited to the southern Levant, with little if no effort at all dedicated to the northern and central Levant, other than a site-scale level of analysis. Thence, this thesis, through an analysis of maritime activities and connectivity, can better our understanding of EBA life on the littoral Levant, providing equal importance to small-scale rhythms of activities as to broad events of trade and connectivity.

Moreover, equally paramount to this research is the establishment of a framework, theoretical and analytical, for the study of the coastal region and maritime connectivity, since, as discussed in section 2.6, such a framework is still lacking and the majority of EBA research focus on urbanisation and complex societies, disregarding space as integral to our archaeological understanding. Therefore, we require an approach that can address the terrestrial, maritime and Mediterranean nature of the littoral Levant. Not only that, but an approach that also encompasses rhythms and activities. One that conjoins rather than separates these elements, and delivers alternatives and new modes of engagement with maritime spaces. Therefore, the following chapter introduces the theoretical and analytical framework at the basis of this thesis, which thereafter will feed into formulating a practical methodology for studying maritime spaces and connectivity.

CHAPTER III: FRAMEWORK OF RESEARCH AND THEORETICAL BACKGROUND- SPACE AND TIME

> *The sea allows us to dream, and the water to aspire. It defines us and connects us. Without it, there would be little poetry to our lives on this planet. TS Eliot wrote, "We cannot think of a time that is oceanless." "In civilisations without boats," Michel Foucault observed, '"dreams dry up."*
>
> (Hoare 2016: para. 9)

Social change during the EBA of the Levant, as described in the previous chapter, was pronounced. The rise, collapse and re-emergence of cities, urban centres and polities are of critical significance, and have much been the focus of academia interested in the genesis of complex societies and formations. The intricacies of Levantine archaeology, however, along with the fact that in our current age, as Greenberg (2002: 2) points out, "*specialization, encyclopaedic knowledge of all the evidence in question, and a comprehensive grasp of the multitude of issues at task lie beyond the scope of the individual scholar"*, brings about two attitudes in archaeological studies. The first is concerned with the detailed nature of the archaeological record and its nuances, first-hand observations of sites, and knowledge of the landscape. This approach becomes an end in itself since the dedication and time it requires are exponential. The second approach is theory laden, which, considering the region of the Levant where new excavations take place every year and interpretations become obsolete even before they are published (Greenberg 2002: 2), is an arduous path. Hence, a balanced approach for archaeological research in the Levant is required. One way to achieve this balance is through a careful selection of a region of study, which permits simultaneously to undertake particular and general investigations. This is the case, for instance, in Greenberg's (2002) work, whose region of study was sufficiently significant to reflect major patterns at the large scale, and small enough to allow for a focused analysis. However, a balanced approach is not necessarily restricted to the careful selection of a unit of study, but to the mode of study and the structuring of processes and evidence. Broodbank (2011: 29) recommends in relation to Mediterranean studies that what is required are models that can operate across multiple scales and a sensitivity to bottom-up and top-down changes.

In the aim of establishing an approach for the study of the EBA coastal Levant, that is neither particularistic nor generalist, but one that is flexible and encapsulates the nature of the littoral Levant, it is essential to recognise that, as mentioned in the introduction of Chapter II, the Levant does not drift apart from the basis of Mediterranean studies, and that the Levantine coast is indeed a Mediterranean zone. Moreover, the coastal Levant is fundamentally a maritime area, typified by the sea, which according to Hoare (2016), quoted above, describes, connects and defines us, but most importantly, it affects the every-day lives of people, their aspirations, the physical dimension that they engage with and the symbolic realm they attribute to their world.

Henceforth, in order to account for these two major aspects of the study area of this thesis, it is crucial to expand briefly on the Mediterranean in order to contextualise developments and changes in Levantine research, which will feed into formulating an analytical and theoretical basis for this thesis. This chapter opens with a review of Mediterranean approaches, and moves on to discuss broader approaches towards maritime spaces, with the aim of establishing a perspective for the study of the coastal Levant, as a Mediterranean and maritime zone. The theoretical framework advocated in this chapter builds on space, and space and time, as relational, lived and experienced. Space is introduced as a mode of engagement with the archaeological past that is multiplicitous and heterogeneous, produced and lived.

3.1 The Mediterranean and the Levant: State of affairs

3.1.1 The Mediterranean

If there is anything that can characterise the Mediterranean, then by far it is its environmental diversity. What the Mediterranean is historically, however, remains a matter of debate. Braudel (1972: 17-18) is keen to clarify this, stating:

> "*Nothing could be clearer than the Mediterranean defined by oceanographer, geologist, or even geographer. Its boundaries have been charted, classified, and labelled. But what of the Mediterranean of the historian? There is no lack of authoritative statements as to what it is not. It is not an autonomous world; nor is it the preserve of any one power. Woe betide the historian who thinks that this preliminary interrogation is unnecessary, that the Mediterranean as an entity needs no definition because it has long been clearly defined, is instantly recognizable and can be described by dividing general history along the lines of its geographical contours*."

However, Braudel's own definitions were at times slippery. He insisted that the Mediterranean by definition depended on the historical time at which it was approached (Braudel, 1972: 21-22; see also Morris, 2003: 36). Horden and Purcell on the other hand, in their seminal work *The Corrupting Sea*, the first major contribution on the Mediterranean following Braudel, adhere to the Mediterranean as essentially a debatable notion (Purcell 2003: 11). Both Braudel (1972) and Horden and Purcell (2000) examine the unity of the ancient Mediterranean but their emphasis and methods diverge. Horden and Purcell's conception of unity

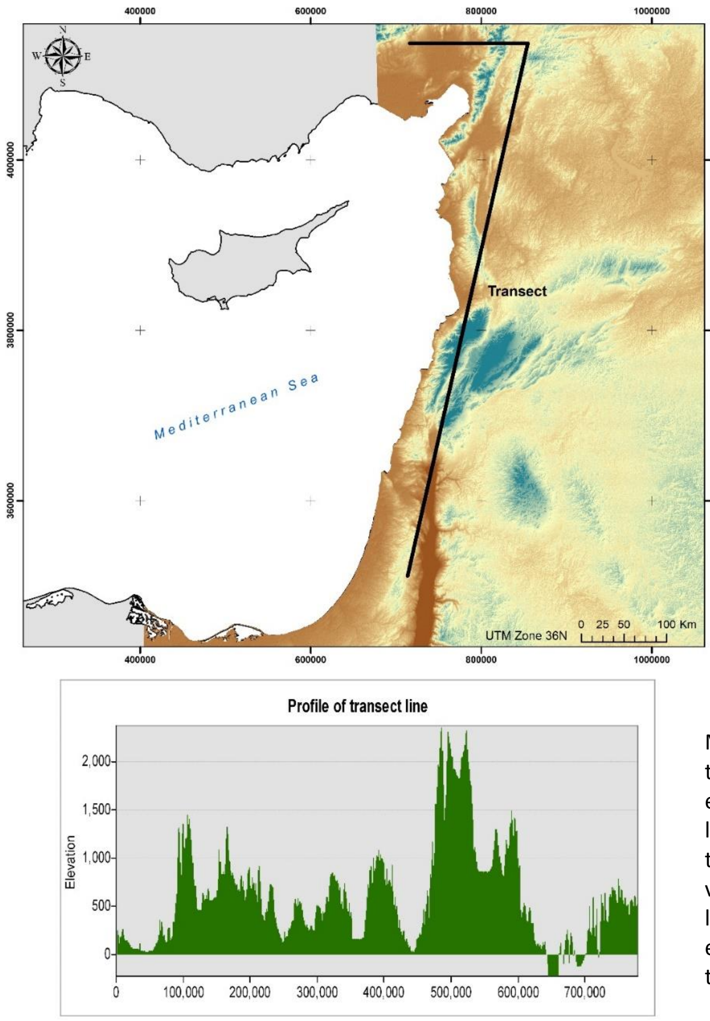
> "*start from a distinction of subject matter between, on the one hand, history in the region, contingently Mediterranean or best conceived under some other heading, and, on the other hand, history of it –history either of the whole Mediterranean or of an aspect of it to which the whole is an indispensable framework*." (Horden and Purcell 2000: 2)

In contrast, Mediterranean anthropologists are not all in favour of a Mediterranean unity, particularly a cultural one (Herzefeld, 1984; de Pina-Cabral 1989, 1992), since it reveals a 'Mediterraneanism' much like Said's (1978) 'Orientalism' (Dommelen and Knapp 2010: 9; Harris 2005: 2).

Braudel's Mediterranean constitutes an inexhaustible source of insights and descriptions for archaeologists (see Broodbank, 2010), yet his work, according to Horden and Purcell (2000: 39), brought to summation an epoch of Mediterranean scholarship. Braudel's model of the Mediterranean is part of an old model that emphasised rigid structures, static cells and powerful institutions. The new model exemplified in Horden and Purcell's contribution is one of fluidity and connectedness. For instance, where Braudel stresses on routes in the Mediterranean, Horden and Purcell (2000: 172) see the movement of people in "*patterns of interaction too various and detailed to be called routes*". This new model of the Mediterranean built on concepts of mobility, connectedness and decentring. Morris (2003) describes this change as a paradigm shift in Kuhn's (1970) sense. He argues that the shift towards an interconnected Mediterranean, and the fluidity of movement of people, commodities and ideas, reflects larger trends in the humanities and social sciences, specifically the greatest phenomenon of globalisation. Discourses on the Mediterranean, in terms of its definition, unity or relevant approaches, are numerous and varied, of the most notable recent ones are Harris (2005) and Broodbank (2013). Unfortunately, the focus on the Mediterranean is a two-sided coin. On the one hand as Herzefeld implies (Harris 2005: 1-2), this concentration on the topic is now a *vieux jeu*, the leftovers from the 1980s and 1990s (Herzfeld 2005: 45), a romantic delusion and worse a '*recipe for boredom'* (Harris 2005: 2). On the other side of the coin, the

Mediterranean is an ever-growing discourse, bringing more players into its net, and a source or a target for yet many unanswered questions (Alcock, 2005). In either way, for most scholars who carry out Mediterranean research, there is a shared agreement on a pan-Mediterraneanist framework, in part due to the environmental characteristics common to the region (see below), and also to the cultural developments and connected histories across it (Walsh 2013: 2).

The Mediterranean is a region that connotes a climate type (Allen, 2001). The sheer dramatic variation of its landscapes is one of its important characteristics. Visually, a simple transect across a Mediterranean region would portray that landscape variability (Map 3.1), which according to Walsh (2013: 2) typifies the Mediterranean. Despite landscape variability, the Mediterranean reflects a set of shared environmental features, particularly geological. Similar environmental niches can be identified across the Mediterranean. However, the Mediterranean's environmental similarities do not indicate homogeneity in terms of human repsonses to these environments (Manning and Morris, 2007), especially when we consider the role of the environment as an agent, affecting the development and formation of societies. This leads us to the study area of this thesis, an environmental zone of the Mediterranean, the coast, and in this case, the coastal Levant. Purcell (2003: 10) remarks that one of the fundamental description of the Mediterranean is "*the distinctive regime of communications made possible by the geography of a land-locked sea with complex coastlines and numerous islands, interlocking coastal lowlands, and frequently navigable lagoons and rivers"*. If the most important definition of the Mediterranean nowadays is connectivity, where the links across the sea constitute the quintessence of Mediterraneanism (Bresson, 2005), then every Mediterranean coast affords a similar space for connections, be it on a micro or macro scale. This statement, however, is not necessarily accurate; it takes on a top-down approach, without interrogating the available data and occurrences on those coastal scapes. By projecting our conceptions of the Mediterranean to every part of it, we risk stripping those coastlines from their unique signature that may or may not fit our conception of it. Hence, this brings forth the challenge to appraise those coastlines, the coastal Levant in this case, to highlight its importance, the processes that its environment may have fostered during the EBA, and the connectivity that it affords.



Map 3.1- Profile of a transect across the eastern Mediterranean landscape of Turkey and the Levant. Note the variablity in the landscape in terms of its elevation (profile of transect line).

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3.1.2 Approaches to Mediterranean and Levantine landscapes

Current approaches to the Levantine EBA as described in Chapter II, Section 2.6, have changed considerably from traditional views. They reflect changes occurring in the field of archaeology at large and in Mediterranean archaeology with a renewed appreciation for diversity, scale, connectivity and context. In Mediterranean archaeology, over the last 25 years, there have been dramatic shifts in theoretical approaches and methodological practices assumed by researchers (Cherry, 2003). In the 1980s for instance, Mediterranean archaeological surveys and landscape research were guided by a concern for economic and demographic processes, consistent with functionalism and scientific humanism at the time (for a summary see Athanassopoulos and Wandsnider 2004: 3). Hence, settlement patterns became crucial to the study of economic, political and social developments (Trigger 1989: 284). This is reflected in Levantine archaeology as well, where demographics and settlement patterns gained much attention (e.g. Gophna, 1974; Gophna and Portugali, 1988; Finkelstein and Gophna, 1993; Joffe, 1993; Marfoe, 1998). Thereafter, the increasing availability of data from excavations and the refined methodology in archaeological fieldwork has allowed for greater emphasis on diversity by engaging with different approaches.

A continuation of modified settlement pattern analyses, still environmentally functionalist, persisted in Mediterranean and Levantine archaeology (e.g. Kolska-Horwitz and Milevski, 2001; Harrison, 2001; Algaze and Fessler, 2001; Yekutieli, 2002; Faust and Ashkenazy, 2009). An emphasis on human agency also emerged, social and symbolic approaches became more abundant (e.g Sherratt and Sherratt, 1991; Chesson, 2015; Ilan, 2001) and studies of landscape taphonomy and geomorphological changes benefitted from considerable efforts (e.g. Stanley, 2002). Moreover, the overall 'hyper-specialisation' of Mediterranean studies (Cherry 2004: 235) provided ample scope for engaging with new perspectives on studying the material record, building on notions of interconnectivity, mobility, identity and materiality (see Van Dommelen and Knapp, 2010). These new perspectives, however, remain of a limited use in Levantine archaeology. Although interconnectivity and mobility are very significant, their integration in Levantine archaeology of the EBA is either restricted to particular sites (e.g. Doumet-Serhal, 2008; Thalmann, 2009; Artin, 2009; Makaroun Bou Assaf, 2009; Genz, 2009), or related to patterns of artefact distribution (e.g. the Khirbet Kerak Ware, Chapter II Section 2.5.3). Rarely though have they been applied for an understanding of the Levant as a space of social action within a defined temporal unit, through a consolidation of the material record.

In terms of scale, a growing number of studies are integrating a bottom-up approach for research on ancient societies in order to highlight alternative pathways to the manifestation of power and wealth, and to understand the processes underlying the emergence and development of complex societies (e.g. Greenberg, 2002; Stein and Rothman, 1994; Meskell, 2002). This type of micro-scale research is more specific to individuals and sub-groups rather than to generic categories such as 'society' and 'culture' (Bolger and Maguire 2012: 3). In general, it is fair to assume that current approaches in archaeological studies bring forward a new way of studying the past by focusing on diversity, integration, scale, context, identity, social interactions, gender, memory, performance, agency, etc. Most importantly, however, is the context of studies, recognised to cover a range of dimensions including spatial, temporal, typological, depositional (Hodder 2003: 173; see also Lucas, 2012 on Formation Theory) and significantly, the broader context that is the framework through which the archaeologists interrogate and interpret the past.

Although changes in archaeological research of the Mediterranean and of the Levant are evident to a certain extent, some treatments of the Levant sustain a narrow focus either on a sub region, e.g. the northern versus southern Levant, or on particular periods and issues. Other syntheses place the

Levant within its wider context, as part of a world system and an interaction sphere (e.g. Beaujard, 2011; Kohl, 2011; Flammini, 2011). The littoral Levant, on the other hand, constitutes an area seldom studied in its entirety, south and north, and in its full potentiality as a seamless space of sea and land. The previous chapter's review brings to light many interrogations regarding the nature of the EBA coastal society in the Levant, and the nature and role of maritime activities and maritime connectivity during the EBA. Thus far, a comprehensive synthesis of maritime-related remains and activities from the Levantine littoral during the EBA is lacking. In the southern Levant, the works of Gophna (1974, 2002) and Marcus (1998, 2002) are substantial in terms of collating the archaeological evidence from the coast and exploring ancient maritime activities and potential anchorages. In the central and northern Levant, studies focus on investigating specific coastal sites and their corresponding underwater vicinities (Morhange *et al.*, 2000; Alvarez and Noureddine, 2010; Pedersen 2012, 2011, 2008, 2007; Frost 1971), while a holistic analysis of the littoral zone during the EBA remains absent. Despite efforts targeted at exploring the maritime world of the Levant, their resultant archaeological studies have not yet succeeded either in accounting for or portraying the significance and qualities of the maritime and coastal space apart from mere functionality, nor in situating the archaeological record of the EBA in its lived space and time context. Henceforth, it is vital to put forth an intellectual framework in order to reach such an analysis, one that is flexible enough to allow exposing the intricate processes taking place on the Levantine coast, where land and sea meet. Having contextualised Levantine research within its Mediterranean setting, this chapter moves on to engage with approaches towards maritime spaces, another significant aspect of the coastal Levant, highlighting the importance of a body of theory in archaeological research, and the objectives that the proposed theoretical and analytical framework of this thesis aims to fulfil.

3.2 Maritime spaces

From cultural-historical to processual and post-processual approaches, archaeological thought has changed markedly during the past 50 years (Trigger, 2006; Johnson, 1999; Hodder and Hutson, 2003). This change is equally evident in social sciences and humanities. Archaeological theory, after all, rests at the basis of our reconstructed accounts of the past. Johnson (1999: 2; 2006: 118) defines it as the order in which we put and determine facts. Whether explicitly stated or not, all archaeologists recourse to theory in the intellectual foundation of their work. In his seminal article on archaeology's loss of innocence, and its transition to a critical self-conscious discipline, Clarke (1973) emphasises on the role of a body of theory in establishing the critical leaps in archaeological reasoning, without which these leaps are rendered a "*free-flight of creative fancy*" (Clarke 1973: 16). Indeed, as Shanks and Tilley (1988: 27) note, "*there is no question of whether or not a consideration* *of social theory is needed in archaeology. The question to be asked is what kind of theory it should be*". Shanks and Tilley (1988: 27) stress that the past is gone and cannot be relived. Hence, they focus on the role of interpretation, stating that the past "*only exists now in its connection with the present, in the present's practice of interpretation*". However, their focus on interpretation and reinterpretation does not imply that all accounts of the past are valid. It rather means that we must accept the necessity for critique and self-criticism. The act of interpretation binds together theory and practice. Nonetheless, Johnson (2006) argues that there is a real disjuncture between what archaeologists say in theory on the one hand and what they do in practice (Johnson 2006: 118). In a polemical paper on archaeological theory, Johnson identifies various manners that indicate the lack of correspondence between theory and practice and explores these via two examples on agency theory and phenomenology. In short his general point is, as Lucas (2012: 2) summarises it: *"sometimes a theoretical approach just does not work with archaeological data, and sometimes a theory is so vague that it can work on any data*".

Thus, with this clear and fundamental role of theory in archaeology, and theory in practice, in this section and what follows, I explore and propose a theoretical framework for this thesis based on the main elements of this research, the 'maritime' and the coastal Levant, that embraces the application of theory in practice. Hence, I continue first by briefly reviewing the range of approaches and concepts related to maritime landscapes studies in general, highlighting their pros and cons, in order to propose a theoretical and practical framework for this research with the following objectives:

1- Provide an approach through which the study of maritime landscapes and maritime activities does not build on a distinction between land and sea considering that such a difference for coastal inhabitants, engaging on a daily basis with their surroundings, is an imposed taxonomy that does not essentially resonate with the past;
2- Move beyond current approaches to Levantine archaeology in order to reflect upon the archaeological record in alternative and new ways.

3.2.1 'Maritime' 'cultural' 'landscapes'

Maritime spaces are endowed with a set of natural characteristics acting upon and beneath the water surface. Together with land, these spaces blend seamlessly to foster a home for the movement of winds, of water, of ships and of people, and for human activities. These practices through maritime spaces are a function of a complex system of interaction between humans, the environment and humans' perception of the environment. Prior to any further discourse on the framework of this research, it is vital to present the known approaches to maritime spaces and landscapes, and thereafter introduce the theoretical basis for this thesis.

Maritime landscapes are studied through a variety of lenses. One of the earliest concepts that fundamentally influenced maritime archaeology and broadened its approach towards a holistic view of maritime activity is maritime cultural landscapes (Adams 2002: 228). The concept of maritime cultural landscapes was first coined by Christer Westerdahl in the 1980s. Westerdahl (1986, 1989, 1992) defines it as comprising "*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 idea of 'maritime cultural landscapes' was championed by many archaeologists (e.g. Westerdahl 1992, 2003; Parker 1999, 2001; McErlean *et al.*, 2002; Flatman, 2003; O'Sullivan, 2004; O'Sullivan and Breen, 2007; Rönnby, 2007; Duncan, 2006). It drew attraction to neglected areas in maritime archaeology, and exposed a range of data that could be used by archaeologists investigating human relations with the sea (Jasinski 1999: 9). Westerdahl's definition of maritime cultural landscapes, in its first introduction, was a response to cultural resource management issues and became an all-inclusive term for heritage management to describe onshore and submerged material culture. In more recent papers, Westerdahl's emphasis extend to encompass a cognitive appreciation of landscape instead of solely emphasising aspects of maritime cultural landscapes in a functionalist way (Westerdahl 2008: 219). Westerdahl points out that the cultural landscape is the sum of the physical and the cognitive landscapes (Westerdahl 2008: 213), and states that maritime cultural landscapes as a term was not invented for any analytical goals; however, its outcome amounted to a theory of men's relationship with the sea (Westerdahl 1994: 226). The concept of maritime cultural landscapes, although first coined by Westerdahl, was not a novel notion. Earlier studies have engaged with such a concept although without using the terminology introduced by Westerdahl. A number of archaeological, anthropological and ethnographic investigations have studied indigenous maritime communities in the Pacific Islands by examining cultural landscape components, beliefs, ethno-history and environmental aspects (Malinowski, 1961; Gladwin, 1970; Lewis, 1980; Johannes, 1992; Hviding 1996) as well as in the Mediterranean (e.g. Braudel 1987, 2002). Certainly, the introduction of the concept of maritime cultural landscapes was a step forward that extended the focus of maritime archaeology. It came to define an archaeological concept that combines sea and land (Westerdahl 1997:13), thence transcending Muckelroy's (1978: 4) definition of maritime archaeology as the scientific study of "*the material remains of man and his activity on the sea"*. Bridging sea, land and maritime cultures under one concept allowed archaeologists to place material remains in a broader context and seek cognitive and cultural remnants of maritime values.

Nevertheless, the term maritime cultural landscapes is a complex one in its threefold components: maritime, cultural and landscapes. Each one of those expressions is convoluted in its definition and hence the integration of these three components to refer to a unified concept taints it with ambiguity. Although the concept has been widely used as an umbrella for research, it is not grounded in a defined approach of investigation, nor is it clear in maritime cultural landscape studies how maritime cultures and landscapes are defined[12].

This brings us to the questions, what is maritime? Moreover, what is a maritime culture? Hunter (1994) and Parker (1995, 2001) discuss the implication of the usage of the term 'maritime culture'. Hunter (1994: 262) correctly points that both Muckleroy's and Westerdahl's usages of the term 'maritime culture' were devised to make political statements rather than to be dwelt upon analytically. Muckleroy's intention being a deliberate usage to bring attention to an emerging discipline and Westerdahl's purposeful usage for underwater cultural resource management. Hunter acknowledges that while many cultures have maritime components, they cannot be solely defined as maritime cultures. Furthermore, Hunter notes that what we term as maritime culture cannot be isolated from the entire range of activities be it maritime or not. For instance, he asks if the hinterland population that supplies the port's subsistence requirement of the maritime centre in Saxon Hamwich (Southampton) and the distant centralised authority in Winchester that controlled maritime trade can be separated from a 'maritime culture'. Hunter uses a parallel analogy in trying to define an airborne culture from the study of aircraft, airport distribution and runaways. He then proposes that instead of a maritime culture, we are interested in maritime components that might depend on a broad range of factors (economic, geographical, etc). "*Maritime components are no more than extensions or reflections of the broader culture to which they belong and are integral rather than isolated economic or social elements*" (Hunter 1994: 262). Parker (2001) complements this argument and states that what we are concerned with is specialisation and specialised functions, although these may not necessarily leave a trace in the material record. Nonetheless, we can distinguish concentration of maritime activity in what Westerdahl (1994) had termed as 'maritime enclaves'.

Similarly, Firth (1995) puts forward Gidden's notion of locales in relation to archaeologists' use of the term 'landscape', and accordingly re-evaluates the meaning of maritime societies. Giddens suggests that individuals take into account their own actions, and the actions and reactions of those around them alongside the setting within which interactions take place (Giddens 1979: 206-207). This setting is conceived as 'locale' and we can somehow relate it to Ingold's 'dwelling perspective'

[12] See Ford (2011) volume, which portrays a range of studies that a maritime cultural landscapes approach may incorporate yet not without problems as to how maritime cultures and landscapes are defined.

(Ingold, 2000). Firth hereafter indicates that the definition of a locale lends a perspective on 'maritime societies' whereby 'maritime' indicates that the locale, institutions or identities are shaped by contact with the sea. Hence, a maritime society can be identified as such based on the degree to which its aspects are shaped by the sea. This adds a sensitivity when appraising the characteristics of a society and challenges the assumption that any activity near or on sea is inherently 'maritime'. Firth further argues that the use of the term 'maritime' "*becomes a conclusion towards which progress is directed rather than a starting point that determines which things maritime archaeologists should study*" (Firth 1995: 3). Most importantly, Firth's perspective on a 'maritime society' raises the significance of scale. The scale of the locale, or the setting of interaction, may range from a crew on a vessel to residents of a fishing village or a whole population, all of which can be termed as 'maritime societies'.

From the discussion above, two points transpire. First, although the concept of maritime cultural landscapes widened the scope of archaeological research from a focus on ships and boats to a holistic study of maritime activity, one that integrates landscapes, its approach and theoretical background are not firm and studies under its tenant retain a sense of ambiguity either in the manner in which a maritime culture is defined, or in terms of what to include or exclude under this landscape approach (see Mckinnon *et al*., 2014). Second, maritime activity takes place within a setting that is integral to a wider context. Drawing the limits of a 'maritime' activity or society is not a realistic endeavor, nor one that archaeologists should seek, since the term 'maritime' is a function of scale, the scale of which the activity is related to any water-body surface, be it directly or indirectly. Given the uncertain usage of the term 'maritime culture' and the limiting nature of 'maritime cultural landscapes', we require an approach that is not restrictive, rather, one that encompasses what is maritime and what is not, hence making 'maritime' an adjective that we can use and not a subject by itself.

3.2.2 Multivalent landscapes and seascapes

Archaeologists have realised, earlier on, the need to develop a creative interpretation in maritime archaeology and an alternative perspective. Crumlin-Pederson (1996 in Parker 2001: 23) expounds that the main objective of maritime archaeology should be "*to learn to perceive the landscape and the settlements as they were seen with the eyes of the sailor or fisherman in the past, approaching land from the sea or from navigable rivers*". The notion that multiple perceptions of the same region exist and that landscape experience is unique to the individual or group is recognised by most researchers. It is also evident in Ingold's concept of a dwelling perspective, as well as in Tilley's (1994) phenomenology. People therefore experience an area differently. Gibbs (2005) observes that multiple perspectives apply to shipwreck sites, for example, as they can be perceived as graves, recreational resources, contested places or events. In a study on Stonehenge, Bender (1993: 9) explores the notion that many landscapes existed and are depended on the participants. Congruently, Westerdahl (1994: 267) coins the term 'topocentricity' to describe the situation where land and sea features were experienced differently depending on where they were perceived from. Westerdahl demonstrates this notion by examining the subsequent meaning of different viewpoints of coastal burial monuments from the sea and land (Westerdahl 2002: 62-65). The different potential perspectives to landscapes influenced archaeologists' approach to cultural landscapes; as Jasinki (1999: 13) notes, "[…] *terrestrial archaeologists while standing on the shore with their backs to the sea, use the inland as the background for their documentation. Maritime archaeologists generally do the opposite*". The understanding of landscapes as multivalent emerges with the integration of the perspective of the observer. In this context, the land and sea divide becomes irrelevant since any area, be it land, underwater or above water, is considered a locale, in Gidden's terminology. For instance, Hviding (1996) demonstrates that islanders regarded the land and sea in the same manner. He shows that the territoriality of the landscapes extended over the water to include 'sealand' areas that were managed within a land tenure system. Congruently comes the notion of perceiving the sea as seascape- alive, rich in ecological diversity and significance and ambiguity (Cooney, 2004).

Seascape provides an extended perspective on how people create their identities actively, engage with and socialize the sea through local knowledge and lived experiences. The term seascape gained currency in the wider public and provided a context to move beyond a preoccupation with technology and subsistence which has dominated much of the archaeology of coastal areas (Cooney 2004: 324). Van de Noort (2003) uses it as "*an ideological one representing the way in which people would have signified themselves and their world through their imagined relationships with nature*" (Cosgrove 1998: 15 cited in Van de Noort 2003). While the concept of seascape has been around for some time, according to Mckinnon *et al*. (2014), it has not yet been fully explored by maritime archaeologists. For Mckinnon *et al*. (2014), the seascape, like the maritime cultural landscape, represents the cognitive and physical, yet it does not presuppose a maritime culture, nor does it require boundaries that separate between maritime and non-maritime related spaces.

> "*The seascape is as fluid as the sea – it may shift in both space and time depending on the individual or culture. […]The seascape has the potential to equalize and give voice to indigenous cultures […] because it centralizes focus on the sea as opposed to land or its relationship to land (i.e. maritime cultural landscapes).*" (Mckinnon *et al*., 2014: 61)

The concept of seascape is a powerful one due to its centralisation of the sea; it offers a counterpoint to landscapes. However, this centralisation in itself is a risk; it makes the sea the main subject of study that only furthers the conceptual divide of land and sea. Sturt (2006) points to a significant problem with the utilisation of concepts such as seascape, Ingold's taskscape and the dwelling perspective, that is the frequent focus on tasks in order to identify past relationships, and on the importance of things rather than processes through which things gain importance. Sturt introduces the work of Henri Lefebvre on rhythmanalysis and the production of space (see Section 3.3.2) to bypass these key issues in archaeological research on maritime spaces. In line with Sturt's bearing, I engage with 'space' rather than landscapes and seascapes. Space as open, decentralised, a process, a production and a verb that evades some of the limits inherent in our utilisation of particular concepts as shown above. Chiefly, space bypasses the land/sea divide and the natural/cultural or social, and expands our imagination to the past lived experience. Thence, the following section introduces space and its attributed characteristics by various philosophers, social thinkers and human geographers, so as to highlight why and how an engagement with space as a theoretical and analytical framework is vital for this research.

3.3 The Spatiality of human life

Can space exist without matter? Can matter exist without space? These questions might sound basic, yet even today, scientists ponder for an answer. For the time being, however, there is an agreement that:

> "*Experiments continue to show that there is no 'space' that stands apart from space-time itself...no arena in which matter, energy and gravity operate which is not affected by matter, energy and gravity. General relativity tells us that what we call space is just another feature of the gravitational field of the universe, so space and space-time can and do not exist apart from the matter and energy that creates the gravitational field. This is not speculation, but sound observation.*"
> (Odenwald 2013: para. 1)

If we concur with such a postulation, then space as a container, as an isolated component of life, ceases to be of interest or valid, and instead of resorting to essentialism to account for space, or to an ontological pledge to the existence of essences, relations, interrelations and the multiplicity of existence gain importance. Although we come to this realisation from a positivist perspective, the disciplines of social sciences, human geography, anthropology and archaeology have concurred on this comprehension somewhere along their various trajectories of development, but driven perhaps by a postmodernist, poststructuralist spirit (see for example Crang and Thrift, 2000; Murdoch, 2006;

Harvey, 1989; Massey, 2005; Whatmore, 2002, Sturt, 2006; Tuddenham, 2010; Ingold, 2011; Bender 2001).

3.3.1 Space and why it is important

Here the absolute is local, precisely because place is not delimited

(Deleuze and Guattari 1987: 494)

One does indeed find folds everywhere

(Deleuze, 1995: 156)

Over the last 30 years, an interest in space gained currency in social sciences and humanities. This 'spatial turn' has arisen from numerous theoretical and practical impulses, and has had extraordinary consequences given its questioning of categories like 'life', 'material' and 'intelligence' (Thrift, 2006). Although different understandings of space and spatiality underpin key epistemological and ontological assumptions some of which are based on approaches to space that can be traced back to scholars such as Aristotle, Plato, Einstein, Descartes, Kant, etc. (see Casey, 1998), in the anglophone school during the past few decades, it has become conventional to claim that space and spatiality are social, cultural, quasi-material, *productions* (Merrimen *et al.* 2012: 4). Such claims have definitely had obvious forbearers like Torsten Hägerstrand's (1975) Time-Geography, Gabriel Tarde's (1969) micrometaphysics and Anthony Giddens' (1987) social theory, yet they emerge particularly with the recent theoretical developments like ANT (Actor-Network Theory), and the influence and rediscovery of the writings of Whitehead, Deleuze and Guattari (see Thrift, 2006). Hence, the writings of Doreen Massey (2005), Henri Lefebvre (1991), David Harvey (1989) and Nigel Thrift (2003, 2006), to mention but a few, espouse a dynamic space of interrelations, a space under construction, open, heterogeneous and lively. This is the space of poststructuralist geographies, a concept that cannot be explained in simple terms for that would entail the reduction of its sheer complexity and richness (Thrift, 2003). Of course, many scholars still prefer to work in their studies with embodied and encultured concepts, such as environment, place, landscape, locale and region, rather than 'space', but as Merrimen (Merrimen *et al.* 2012: 4) aptly states:

> *"it is precisely the multiplicitous and heterogeneous nature of space and spatiality- as abstract and concrete, produced and lived, imagined and materialized, structured and lived, relational, relative, absolute – which lends the concept a powerful functionality that appeals to many geographers and thinkers in the social sciences and humanities*".

Hence, it is of no interest to offer a definition of space here, for no definition can quite encapsulate what philosophers and thinkers spent lifetimes reflecting upon and writing on. Nor is a definition necessary, for instead of delineations and summaries, space is open, and although I write about space, by no means is this THE space; space is not to be found in the one, nor in the many, but in the difference, in the joint, in the interval and in the relation, in Deleuze and Guattari's (1987) multiplicity of ANDs. Space is broken into elements but it is not a jigsaw. Congruently are the qualifications of poststructuralist spatiality as non-totalisation (no unifying whole), incommensurability (no common measure) and incompossibility (elements occupy different universes). Declining integration to reach the One, space takes on a consistency of its own – Multiplicity-, which does not depend on totalisation and fragmentation, nor on universality and particularity (Doel 2000: 125).

The canvasses of Julie Mehretu, an Ethiopian-American artist, are a brilliant approximation to portray space and its manifolds, many spaces, different kinds of dynamics, of existences and of imaginations (Figure 3.1). Her work holds every space in tension, in concordances and collisions, dynamisms, potential and struggle, without offering a resolution, only a trajectory (Thrift 2006: 140). Thrift (2006) refers to her art and raises key principles that underlie her moves, which ought to be at the source of any approach to space. First is that everything is spatially distributed and that distribution is fundamental to processes and to life. Second, there is no boundary and spaces are porous. Third is that space is in motion, never static or stable despite attempts to make it so. All there is, is process. This chimes with Deleuze and Guattari's cartography of rhythms and movements, its emphasis on the concept of space as an open, intensive and consistent multiplicity, as well as with Lefebvre's rhythmanalysis. Fourth, there are many kinds of spaces. For some it can be points, planes or dimensions, while for others it can be emergence or translation. All these exist and do not exist as part of the closeness and the one-to-many mappings of semantic representations (language, communication) to conceptual representations (thoughts, concepts); "*Semantic representations have some kind of partial isomorphism with, and (largely) one-to-many mappings to conceptual representations of a propositional kind*" (Levinson 2004: Chapter 7). Simultaneously and according to Thrift (2006), Mehretu's work represents a turning away from traditional ways of thinking space. A turning away from a search for space outside metrics, a space separated from movement and a space separated from time. The latter, space-time, will be discussed further on in this chapter.

Figure 3.1- Julie Mehretu: Rising Down (2008).

Although speaking of politics, Massey (2005: 9) states that:

> "*thinking the spatial in a particular way can shake up the manner in which certain political questions are formulated, can contribute to political arguments already under way, and -most deeply- can be an essential element in the imaginative structure which enables in the first place an opening up to the very sphere of the political*".

If we substitute the first two mentions of political with archaeological and the third mention with the past, the statement would then elucidate a fundamental role of thinking spatially and engaging with space in archaeological theory and practice. For Massey, thinking the spatial in a particular way entails an alternative approach to space that can be articulated in three intertwined propositions. The first proposition is that space is the product of *interrelations,* constituted through interactions. Second, space is the sphere of the possibility of existence of *multiplicity,* the sphere of coexisting *heterogeneity*. The third proposition is that space is always under construction, never finished, never made (Massey 2005: 9; see also Anderson, 2008). This resounds with Sheppard's (Merrimen *et al.* 2012: 7) emphasis on spatiality, which, if not granted importance and taken seriously, can disrupt theories. Moreover as Sheppard states "*what is crucial is which theorizations of spatiality are imported into a set of discussions, and to what effect*". Although there has been waves of theorisations and concerns, whirling concepts replacing one another, such as an interest in space and distance, in place and territoriality (Yi-Fu Tuan, 1974), theorisations on the construction of scale (Delaney and Leitner, 1997), followed by networks, connectivity and relational approaches (Jones, 2009), Sheppard argues that these lists are incomplete and to no end. Instead, Sheppard suggests in the case when an ontological claim is to be made, that it be a modest one rather than deeply philosophical, that complex spatialities matter. They matter in terms of representations and discourses mobilised around spatial concepts. They matter materially, and in the everyday production of space. Moreover, it is not about space and spatiality, but about spatiotemporality, space-time. Sheppard also urges to move away from predispositions that separate out certain ways of thinking about space and associate them with particular methodologies (Merrimen *et al.* 2012: 9). For instance folding space is not restricted to Deleuze and Doel (1999, 2000), but is also evident in complexity theory (Sheppard, 2008; Delanda, 2006). Alternatively, Geographical Information Systems (GIS) technology which was quickly criticised by social theorists, in fact proves flexible with other spatial representations in creating qualitative and ethnographic GIS (e.g. Cope and Elwood, 2009; Kwan, 2002).

Space, therefore, as illustrated above, not as a container or absolute, but relational and lived, is crucial to engage with in archaeological research. It shifts the focus from tasks to processes; it constitutes and is constituted by relations and productions. In the case of this thesis, space is an alternative to a sea-centred or land-centred approach. Rather than presuppositions and presumptions, it offers an open, potential and actual field to examine and understand EBA coastal life. Recognising that everything is spatially distributed, relationally, highlights simultaneously the significance of land and sea and their affordances to humans. Moreover, the multiplicity and heterogeneity of space makes it a flexible concept that is not constrained by notions of scale and boundaries, and engenders a modesty in that our research on space is one of many, manifolds. Most crucially, however, space expands our imagination to different ways of thinking about and investigating the past. However, as Sheppard (2008:2610) notes "*Each approach, or local epistemology, is no more than an emergent permanence, whose nature and properties are not defined internally but are shaped through their relations with other ontologies and epistemologies*". This is to say that space, as a concept in this research, is a status-quo but not a conclusive state of our understanding of it, nor an essence, and is constituted through relations to other epistemologies and ontologies, which makes its application to this research directed on a trajectory emergent from those relations, but not defined.

3.3.2 The trialetics of space

Archaeology is about the social. The social, however, is not a reified abstraction, entity or beliefs and rules. Societies are material assemblages composed of relations, with humans playing only a part in these relations (a thorough analysis on archaeological entities can be found in Lucas 2012, Chapter 5). Following Delanda (2006) and his interpretation of Deleuze and Guattari (1987), assemblages are wholes characterised by *relations of exteriority*. These relations suggest that the whole is not reduced to its part, nor is it an aggregation of components' properties, but rather, the exercise of their capacities. The *relations of exteriority* can be defined through material and expressive roles, and through processes of territorialisation/deterritorialisation, coding/decoding (Delanda 2006: 10-17). Yet taken too literally, assemblages become a dead metaphor according to Marcus and Saka (2006: 106):

> "*At best, then, extracted from the Deleuzian theory machine and made to do conceptual work in specific projects of cultural analysis and research, assemblage functions best as an evocation of emergence and heterogeneity amid the data of inquiry, in relation to other concepts and constructs without rigidifying into the thingness of final or stable states that besets the working terms of classic social theory*".

Whether adhering or not to the full philosophical pledge by Delanda, and Deleuze and Guattari, what is of significance here is that the social as an assemblage is hence grounded in material practices. Moreover this assemblage is heterogeneous, emergent and constituted through *relations of exteriority*. With space grounded in the material, relational and the social alike, space and the social are then interrelated and produce one another. This is where the work of Henri Lefebvre on the *Production of Space* (1991) is of vital concern.

Lefebvre's theory published in the early 1970s on the production of space (see Lefebvre, 1991), saw a remarkable renaissance and gained much interest especially with the 'spatial turn' that took hold of social sciences and humanities. It has become routinely quoted and infiltrated postmodern narratives, yet not without confusion. Lefebvre's fundamental thesis is that (social) space is a social product. It is constructed on the assumptions of a relational concept of space and time, where society neither signifies totalities nor sums. This materialist theory centres on the corporeality, sensitivity, thinking and ideologies of human beings. Key to Lefebvre's theory is his division of the production of space into three processes, the triad of "*spatial practice*", "*representations of space*" and "*spaces of representation*".

> *1) Spatial practice, which embraces production and reproduction, and the particular locations and spatial sets characteristic of each social formation. Spatial practice ensures continuity and some degree of cohesion. In terms of social space, and of each member of a given society's relationship to that space, this cohesion implies a guaranteed level of competence and a specific level of performance.*
>
> *2) Representations of space, which are tied to the relations of production and to the 'order' which those relations impose, and hence to knowledge, to signs, to codes, and to 'frontal' relations.*
>
> *3) Representational spaces, embodying complex symbolisms, sometimes coded, sometimes not, linked to the clandestine or underground side of social life, as also to art (which may come eventually to be defined less as a code of space than as a code of representational spaces).*
> (Lefebvre 1991: 33)

This triad, in other words, refers to the 'perceived', 'conceived' and 'lived' spaces. The perceived space designates the material dimension. By spatial, Lefebvre means the simultaneity of activities. Concretely, this space would denote the networks of communication and interaction of everyday life. The *representation of space* or conceived space emerges at the level of speech and discourse, and comprises descriptions and theories of space. Maps, plans and images for instance, are amongst representations of space. The lived space on the other hand, does not refer to spaces but to their symbolic dimension, to the process of signification that is associated with material symbols such as trees, artefacts, landscapes (see Schmidt 2008 for more in depth analysis of Lefebvre's work). Hence, for Lefebvre, space is understood as a production process taking place in three dialectically tangled dimensions. These three dimensions, however, do not represent categories. Although they are distinct from each other, they exist in conflict, in interaction and alliance with each other (Schmidt

2008: 33). Mere reference to define these dimensions from Lefebvre's passages is insufficient; to fully understand their meaning, the overall context of Lefebvre's theory needs to be clear. The confusion with Lefebvre's theory according to Shmidt (2008) stems from his three-dimensional dialectic (Lefebvre, 1980). Lefebvre's dialectic posits three dimensions of equal value related to one another through complex movements wherein one prevails over the other rather than negating one another.

Edward Soja's work and his postmodern appropriation of Lefebvre has been very influential in the field of geography (Soja, 1996). Soja postulates the existence of three spaces: a physical one (first space), a mental one (second space) and a social one (third space). The social space is deemed exclusively important and he coins it 'Thirdspace'. Thirdspace for Soja is a lived space, a space of representation, where all spaces can be understood and transformed. Soja further distinguishes certain spatial epistemologies that have been used in the investigation of each of these spaces, for instance the use of GIS and remote sensing to study and describe the empirical content of the physical space, or 'Firstspace' (Soja 1996: 76). In *Postmetropolis* (2000), Soja applies this differentiation of spaces and methods to urban research. The conception of these three spaces by Soja is very interesting but, in a way, although grounded in Lefebvre's theory, diverges from it in that the Lefebvre's three spaces are dialectically interconnected processes, not independent spaces.

The three spaces or processes proposed by Lefebvre, and in their light Soja's three spaces, will neither be considered in this thesis as independent spaces, nor is it deemed feasible to fully represent a Lefebvrian account on the production of space during the EBA of the coastal Levant. Nonetheless, Lefebvre's three dialectical spaces offer a powerful conceptualisation of processes of social life that is extremely important to recognise in archaeological research. This conceptualisation is a means to widen our imagination and to analyse ancient human social life in an open context where the focus is no more unidirectional on certain tasks, on the physical landscape or on the cultural, but on the processes that relate all these elements together and the lived spaces they produce. Such an approach offers a trajectory for analysis where the archaeologists' conceived spaces of the past can alter with their relation to the perceived and lived spaces (see for example Sturt, 2006; Barceló and Pallarés, 1998).

3.3.3 Space-Time

Thus far, space has been primarily discussed, yet it is vital to acknowledge that it is always about space and time, space-time. Massey (2005: 47-55) suggests that space and time are distinct but co-implicated, integral to one another and "*it is on both of them, necessarily together, that rests the* *liveliness of the world*". From the 1960s onwards, concepts of time became generally incorporated in new ways throughout the disciplines of social sciences and humanities (see Lucas 2005 for a review on the concept in archaeology; Carlstein *et al,* 1978 for geography; Adam 1990 for sociology). This movement was governed by a shift from a focus on time as a physical dimension to a focus on social time, on the view of time in terms of social change (e.g. Adam, 1990). However, theories of social time did not eradicate the prioritisation of space over time/time over space, or attempts to study them in isolation. According to May and Thrift (2001: 3) "*any search for a singular or universal social theory of time must be doomed to failure as both that which it seeks to account for (the timing of social life) and the frame within which those timings may be set is itself variable across both time and space*".

In the vein of a time-space understanding, many models developed both to account for and to analyse time-space experiences and projects. *Time-space convergence* is a concept that was developed by Janelle (1969) who, drawing on data for the time it takes to travel between towns, constructed graphs of the decline of travel time from the seventeenth to the nineteenth century. This concept is at the basis of 'time maps' where the metrical distances are replaced by time distances (See also Chapter VI, Section 6.3). Although the *time-space convergence* concept is restricted to the physical dimension of movement and travel, it is nonetheless a powerful concept that appears time and again in archaeological and geographical research.

On the individual level of time-space experience, Hägerstrand's (1973) *Time-Geography* concept is one of the most original contributions to critical and human geography (see Figure 3.2). Hägerstrand uses a three-dimensional diagram, where two-dimensional space constitutes the base map and the third dimension is representative of time. In this three-dimensional space, Hägerstrand attempts to trace time-space paths of everyday life tasks, upwards and sideways. In order to understand and construct these time-space paths, Hägerstrand evokes three large aggregations of spatio-temporal constraints. First are capability constraints based on biological needs, e.g. sleep and food, and distance oriented constraints. Second set is the coupling constraints. These define where and how individuals come together to produce, transect and consume. The third agglomeration is the authority constraints that involve the spatial hierarchy of domains that controls the areas that an individual can access (Hägerstrand 1970: 11-13). The constraints on individuals' tasks define then a space-time prism of boundaries of what activities are feasible from the home base of an individual. As Pred (1977) explains, Hägerstrand aims to develop a contextual rather than a compositional approach to human activities, whereby his approach asks about the situation that an individual and object are found in, and interrogates the existing connections and behaviours between the object and the individuals.

Pred's (1986) historical research is an exemplar of a time-geography approach for understanding social changes and everyday life. Time-geography, however, as pointed out earlier, focuses on tasks rather than processes, and deals with the measurable and evident, i.e. the mappable. Moreover, its application to archaeology, given the fragmented nature of the archaeological record and its resolution, makes it extremely limited. Nonetheless, this concept remains vital when it is embedded in a wider framework of social space, since movement and accessibility are important parameters for analysis (see for example Crang 2001 where time-geography was used alongside Lefebvre's rhythmanalysis and phenomenological approaches). Mlekuž (2010) for instance, was able to devise methods based on Hägerstrand's time-geography for archaeological research. Through an analysis of the three-dimensional prism as a field of possibility and of potential path areas, Mlekuž studies and analyses the conditions of interaction in the past, e.g. minimum and maximum path fields, by applying spatial derivate of the time-space prism.

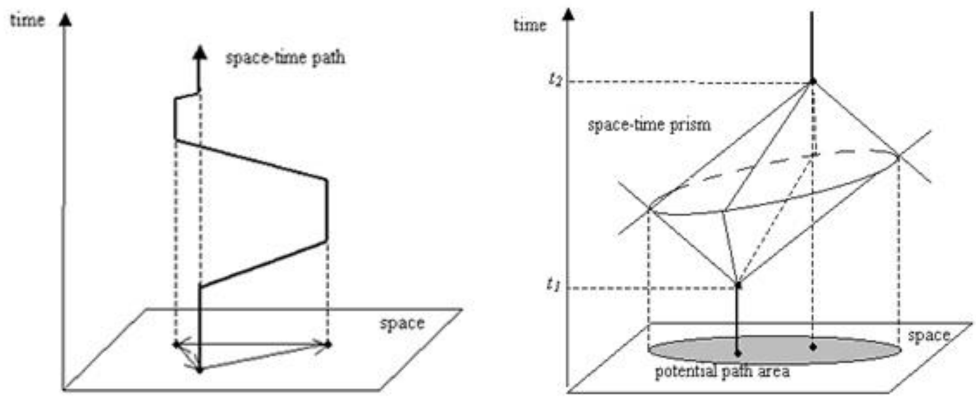

Figure 3.2- Hägerstrand' Time-Space path and prism (from Yu and Shaw 2006: Figure 1).

Congruent to time-geography and time-space convergence is Harvey's (1989) *time-space compression*. Harvey develops the concept as an argument that links space and time to economic and cultural necessities and expressions (Taylor 2003: 155). In contrast to time-space convergence where the focus is on the cumulative effect of the improvements in speed of movement, Harvey's concept centralises on what such improvements to the speed and technological changes incur on the society's experience. Harvey argues that to conquer space, new space has to be produced, in communication and transport. These new spaces generate a feeling of the world 'speeding up' and an 'overwhelming sense of compression'. Harvey's time-space compression relates mainly to capitalism, and to the experience of space and time as coinciding with technological change (Stein, 2001). His concept offers a further insight on how change in travel-time affects social experience. However, when working with Harvey's time-space compression it is worth acknowledging, as Stein (2001) argues, that the experience of time-space compression does not necessarily reflect everyone's experience, but is rather elitist. Moreover, this experience is often assumed as a result of the advent of new technologies thereby prone to technological determinism and the exaggeration of the consequences of technology.

The concepts presented so far provide valuable insights into some of the facets of lived space-time experience. As stand-alone approaches, however, they risk failing given the limits imposed on each by their very definition. Arguably, one the most evocative concepts of the multiplicity of space-time and everyday life is Lefebvre's (2004) rhythmanalysis. Time-geography stands as an obvious antecedent of rhythmanalysis, it establishes that individuals "*repeatedly couple and uncouple their paths with other people's paths, institutions, technologies and physical surroundings*" (Mels 2004: 16). Rhythmanalysis, however, develops a richer analysis of the synchronic spatial practices while considering sensations, habits and spatial qualities (Edensor 2010:2). Lefebvre's (2004: 15) premise is that "*everywhere where there is interaction between a place, a time, and an expenditure of energy, there is rhythm*". Moreover, there is no "*rhythm without repetition in time and space, without reprises, without returns, in short, without measure".* Lefebvre is explicit, however, that "*there is no identical absolute repetition indefinitely… there is always something new and unforeseen that introduces itself into the repetitive*" (Lefebvre 2004: 6). Thence, rhythmanalysis allows us to explore the emergent properties and process of becoming of space-time, as well as the stabilised patterns that benefit from rhythmic qualities. Bodily rhythms, seasonal rhythms, mobility rhythms and everyday rhythms all contribute to and are part of the plethora of rhythms of the world we live in. Henceforth, via rhythmanalysis, the manifolds of lived space can transpire, yet it is crucial to step away from a totalitarian approach, when the totality of rhythms is sought, for that would contradict with the heterogeneity and multiplicity of space-time.

3.4 Thirding-as-Othering: Mapping

The theories and concepts of space and space-time elucidated to the best of abilities are no more than trajectories and frames of reference that help sustain a consistency to this research. Yet, remaining faithful to the premise of this chapter, these theories and concepts require a practical counterpart, otherwise they risk becoming mere words in air. To this end, I propose the strategy of thirding-as-othering, introduced by Soja (1996), for the use of 'mapping' with GIS to bring theory and practice together, which will be developped in the next chapters.

3.4.1 Thirding-as-Othering

Soja's (1996) Firstspace, Secondspace and Thirdspace, although different from Lefebvre's trialectics, are nonetheless very significant in terms of scholars' engagement with spatiality. Soja (1996: 10) argues that mainstream spatial imagination has operated primarily in two modes of thinking about space, which he designates as Firstspace and Secondspace. Firstspace is fixed on concrete materiality, and on subjects that can be empirically mapped. This, unsurprisingly, correlates with spatial and pattern recognition, and resonates with processual archaeology's epistemologies. Secondspace is associated with cognitive forms of spatial representations, and the conceptualisation of space. Secondspace thinking has undoubtedly gained a strong and dominant theoretical position in archaeology and other disciplines. It comes along with the critique on the results and modes of analyses of processual archaeology. For example, Tilley's (1994) *Phenomenology of Landscape*, although it contains useful insights, observations and ideas on space, does not make recourse to any actual spatial analyses (see Exon *et al.* 2000: Chapter 2). Soja suggests that the first step to bypass such contradictions between Firstspace and Secondspace is to radically re-assert the role of space through particularly a historical-social-spatial trialectic denoting the social production of time, being-in-the-world, and space (Soja 1996: 71). Moreover, Soja proposes a critical strategy that he terms thirding-as-othering. Thirding-as-othering:

> "*introduces a critical "other-than" choice that speaks and critiques through its otherness. That is to say, it does not derive simply from an additive combination of its binary antecedents but rather from a disordering, deconstruction, and tentative reconstitution of their presumed totalization producing an open alternative that is both similar and strikingly different*." (Soja 1996: 61)

Hence, thirding is an approximation that builds on earlier ones, while never assuming totalisation or a finality; there is always an alternative, an-other. Thirding-as-othering is a strategy that transcends the closed logic and the categorical of either/or and assumes the dialectically open logic of both/and/also. This resonates with Hodder's appeal "*both/and is better than either/or in a number of domains of archaeological methods*" (Hodder 1992: 62). Soja's thirding-as-othering of Firstspace and Secondscape is the approximation of Thirdspace. "*Thirdspace epistemologies can […] be […] re-described as arising from the sympathetic deconstruction and heuristic reconstitution of the Firstspace-Secondspace duality, another example of what I have called thirding-as-Othering*" (Soja 1996:81). Thirding-as-othering thus creates spaces that are both Firstspace, empirical, Secondspace, conceptualised and more. Thence, this leads us to the role of mapping, and spatial technologies, i.e. Geographical Information systems (GIS), which will be elucidated below, as a thirding-as-othering strategy to transform the either/or logic of a Cartesian, empirical and symbolic representation of space to a both/and logic that incorporates the previous approximations but is not bound to them, hence revealing an approximation of lived space. The following section will show how mapping can third geographical space and social activities such as the performance of seafaring, to generate a space that is not bound to both, a space that approximates for instance the experience of seafaring.

This approach provokes alternative ways of engagement with maritime spaces and of thinking about maritime activities that will be demonstrated in the following chapters.

3.4.2 GIS, maps and mapping

Geographical Information Systems (GIS) is of great advantage to archaeologists for a number of reasons as it provides methods to visualise and analyse data. Its use is very much recognised in archaeology as a research, heritage management and teaching tool (Bevan and Lake, 2013; Conolly and Lake, 2006; Wheatley and Gillings, 2002). Foremost, GIS offers methods to analyse and explore spatial information. However, GIS is not without critique, for in the surge of post-processualism, GIS-based analysis, interpretations and maps were deemed inadequate to convey the multi-sensorial experience of space, and were criticised for their visual centredness (see Thomas 1993, 2004; Wheatley and Gillings, 2000). In such a way, GIS was considered a tool in the investigation of Firstspace, incapable of any other approximations of space. For instance Thomas (2004: 200) argues that attempts to "*'humanise' digital technologies is misguided, principally as a result of the way in which it deals with the concept of perception*". Although there would seem to be a conflict between GIS modes of analysis, on the one hand, and post-processual, qualitative and humanistic approaches on the other hand, such conflicts have been addressed and overcome (see for example Sturt, 2006; Cope and Eldwood, 2009). Moreover, these conflicts cease when we engage with the process of mapping and critical cartography as a thirding-as-othering strategy, and when we recognise that the key is not in the tool per say, GIS, but in the way in which we employ such technologies and to what end.

Considering that GIS spatial representations in the form of maps are ubiquitous in archaeological research, and they very much rest both at the basis and as a result of analyses, it is puzzling, as Lilley (2012) notes, that critical debates on 'mapping' have been thus far overlooked by scholars. Ever-since the mid-1980s, the view of cartography and maps as objective products of science has been challenged. Critical cartographers, drawing on critical social theory, questioned the principles of cartography (see Crampton, 2003). Harley (1989) argues that the process of mapping is laden with power. Rather than a process of revealing knowledge, mapping consists of creating, and in that process of creation, subjective choices are made e.g. what to include, what the map looks like and what the map is making (Monmonier, 1996). Maps are thus, according to Harley, imbued with individual judgements and retain a reflection of the individuals' culture. In this sense, maps represent the individuals' conception of space, Lefebvre's conceived space. This critique of maps was paralleled during the 1990s with critiques of GIS (e.g. Pickles, 1995), and produced the field of 'critical GIS', similar to 'critical cartography'. Hence, it is within these critiques that there is a potential to reflect upon a humanistic-based GIS. According to Edney (2005), there is a distinction between 'map-making' and 'mapping'[13] (also in Harley, 1989). While the former consists of a conventional and narrow sense of cartography, the process of map production. The latter, as Lilley (2012: 205) suggests, "*helps in theorising this relationship between maps and truth, for it highlights not just the manifold kinds of 'mappings' that exist but also their myriad and complex meanings for those who engage with them*". However, Harley believes that by identifying the politics of mapping and representations, we can then circumnavigate them in order to reveal the truth. Conversely, Crampton (2003), following Edney (1993), argues for a relational ontology of maps rather than a teleological one, wherein mapping and truth are contingent on the cultural and social at certain places and times. In the vein of a non-teleological ontology, Pickles (2004) proposes a post-representational cartography where maps are producers of nature instead of mere mirrors of nature. Hence, post-representational cartography rests on the production of a de-ontologized cartography and denaturalised histories:

> *"A de-ontologized cartography is on the one hand about accepting counter mappings as having equal ontological status as scientific cartographic (that there are many valid cartographic ontologies) and, on the other, deconstructing, reading differently, and reconfiguring scientific cartography (to examine alternative and new forms of mapping)."* (Kitchin and Dodge 2007: 334).

Henceforth, by putting aside the idea of a truthful objective representation of space, and taking on board the process of mapping whereby mappings are manifold, imaginative, experienced and lived, we can engage with the thirding-as-othering strategy to convey representational spaces, yet not without acknowledging that first and foremost these representational spaces are a product not just of the past (when working with data from the past), but also of the present (with the archaeologists' input and decisions). Herein lies the contentious yet powerful approach to archaeological spaces. GIS then, is no more than a tool, flexible enough to allow the representation of such spaces. Lucas (2012: 242) states about archaeological sites and grids that "*once the site has these grid pegs in, we even begin to start moving around the site in a different way, we experience it in a different way, as part of a prelude to translating the site onto paper… The grid pegs therefore are a primary key in this translation process".* What I am proposing through the thirding-as-othering strategy to mapping with GIS is to deconstruct the grid, to alter it in ways that does not only convey Cartesian space but a relational social space-time. For only then can our translation change from one seeking the truth about the past, to one in awe of the multiplicity and the manifolds of human life.

[13] The discussion on mapping and mediation with mapping in archaeology continues in Chapter VI in order to elaborate on different forms of representations by mapping, not necessarily bound to Cartesian space, so as to give way for mapping the maritime space-time of seafaring (mapping the sea).

Space and Time

This thesis employs the methodology of thirding-as-othering via mapping for mapping land (Chapter IV), mapping maritime activities (Chapter V) and mapping the sea (Chapter VI). In each of these folds, specific methods that correspond to the nature of data at hand and the purpose of the mapping exercises are used. In mapping land, preliminary analyses of the study area and the distribution of EBA sites in space and time are explored. This allows breaking from traditional coastal Levantine representations, opening up alternative ways of mediating the study area and reflecting on the imposed boundaries between the southern, central and northern Levant. Mapping activities builds on a consolidation of EBA direct and potential evidence for maritime practices, and attempts at mapping the EBA bundles of maritime activities in space and time. Mapping the sea mediates the navigable space-time of the Levantine Basin. It puts forth a model to translate the conceivable sea of seafaring, a space-time that may have been experienced by seafarers, constituted by and entangled in rhythms. Mapping the sea offers a platform to reflect on the maritime space of seafaring in new and innovative ways. Henceforth, mapping land, mapping human engagement with the sea and mapping the sea establish three parallel and contingent folds of the lived space-time of the EBA costal Levant that in turn can be thirded to generate interpretations and understandings as in Chapter VII.

This chapter discussed the theoretical and analytical framework at the basis of this research. At its core, it builds on the two major aspects of the Levantine littoral that is its Mediterraneanism and its maritimity. Mediterranean and maritime approaches were reviewed in the aim of contextualising and providing a background for the reasons behind the choice of space, a relational lived space, as a mode of engagement in this thesis. Following that, an understanding of space as perceived, conceived and lived, according to Henri Lefebvre, was introduced. The trialectics of space serve as a powerful conceptualisation of the spatiality of social life on the level of the interpreters of the archaeological record, the archaeologists working with their own conceived spaces and on the level of the material past. Therefore, the trialectics of space open up a window of engagement with the past that is not restricted to one mode or another, i.e. perceived, conceived, lived spaces, but one that challenges what we know and what we think we know on the part of the archaeologist and on the part of the archaeological past. Furthermore, the discourse moved on to space-time, introducing the works of Hägerstrand's Time-Space Geography and Lefebvre's rhythmanalysis. All these approaches and conceptualisations, on one level or another, will be referred to later on in this research.

The thirding-as-othering via mapping was presented as a strategy that responds to the main premise of this framework. Via thirding-as-othering, it is possible to bypass the issue of the particularistic and generalist approaches to Levantine archaeology, therefore providing a flexible approach to work with.

CHAPTER IV: ARCHAEOLOGICAL DATA SOURCES AND SPATIO-TEMPORAL MATTERS

The EBA period marks a span of c. 1500 years that is distinguished from the earlier Neolithic period by at least one crucial factor: the use of copper, a technological catalyst. As described in Chapter II, the Levant during the EBA is characterised by many aspects relating to pottery traditions, e.g. Grey Burnished Ware, the Khirbet Kerak Ware and the Combed Ware, in addition to architectural traditions, e.g. rectangular installations versus previous circular houses of the Chalcolithic and the Neolithic, mudbrick walls laid on top of a stone foundation and supportive wooden columns at the corners. Furthermore, the EBA Levant is marked by traditions relating to burial, agricultural and pastoral practices, most importantly the development of horticulture (olive and wine production) and the intensification of agrarian activities. Scholarly work on the EBA Levant is ample, even though it is restricted by its concentration on either the southern, northern or the central Levant. It is further differentiated by the number of excavations and surveys dedicated to each of those regions, as discussed in Chapter II. It is thus confounding that within the abundance of scholarly studies, few target maritime practices, and few place emphasis on maritime space and activities integral to our understanding of that period. This is not to say that the problem lies within the archaeologists' and researchers' comprehension, rather, as this chapter will show, the problem lies in the disparity, resolution, incoherence and fragmented nature of the archaeological record of the EBA coastal Levant, specifically that which relates to maritime practices (Chapter V).

In Chapter III, an approach building on relational and lived space was advocated as a mode of engagement with the EBA coastal Levant. This approach employs the methodology of thirding-as-othering via mapping in order to deconstruct and alter conventional conceptions of the space-time of the Levant and, by doing so, mediate and translate the maritime space of the EBA. Notwithstanding, noted in Chapters II and III, there are challenges with working in the region of the Levant and with the specific chronological period of the EBA. Whilst Chapter III responded to the lack of a theoretical framework that incorporates maritime activities and space in Levantine scholarship, this chapter will present in detail how we can build a more humanised space of the Levantine coast, and populate it with processes unfolding during the EBA. This chapter, through its mappings of the study area and of EBA coastal sites, aims to show the recursive relationship between people and space, through which concept(s)/representation(s) of lived space of the EBA littoral Levant can be built.

Any study of maritime practices is faced with challenging conditions. These challenges lie with the nature of the corresponding archaeological record. Some of the obvious indicators of maritime activities are: remains of boats/ships, hooks, net weights/sinkers, anchors, harbour installations, faunal remains of marine life, evidence of woodworking, textual sources, etc. Such a body of evidence permits straightforward inferences; however, rarely is the archaeological record this transparent, and those indicators, if present, are scarce.

Sea-crossings evidently took place in the Mediterranean during the Neolithic (Ferentinos *et al.,* 2012; Broodbank 2002, 2006) and earlier during the Upper Palaeolithic, c. 30ka BP. These crossings are confirmed by indicators for the presence of humans on islands, e.g. stone tools as in the Aurignacian stone-tools in Sicily (Mussi, 2001), the Natufian industry in Cyprus (Ammerman, 2010) and the presence of stone-tools in Crete (Strasse *et al.,* 2011). Furthermore, the circulation of obsidian in the Mediterranean has been a strong indicator for sea-going practices (see Farr, 2006; Williams-Thorpe, 1995). Notwithstanding, remnants of boats that can further substantiate maritime movements are meagre. The earliest evidence of a boat from the Mediterranean is a Neolithic canoe from the site of La Marmotta on Lake Bracciano, north of Rome (Fugazzola *et al*., 1995; see also Robb 2007: 255). This 10m long canoe, dugout from an oak trunk, is a unique find shedding insight on how Neolithic people might have navigated the sea. Other similar or reed boats most likely existed during the Neolithic (Farr, 2006: 90); remains of reed boats, however, are unlikely to have survived, as they are made from degradable, friable material. The scarcity of evidence for sea-going vessels persists during the Bronze Age. Unfortunately, to date, EBA boats have yet to be discovered. A renowned shipwreck from the Late Bronze Age however, that of the Uluburun, provides a glimpse into Late Bronze Age maritime practices and trade in the eastern Mediterranean (Pulak, 1998).

The limited number of boat and ship remains is a challenge that faces the study of ancient maritime practices and sea-going journeys, along with other challenges such as changing coastlines and environments. Nonetheless, rather than stand as obstacles, these difficulties act as instigators that force us away from a traditional line of thinking in which tasks and events are given prime importance over processes, rhythms and skills. As Tartaton (2013: 8) mentions:

> "*Bronze Age coastal history is a complex narrative, not merely a series of fixed points on a map or a normative characterization that masks changes over centuries or millennia. Thus, for any coastal area that we study, we must deploy diverse perspectives and analytical tools and we must find a way to represent its dynamism*".

Chapter II outlined a narrative for the Levant during the EBA, a narrative commonly referred to in archaeological research, which portrays a linear diachronic development. That narrative as indicated previously, however, tends to focus on terrestrial activities, on settlement patterns, on core-periphery interactions with the states of Egypt and Mesopotamia and on two main themes, social complexity and urbanisation. Chapter II has also shown that our knowledge of EBA in the Levant is skewed due to an overt attention to terrestrial dynamics. The maritime component and maritime space have been largely overlooked. Yet, without accounting for maritime practices and space as integral to our understanding of the EBA Levant, primarily of the coastal area, we risk stagnation in archaeological scholarship and falling in a repetitive cycle of research agenda.

A study of maritime practices during the EBA on the coastal Levant has the potential to inform us about rhythms of life in that space and time, the scale of maritime specialisation if any and the intensity of maritime activities. Additionally, such an investigation sheds light on how EBA inhabitants engaged with the sea and on connections made viable via the sea. However, in order to reach such an understanding, it is necessary to abandon the inclination of producing a grand narrative built upon major events and tasks, e.g. the relationship between Byblos and Egypt during the EBII, or that of Egypt and the southern Levant during the EBI. Although the importance and influence of external forces such as the states of Egypt and Mesopotamia during the EBA cannot be discounted, this chapter and this thesis aim to shift perspectives to the importance of dynamics and practices taking place on the coastal Levant and from that region, be it on a local, regional or international scale. Additionally, this research adheres to Bailey's (2013: 107) advice that states:

> *"We should avoid falling into the trap of progressivism: that is, the belief that the long-term trajectory of change is necessarily one of cumulative and progressive development along a linear pathway from simple to more advanced, and that the past should be interpreted retrospectively in the light of what came later as a teleological process leading towards that later outcome. […] Otherwise, we risk falling into […] the belief that the longterm trajectory of change is a ladder of progress punctuated by revolutions, which happened when they did because previously 'culture' or 'mental abilities' were not yet ready for them, or else because of some unusual or powerful external disturbance. Such arguments […] are largely circular in nature, assuming as fact the very matters in need of explanation, and thus closing off the investigation of alternative evidence and alternative hypotheses on the grounds that there is no point in looking".*

Henceforth, regardless of how appealing it is to compare and contrast EBA maritime practices to those of the earlier Neolithic and later Middle and Late Bronze Age periods, we need to attune to the stories that that space and time has to offer. This is achieved through the approach put forth in Chapter III that is based on a relational space and time that is open, fluid, non-totalising, incommeasurable and of manifolds and rhythms. This umbrella for the study of maritime activities on the coastal Levant, further supported by the thirding-as-othering via mapping methodology, can alter, construct and deconstruct ways of representing and understanding the past.

The undertaking of a research that aims to study and evaluate the lived maritime space of the littoral Levant is critical for two main reasons. On the first hand, it has the potential of shifting the narrative of the EBA coastal Levant from a grand one focusing on events to a plethora of narratives and stories each reflecting processes of that space and time. On the second hand, an initiative is required to set a base for future work. Therefore, in order to undertake this research, a consolidation of an archaeological database of EBA coastal sites and maritime-related material culture is required. This database elucidates the potential of the data and lays down what is knowable in the archaeological record, in order to recognise what is doable based on that data.

The first section of this chapter presents the data sources used to create a database of EBA archaeological sites and maritime-related material evidence, as well as relevant issues pertaining to the resolution and availability of the archaeological record. The next section defines the extent of the study area, taking into consideration not only topographical parameters but also time as representative of daily rhythms of movement. The following section presents EBA sites along with an analysis of their distribution and density in space and time. The spatio-temporal analyses (mapping land) aim to bring to the forefront some aspects of EBA coastal patterns that may have been shadowed by traditional research guidelines. The relative location of EBA sites within environmental niches breaks the domination of large spatial units of landscape classification. The space-time density of settlements paints a picture of settlement integration and affiliation that diverges from the modern geo-political division of the region. Furthermore, the propagation of the sounds of the sea inland provides insights on the exposure of coastal sites to rhythms of the sea. Rather than a background or context, these time-space explorations deconstruct spatial restrictions on the study area, and provide a dynamic ensemble that partakes in an emergent, relational and lived coastal space. Such analyses, however, remain short without mapping the actual evidence for maritime practices. Henceforth the following chapter continues exploring and presenting evidence for maritime practices across the archaeological record of all EBA coastal sites, including potential evidence, suggestive of sea journeys.

4.1 Archaeological data sources and relevant issues

Prior to introducing archaeological data sources, it is necessary to bring to the forefront some additional aspects of the history of Levantine archaeological research, for that would contextualise problems associated with the archaeological record often encountered while researching Levantine archaeology.

Although political influences and geopolitics, past and present, have no direct weight on this research, archaeological research has been and to some degree is still, running in parallel to a political and religious agenda in the Middle East. During the mid-nineteenth century, western public interest in the region led to the establishment of a plethora of societies, academic and religious, whose main concern was Near Eastern archaeology. For example, the Palestine Exploration Fund and the Egypt Exploration Fund in Great Britain, whilst the United States witnessed the establishment of the Palestine Exploration Society and the American Schools of Oriental Research (Segre, 2001). In addition, the biblical connotation was behind much of the interest in Levantine archaeology (Davis, 2004).

By the First World War, academic research followed political interests with British communities dominating archaeological work in Egypt and Cyprus, balanced by a French interest in Lebanon and Syria. Tell sites were the focus of excavations as they represented the remains of cities and social elites, facilitating the recovery of ancient texts and works of art that reflected European and American desires. During colonial times, after the First World War, Levantine archaeology expanded with increased international interest, supported by a British and French governance (Davis 2013: 54). Archaeological methods saw large-scale excavations, such as the twenty-five year campaign at Megiddo. In Lebanon, more than forty seasons of excavations were dedicated to the site of Byblos.

In the postcolonial world, following the independence of many states including Syria, Lebanon, Jordan, Israel and Cyprus, departments of archaeology led by national archaeologists were founded. The independent states appropriated their history in the quest of building a national identity. This encouraged the cultural/historical approach to archaeological interpretation. However, the international character of Levantine archaeology persisted with American, British, French, eastern European and Asian teams involved in the field. Political conflicts between states within the region accelerated according to Davis (2013: 57) “*the scholarly tendency to cultural ‘tunnel vision’ by preventing direct archaeological cooperation across modern political boundaries*”. Nonetheless, the international involvement in Levantine archaeology and worldwide conferences counterbalanced this tendency.

Although Levantine archaeology today benefits from not only an international character but also from a multidisciplinary approach, wars and conflicts within the region have prevented archaeological research for long periods , such as the Arab-Israeli war of 1967 and the Lebanese Civil War (1974-1991), not to mention the current situation in Syria. Henceforth, the present archaeological corpus of the Levant shows discrepancies marked by a history of unequal attention dedicated to the coastal zone and to the sub regions of the Levant (i.e. northern, southern and central Levant). Additionally, the involvement of international institutions entails the employment of different approaches to Levantine archaeology, mirroring differences between, for example, the French, British and American schools. These issues are important to bear in mind, for their influence on the archaeology of the Levant will transpire throughout this chapter.

4.1.1 Archaeological and spatial data sources

The archaeological database of EBA sites is characterised by two sets of data. The first is spatial data, indicating the geographical location of sites; the second is attribute data giving a site description as well as of finds, chronology, architecture, etc (Appendix D).

Several platforms for archaeological spatial databases are available for the Levant. The Digital Archaeological Atlas of the Holy Land (DAAHL) is an international project, bringing together experts in GIS and the archaeology of the Levant including Lebanon, Syria, Israel, Palestine, the Sinai Peninsula and Jordan. The database offers a comprehensive list of archaeological sites from prehistoric periods to the early twentieth century. For the EBA period in the Levant, the DAAHL spatial database[14] is primarily founded on Lehmann's (2002) extensive bibliography of archaeological sites in Lebanon and Syria. Lehmann's database includes 1333 sites detailing site names, locations and chronology. The DAAHL database was queried to identify and locate EBA sites in the Levant. Nonetheless, reliance on one source for the spatial distribution of sites is insufficient. Hence, the database of the Archaeological Survey of Israel, accessed via the Israel Antiquities Authority (IAA) portal[15], was consulted. The Archaeological Survey of Israel consists of a 161 survey maps, covering the breadth of Israel. The documented sites are published on the IAA website and displayed in survey squares of 10x10km.

Once this substantial list of EBA sites in the Levant was compiled, further bibliographic references were consulted to confirm the validity and breadth of data. This included *the Inventory of Stone-Age sites in Lebanon*, *Part One and Two* (Wescombe and Copeland 1965, 1966) and *the revised inventory of sites in Lebanon*, *Part III* (Copeland and Yazbeck, 2002). These references list all sites in Lebanon

[14] The DAAHL can be accessed on https://daahl.ucsd.edu/DAAHL/.
[15] The IAA can be accessed on antiquities.org.il.

and provide corresponding information. Sites listed within these references were compared against the compiled EBA database from the DAAHL. Furthermore, a catalogued reference of EBA sites in Lebanon produced by Dr Hermann Genz from the American University of Beirut was incorporated. As for Syria, other than sites listed within the DAAHL database, *The Archaeology of Syria from Complex Hunter-Gatherers to Early Urban Societies (c. 16,000-200 BC)* (Akkermans and Schwartz, 2003) provided additional information regarding EBA sites.

Therefore, a spatial and informative database of EBA sites in the Levant was produced. This was integrated in a GIS and in Excel spreadsheets. All information provided by the many sources was retained. Within the study area, which will be defined and explained in the next section, 110 EBA sites are located in Israel-Palestine, 14 sites in Syria and 44 sites in Lebanon (Table 4.1). This totals to 168 EBA sites, some of which represent scatters, Tells and other types of settlements as will be explained in the next section. For each site a unique ID was devised, composed of a number and a letter. The letter designates the regions, e.g. Lebanon (L), Syria (S), Israel/Palestine (P).

Table 4.1- Summary of EBA sites in the Levant.

Region	**No. of excavated sites**	**No. of surveyed sites**	**No. of EBA sites**
Northern Levant (Syria)	7	7	14
Central Levant (Lebanon)	21	23	44
Southern Levant (Israel-Palestine)	51	59	110

The compilation of a list of EBA sites was the first step in the production of the database. Refined information about each site was required in order to address questions central to this thesis. Therefore, corresponding sources of grey literature-fieldwork reports, published volumes and articles, scientific reports and research articles were accessed. In total, more than 300 sources were consulted to retrieve relevant information.

Additional spatial data e.g. shapefiles and rasters for modern political boundaries, rainfall ranges, pedological classification and digital elevation models, were obtained from the ArcLeb collection of Lebanon's spatial information that was provided by the Department of Geology at the American University of Beirut, the Diva-GIS platform[16], the National Oceanic and Atmospheric Administration (NOAA) and USGS Earth Explorer (see Appendix A for information regarding spatial data). All spatial

[16] The Diva- GIS can be accessed on http://www.diva-gis.org/Data.

data was integrated in a geodatabase and projected to UTM Zone 36N coordinate system that best fits the study area.

As discussed earlier, many factors influence the nature of the archaeological record of the EBA and its corresponding literature. This is noticeable in the number of EBA sites in the northern, southern and central Levant. Although the difference in number of EBA sites might reflect actual occupation density during the EBA, it may as well reflect the level of dedication to archaeological research, excavations and surveys in each of those regions. For instance, the coast of Lebanon (central Levant) thus far has not been the target of a systematic archaeological survey, nor has the coast of Syria (northern Levant). In comparison, the Archaeological Survey of Israel covered not only the coastal region but the hinterland as well. Although it stands clear the necessity for an archaeological survey of the coast of Lebanon and indeed Syria, this research is satisfied with the consolidation of available evidence since this undertaking on a Levantine-wide scale is yet to be accomplished. Furthermore, the strength of this research rests in its over-arching and unifying approach, that bridges the Levantine littoral via the common denominator of the region, the sea. Such an approach would have lost ground had the geographical extent of this study been limited to one specific region.

4.2 The study area

Characterising the littoral Levant as a study area, though for pragmatic reasons and deliverable outcomes, strips bare the coastal region and turns it into a blank space whose borders can be marked, a Cartesian space ready to engulf all that it is we wish to embed it with: archaeological sites, artefacts and people. True, the notion of a study area renders feasible archaeological analysis and studies of the coast. However, it is restrictive for it delineates, it marks and it forces constraints on a space that is boundless, flowing and emergent. Defining the coastal region goes against the openness of the relational space bridging land and sea as discussed in Chapter III. Nonetheless, it is, in the case of this research, a necessity given the number of EBA sites located in the Levant and given the aim of this research. Which sites can we include in this study to reflect on possible maritime practices, and which sites can we exclude? Where can we place the dividing line?

The difference between the notion of a Cartesian study area and of a coastal fluid relational space is one of conception and representation. Regardless of where we place the dividing line, it is in how we approach that space that the study area may or may not morph into its dynamic, vibrant nature and its multiplicity. Henceforth, albeit a line must be drawn, it is a permeable line, sketched with an 8H pencil, with some gaps in between. It is in fact a conceptual line, drawn on one of the manifolds of space, that will undoubtedly affect all relations and interpretations produced throughout this thesis, but it is important to remember its ephemerality and it is even more important to consider thoroughly where to place it. Hence the question, how can we define the coastal region?

The European International Coastal Zone Assessment (ICZA) defines the coastal zone as:

> "*a strip of land and sea of varying width depending on the nature of the environment and management needs. It seldom corresponds to existing administrative or planning units. The natural coastal systems and the areas in which human activities involve the use of coastal resources may therefore extend well beyond the limit of territorial waters, and many kilometers inland*"[17].

This quotation denotes the variability that any definition of a coastal zone must inherit. However, the Integrated Coastal Zone Management (ICZM) in the Mediterranean (Škaričić, 2012) suggests that the coastal zone extends somewhere between a minimum of 100m to 30km maximum inland. Hence, it seems reasonable to consider that option, but not without further analysis of coastal variability and how well that limit reflects the Levantine zone. At the first instance, a 20km distance from the modern shoreline, almost midway between the minimum (100m) and maximum (30km) limits suggested by the ICZM, was chosen to denote the coastal area (Map 4.1).

Although the modern Levantine shoreline does not equate the ancient shoreline of the EBA, a reconstruction of the Levantine shoreline during the EBA has not been accomplished to date. The coastline as we know it today has endured and still is enduring various processes that are shaping it. Hence, any coastal study must consider the palaeogeography of the region, coastal changes and the nature of coastal processes. Displacemenet of the shoreline (transgression and regression), whether eustatically induced or not, modifies the coastal zone which consequently affects human occupation, use of coastal sites and their discovery (Pirazzoli 1996: 98). The Mediterranean basin has witnessed major sea-level changes during glacial cycles (Lambeck and Purcell, 2005; Roberts *et al.*, 2017; Petit-Maire and Vrielinck, 2005; Flemming *et al.*, 1998). The rapid phase of post-glacial sea-level rise ended around 8000 BP , after which the transgression of the continental plateau stabilized around 6000 BP (Lambeck and Purcell, 2005; Pirazzolli, 1987), and provided a generally stable environment for human societies to sedentarise along the coastlines (van Andel, 1989). The submergence or uplift of coastal sites since that time is related to two geological factors: tectonic movements and sedimentation.

The fringes of the Levant or the eastern Mediterranean constitute an area where the African, Arabian and Eurasian tectonic plates interact. The vivid neotectonics along the shoreline of the

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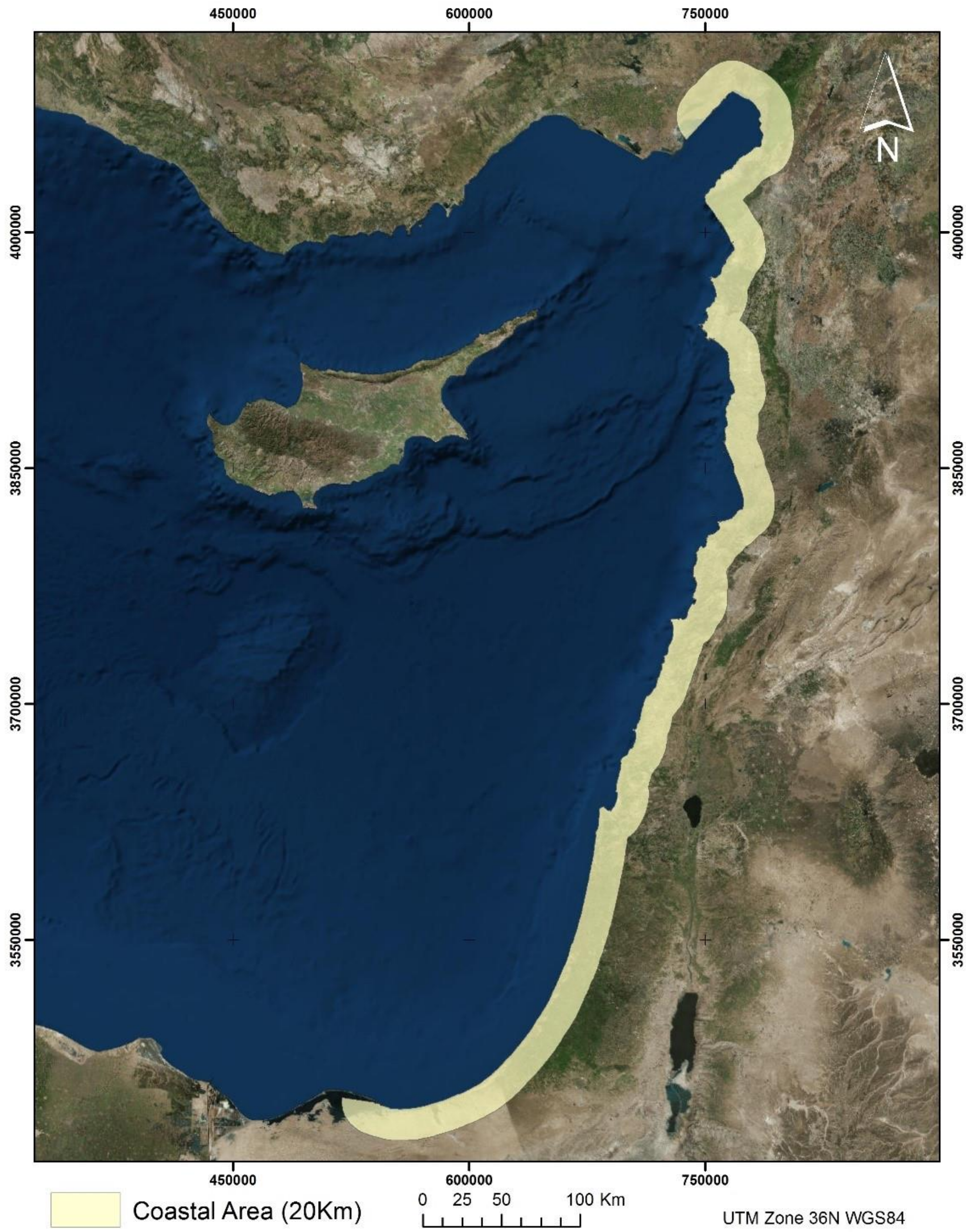
[17] The ICZA can be accessed on http://ec.europa.eu/environment/iczm/situation.htm.

eastern Mediterranean produce different patterns of coastal uplifts and submergence, thereby constituting a major obstacle in the identification of a unified sea-level curve, i.e. general eustatic movement of the sea. This however does not rule out joint efforts for spatially aggregating relative sea-level markers in the Mediterranean such as in the MEDFLOOD project[18]. In order to fully comprehend sea-level changes along the Levantine coastline during the EBA and subsequent changes to the coastal landscape, a full understanding and systematic research into the convoluted system of tectonic places and fault system in the region must be carried out. For instance, Morhange *et al.* (2006) collected and dated 29 vermetid samples from exposed benchmarks on the Lebanese coast. Their evidence reveals the presence of an upper shoreline at c. +120 to +140cm that lasted from c. 6000 to 3000 BP. Whereas in the southern Levant, Galili *et al.* (2005) investigated Holocene sea-level changes on the northern Carmel Coast. They distinguish that during the EBA, the sea-level reached 2m below present level. This difference in terms of sea-level changes during the EBA on the Levantine coast implies the need for local studies that can then be aggregated for a broader understanding.

Since Levantine coastal landscape reconstructions and sea-level studies are still underway, and a throurough understanding of the EBA coastal landscape is lacking, this research deems viable working with data available at hand, i.e. the modern extension of the coastline, whilst acknowledging that the coastal Levant was different in the EBA than how we know it today.

[18] Accessible at http://www.medflood.org/



Map 4.1-Coastal area of the Levant (yellow 20km buffer from the modern shoreline).

4.2.1 Evaluation of the 20km margin

In accordance with Chapter III, space is inclusive of time. Hence, in order to evaluate what 20km from the coastline implies to rhythms of life within that zone, we require a space-time understanding of the study area. One way to reflect on space-time is via movement and mobility, meaning travel time, which accounts for the rhythms of land and its topography. The time it takes to travel or move away from the Levantine coast according to the characteristic of that space provides a better and more realistic understanding of how accessible the sea is for inhabitants within the 20km dividing line, and it allows us to evaluate the validity of a choice of 20km distance inland.

During the EBA, three means of transportation were in practice. The first by sea (explored in Chapters VI and VII), the second by walking and the third marks the use of donkeys as a mode of transportation. Faunal data regarding the use of donkeys is problematic since it mostly comes from recent fieldwork, whereas samples published more than three decades ago are either poorly reported or lost (See Milevski 2005: 242; Horwitz and Tchernoc, 1989). Milevski's (2005) research generates a substantial amount of information regarding the potential use of donkeys as a mode of transportation during the EBA in the southern Levant. His work compiles zooarchaeological evidence (Milevski 2005: Table 21), donkey figurines and containers that may have been used in the transportation of goods. The results show that donkeys were domesticated in the Levant during the EBIA. They were used as beasts of burden, capable of carrying substantial heavy loads (see also Zarins 2014: 248-249). Moreover, Milevski (2005: 260) suggests that the high frequency of donkeys at the site of Afridar in the southern Levant is an indication that donkey-based transportation was in the form of donkey caravans. The use of donkeys as beasts of burden permitted the transportation of greater loads over longer distances and for greater spans of time. Donkey-based transportation, other than caravans, would not have affected travel time per say, but would have influenced the ability of undertaking longer journeys. That is because the beasts of burden spared energy expenditure on behalf of humans walking along them, allowing hence for humans to sustain more demanding journeys (Goulder, 2016; Algaze 2008: 141).

In any case, what is of interest when it comes to travel time in relation to the coastal zone is whether the area defined by the 20km line, in terms of time, allows accessibility to the coast and the sea within daily rhythms of routines of ancient inhabitants. If that is the case, then the coast and the sea were part of the immediate surrounding of people, and entangled in their lived space. It is not in the intention of this section and this research to generate a comprehensible model for travel time on land. However, in the aim of evaluating the choice of the study area, and how it corresponds to the rhythms of coastal activities, it is necessary to formulate a generic space-time evaluation, starting first by a concise analysis of travel time. Here, travel time denotes walking time, since although donkeys were employed in transportation, they were led on foot by humans[19].

Many rhythms affect travel time, e.g. seasonal changes, rainfall, daylight, weather, etc. However, one of the most prominent factors is landform, implying topographical changes. Hills, valleys and flat

[19] The case of how the use of donkeys influence travel time, though very significant, is beyond the scope of this research. A pack train of 50-100 donkeys could cover an average rate per day of c. 25-30km (Förster 2007:5).

plains, all affect the time of movement within these landscapes. Therefore, in order to account for travel time on land from the coast, topographical characteristics must be considered.

Having acquired the digital elevation model (DEM) for the Levant (30m resolution), it was used to generate a first derivative, slope surface in GIS. Following the steps explained in Appendix B in details, time of travel could be calculated once the velocity of transport across the landscape is known. Thus, the Hiking function, widely used in velocity computation, estimated by Gorenflo and Gale (1990) from empirical data given by Imhof and input from Tobler (1993), was employed in GIS to generate a velocity surface. Thereafter, a friction surface for the number of hours per meter of walking was generated. This friction surface allows the interpolation of a cost distance surface using the coastline as a source away from which the cost in time is calculated.

A comparison between the coastal zone divided by the 20km distance from the coast and the cost distance in time (see Map 4.2), shows that the limits of the zone defined, lie approximately within a maximum of 8.5 hours of walking from the coastline. This value on its own is barely significant, however, when placed within the framework of Hägerstrand's time-space geography (see Chapter III, Section 3.3), it takes on a valuable connotation. As discussed in Chapter III, Hägerstrand traced time-space paths of everyday life. He placed three main families of constraints on rhythms of the everyday (Hägerstrand 1970: 11-13). Subsequent to the capability constraints on daily travel according to Hägerstrand, mainly the biological and physical constraints, a day of activities can be divided as follows: 8 hours a day may be dedicated for sleeping and rest, this leaves 16 hours a day to participate in and carry out activities. Assuming that 4 hours a day are invested in general activities, consumption of food, leisurely time or for performing specific tasks, we are left with 12 hours a day as an average for the time that can be dedicated to travel from and to a locality. Hence, this amounts to 6 hours as the time invested for a one-way journey, when the return journey is within the same day[20].

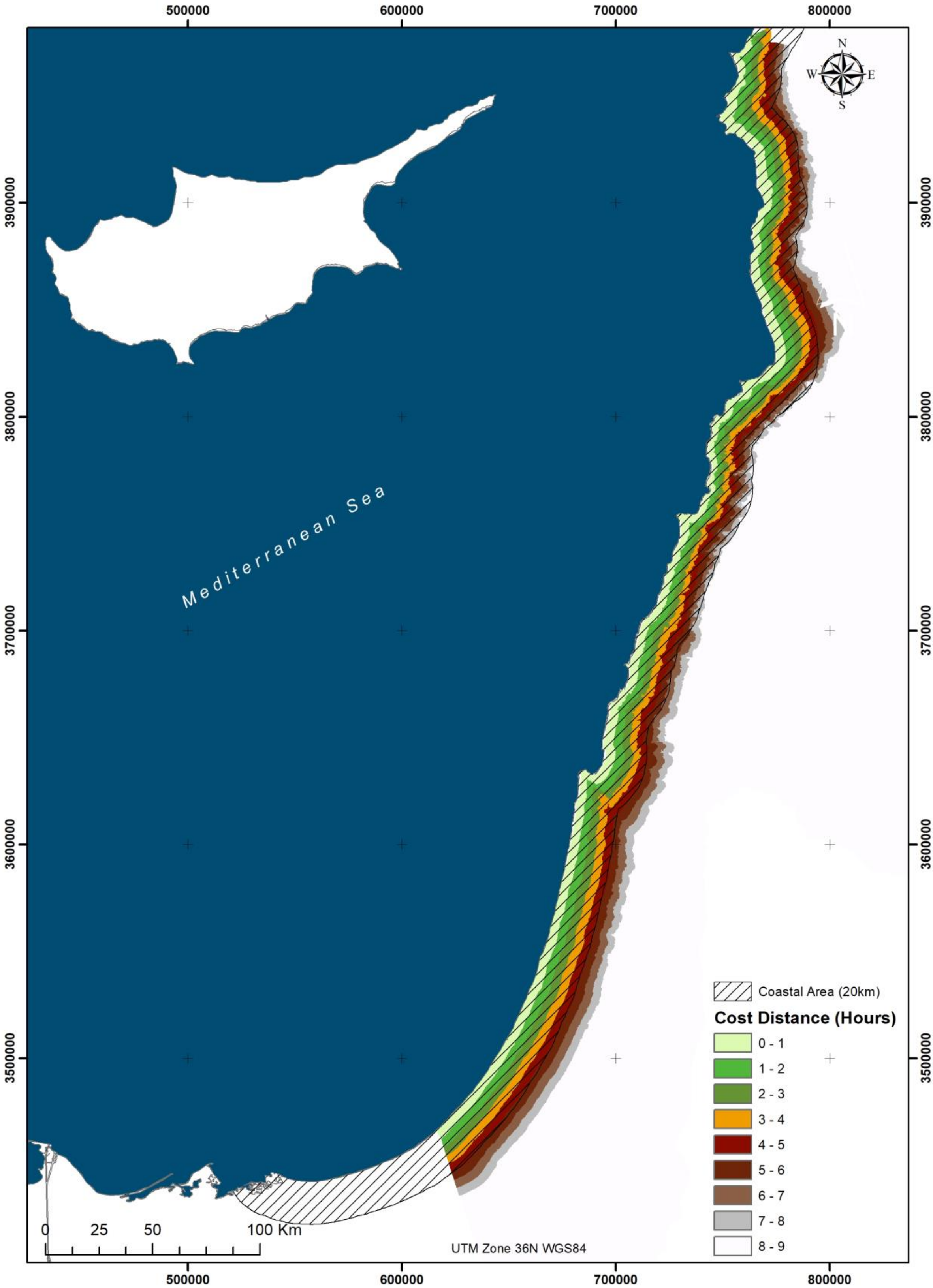
Since the zone defined by the 20km distance from the coast is, according to the nature of the Levantine terrain, within a maximum of 8.5 hours of walking from the shore, then the sea would have been reachable on a daily basis. In fact, rather than 6 hours, 8.5 hours allow for a degree of flexibility when more time might have been dedicated to walking and travelling[21]. Henceforth, the 20km buffer region is a valid study area that not only adheres to the ICZM international guidelines,

[20] Indeed there are variations in terms of how and in what people invest their time, e.g. some might sleep for 6 hours, others for 10 hours. These kind of differences are inevitable, but as in any model and analysis, there are assumptions to be made. The assumptions made in this instance are the author's own. Hägerstrand's capability constraints although physical and biological in nature, they are the sole constraints we have access to since other social and economic constraints on daily travel for the EBA are convoluted (and lack sufficient archaeological support).

[21] The majority of the 20km zone however lies within 5-6 hours of walking time from the coast.

but also represents, within a space-time framework, an adequate region for investigating processes within a regular rhythm of routines.

The study area hence lies within a zone defined by a 20km distance from the coast. EBA sites within that region will be the emphasis of this research (see below, Section 4.3.1). The following section introduces those sites and presents several space-time explorations of EBA sites' distribution that aim at portraying the influence of spatial and temporal scales on observable patterns. Although the focus here is on land dynamics and sites' location (mapping land), together with mapping the maritime space in Chapter VI, the models and explorations put forth in this research via the thirding-as-othering strategy demonstrate how, through working with space and time, we can move away from static narratives to shed light on the vibrancy of EBA coastal life, the myriad of processes inhabitants were engaged in and exposed to.



Map 4.2-The cost distance, inland from the shore in hours, compared to the coastal area limited to a 20km distance.

4.3 Spatial matters of EBA coastal sites

4.3.1 Type of EBA sites

The number of EBA sites located within a 20km distance from the coast is 168. These include excavated and surveyed sites as per Table 4.1. The term 'site', however, may be suggestive of different types of occupation. The understanding of the full scope of occupation types depends on whether a site was excavated or not, and the length and breadth of excavations. Nine categories of sites were distinguished on the coastal Levant according to descriptions provided from the relevant databases and sources mentioned in Section 4.1.1. These are: settlement (referring to several occupation layers with no other particuliarities identified), scatter (based on surface finds), Tell (a specific type of settlement that is distinguished by its morphology), stone-heap (remains of stones), rock-hewn installations, tombs, rock-cut tombs (indicating a specific kind of tomb when known), occupation (referring to archaeological remains in distinct locations that represent part of a larger settlement that spread over a large area; this is the case of Beirut in Lebanon, which is known through different EBA occupations, e.g. Bey 003, Bey 013, Bey 020) and funerary caves. Some sites might represent two of those types, for instance a settlement with funerary caves. Important to note here that although for instance, a Tell is in fact a settlement, and both serve the same function, if the site is known to be specifically a Tell then that classification is used as it highlights more details about the type of site it is, even if that is strictly physical in nature. This is similar to the case of tombs, if a site is known to be specifically a rock-cut tomb, then that classification instead of solely tomb is used in order to provide as much information about sites as possible. Furthermore, this classification does not affect neither the spatial exploration of sites and their surrounding nor the derivation of maritime-related evidence, since all types of sites are included in this research.

Scatter sites represent around 25.5% of the total number of EBA sites on the coastal Levant, 41 scatter sites in total (Table 4.2). This is a predictable percentage in light of the history of archaeological work in the Levant, which tended to focus on the excavation of large Tell sites, with little effort placed on sites identified during surveys. Scatter sites are significant locations that can denote a number of things including settlements yet to be explored, movement of EBA inhabitants, temporary settlements and places of activities.

Table 4.2- List of scatter sites on the Levantine coast.

Levantine Region	***Site Code***	***Site Name***
Central Levant	1L	Aalma ech Chaab
	2L	Adloun III
	3L	Aramoun
	6L	Bchemoun
	20L	Naame
	21L	Nahr Damour
	22L	Nahr Ibrahim
	26L	Sarjbal
	33L	Tell Hmeira
	40L	Tibnin
	42L	Wadi Halloueh
	44L	Zahrani I
Southern Levant	2P	(95) Map: Atlit-26
	3P	Abu edh Dhahab (M*)
	4P	Abu el Hubban (M)
	5P	Ain Umm Hmeid (M)
	9P	Bet ‘Uziel (West)
	16P	En Qedem
	26P	Holot Ashdod
	27P	Holot Ashkelon
	40P	Kh. Belas (s)
	51P	Naḥal Besor (38)
	52P	Naḥal Besor (44)
	53P	Naḥal Besor (52)
	54P	Naḥal Besor (70)
	55P	Naḥal Besor (71)
	56P	Naḥal Besor (77)
	60P	Nahal Bet Arif' (126)
	61P	Nahal Daliya
	62P	Nahal Lakhish (105)
	64P	Nahal Maharal (36)
	66P	Nahal Oren
	67P	Nahal Qana (3)
	68P	Nahal Saflul
	69P	Nahal Shiqma (121)
	70P	Nahal Shiqma (198)
	81P	Saknat Muhammad Mahmud (southwest)

		110P	Yad Rambam (North)
		44P	Kh. Kafr Hatta
		63P	Nahal Maharal (2)
		72P	Nahal Soreq (south)
Total number of sites	41	**Number of excavated sites**	0
		Number of non-excavated sites	41

As for Tell sites, not all of these were subject to an excavation. Table 4.3 summarises Tell sites in the three Levantine sub regions. In total, 60 Tells are located on the Levantine coast, of those 39 are excavated and 21 non-excavated.

Table 4.3- List of Tell sites on the Levantine coast.

Levantine Region	***Site Code***	***Site Name***	***Excavation***
Central Levant	4L	Ard Ardousie	YES
	5L	Arde-Ardata	YES
	14L	Byblos	YES
	18L	Khalde II	NO
	28L	Tell Arqa	YES
	30L	Tell Biri	NO
	31L	Tell Fadouos-Kfarabida	YES
	32L	Tell Hayat	NO
	34L	Tell Khan Khalde	YES
	35L	Tell Kirri	NO
	36L	Tell Koubba	YES
	37L	Tell Maashuq	NO
	38L	Tell Rachidiyeh	YES
Northern Levant	1S	Amrit	Yes
	2S	Qalaat ar-Rus	NO
	3S	Qalaat Syriani	NO
	5S	Rouesset al-Amir	NO
	6S	Tell Bisnada	NO
	7S	Tell Bsayssa	NO
	8S	Tell Daruk	YES
	9S	Tell Jamous	NO
	10S	Tell Laha	NO
	11S	Tell Sianu	Yes
	12S	Tell Simiryan	Yes
	13S	Tell Sukas	YES

	14S	Ugarit	YES
Southern Levant	15P	En Besor	YES
	31P	Jaffa	YES
	32P	Jaljulye	YES
	33P	Jazirat Dawud (M)	NO
	37P	Kefar Rosh ha-Niqra	YES
	38P	Kfar Bara (1)	NO
	41P	Kh. Burnat (northwest)	NO
	45P	Kh. Shallala (M)	NO
	47P	Lod	YES
	49P	Mizpe Zevulun	NO
	85P	Tel Akko	YES
	86P	Tel Aphek	YES
	87P	Tel Ashdod	YES
	88P	Tel Assawir	YES
	89P	Tel Burga	YES
	90P	Tel Dalit	YES
	91P	Tell edh-Dhahab	NO
	92P	Tel 'Eran	YES
	93P	Tel Erani	YES
	94P	Tell es-Sakan	YES
	95P	Tel Gerisa	YES
	96P	Tel Gezer	YES
	97P	Tel Gimzo	NO
	98P	Tel Hesi	YES
	99P	Tel Kabri	YES
	100P	Tel Kurdana	YES
	101P	Tel Lachish	YES
	102P	Tel Malot	YES
	104P	Tel Poran	YES
	105P	Tel Qana	YES
	106P	Tel Qashish	YES
	107P	Tel Re'ala	NO
	108P	Tel Yoqne'am	NO
	109P	Tel Zefi	YES
Total number of sites	60	**Number of excavated sites**	39
		Number of non-excavated sites	21

Settlements represent sites with traces of EBA activity that show some architectural evidence and although they may not have been excavated, there is sufficient evidence to differentiate them from scatter sites. Table 4.4 summarises settlement sites on the Levantine coast, in total 36, of which 25 are excavated whilst 11 are non-excavated.

Table 4.4-List of Settlement sites on the Levantine coast.

Levantine Region	***Site Code***	***Site Name***	***Excavation***
Central Levant	19L	Lebea	YES
	23L	Qaabrine	NO
	25L	Sarafand-Baissariye	YES
	27L	Sidon (College Site)	YES
	39L	Tell Sabael	NO
	41L	Tyre	YES
	45L	Anfeh	YES
Northern Levant	4S	Ras Ibn Hani	YES
Southern Levant	6P	Ashkelon, Afridar (west)	YES
	7P	Azor	YES
	8P	Bareqet	NO
	10P	Bet Ha`emeq Site	YES
	11P	Bir et-Tata (Mül)	NO
	13P	Ein Hevraya	NO
	14P	El Khirba (M)	YES
	17P	Esh Sheikh Suleiman (M)	NO
	21P	H. Nemal Akhziv	YES
	22P	H. Tafat (north)	NO
	23P	H. Zeror	NO
	25P	Holon 5	YES
	28P	Holot Karmiyya	NO
	30P	Horbat Sibkhi	YES
	34P	Kafr Qasim	YES
	35P	Kefar Glickson	YES
	42P	Kh. el Bornat (S)	NO
	43P	Kh. el Musalla (M)	NO
	46P	Kh. Shefeya	YES
	57P	Nahal Besor (Site H)	YES
	74P	Nizzanim	YES
	76P	Palmahim	YES
	77P	Qannir (M)	YES

	78P	Qiryat Ata (72)	YES
	79P	Ramat Ha-Nadiv	YES
	83P	Shoham	YES
	84P	Taur Ikhbeineh	YES
	103P	Tel Megadim	YES
Total number of sites	36	**Number of excavated sites**	25
		Number of non-excavated sites	11

The remaining sites for practical reasons are grouped together as miscellaneous. These include caves, funerary caves, occupation[22], stone heap, tombs, rock-hewn installations and rock-cut tombs sites. Table 4.5 summarises the list of sites per Levantine region. Of the total number of 31 sites, 15 are excavated and 16 non-excavated.

Table 4.5-List of miscellaneous sites on the Levantine coast.

Levantine Region	***Site Code***	***Site Name***	***Site Type***	***Excavation***
Central Levant	7L	Bey 003	Occupation	YES
	8L	Bey 013	Occupation	YES
	9	Bey 020	Occupation	YES
	10L	Bey 023	Occupation	YES
	11L	Bey VII	Occupation	YES
	12L	Bnaaful	Funerary caves	YES
	13L	Burj Hamoud	Funerary caves	NO
	15L	Jiita I	Cave	NO
	16L	Kafer Jarra I (Gelal-en-Nammous)	Rock-cut tomb	YES
	17L	Kafer Jarra II (Roueisse)	Tomb/Scatter	NO
	24L	Ras el-Kelb III	Tombs/Cave	NO
	43L	Wadi Limoun	Tombs	YES
Southern Levant	1P	(59) Map- Atlit-26	Quarry	NO
	12P	Dhaharat el ‘Ein (M)	Stone heap	NO
	18P	Even Yizhaq (Gal‘ed) (northwest)	Stone heap	NO
	19P	Givatayim	Funerary caves	YES
	20P	H. Merar	Funerary caves/tomb	YES

[22] Occupation sites are restricted to the case of Beirut. The Beirut City District excavations identified different sites in Beirut with EBA activity. However, these sites are in fact part of the larger site of Beirut. Rather than settlements, which suggests an independent presence, occupation type was used to refer to the Beirut sites in order to hint to their connectedness.

	24P	Ha-Bonim (west)	Rock-hewn installation	NO
	29P	Horbat Gilan (west)	Funerary caves/ Rock-hewn installations	YES
	36P	Kefar Ha-No'ar Ha-Dati	Rock-hewn installations	NO
	39P	Kfar Monash	Finds	NO
	48P	Me'arat Ornit	Cave	YES
	50P	Nahal 'Ada	Stone heap	NO
	58P	Nahal Bet Arif' (102)	Rock-hewn installation	NO
	59P	Nahal Bet Arif' (125)	Cave	YES
	65P	Nahal Nevallat	Tomb	NO
	71P	Nahal Siyah (51)	Cave	YES
	73P	Nahalal	Cave	NO
	75P	Oshrat 2	Cave	YES
	80P	Rujm el Bahta (M)	Stone heap	NO
	82P	Sheikh Baraz ed Din (S)	Tomb	NO
Total number of sites		31	**Number of excavated sites**	15
			Number of non-excavated sites	16

The reason the number of excavated and non-excavated sites is highlighted per each site type is to give an insight as to which sites most archaeological information can be derived from. This is further represented in Table 4.6 and the resulting Diagram 4.1, Diagram 4.2 and Diagram 4.3) that summarise the number of site types per Levantine region (see also Map 4.3). Clearly, the Tell site type dominates the distribution. This is expected in the Levantine region, well-known for the formation of archaeological Tells (Wilkinson 2003: 100-128). Nonetheless, the other site types should not be discounted as equally important.

This research aims to compile all available EBA data, regardless of whether it originates from a Tell or scatter site, for all findings, regardless of their density and extent, are valuable for understanding the EBA lived coastal space and maritime-related activities. Henceforth, the following analyses of mapping land take into account all site types and look at exploring processes and relations in space and time that help shaping our knowledge of the EBA lived space. The analyses include the distribution of the EBA sites according to landforms, their density in relation to space-time travel and their exposure to the sound of the sea. Since most EBA studies of the Levant focus on one of the Levantine sub regions, the space-time investigations (mapping land) presented in this chapter, on a fundamental level, present the first endeavour of its kind that incorporates EBA sites from the whole Levantine coast. Furthermore, these investigations offer insights about EBA patterns in relation to rhythms of movements and of the sea (e.g. soundscape) that feed into building an understanding of how the coastal maritime space was lived and potentially experienced.

Table 4.6-List of EBA site types per Levantine region

LEVANTINE REGION	SCATTER	TELL	SETTLEMENT	MISCELLANEOUS	EXCAVATED	NON-EXCAVATED
CENTRAL LEVANT	12	13	7	12	21	23
NORTHERN LEVANT	0	13	1	0	7	7
SOUTHERN LEVANT	29	34	28	19	51	59
TOTAL	41	60	36	31	79	89

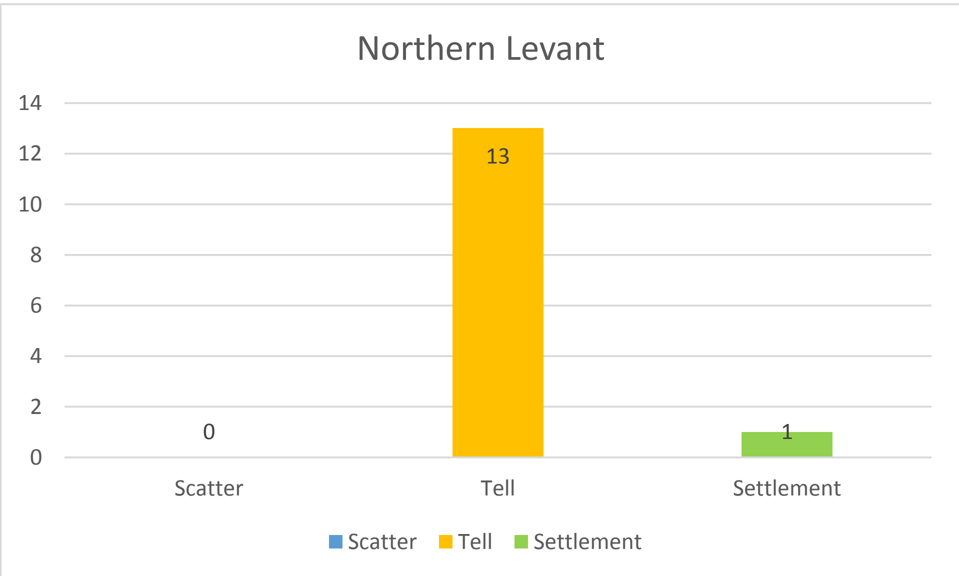


Diagram 4.1 Summary of site types in the northern Levant

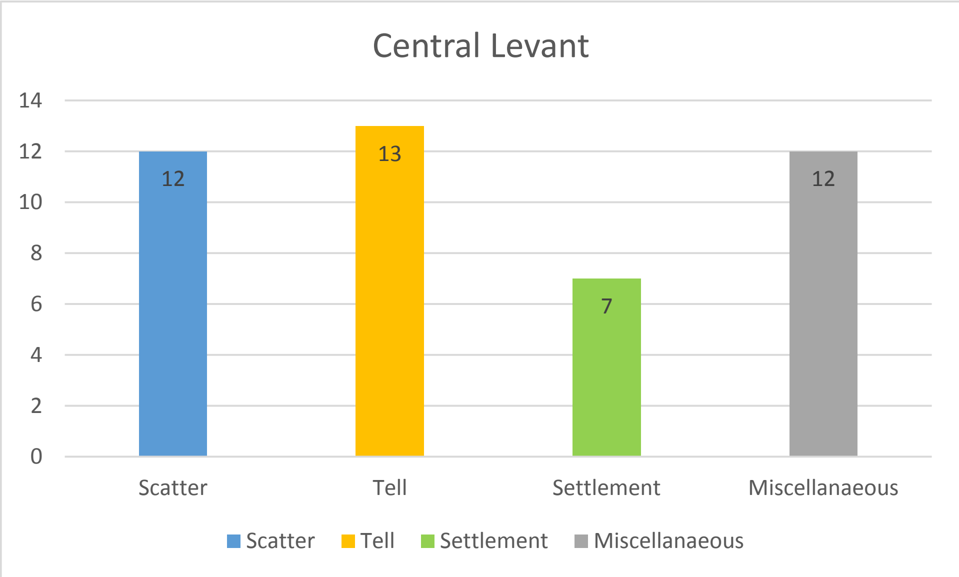


Diagram 4.2- Summary of site types in the central Levant.

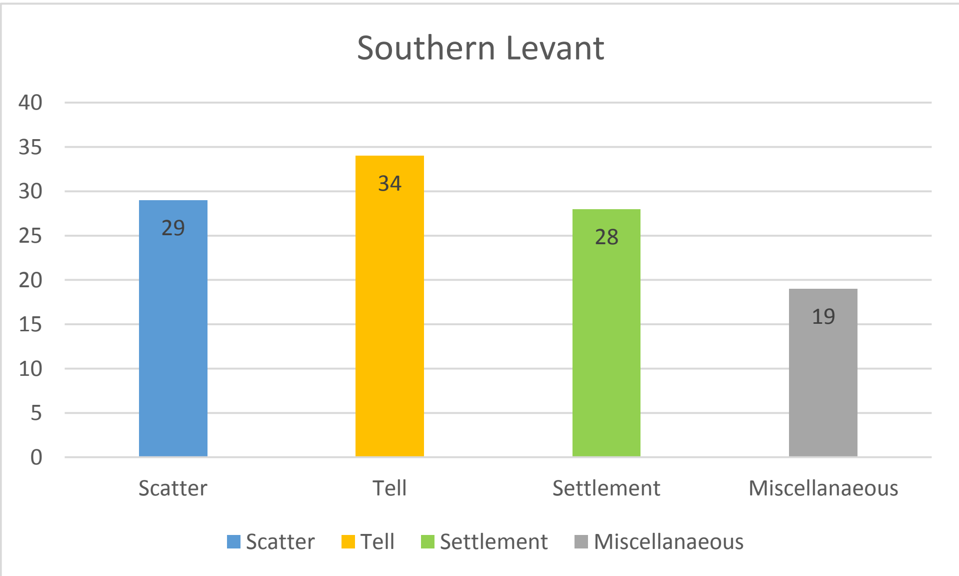
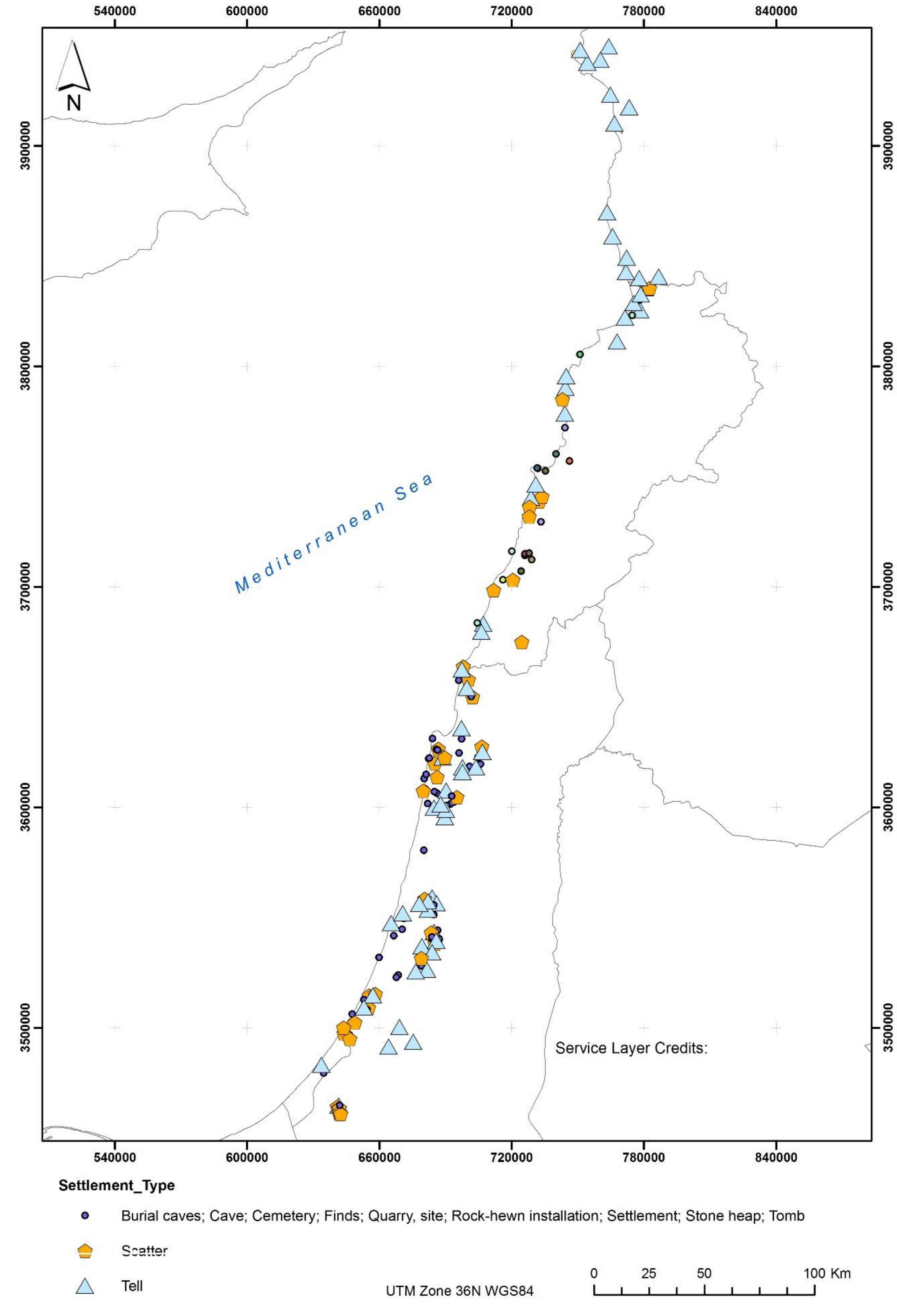


Diagram 4.3- Symmary of site types in the southern Levant.

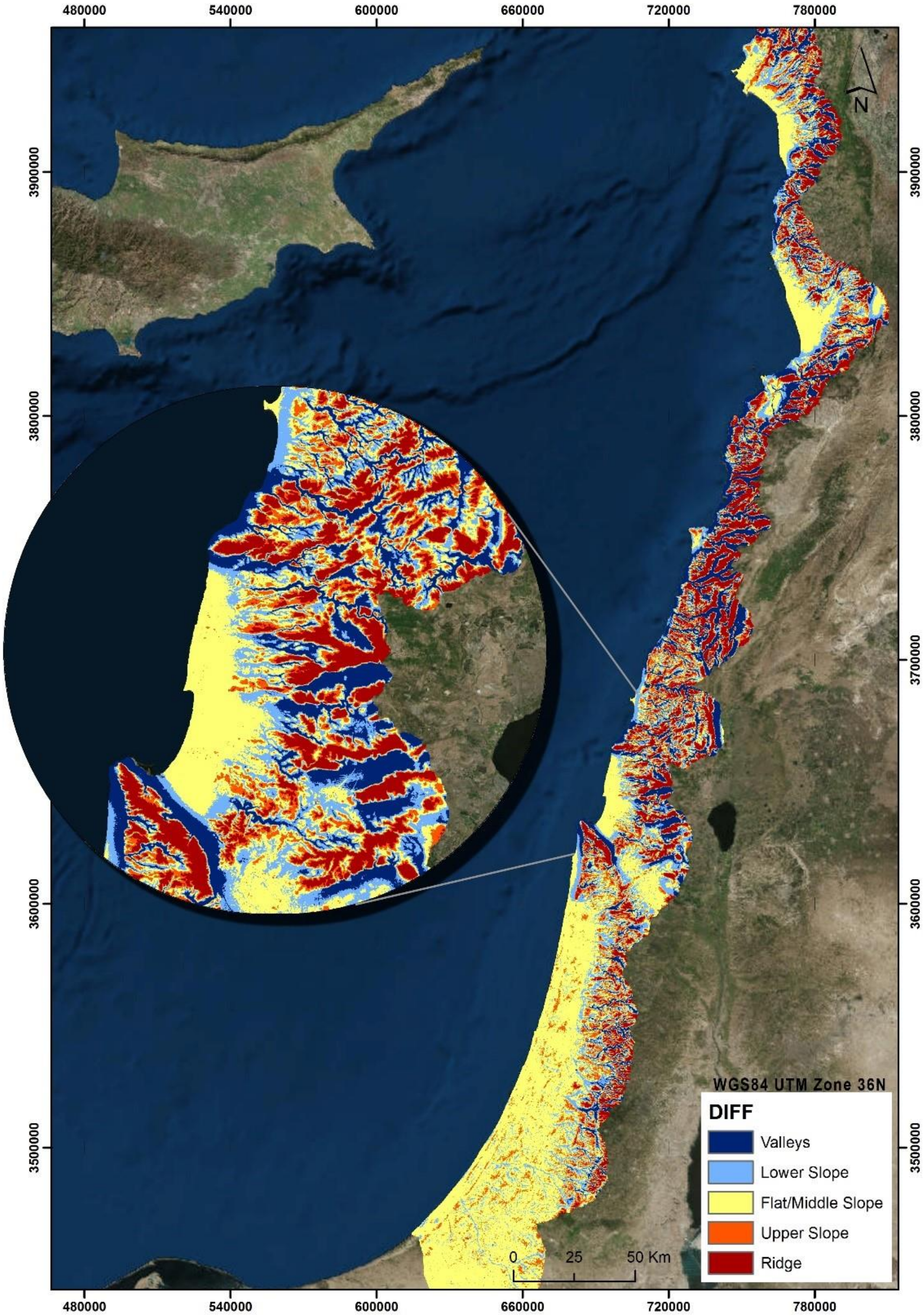


Map 4.3- Distribution of EBA sites according to site types. Note the high numbers of Tell sites.

4.3.2 Location of sites in relation to topographic and environmental features

The Levantine coast in its many sub regions (Chapter II Section 2.2) is not a uniform space. In fact, the Levantine coast is a Mediterranean zone. According to Horden and Purcell (2000: 53-54), any Mediterranean zone is an assortment of micro-regions that differ in their climate, topography, flora and fauna. Henceforth, in order to reflect on the coastal lived space of the EBA Levant, we need to understand not only where EBA sites are located in respect to elements of interest, but also how processes entangle, relations form and experiences unfold. This includes not only space, but time as well. A fundamental element that takes part in this lived space is the nature of the terrain, which in the coastal Levantine zone varies greatly. In some instances, Levantine mountains border the sea, restricting the coastal plain. The coastal plain north of Sidon in Lebanon for example has a width of 1.5km compared to the coastal plain north of Tripoli extending to Syria, which reaches up to 10km in width (Sanlaville, 1977). These differences in the landforms that touch the sea and surround it must have affected the ways of life of ancient inhabitants. Activities taking place on a flat plain, with accessibility to arable land, differ from those that occured on hills or rocky surroundings. A general overview of the topography of the coastal zone allows us to delineate observable forms such as major plains, promontories, mountains and valleys. However, these classifications ultimately depend on the neighbouring landform type. For instance, for a large area of land to be characterised a valley, the difference in elevation between the lowest and highest elevation values must be significant. Nonetheless, this difference in elevation for a smaller area of land does not necessarily have to be enormous for the land to be perceived as a valley within its surrounding environment. Therefore, the radius at which landforms can be classified varies and this variation greatly affects the representation and experience of space. A relatively small hill for example, is noted as such when compared to larger mountainous topographic features. Yet, when that minor hill is compared to its surrounding environment, it might well then be classified a mountain. Thence, it is not sufficient to characterise the coastal zone according to a generic taxonomy; what matters here is the lived space-time of EBA inhabitants.

The difference in landform classification according to the surrounding environment is known as the relative topographic position or Diff, the difference from mean elevation. The radius for the generation of a DIFF surface is the most important parameter. However, since this research focuses on space and time, the time of travel on land must be taken into consideration. In fact, travel time can indicates accessible land in the surrounding environment of EBA inhabitants within a daily rhythm of routine. Following the steps described in Appendix C, a DIFF surface for a radius representing 6 hours of travel time was generated, classified according to landform, e.g. hills, valleys (Map 4.4).



Map 4.4-Classification of landforms in the coastal Levantine zone (clipped to the 6 hours area).

Having classified the landforms of the study area by accounting for movement along the coast, in other words space and time, we can now interrogate this data in order to reflect on possible patterns and better understand the variability of the region. Diagram 4.4 shows a summary of the distribution of EBA sites according to landforms in the three main regions of the Levant. It also shows the general classification of the landscape (based on the number of cells in the DIFF raster) and that of EBA sites in the Levant as a whole. Readily observable is the concentration of sites on flat and middle slopes in the Levant, and specifically in its southern and northern regions. The largest concentration of EBA sites in the central Levant, however, is in valleys. This observation may relate to the nature of the central Levant's landscape, where mountains border the shore, leaving a narrow space for the coast. However, it may alternatively reflect a selective pattern of settlement. Hence, this leads us to question whether the distribution of EBA sites in the central Levant is statistically significantly different from the actual distribution of landscape units within the central Levant. Given the ordinal type of data, the Kolmogorov-Smirnov test (K-S), a non-parametric test, permits to statistically evaluate the significance of the distribution of central Levantine sites in comparison to the distribution of landscape units, for P 0.05, a 95% confidence level. With a Null Hypothesis stating that the distribution of central Levantine sites in respect to landforms is not different from that of landscape units, the K-S test resulted in a P value of 0.37, which is greater than 0.05, thus we cannot reject the null hypothesis (the two distributions are not different). In fact, the distribution of EBA sites in the central Levant is similar to that of the central Levantine landscape, with a concentration on valleys. We can thus conclude that there may not have been a specific intent to occupy valleys in central Levant.

The emerging pattern of EBA site locations according to landforms conforms to the nature of the Levantine Landscape (see the Blue and Green distributions on Diagram 4.4). While EBA sites in the central Levant are primarily located in valleys, their distribution is no different from that of the central Levantine landscape. Northern and southern Levantine EBA sites are mostly located on flat and middle slopes. Although there is a variability in the location of EBA sites according to landforms in the coastal zone of the Levant as a whole, this variation reflects a uniformity in that preferences that may entail separate community identities are non-existent. EBA inhabitants sought to partake in the space-time volume available at their disposal, and, in that respect, whether settling in valleys or flat and middle slopes, they show a uniform engagement with their environment. Thence, we must be critical of the archaeological research agenda that takes fragmentation as a starting point, dividing thereof the Levant to three separate regions, the north, the central and the south. For the coastal zone at least, inhabitants sought to settle in their local environment, be it valleys or flat plains. Any boundaries inspired by topographical variations are modern impositions. The segmentation of coastal communities into northern, central and southern regions requires much more evidence about traditions and practices, if a division is ever required. Thus, it is safe at this initial stage to point out the possibility of homogeneity rather than fragmentation within the littoral Levant. This observation does not stand in contrast to the proliferation of Mediterranean micro-regions and does not eradicate their variability; rather it values the fluidity of the relational space-time from which those regions emerge.

The value of this analysis rests in bridging the coastal Levantine space and time. Rather than contrasting the distribution of EBA central Levantine sites for instance, to the distribution of sites in the northern and southern Levant, this analysis on a Levantine-wide scale shows a homogeneity in the distribution of sites in that they respond to local landscape forms.

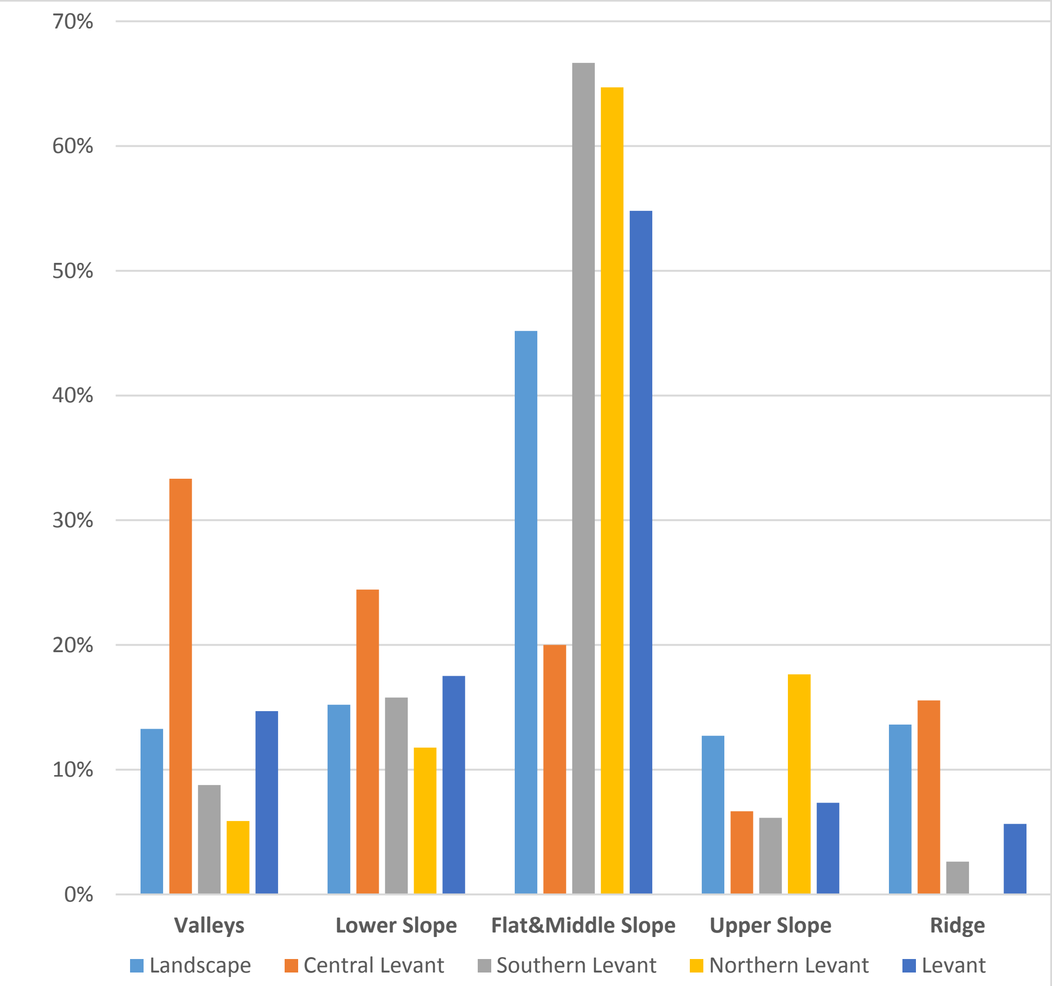


Diagram 4.4- Distribution of EBA sites in the central Levant, the northern Levant, the southern Levant and in the Levant as a whole according to landform classification, as well as the distribution of landscape cells.

4.3.3 Density of settlements in space and time

The previous analysis highlighted a level of uniformity on the Levantine coast. By means of a space-time approach, the study area is bridged together, not only by the sea as its common denominator, but through the engagement of ancient inhabitants that shows when it comes to site location, no particular preferences were in place to inhabit specific environments. This basic level of homogeneity can be further evaluated by analysing site density. The density of settlements plays a role in the experience of space-time. In a modern setting, when traversing a long or short distance between two places by car, if within that distance travelled, very few or no towns or cities were on the way, the experience of that space isolates the place of departure and place of arrival, as if they belong to two separate worlds. Whereas when the distance traversed is densely settled, this constitutes a sort of continuity between the places of departure and arrival, hence connecting them to one world of interaction[23]. As a demonstrative example, Figures 4.1 and 4.2 show the walking time according to Google Maps from a location in Southampton, UK, to Eastleigh and Romsey respectively. The distance covered by walking is more or less the same, about 3 hours in total. However, the density of settlement on the way from the place of departure to both of these locations is different. Heading towards Eastleigh, one hardly notices a break in settled area (see Figure 4.3), whereas heading towards Romsey, it is clear that one needs to cross an unsettled area of about 6km, highlighted by the polygon on Figure 4.3. This 6km distance according to Google Maps walking time calculations (15-30 min per Mile) takes about 1.1 hours to cross. In respect to the whole length of the journey of about 3 hours, 1 hour then is a third of that time and hence greatly influences the experience of space. For inhabitants in Southampton or in Eastleigh, these two locations are considered part of the same area. In fact, if one is searching for housing in Southampton, Eastleigh shows up in the search. Contrastingly, Romsey and Southampton are considered two separate locations, although within commutable distance to each other.

[23] This reflects the author's own experience of traversing spaces.

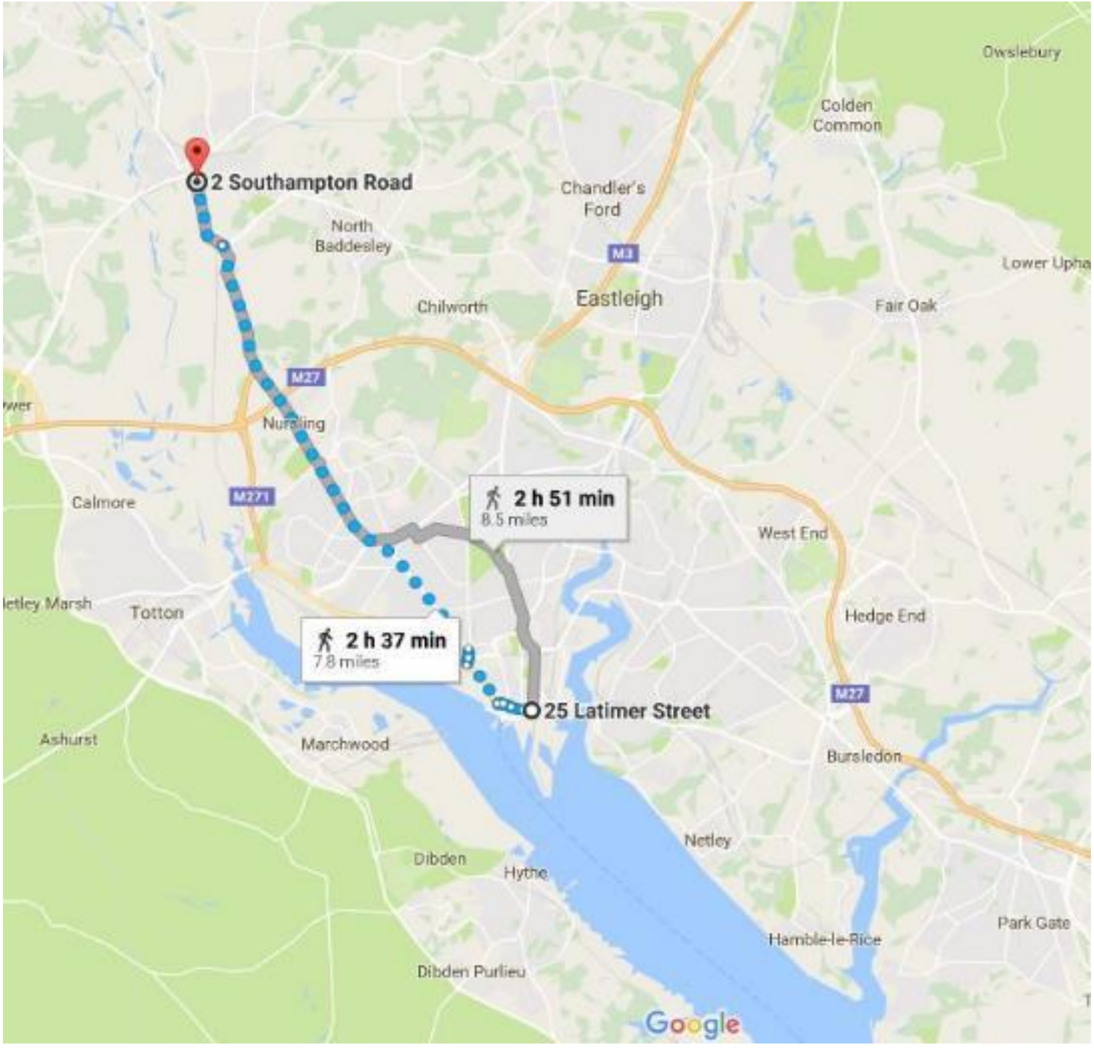


Figure 4.1- The walking time between a place of departure in Southampton, UK, to Romsey (represented by the red dot). Credit: Google Maps 2017.

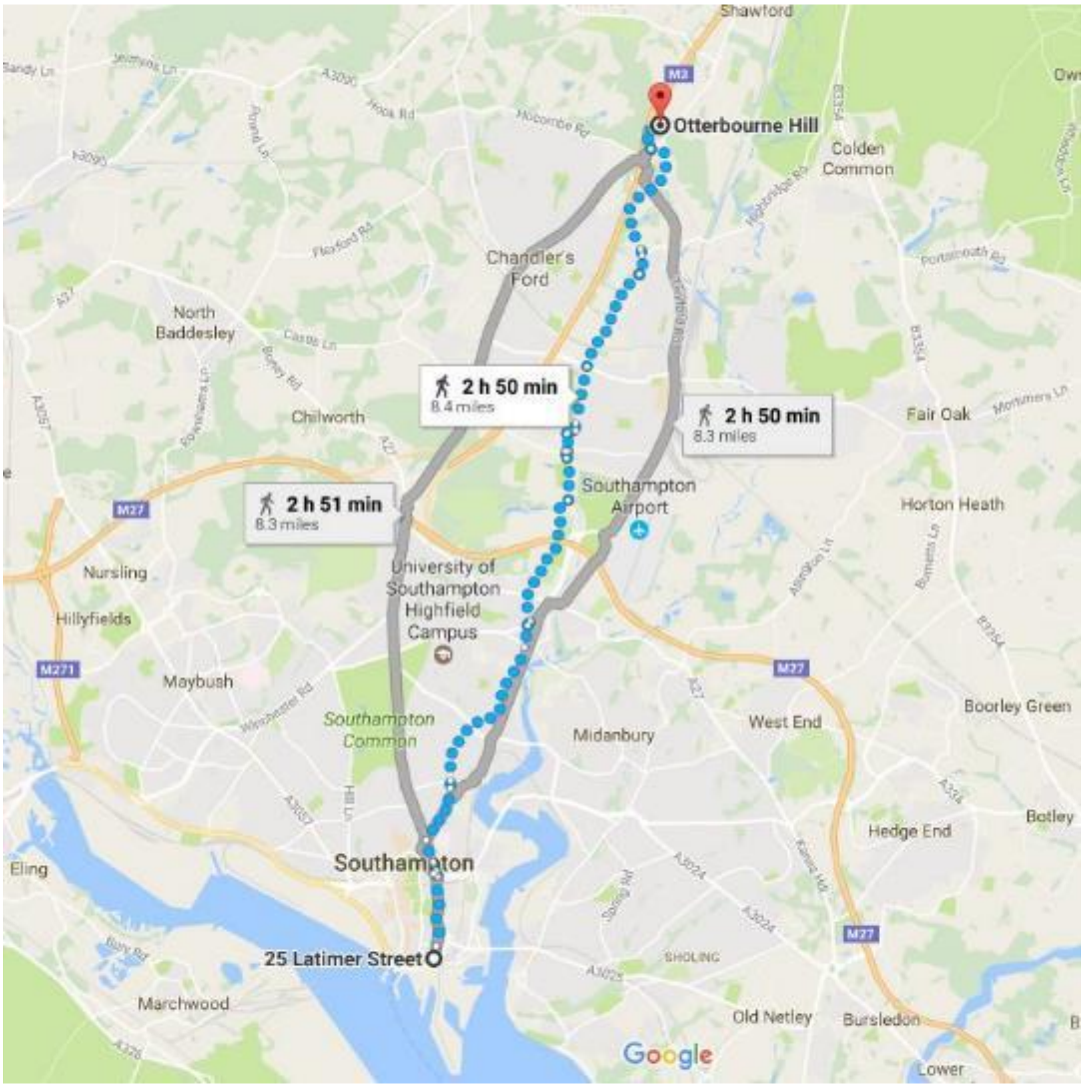


Figure 4.2- The walking time between a place of departure in Southampton, UK, to Eastleigh (represented by the red dot). Credit: Google Maps 2017.

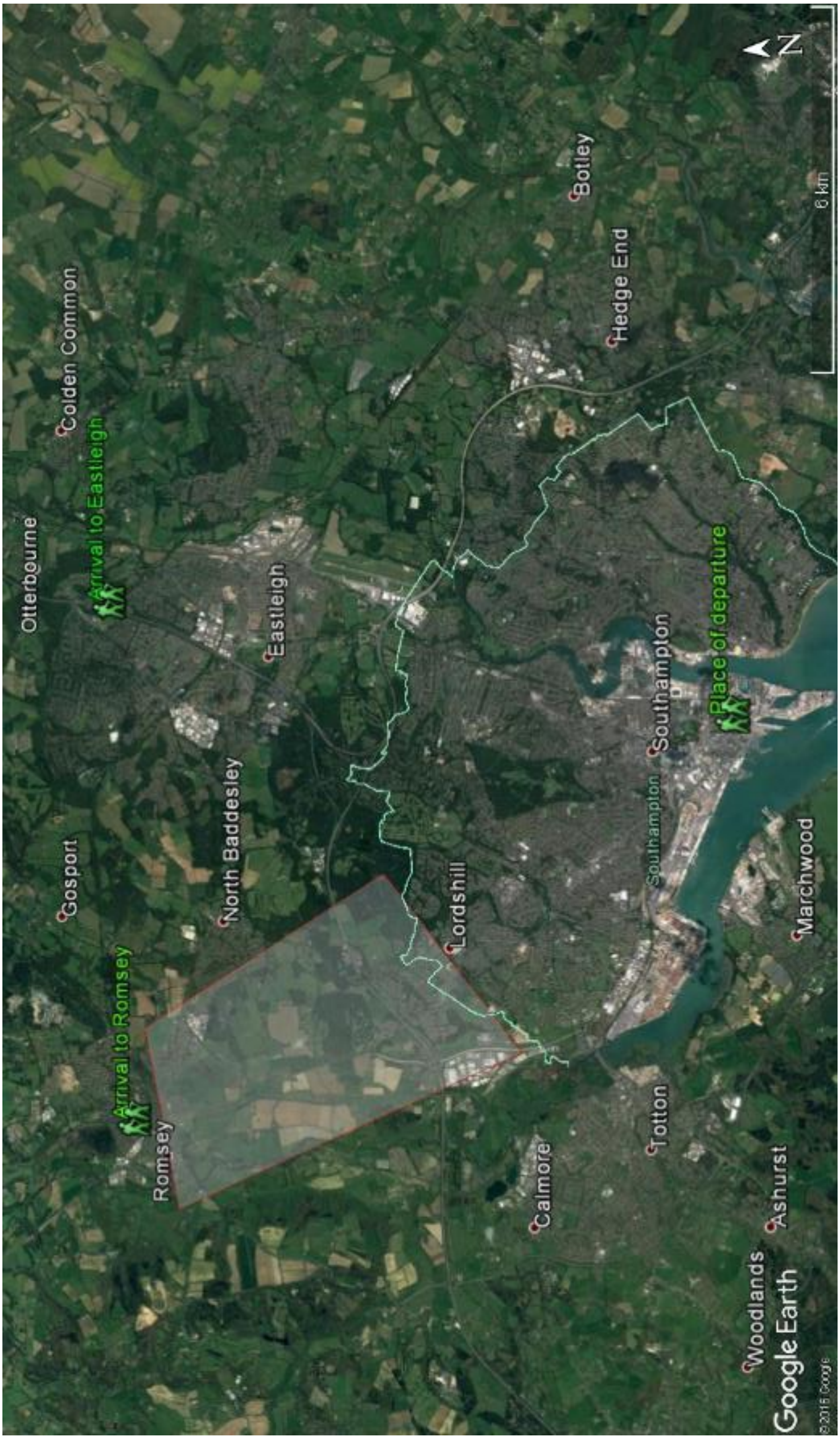
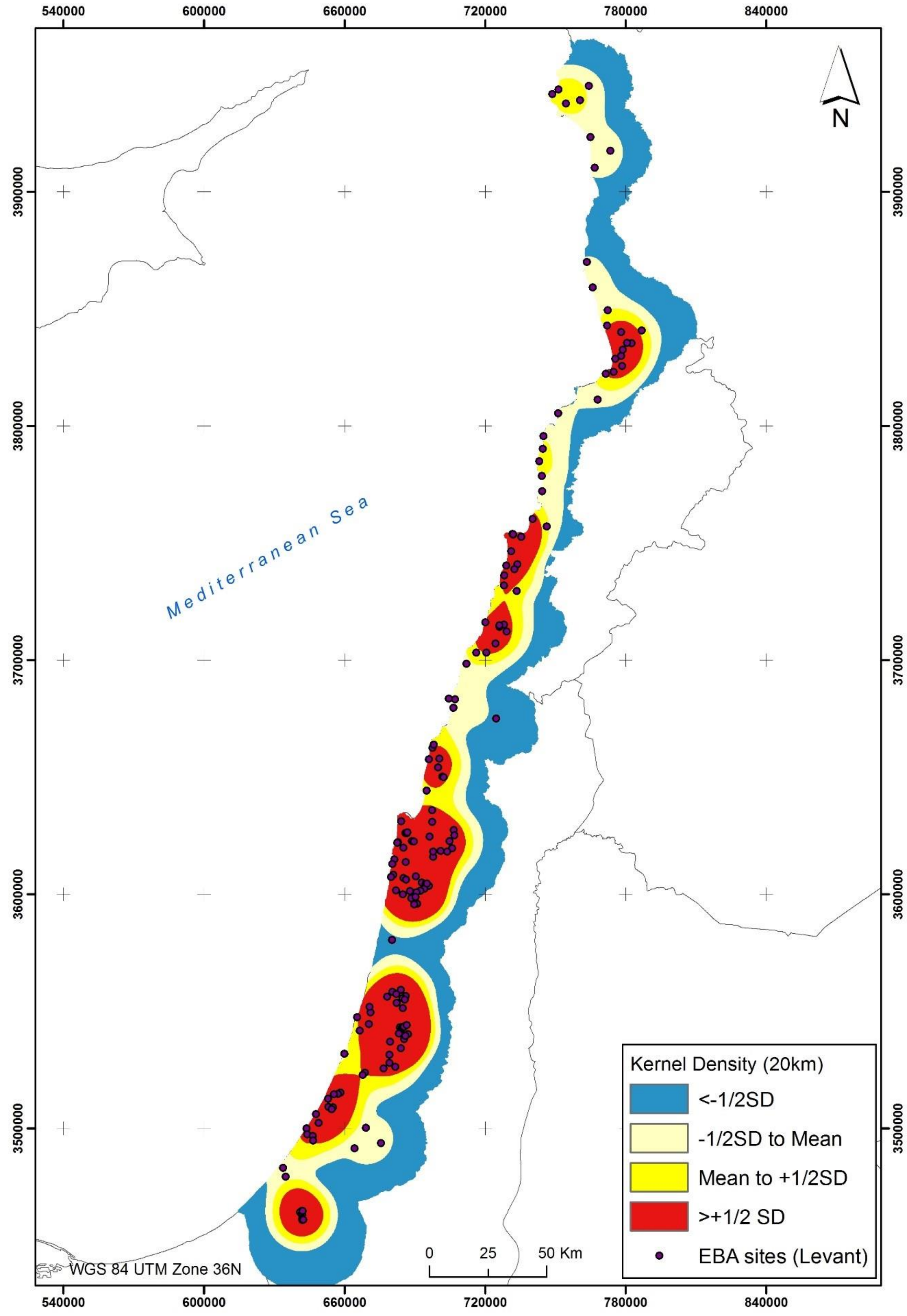


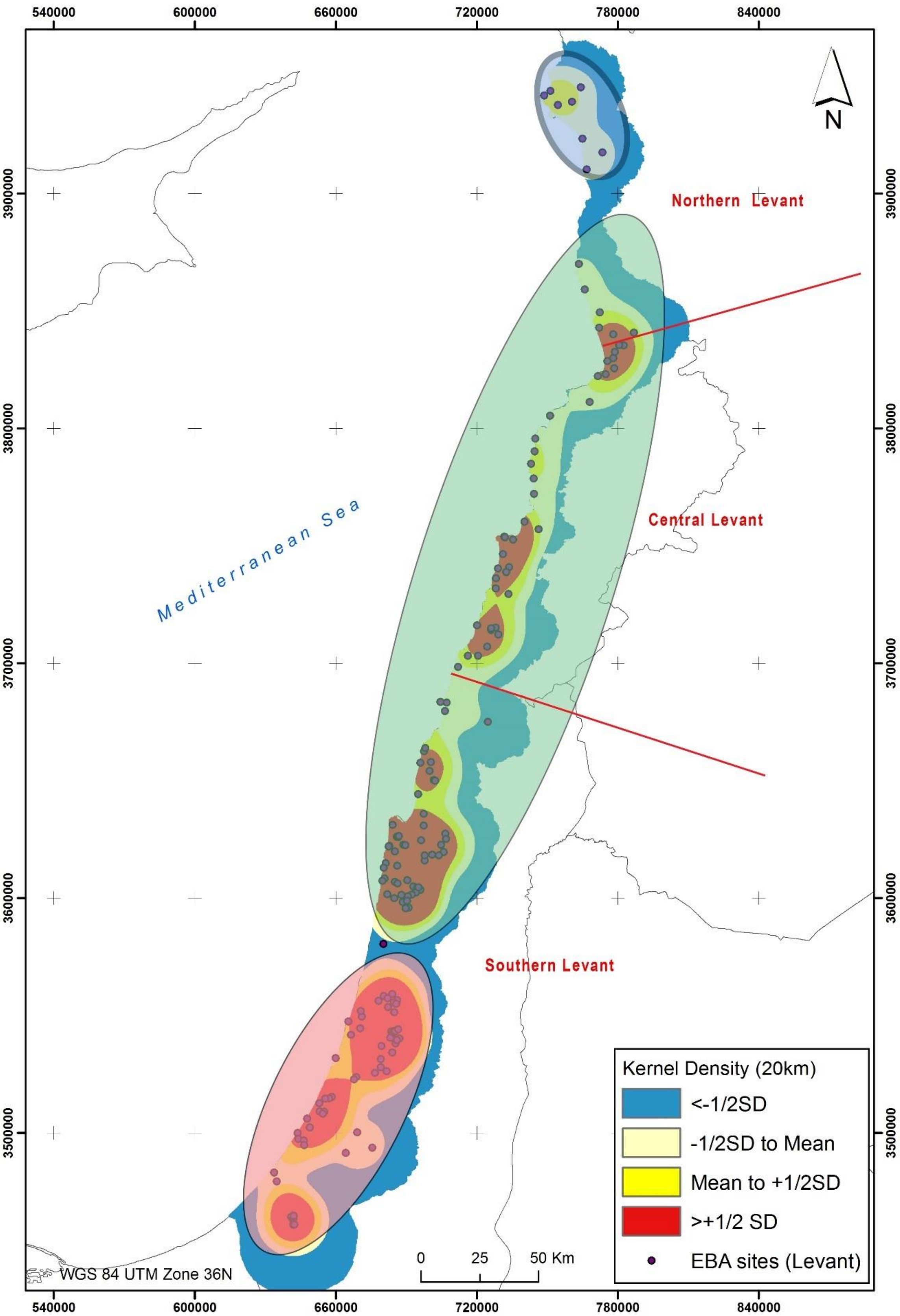
Figure 4.3-The three locations (place of departure, Eastleigh and Romsey). The polygon shows an area not densely settled. Credit: Google Earth 2017.

Henceforth, since one of the objectives of this research is to understand how ancient inhabitants engaged with and experienced the space-time of the coastal Levant, it is necessary to evaluate the density of settlements whilst taking into consideration movement in time across the study area. Thence, the cost distance surface, as in the previous section, which reflects the cumulative time of walking based on a friction surface, provides a time base that we can rely on. Adhering again to Hägerstrand's restrictions on daily space-time rhythms, a 6 hour time period dedicated for walking time, represents a window within which we can evaluate the density of settlements. Yet given that site density must be generated according to a metric radius *r*, the 6 hours temporal window needs to be translated into a metric value. Following the logic presented in the previous section, the meter per hour surface clipped to the 6 hours polygon area (see Appendix C) provides a mean distance of 3km/hr. For 6 hours of travel, this distance is of 18km, rounded to 20km. Thus, using a radius of 20km, we can assess the density of settlements and how that influences the experience of space-time of the coastal Levant. In ArcGIS 10.4, the Kernel Density tool calculates a density surface of point features (EBA sites) within a radius of 20km. This density surface is known as a hot spot analysis as well, used frequently in modern spatial analysis. The resulting density surface is a qualitative tool that allows us to explore the number of settlements per area of interest. The classification of the density surface plays an important role in the qualitative assessment. Here, classification based on the standard deviation (SD) was chosen. In such a way, density classes represent their deviation from the mean. Classes within -1/2 SD and +1/2SD are within acceptable density limits, which entail that the density is not too low or too high for that space to be qualified as devoid of settlements or highly settled. Classes less than -1/2 SD represent areas where the density is below the average to constitute a continuous horizon for ancient inhabitants crossing the land. Classes above +1/2 SD can be qualified as more than average to highly settled.

Map 4.5 shows the density surface along with EBA sites on the Levantine coast. Three density classes greater than -1/2 SD dominate the area bordering the sea. This means that movement within the coastal Levant, apart from few areas, benefited from a continuous horizon of settlements. Indeed, many factors influence that observation, for instance the routes traversed and sites' visibility and size. However, this analysis is exploratory and qualitative in nature; the purpose here is not to generate specific routes of movements, but to reflect on the lived Levantine space and time. In fact, the density surface can be divided into three main areas (as shown by the spheres on Map 4.6). These areas constitute separate units in which the experience of space-time by ancient inhabitants was of an unbroken engagement and familiarity. Comparing these units to the borders of the southern, central and northern Levant reveals an interesting observation: the limits do not match. In other words, the geographical political division of the Levant into southern, central and northern does not correspond, during the EBA, to the space-time density of movement and interaction. This leads us to question how accurate it is to divide the Levant into three traditional regions, at least for the coastal zone, where the location of EBA sites and space-time processes point to a level of homogeneity and a continuous horizon, apart from few places.



Map 4.5- Density of EBA sites classified according to the Standard Deviation, within the limits of the 6 hours polygon.



Map 4.6- Density of EBA sites overlaid by three spheres representing space-time units of movements. The map also shows the limits of the southern, central and northern Levant (red lines).

4.3.4 Sound of the sea

Whilst the analyses of relative topographic position and space-time density provide us with land-based insights, rhythms of the sea play a significant role in the lived space of EBA inhabitants. Although some of these rhythms are further explored in Chapter VI, of the considerable influences of the sea on coastal life is the ability to hear the sound of the waves inland (Ryan 2012: 16-17). Certainly, visibility (that of the sea and of the horizon) plays an equally significant role. Sound, however, especially that of a rhythmic movement such as the waves of the sea, has a much more direct effect on everyday life, on emotions, moods and associations (Hartig *et al.*, 1999; White et al., 2013). Nature sounds such as sounds of sea waves, rainfall and birds are grouped together under the holistic term of soundscape (Booi and Van Den Berg, 2012). An analysis of the sea's soundscape for the coastal Levant has the potential of generating a third space, a lived space. Recalling from Chapter III, thirding-as-othering introduces an other-than choice, an open alternative that is both similar and different from its component parts. Hence, mapping the sea's soundscape is a mapping exercise of Cartesian space and of the conceptualisation of sound, but its product is more than both combined, as it opens up a window to reflect on maritime processes and patterns of EBA coastal life. It can bring forth differences in experiencing space and offer an alternative mediation of maritime space that constitutes one of the many folds of the lived space of the coastal Levant. As mentioned previously at the beginning of Section 4.2, the notion of a study area tends to restrict space by delineating boundaries of a geographic region. However, the analyses described so far and the following soundscape analysis, re-institute the fluidity, variability and openness of the study area.

The breaking waves of the sea produce a powerful sound source that inevitably partakes in the assemblage of coastal experience. The intensity and type of sound depend on several factors, namely the distance to the sound source, the surface level or landscape elevation, the strength of the sound source and the dimensionality of the sea. The meeting of materials, of water, sand and rocks affect the strength and type of sound. The auditory experience of the sea is a particular one; E.B. White (1982: 179) writes "*the sound of the sea is the most time-effacing sound there is. The centuries reroll in a cloud and the earth becomes young again when you listen, with eyes shut, to the sea… The sea answers all questions, and always in the same way […]".* Although it is inconceivable to point out with certainty the impact of the sound of the sea on the experience of coastal space during the EBA, this analysis, in itself of an exploratory nature, allows us to explore associations, for instance between the exposure of EBA sites to the sounds of waves in comparison to the level of intensity of maritime activities they evidence for.

The range of human hearing is defined in relation to the sound intensity and the frequency of sound. Figure 4.4 provides an illustration of that range. A sound level of 0 dB corresponds to $10^{-2}\ w/m^2$ and constitutes the threshold of audibility.

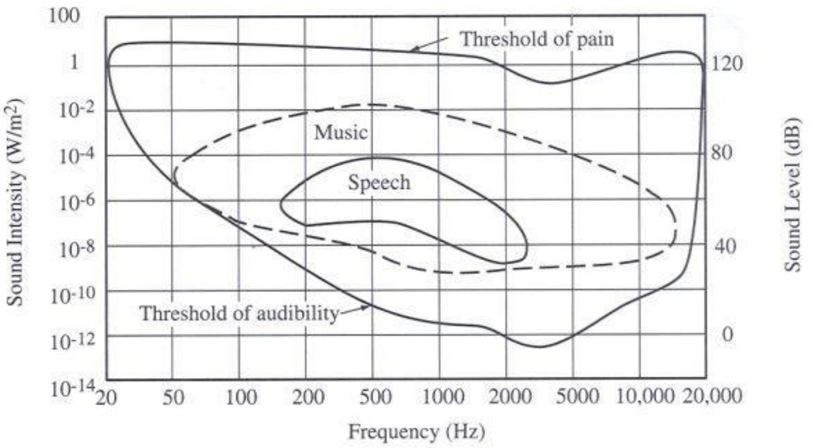


Figure 4.4-The range of human hearing according to sound intensity level vs frequency (from Du-Hueon *et al*. 2012: Fig 1).

Although the propagation of sound depends on several factors such as the air temperature, the size and elevation of landforms and the source power (wave height and strength), the aim of this analysis is to provide insights into the sea's soundscape and the lived space of EBA inhabitants rather than the production of a complex reconstruction of sound. Henceforth, the analysis assumes an average, generic sound pressure of sea waves of 85dB (Sources of Noise, 2017). The sound pressure in Decibels (dB) at any location is given by the following formula:

$$DL_2 = 20\log(\frac{r_2}{r_1})$$

$$DL = DL_1 - DL_2$$

Where DL_1 corresponds to 85dB, r_2 is the distance to the sound source and r_1 is the original distance at which the sound pressure was recorded. In this case, the sound pressure of 85dB is considered to have been recorded very near to the sound source, specifically about 10m. The r_2 value is nothing but a Euclidean distance from the Levantine coastline. The sound pressure formula taking as input for r_2 a Euclidean cost distance surface from the Levantine coastline was used to generate a sound pressure surface which was then subtracted from 85db.

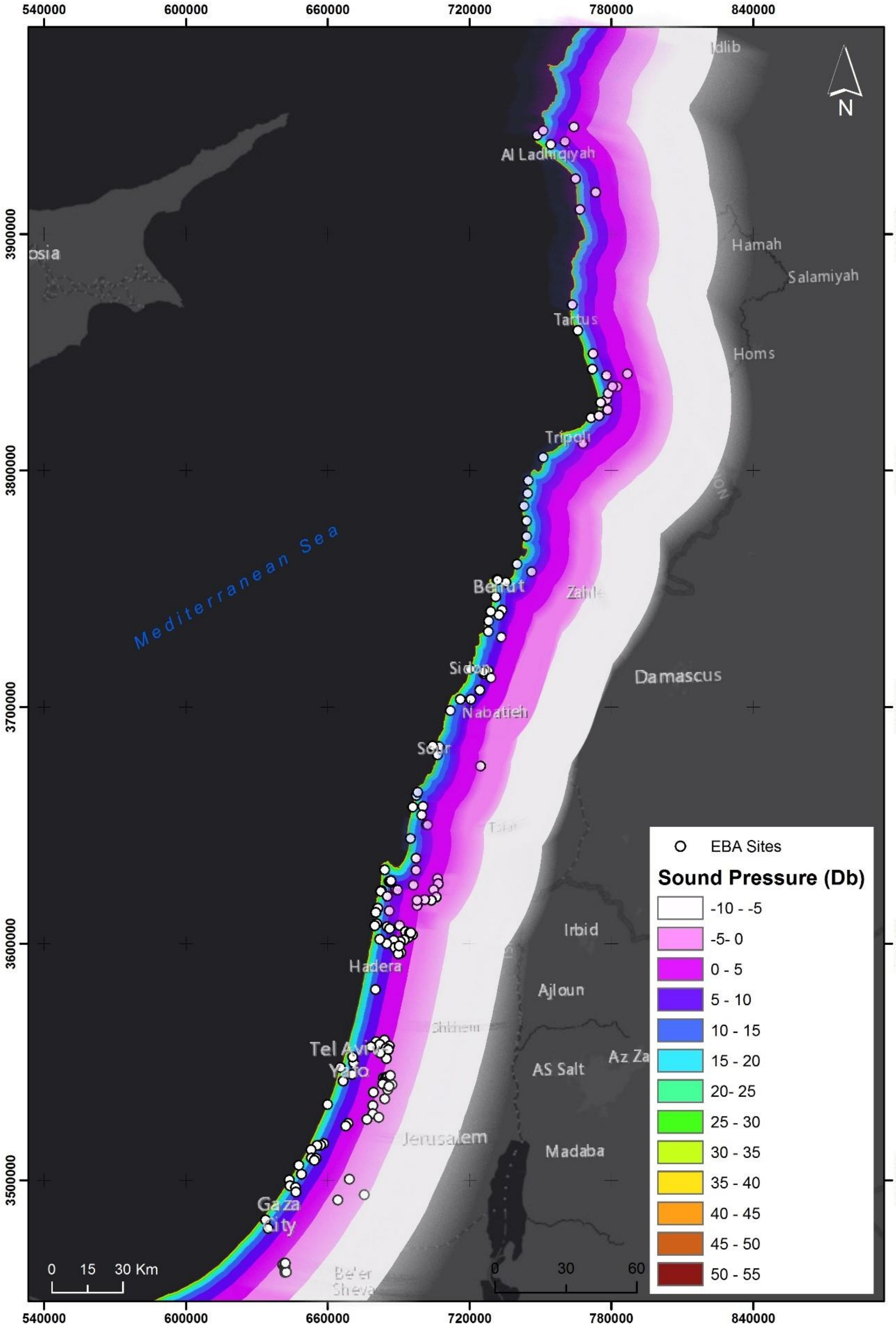
The resulting sound pressure surface reflects in dB the soundscape of the sea breaking waves (Map 4.7), how far inland the sound may have reached, how strong it is and where it would have faded out (less than 0dB). What is of interest, however, is the relevance of the sea's soundscape to EBA sites. Map 4.8 shows the distribution of EBA site in accordance to the level of sound Decibels that each site is exposed to. Of all the EBA sites, 87 are located out of reach from the sound of the sea or exposed to a very faint noise (similar to breathing in magnitude). Sites exposed to up to 30dB, 54 in total, experience a very quiet, ambient sound of the sea, almost on the same level as whispering sounds. While those exposed to more than 30dB inevitably hear the sea clearly as an ambient sound. Sites predominantly exposed to the sound of the sea (within the 40 to 50dB range) are 10 in total (Table 4.7). Even though the list of EBA sites in this research is qualified as coastal, difference in exposure to the sound of the sea presents us with nuances in the lived space of EBA inhabitants. The level of engagement with the sea, when it can be heard, when it constitutes a normality or an element of the ambient surrounding, may be different from places where the sea is distant to the ear. We can wonder whether this potential difference reflects in the scale of maritime activities. This is where the importance of the next chapter transpires, not in terms of relevance to this particular soundscape analysis or to the previous analyses, but as the material expression of the lived space of EBA coastal Levant. Archaeological evidence for maritime activities tangles conceptions and understandings to processes of the material world.

Table 4.7- List of EBA sites mostly exposed to the sounds of sea waves along the Levantine coast.

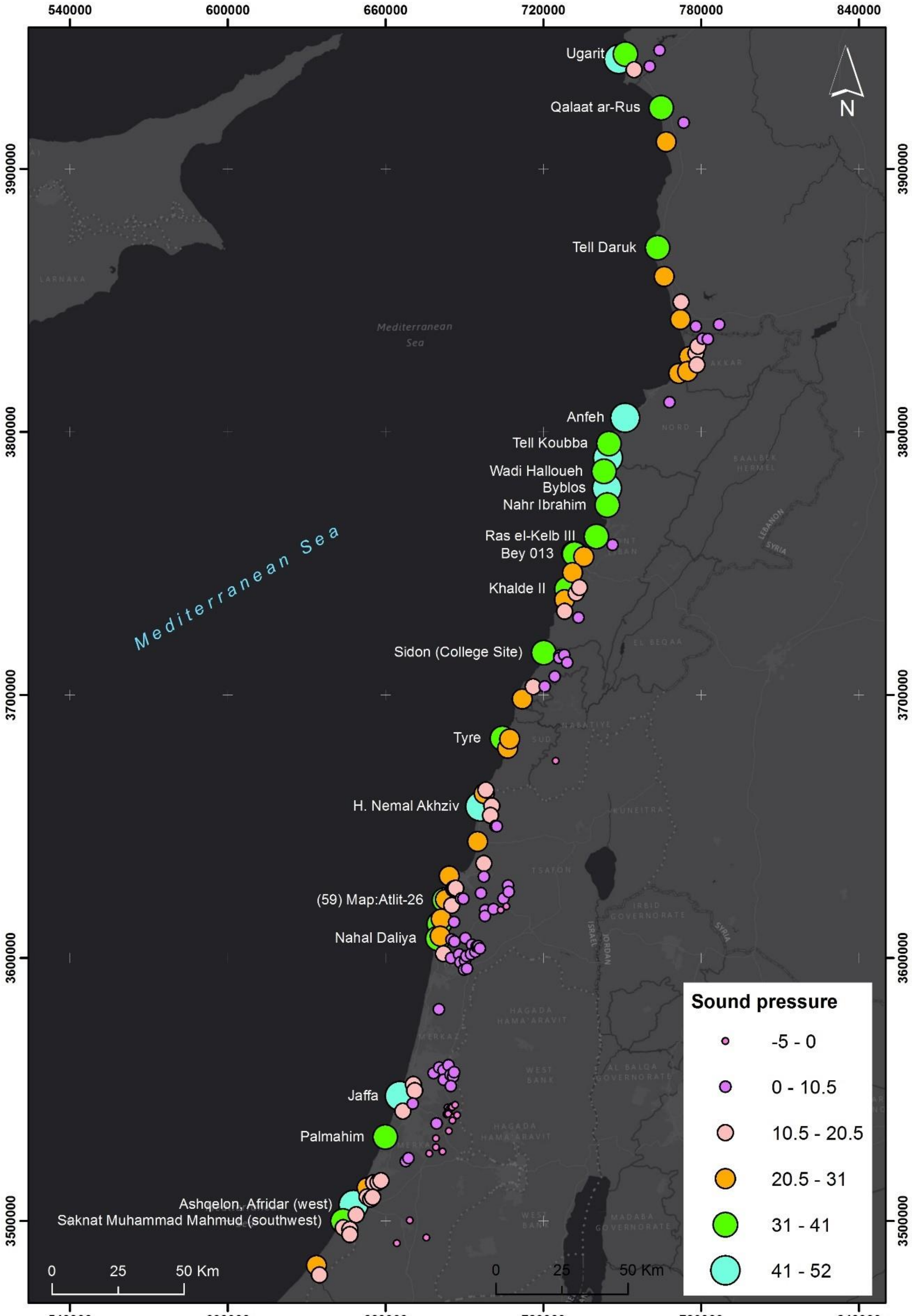
Ugarit	Jaffa
Qalaat ar-Rus	Palmahim
Tell Daruk	Ashkelon, Afridar (west)
Anfeh	Saknat Muhammad Mahmus (southwest)
Tell Khoubba	
Wadi Halloueh	
Byblos	
Nahr Ibrahim	
Ras el-Kelb III	
Beirut	
Khalde II	
Sidon (College Site)	
Tyre	
H. Nemal Akhziv	
(50) Map: Atlit-26	
Nahal Daliya	

4.4 Mapping land: a summary

This chapter has introduced archaeological data sources and EBA sites on the coastal Levant. It has also mediated the study area for this research as a malleable, intangible concept. The study area was not generically defined according to international guidelines, but was examined in respect to how well it represents daily rhythms of activities and engagement with the sea. Indeed, there are many other ways in which a study area can be defined, but this thesis establishes space and time as a theoretical and methodological approach for research. Within the study area, 168 EBA sites were identified that belong to different types of occupation, in total nine. Through the analyses of the distribution of EBA sites according to Diff, space-time density and sound of the sea, a dynamic space-time that characterises the coastal Levant has emerged. These analyses did not aim to produce a particular result or conclusion; rather, they opened up a multiplicity of pathways through which we can reflect on the past, on archaeological data and on regions. Hence lies their significance in instituting a space for questioning pre-established concepts and developing new ones. The Diff and density analysis challenged the borders of Levantine sub regions for the EBA period. This implies the need for sensitivity and awareness of different spatio-temporal scales at which patterns emerge. This chapter presented the first step in mediating the recursive relationship between people and space. It is the first step in the methodology set in Chapter III through which an understanding(s) of the lived EBA coastal space can start forming. However, this thesis does not follow a linear development. Mapping land, mapping maritime activities (Chapter V) and mapping the sea (Chapter IV) mediate parallel folds of EBA lived space. One does not necessarily lead to the other, but they are all interconnected as will be discussed in Chapter VII. Whereas this chapter targeted the study area and distribution of EBA sites, the next chapter delves a step deeper into exploring the extant material evidence for human engagement with the sea during the EBA on the coastal Levant.



Map 4.7- Sound pressure propagation inland measured in Decibels.



Map 4.8- Distribution of EBA sites according to their exposure to the sea's soundscape of waves breaking.

CHAPTER V: EVIDENCE FOR HUMAN ENGAGEMENT WITH THE SEA

The spatial analyses carried out in the previous chapter serve as an exploratory and qualitative tool that permits the inference of observations related to the lived space-time of the EBA coastal Levant. By no means are these reflections conclusive or absolute, however, they allow for a critical re-evaluation of definitions, patterns and modes of Levantine studies that are already in place. Furthermore, they open up a space for reflection that acts as a medium for raising new questions and altering preconceived ideas of the coastal Levant. Nonetheless, the most crucial source of data is in the archaeological record. Therefore, this section continues exploring the EBA archaeological remains of the coastal Levant, with a focus on maritime-related activities since this rests at the core of the aim of this thesis. The maritime-related remains provide insights on how ancient inhabitants engaged with the sea and the coastal region, at all scales of interaction. Regardless of how copious or meagre the archaeological record for maritime activities is, this consolidation of data is the first of its kind for the whole of the Levant and it allows us to establish a baseline of EBA maritime activities. Furthermore, employing the strategy of mapping advocated in Chapter III for the archaeological record, we can move away from generic narratives for that space and time to narratives that are more truthful to the nature of the evidence.

As mentioned in Section 4.1, information regarding the 168 EBA sites on the Levantine littoral was compiled in a spreadsheet. The information included the type of settlement, whether it was excavated or not, the architecture if any, a general description, main pottery types and notes regarding chronology (see Appendix D for the full list of details). While compiling the data, however, decisions were required as to what constitutes maritime-related archaeological evidence. Rather than imposing a set of archaeological evidence related to maritime activities, which may or may not resonate with the nature of the archaeological record of the EBA Levant, for instance seeking remains of boats of which there are none from this chronological period, general guidelines for maritime activities were put in place. These guidelines fall in two main categories:

- Direct indicators for maritime activities: This category refers to evidence of activities that necessitated EBA inhabitants to engage in direct contact, i.e. physical, with an aquatic environment or with material that is exclusively found in the coastal region. The range of evidence can vary from watercraft remains, anchors or harbour installations to remains indicating local fishing or gathering shells and the use of coastal rocks.
- Potential indicators for maritime activities: This category mainly refers to evidence that shows some indication of a relation with the aquatic environment. This can be in the form of

representations such as boat models or glyptic depictions, or in the form of connections between sites and places which may have taken place via the sea. Hence, this category includes details regarding the provenance of material culture recovered from sites, as these sources provide us with information about potential maritime connections between sites and places. The provenance of materials include provenance of clay established in petrographic analyses, provenance of foreign pottery based on typological analysis, provenance of flint, of fauna and flora, of stone material, obsidian, and any other relevant material whose source is distant from the site.

While reviewing archaeological data of the 168 EBA coastal Levantine sites, bearing the above description of direct indicators for maritime activities, evidence transpired for the following sub-categories of direct human engagement with the sea in the form of: fishing activities, gathering shells, use of coastal material (mainly rocks for the making of tools, as a building material or for ornamental purposes), remnants of turtles, hippopotamuses and anchors, as well as indication of island occupation (see Appendix E for the list of direct maritime-related evidence). In total, 16 sites show evidence for fish remains, shell remains are present in 24 sites, 21 sites demonstrate the use of coastal rocks, three sites have turtle remains from the EBA period, hippopotamus remains are found in seven EBA sites, one site attests for anchors and one island was occupied during the EBA.

Although these sub-categories dismiss some of the general indicators for maritime activities, they represent the actuality of finds from EBA coastal sites. Noticeably, the sub-categories do not include shipwrecks, as none have been found dating to the EBA (see Chapter VI, Seciton 6.5.2), nor do they include fishing equipment, since rarely they are referenced in EBA archaeological scholarship (there are exceptions, see Section 5.1.2 and Figure 5.6). Furthermore, harbours are omitted from the list of direct evidence since EBA harbours are natural ones. While they may have benefited from the presence of reefs and rock-cut installations, the latter are difficult to date or assign to the EBA period (see Frost 1972, 1995; Raban 1995).The presence of a natural shelter and anchorage is of prime importance however, since it has implications on the function and usage of a coastal site, as well as on maritime connections since the presence of natural shelters influences the journeys and routes that seafarers undertake. Appendix G includes those sites that may have functioned during the EBA as a natural harbour according to Safadi (2016), Blue (1995) and Gophna (2002), the relevance of these sites as a land and sea interface for maritime activities will be discussed in Chapter VII, Section 7.2.

Potential maritime evidence from EBA sites (see Appendix F for the full list of evidence) along the Levantine coast includes information regarding the source of material culture. The provenance of material culture, when not sourced from the vicinity of sites, may very well have been procured via maritime pathways, given the coastal nature of sites. This includes the provenance of pottery, lithics, obsidian, precious stones and of fauna and flora.

The following section focuses on the direct maritime evidence. It describes the data for those sites that testify for more than three sub-categories of activities (Table 5.2), and attempts at mapping the bundles of maritime activities that humans were engaged with during the EBA. The mapping is a process of representation that aims here at pushing the boundaries of what we can extract from the data and, by doing so, establishing the limits of what is achievable.

5.1 Direct maritime evidence

Direct maritime evidence for the EBA coastal Levant is restricted, as mentioned previously, to seven categories (Diagram 5.1, Table 5.1 and Map 5.1). The remains of shells are the most dominant in the list of evidence, found in 24 sites. The second largest category is that of the use of coastal rocks, followed by fish remains. Compared to the total number of EBA coastal sites in this study, 168, the figures in Table 5.1 reveal that the evidence for direct maritime activities (in total 75 occurrences/events) is rather weak. It cannot be certain whether this result is a direct reflection of the EBA period, but it is worth remembering the problems already stated in Chapter IV Section 4.1. In addition, many of these sites were excavated at an earlier time when appropriate methods for retrieving fine and fragile material, e.g. sieving, were not common practice, not to mention taphonomic processes that influence the state and preservation of the archaeological record. In contrast to earlier methods of recovery, recent excavations, such as the ones of Tell Fadous-Kfarabida, which first began in 2004, yield systematically sampled faunal assemblages from the Levant (see below Sections 5.1.1 and 5.1.2). It is unfortunate, however, that some of the fine archaeological record from certain EBA sites is lost (e.g. Byblos).

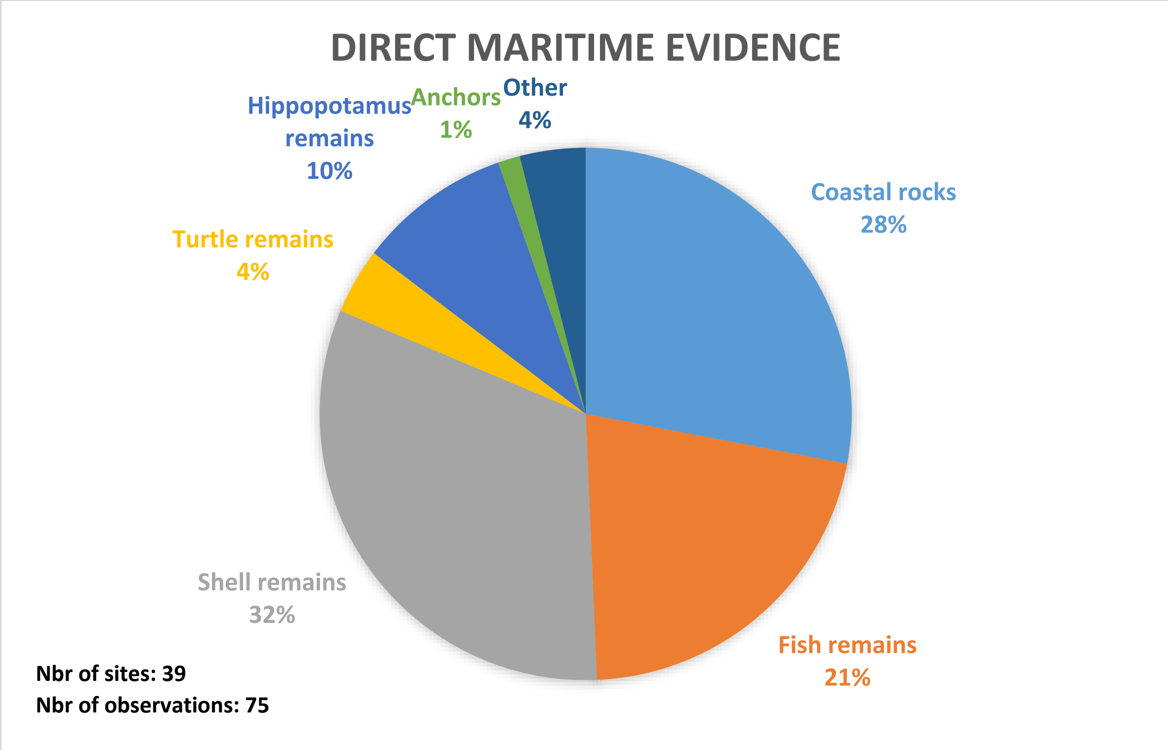


Diagram 5.1- Percentage of direct maritime evidence according to the archaeological record.

A comparison between the number of sites showing direct evidence for maritime activities, 39, and the number of excavated sites, 79, shows an indication of the frequency of engaging in maritime activities. In fact, 39 EBA sites reveal at least one type of direct maritime evidence, corresponding roughly to 50% of the number of excavated sites. Indeed, we would expect a higher intensity and frequency of direct maritime evidence had more sites been excavated and appropriate recovery methods employed.

Table 5.1- Summary of the number of EBA sites attesting for direct maritime evidence.

Coastal rocks	Fish remains	Shell remains	Turtle remains	Hippopotamus remains	Anchors	Other
21	16	24	3	7	1	3

Appendix G establishes the list of EBA sites engaged in direct and potential maritime activities. Rather than describing the data for all of those sites, the descriptive analysis[24] will focus on those sites that show more than three types of indicators for maritime activities (Table 5.2). The reader, however, can refer to Appendices B and C for information on the remaining sites. The following data

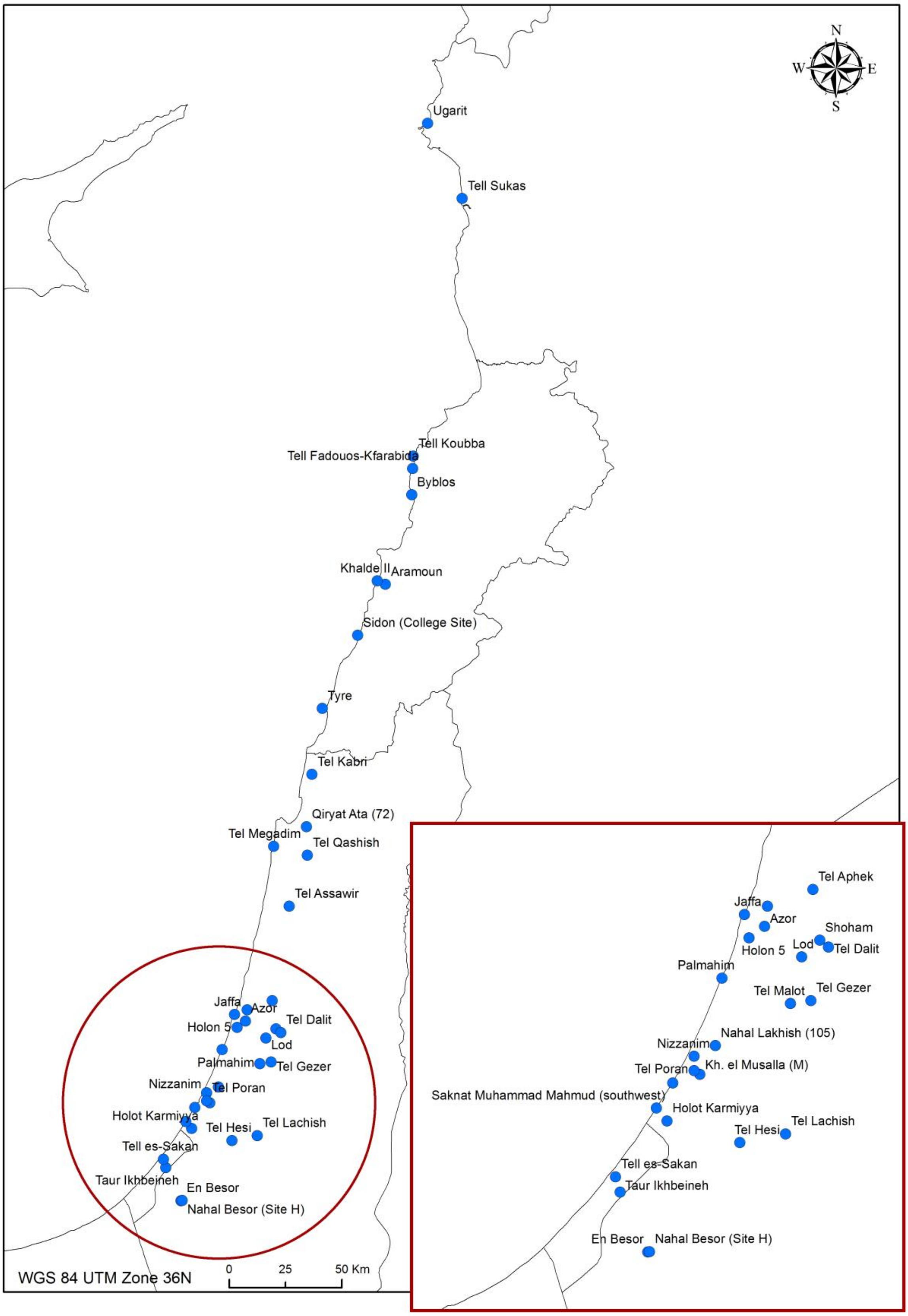
[24] The descriptive analysis in this section provides as much details as is available in the corresponding sources for each EBA site. The lack of details simply suggests that information or analysis were not provided/carried out for the archaeological remains.

description lays out the sub-categories of direct evidence and represents the nature of the data and its relevance. Some of the sub-categories are grouped together for ease of relaying the information. Afterwards, given that this research rests on the premise of mediating the archaeological past via mapping in order to make space for formulating alternative narratives (thirding-as-othering), the bundles of maritime activities will be spatio-temporally mapped.

The descriptive analysis in this section provides as much details as is available in the corresponding sources for each EBA site. The lack of details suggests that information or analyses were not provided/carried out for the archaeological remains in question. This brings forth the issue of comparing and investigating different sized data sets, an issue that is inevitable and acknowledged in this thesis.

Table 5.2- List of sites for which direct maritime evidence will be discussed.

ID	Site Name	ID	Site Name
31L	Tell Fadouos Kfarabida	47P	Lod
27L	Sidon (College Site)	57P	Nahal Besor (Site H)
14L	Byblos	76P	Palmahim
6P	Ashkelon, Afridar (west)	84P	Taur Ikhbeineh
7P	Azor	88P	Tel Assawir
74P	Nizzanim	90P	Tel Dalit
94P	Tell es Sakan	96P	Tel Gezer
106P	Tel Qashish	98P	Tel Hesi
14S	Ugarit	99P	Tel Kabri
101P	Tel Lachish		



Map 5.1- Archaeological sites along the Levantine coast that show at least one direct maritime evidence indicator.

5.1.1 Overview of shell remains

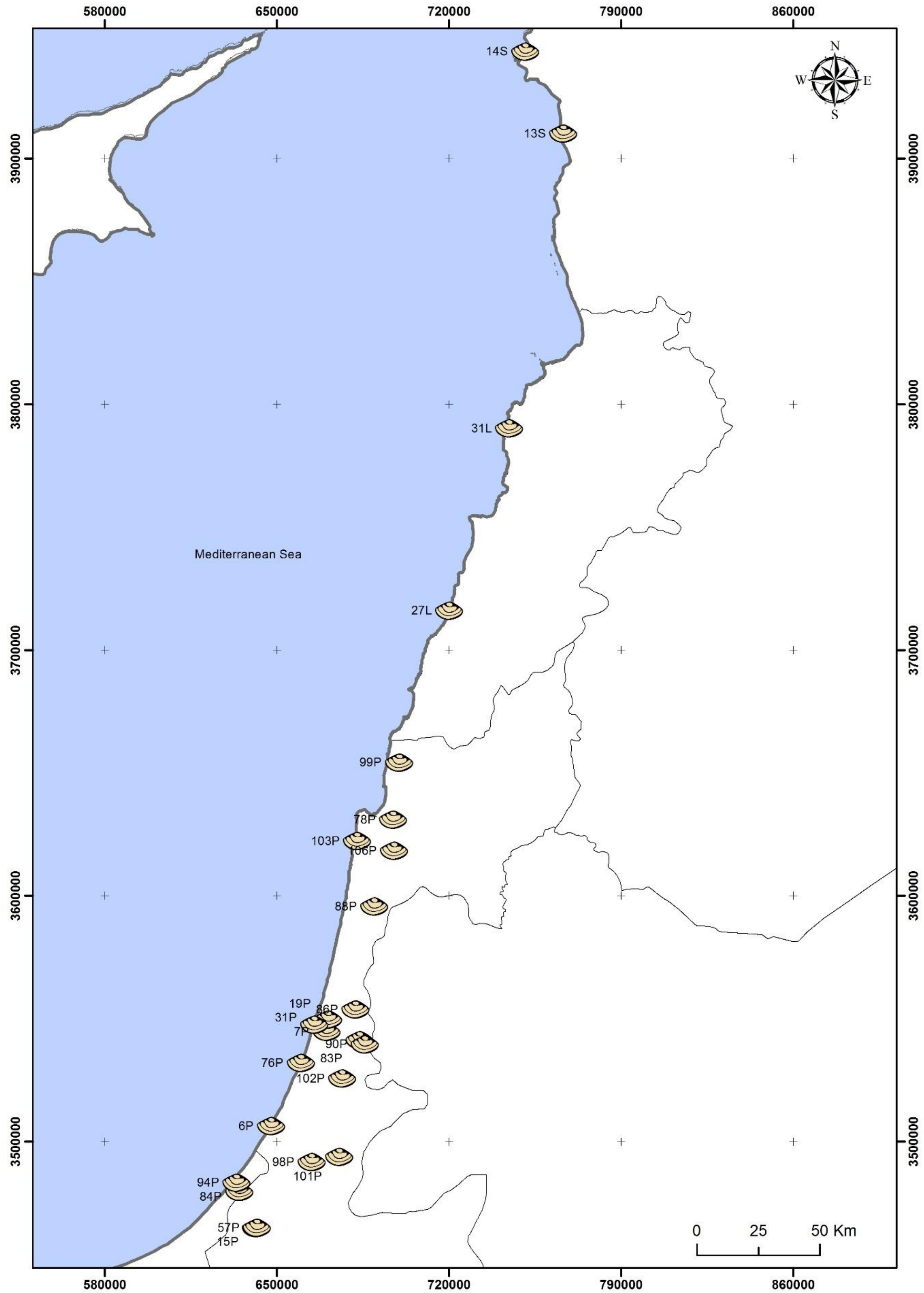
The remains of shells found at EBA sites constitute a direct indicator for engaging with a marine environment since their in situ presence (deliberately placed/utilised shells) in the archaeological record signals the activity of collecting and consuming shells. Certainly, the type of species, quantity and context of shell remains can only verify their consumption in the past. However, shells inevitably contributed to subsistence strategies and economy, even as a basic dietary supplement (see for example Ben-Tor *et al.* 2003: 420). Shells did not only contribute to the diet however, they constituted the raw material for the making of ornamental objects and tools (but see Horwtiz *et al.* 2002: 111-112 and Golani 2013). Furthermore, non-local shell remains suggest exchange amongst sites and places (e.g. Bar-Yosef Mayer, 2002). However, shell remains of a non-local origin such as from the Red Sea or the Nile River will be discussed in the next category of potential indicator for maritime activities.

The molluscs recovered from EBA sites originate from a marine, freshwater or land-based environment. Only the marine and freshwater molluscs will be described in this section as they relate to an aquatic environment. Molluscs inhabit several habitats: sandy beaches, intertidal mud and sand flats, and the splash zone of rocky shorelines and reefs (Allen, 2017). Therefore, the activity of collecting shells involved a familiarity of these environments and an understanding of the different species and their affordances. Furthermore, the gathering of shells is a hands-on activity that does not necessitate the use of a medium such as a boat in the case of fishing, nor a weapon/tool for gathering.

An abundance of shells has been found in coastal Levantine EBA sites (Table 5.3, Map 5.2). The resolution and precision of the data is relative to the recovery methods employed and to malacological analyses. Furthermore, the number of shells found at EBA sites is based on identified specimens as reported on in the archaeological literature for each site. The corresponding data on shells from EBA coastal sites is inconsistent, as can be noted from the fragmentary nature of information in Table 5.3.

Table 5.3- Details on shell remains from EBA coastal sites (sites selected according to the criteria explained in the text).

ID	Site	Brief Description	Nbr. of identified specimens	Decorative/ Tools	Dietary	Ritualistic
14S	Ugarit	45 shells. Evidence for ornamental use. EBI, EBII, EBIII.	45	x	x	
31L	Tell Fadouos Kfarabida	Over 5000 molluscs remains including marine bivalves and marine gastropods.	5000 +	x (Net weights?)	x	
27L	Sidon (College Site)	Marine gastropods and bivalves. A collection 515 shells in one area within an EBA room.	950 (mostly from the EBIII)		x	x
6P	Ashkelon, Afridar (west)	Small collection of molluscs.	Small collection of shells			
7P	Azor	Large number of shells. Small pierced shells found in tombs.	Large number of shells	x	x	
47P	Lod	Mediterranean shell species and a perforated piece.	?	x	x	
57P	Nahal Besor (Site H)	38 shell fragments. Some shells are perforated.	38 fragments	x	x	
76P	Palmahim	Hundreds of shells, associated with round EBIB installations.	Hundreds of shells		x	?
84P	Taur Ikhbeineh	34 shells from the EBIA deposits.	34 (EBIA)	x	x	
90P	Tel Dalit	Total of 183 shells.	183	x	x	
94P	Tell es Sakan	Mediterranean taxa. Perforated shells part of a pendant.	?	x	x	
98P	Tel Hesi	Mediterranean shell species.	?			
99P	Tel Kabri	47 shells, some are perforated.	47	x	x	
101 P	Tel Lachish	Several shells from the Mediterranean.	Numerous		x	
106 P	Tel Qashish	More than 100 marine shells and 500 freshwater shells.	600	x	x	



Map 5.2- Distribution of all EBA coastal sites demonstrating evidence for shell remains.

In the northern Levant, the site of Ugarit produced 45 shells. De Contenson (1969: 47) suggests that of the seven EBIII shells, five had an ornamental use, of which three are scallops, while the other shells served for combing pottery. From the EBII deposits at Ugarit, 30 shells were recovered, 13 of which are perforated scallops, which may have been used as pendants, 11 are dentals (Dentalium) used for necklaces, and two shells were embedded in one another. Additionally, two murex shells, a 15cm long whelk and a shell ring 2.3cm in diameter were discovered (de Contenson 1969: 63). As for the EBI period at Ugarit, it yielded eight shells, two of which are perforated.

The site of Tell Fadous-Kfarabida produced over 5000 mollusc remains. The assemblage is rich with four species of marine bivalves, 11 species of marine gastropods and freshwater bivalves (Badreshany *et al.* 2005: Table 11). Topshells and limpets (aquatic snail) were found in clusters of about 12 specimen in a single context. These two taxa inhabit the splash zone of rocky shorelines (Genz *et al*. 2009: 86). Their contextual abundance indicates their role in the diet of EBA inhabitants. These molluscs were collected alive as they are found in a well-preserved state. Three other species occur frequently in the EBA deposits at the site. These are *Charonia spp*. (trumpet snails), *Stramonita haemastoma* (whelk) and *Glycemeris spp.* (dog cockles). Three almost complete trumpet shells bear irregular holes; they were found in the same cluster. Genz *et al*. (2009:86) suggest that these large and heavy shells might have been used as net weights. Additionally, a complete whelk specimen was perforated and suggests for a secondary use, possibly as net weight (Figure 5.1).

Moreover, 154 *operculae* were also found at Tell Fadous-Kfarabida. *Operculae* are an oval, calcareous disc (Figure 5.2). It is formed by marine gastropods species (Genz and Damick 2015*;* Barker, *2001*). Although the holes of the *operculae* are not necessarily fabricated, they are referred to as beads and may well have been worn by EBA inhabitants.

Figure 5.1- Perforated whelk shell from Tell Fadous-Kfarabida (from Genz *et al*. 2009: Fig. 21).

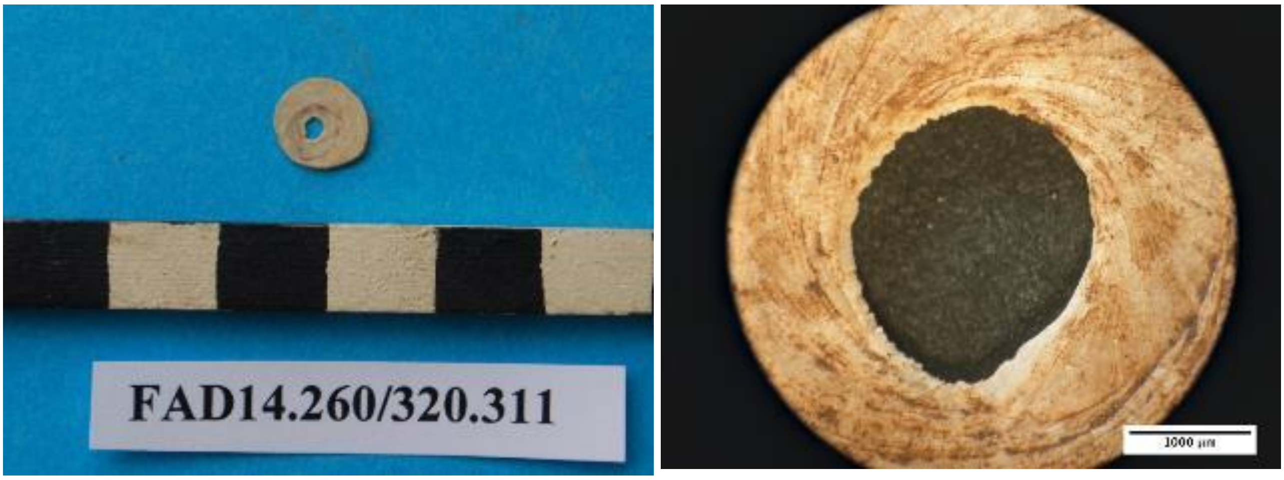


Figure 5.2-Operculae from Tell Fadous-Kfarabida (from Genz and Damick 2015: Fig 32, 33).

The EBA at Sidon yielded around 950 specimen belonging to 19 species. The most abundant in the assemblage of marine gastropod and bivalve species are *Glycymeris violacescens* (160 shells), *Nassarius gibbosulus* (26+515 shells) and *Monodonta turbinata* (115 shells) (Abdul-Nour *et al*., 2009). Apart from the *Nassarius gibbosulus*, the two other species are edible and may have been collected for dietary purposes. The most exquisite find at Sidon, however, is the collection of 515 *Nassarius gibbosulus* that was found in the centre of an EBIIIB room, part of an eight room building complex. An area, enclosed by stones, was covered with the 515 shells belonging to *Nassarius* gibbosulus (Figure 5.3).

Figure 5.3-Area enclosed by stones where a collection of 525 *Nassarius gibbosulus* was found at Sidon (from Abdul-Nour *et al.,* 2009).

Nassarius gibbosulus is a non-edible, relatively small (1-2cm) and uncommonly found species. Abdul-Nour *et al.* (2009: 22) conclude that given the concentration of this species in one area compared to only 26 specimen found in 133 EBA contexts at Sidon, this particular shell was associated with a cultic activity. Whether this indeed reflects a ritualistic act or not, the concentration of so many shells in a small EBIIIB area is a clear indication of a well-engrained maritime activity, of preferentiality and of a regular engagement with the sea.

Large numbers of shells from the EBIA were found at the site of Azor. (Golani and van den Brink, 1999). Most of these shells originate in the Mediterranean while others are imports (Section 4.2.3). The Mediterranean shells include *Glycymeris insubrica* (Bar-Yosef Mayer 1999: Fig. 18:3-4) and *Donax trunculus*. Small pierced shells were also found in Tombs 1 and 4, excavated by Ben-Tor (1975: 23). During the 2000 excavation at the site of Lod, shells were retrieved from the EBIB-EBII strata. The shells identified belong to marine gastropods and bivalve species, *Glycymeris insubrica*, *Cerastoderma glaucum* and *Nerita species*. In addition, a piece of a perforated *Cerastoderma* shell was found (Yannai and Marder 2000; Milevski 2005: 205).

The shell remains recovered from Nahal Besor (Site H) were badly preserved, hindering the identification of the number of shells. In total 38 fragments were discovered belonging to six taxa. The Mediterranean taxa is represented by *Glycymeris insubrica*, *Cerastoderma gaucum* and *Donax tunculus* (Horwitz *et al*. 2002: 112). Some of these shells exhibit man-made holes.

Hundreds of shells belonging to the *Glycymeris* species were found at the site of Palmahim. Milevski (2005: 204) associated these remains with round installations from the EBIB, which may denote specific areas on the site of shell processing, storing, consuming or discarding.

At Taur Ikhbeneh, excavations yielded 34 shells from the EBIA deposits. The shells are large in size and were hand collected during excavation. They belong to seven species, five of which originate from the Mediterranean Sea (Horwitz *et al*. 2002: Table 6). The scarcity of Mediterranean gastropods, however, is noteworthy (Horwitz *et al*. 2002: 116). Of the *Glycymeris insubrica* and the *Cerastoderma glaucum* valves, ten and one valve respectively exhibit fabricated holes. These shells most probably were used as pendants (Horwitz *et al*. 2002: 117).

The mollusc material of Tel Dalit was collected from EBA strata I-II (mostly EBII), excavated during three seasons. The shells (183 in total) belong to seven species (Hellwing and Gophna 1984: 56). Some of these were consumed, while others used as decorative objects, such as the *Cardium* and *Glycymeris* (marine bivalves) species.

The shell assemblage from Tel es-Sakan is represented by Mediterranean taxa such as *Glycymeris species*, *Ostrea edulis*, *Cerastoderma glaucum*, *Donax trunculus* and *Nassarius circumcintus* (de Miroschedji *et al*. 2001: 90; Milevski 2005: 206). Amongst the shells is a pendant fragment (Figure 5.4).

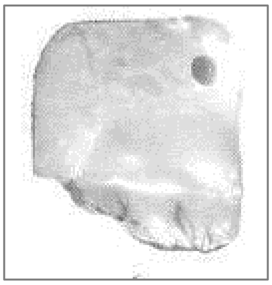


Figure 5.4- Perforated shell from Tel es-Sakan (from de Miroschedji *et al.* 2001: Fig. 14.6).

At the site of Tel Hesi, some sea shells were found originating from the Mediterranean Sea, but no species are given (O'Connell 1978: 89; Toombs 1983: 44). As for Tel Kabri, nine taxa represented by 47 shells from the eastern Mediterranean and freshwater sources were discovered. Some of these show manufactured holes. However, it is unsure whether these date to the EBA (see Kempinski 2002: 403-406).

Tel Lachish produced several shells of the *Glycymeris insubrica* (Bar-Yosef Mayer 2004: 2493). Furthermore, Tufnell (1958: 323-324) reported numerous EBA shells. One Mediterranean species was found, the *Pectunculus* in the NE section at the site. While a single *Nassa circumcinta* may have originated either from the Mediterranean or the Red Sea.

Freshwater and marine shells were recovered from Tel Qashish, specifically about 500 freshwater shells and more than 100 marine shells (Ben-Tor *et al.* 2003: 419-420). The freshwater shells were probably gathered in the Kishon River for consumption (bivalves molluscs), whereas the freshwater gastropods where either gathered accidentally or collected in the course of gathering other shellfish species (Ben-Tor *et al.* 2003: 419). The marine shells found at the site from the EBI belong to several taxa of which *Glycymeris violacescens*, *Tonna galea*, *Connus mediterraneus*, *Cerastoderma glaucum, Patella caerulea* and *Donas trunculus*. Some of the *Cerastoderma glaucum* shells show evidence for artificial holes. The *Patella caerulea* is an edible species, usually collected for consumption (Reese, 1978; Shackleton, 1988). According to the decline in the number of freshwater shells compared to marine shells during the EBII-III, Ben-tor *et al.* (2003: 420) suggest that due to over-harvesting, the shellfish resources of the Kishon River were depleted, which prompted inhabitants to go further afield for obtaining shellfish from the Mediterranean Sea. Furthermore, given that shellfish rots quickly, the edible species would have been consumed on the seashore. That can explain the small quantity of edible shellfish from Tel Qashish.

The above overview described the specificities of data on shell remains from EBA sites. While some sites demonstrate strong evidence for shell remains, e.g. Tell Fadous-Kfarabida with over 5000 shells, the evidence from other sites is meagre or undocumented, and depends additionally on shell gathering strategies. This poses a problem for establishing a consensus on the frequency, intensity and significance of this maritime activity during the EBA.

Shell remains at EBA sites reflect three types of usage: consumption, manufacturing (decorative objects and tools) and exchange (Section 5.3.3). Their dietary role and contribution to subsistence strategy is difficult to establish without precise information on their quantity and context, which greatly depends on excavation and retrieval methods employed, not to mention the archaeological interest in such data. It is clear, however, from the quantity of shells found at Tell Fadous-Kfarabida, Sidon and Tel Qashish that the consumption of molluscs constituted a worthwhile aspect of the diet but was not found in such an abundance in comparison to other fauna as to suggest that it was a primary source of subsistence (see Genz *et al.,* 2016; Villa and Chahoud, 2011). Perhaps the prominent significance of shells is in their use in the making of artefacts and as symbolic/ritualistic objects. Shell remains from ten sites described above demonstrate some sort of fabricated alterations, e.g. perforation, rings. Furthermore, their discovery in tombs at Azor (Ben Tor, 1975: 23) and the distinct collection of shells in the centre of an EBA room at Sidon (Abdul-Nour *et al*., 2009) signal an engagement that bypasses material needs, i.e. consumption, and the morphing of shells into representational objects for individual or communal desires. In fact, the human-shell connection dates as far back to the Upper Palaeolithic in the Levant, c. 54-20 ka BP (Bay-Yosef Mayer 2005: 177-179). While their use as a food source is documented, shells were consistently exploited as beads and ornaments from the Upper Palaeolithic on (Bar-Yosef Mayer, 2005). This indicates that ancient inhabitants were aware of the potential of shells for adornment purposes. Bar-Yosef Mayer (2005: 183) notes, however, that their occurrence in burials in the Levant only intensified during the Chalcolithic period. Potentially, this may correlate with an intensification in maritime activities at the time that extended to the EBA and beyond. Worthy of note here is that marine shells, regardless of how far inland they are found and what becomes of them (consumption, production, exchange), they are first and foremost elements of the sea, a particular sea. This association does not fade; it renovates itself with each usage and re-usage of shells. The remains of shells at EBA sites is a clear indication of the activity they denote -shell gathering. It is clear from the evidence presented here, that this activity was significant in the coastal zone, the gathering of shells led to their consumption, trade and use in the making of artefacts. Henceforth, shells as a commodity during the EBA on the coastal Levant was evidently revered.

5.1.2 Fishing practices

Eastern Mediterranean fish taxa and distribution, as found today, is a result of climatic and ecological changes in the Mediterranean over millions of years. The Mediterranean's opening into the Atlantic Ocean occurred 5-10 million years ago, during the Pliocene Era (Golani 2005: 8). This connection sustained via the Straits of Gibraltar, altered the oceanographic conditions and have had a significant effect on the distribution of fish species. The present 600 indigenous fish species of the Mediterranean Sea are of Boreal, Atlantic cold origin. However, their distribution in the eastern Mediterranean basin is limited to about 400 species because of the cold-affiliation of the species and the increase in temperature in the eastern Mediterranean (Golani 2005: 9). The two main classes/groups of fish found in the Mediterranean are the Cartilaginous fishes (chondrichthyes) and bony fishes (Osteichthyes).

The practice of fishing is a long-standing tradition throughout the world. It constitutes an economic platform for many communities and societies, and has played a significant role in subsistence and life during prehistoric times (Beech, 2002; Rick *et al.,* 2001; Zohar and Dayam, 2001; Stewart, 1989; Yesner, 1980). Fishing practices, as studies have shown (Rick and Erlandson, 2000; Yesner, 1980), do not necessarily entail sophisticated technologies. The intensification of marine exploitation is not an outcome of technological proficiency. Early fishing has been seen to involve limited activities by small-scale communities of fishermen, as is the case nowadays in many parts of the world (Figure 5.5; Gunda 1984: 50). The study of fishing practices including taxonomic identification, body sizes, fishing techniques and environmental conditions is of prime importance for inferring the richness and diversity of species, seasonal characteristics, places of fishing and connections to water temperature and salinity. In addition, such studies feed into our knowledge of trade and exchange patterns in the ancient world (e.g. Van Neer *et al*., 2004). Nonetheless, the development of ancient

Figure 5.5- Modern day fishing on the shores of Tyre, Lebanon. Credit: FocusMiddleEast, 2017.

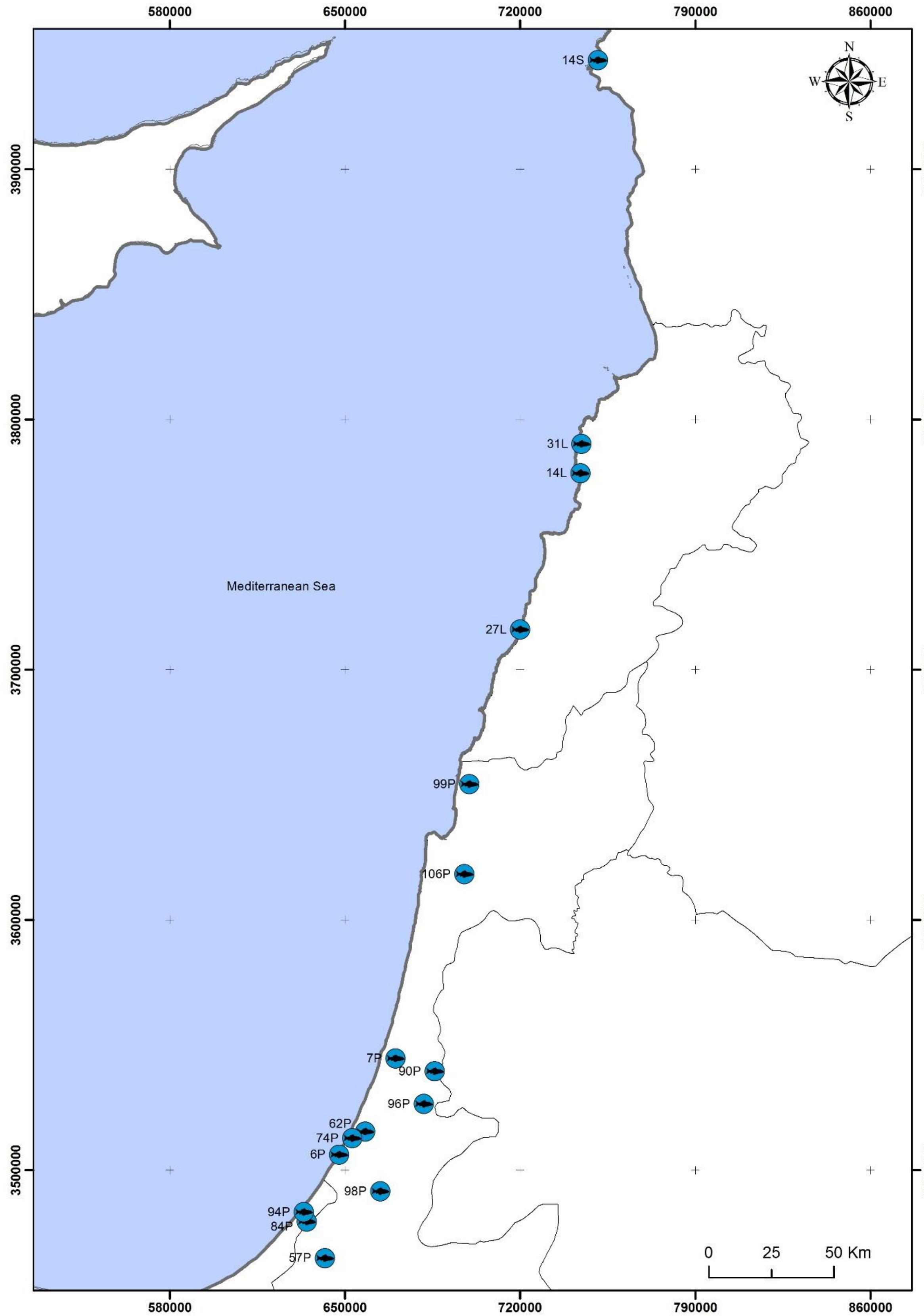
fishing practices and their importance is little yet known in the Levant. This is partly due to inadequate methods applied during excavations for the sampling of fish remains in the past, which has led to an underestimation of fish exploitation. More recently, however, appropriate methods for sampling and sieving have been in place, allowing for a diverse and detailed body of research relating to fish exploitation in ancient times (Zohar and Belmaker, 2005; James, 1997; Grayson, 1981).

Since EBA sites incorporated in this research have been excavated at different times throughout history and were subject to diverse excavation methods, their corpus of fish remains may have been lost due to inappropriate sampling and sieving methods. When and if fish remains were recovered, the scale of information regarding fish species, quantity and fishing practices, and in a similar manner to shell remains, greatly depends on how aptly the material was recorded and analysed. Table 5.4 summarises the data collated and Map 5.3 shows the corresponding distribution of those sites.

Table 5.4- Summary of fish remains from EBA coastal sites.

ID	Site	Brief Description	Number of fish	Consumption	Ornamental
14S	Ugarit	Two vertebrae of a large fish, that may have served as pendants or are the result of taphonomic processes.	1	?	x
14L	Byblos	Evidence for transformed fish can be inferred.	?	x	
31L	Tell Fadouos Kfarabida	High percentage of fish bones (expected to be ten times more). Species include shark and rays. Evidence for offshore fishing. Few fish worked vertebrae.	500 +	x	x
27L	Sidon (College Site)	Large number of fish bones mainly from the EBIII. Sharks are frequent.	157	x	
6P	Ashkelon, Afridar (west)	Fish remains from Areas E, F and G. Assemblage dominated by the Seabass family. Evidence suggests drying, salting or smoking fish.	98	x	

7P	Azor	One bone of a Mediterranean Sea fish from the EBIA.	1	?	
57P	Nahal Besor (Site H)	Spine of a mudfish.	1	?	
74P	Nizzanim	Fish remains rank high in comparison to the total number of animal bones.	40	x	
84P	Taur Ikhbeineh	Few fish bones. Specific information is unavailable.	4	?	
90P	Tel Dalit	The remains of one fish bone (probably from dried fish).	1	?	
96P	Tel Gezer	Fish (a single quadrate bone).	1	?	
98P	Tel Hesi	Fish bones, no more than 6% of the assemblage of animal bones.	?	?	
99P	Tel Kabri	Marine fish (Seabass and Grey Mullets), one in a burial context.	9	x	x
106P	Tel Qashish	Marine and freshwater fish bones.	10	x	



Map 5.3-Distirbution of EBA coastal sites showing evidence for fish remains.

Ugarit is the only site in the northern Levant that has yielded fish remains. Two vertebrae of a large fish that may have served as pendants were recovered from the EBI remains (de Contenson 1969: 63). There is no mention, however, of the type of fish found at Ugarit or any further information regarding other fish finds from the EBA. This is unfortunate since Ugarit is an important coastal site. Excavations at the site began in 1928, a time when Levantine archaeology was concerned with large finds and palaces, as stated in Chapter IV, Section 4.1. At the site of Byblos, in central Levant, the production of transformed fish may be surmised, although it is not clearly discernible in the archaeological record (Nigro and Artin 2007: 32). Byblos is to this day a fishermen's village. Regrettably, the excavation method employed by Maurice Dunand, a French archaeologist, consisting of the removal of 20cm thick horizontal layers (levée) was ill suited for a Tell site, since it hindered the association of each levée to a chronological period (see Makaroun 2009: 3). Furthermore, excavations at Byblos did not provide information regarding fishing practices from the EBA. In contrast, excavation efforts at the site of Tell Fadous-Kbarabida on the Lebanese coast provides us with a systematically sampled faunal assemblage, one of the few of its kind from the northern and central Levant. More than 500 fish specimens have been identified from the EBA at Tell Fadous-Kfarabida. In reality, according to Genz *et al.* (2016: 96), the actual number of fish remains is expected to be ten times or more since the analysis of EBA deposits continues. The most commonly captured species of fish were seabreams and groupers, frequently encounted in the eastern Mediterranean (Genz *et al.,* 2009). These species live in coastal areas and can be caught using simple techniques, implying basic fishing practices targeting inshore demersal fish (Genz *et al.* 2009: 90). Stone weights found at the site were probably used in fishing nets (Genz *et al.,* 2016; Damick in Genz *et al*., 2010). A total of 97 perforated stones were discovered (Figure 5.6). According to Damick (Genz *et al*. 2016: 107), similar ground stone artefacts are identified as loom weights and may have equally served as sinkers or net weights, which, given the coastal character of Tell Fadous-Kfarabida, could well have been the case.

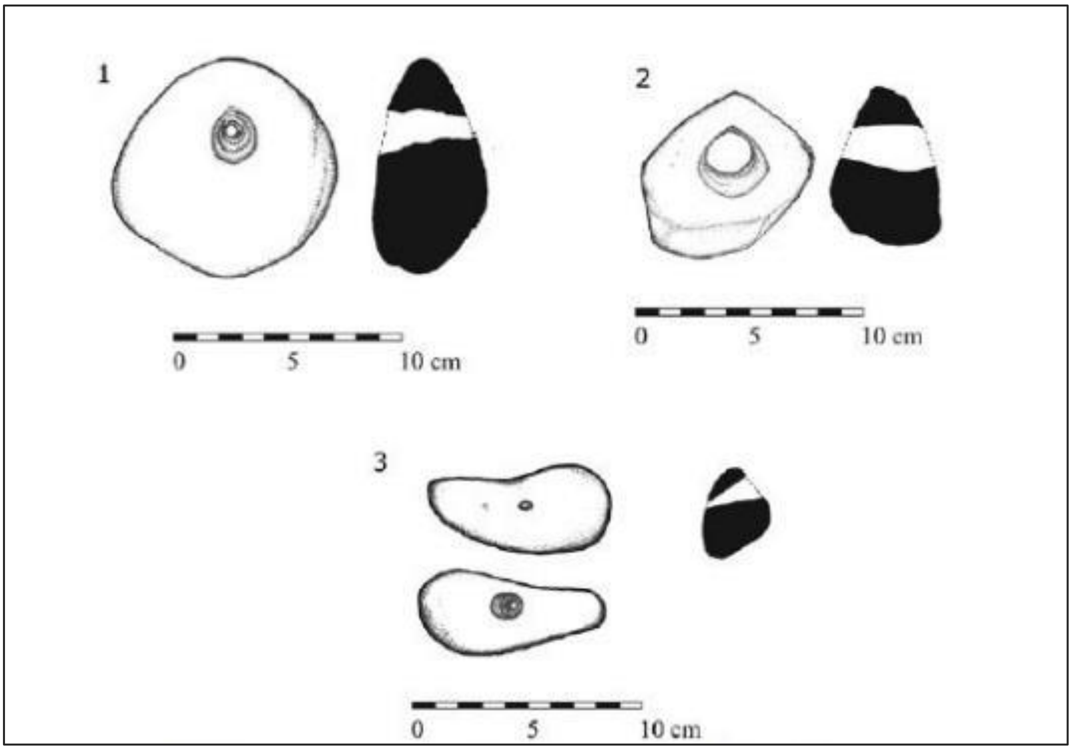


Figure 5.6- Perforated limestone, beach pebbles from Tel Fadous-Kfarabida (from Genz *et al.* 2016: Figure 29).

Fish remains from Tell Fadous-Kfarabida make up 33.4% of wet-sieved vertebrate remains and 5.4% of the hand collected, which permits inferences on the size classes of fish most frequently captured (see Table 5.5 and Figure 5.7). The number of cartilaginous fish remains indicates deliberate attempts to capture sharks and rays. While the measured *Carcharchinid* vertebrae shows that they correspond to large individuals, most likely caught in the open sea rather than inshore (Genz *et al.* 2009: 87).

Offshore fishing activity is further corroborated by very large *Carangids* (80 and 120cm long). While the identified Bullrays can be benthic, they may dwell on the water surface. Based on these remains, Genz *et al.* (2009: 88) conclude that in the absence of other pelagic and schooling fish such as tunas and mackerels, offshore fishing during the EBA at Tell Fadous-Kfarbida was practiced but only to a limited degree. Nonetheless, this provides valuable insight on maritime fishing practices. Offshore fishing when undertaken suggests the use of boats to reach the places of fishing and a local knowledge of the maritime environment.

Table 5.5-List of fish remains from Tell Fadous-Kfarabida (from on Genz *et al*. 2009: Table 5). Note the difference wet sieving makes to the total number of identified species.

Method of retrieval	**Hand sampling**		**Wet-sieving**	
Taxon	**NIS**	**%**	**NIS**	**%**
Cartilaginous fish				
Charcharchinidae indet. (unidentified requiem shark	5	2.7%		
Pteromylaeus bouinus (bullRAY)	3	1.6		
Rajidae indet. (unidentified ray)	2	1.1%	2	2.7%
Bony fish- marine		%		
Serranidae indet. (unidentified grouper, bass or perch)	2	1.1%		
Epinephelus spp. (unidentified grouper)	48	26.1%	4	5.3%
Carangidae indet. (unidentified jack)	3	1.6%		
Seriola dumerili (greater amberjack)	1	0.5%		
Sparidae indet. (unidentified sea bream)	13	7.1%	7	9.3%
Sparus aurata (gilthead sea bream)	3	1.6%	1	1.3%
Sparus pagrus (common sea bream)	4	2.2%		
Dentex cf. dentex (dentex)	1	0.5%	1	1.3%
Diplodus sp. (other seabreams)			2	2.7%%
Sarpa salpa (salema porgy)	2	1.1%		
Mugil cephalus (flathead grey mullet)	1	0.5%		
Sparisoma cretense (parrot fish)	1	0.5%		
Balistes carolienensis (grey trigger fish)	11	6%		
Bony fish- freshwater		%		
Tilapia zilli (redbelly tilapia)	1	0.5%		
Pisces indet.	83	45.1%	58	77.3%
Total	184	100.0%	75	100.0

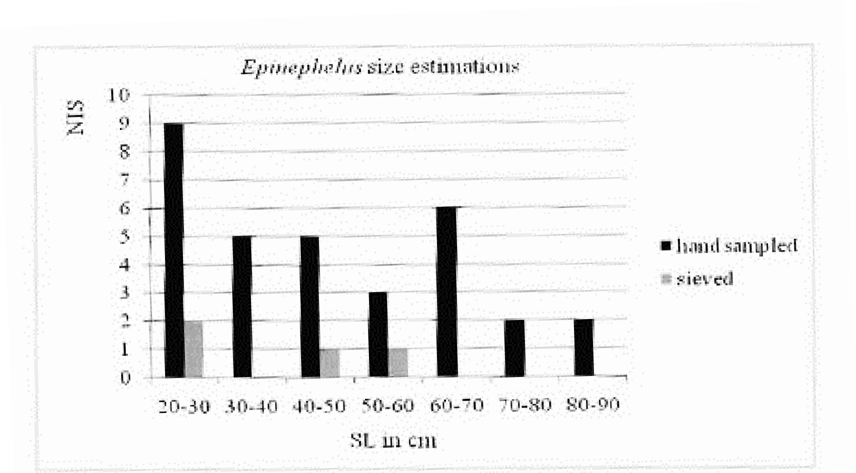


Figure 5.7-Size estimation of Epinephelus from Tell Fadous-Kfarabida (from Genz *et al.* 2009: Fig.22).

Sidon is another site where fish remains from the EBA are abundant (Figure 5.8). The total number of fish remains from Sidon is 157 (biggest concentration from the EBIII), of which more than 64% belong to the *Carcharhinidae* family (Doumet-Serhal 2006: 325). The most frequent fish taxa are groupers, sharks, carangids and sparids, similar to fish taxa from Tell Fadous-Kfarabida, except for the abundance of shark remains. The vertebrae of sharks identified belonged to individuals of at least one meter and a half in total length. As Van Neer (2006: 87) notes, the abundance of sharks

	stratum 3	stratum 4	stratum 5	stratum 6		
	EB II A	EB II B	EB III A	EB III B	EB III	EB sum
Marine fish						
porbeagle (*Lamna nasus*)	-	-	-	1 (+1?)	-	1 (+1?)
hammerhead shark (*Sphyrna* sp.)	-	10	1	74	13	98
sharks (Pleurotremata indet.)	-	-	-	1	-	1
groupers (Serranidae indet.)	1	3	1	13	2	20
greater amberjack (*Seriola dumerili*)	-	1	1	3 (+1?)	-	5 (+1?)
jacks (Carangidae indet.)	-	-	-	-	-	-
gilthead seabream (*Sparus aurata*)	-	-	-	-	-	-
common seabream (*Sparus pagrus*) / bluespotted seabream (*Pagrus caeruleostictus*)	-	-	-	-	-	-
seabreams (Sparidae indet.)	-	1	-	1	-	2
meagre (*Argyrosomus regius*)	-	-	-	1	-	1
mullets (Mugilidae indet.)	-	-	-	1	-	1
tuna (*Thunnus* sp.)	-	-	1	4	-	5
tunny (*Euthynnus* sp.)	-	-	-	-	-	-
grey triggerfish (*Balistes capriscus*)	-	-	-	-	-	-
Freshwater fish						
catfish (*Clarias* sp.)	-	-	-	-	-	-
catfish (*Bagrus* sp.)	-	-	-	-	-	-
Nile perch (*Lates niloticus*)	-	-	-	-	-	-
total identified fish	1	15	4	101	15	136
unidentified fish	1	-	1	3	1	6

Figure 5.8- Overview of Sidon's fish remains from the EBA (from Van Neer 2006: Table 1).

and of large carangids signifies that offshore fishing was well developed during the EBA. The remains of typical open water fish, *Seriola Dumerili* (amberjack) and tunnids, further support the theory of offshore fishing activities although these fish could occasionally enter coastal areas. Besides these fishes, remains of grouper and seabream taxa are found in abundance. These fish commonly inhabit inshore coastal waters (Van Neer 2006: 87-8). Furthermore, ten individual fish were associated with an oven and bronze hooks from the EBA building at Sidon (Chahoud and Vila 2011: 263). Although not chronologically relevant to this research, fish bones were also found in MBA tombs at Sidon. This use of fish as grave gifts can only indicate that fishing and fish had an important role in the lived and experienced space-time of EBA inhabitants, partaking in their symbolic and ritualistic practices. Sidon’s ichthyofauna is one of the earliest robust evidence for EBA exploitation of pelagic fish and shark in the eastern Mediterranean.

The site of Ashkelon, Afridar in the southern Levant (Figure 5.9), produced 98 fish remains for analysis. Of those fish remains, the skeletal elements for 68 were established (Lernau 2004: 299), while a taxonomic identification was possible for 54 bones. The identified bones belong to five fish families, four marine and one freshwater family (see Figure 5.10). The Seabass (*Serranidae*) family constitutes the majority of the assemblage. The *Serranidae* can reach a total length of 120cm, yet the bones identified at Ashkelon range between 44 to 70cm in length (Lernau 2004: 300). These fish

Figure 5.9- Aerial view of Ashkelon on the Israeli coast (from Stager *et al.* 2008: Cover Photo).

lived close to the shore among rocks. The second large family of fish identified is the *Sparidae* (Porgies). With an estimated average size of 40cm in total length, this family of fish lives in coastal lagoons (the *Sparus aurata* species) and inhabits shallow rocky bottoms or deeper waters according to fish size (the *Pagrus coeruleostictus* species). One bone of Askhelon's EBA fish remains belongs to the *Sciaenidae* (Drums) marine family, and one calcified vertebrae to a small shark (*Elasmobranchii* subclass).

Most of the fish bones from Ashkelon were found in pits that were dedicated for storage. It was suggested, based on the large number of fish heads found in the pits and the function of the area where fish remains were located, that processing activities took place such as drying, salting or smoking of fish (Lernau 2004: 302; Kansa, 2004).

Family	NISP*	MNI**
Serranidae (M)	32	16
Sparidae (M)	19	16
Sciaenidae (M)	1	1
Elasmobranchii (M)	1	1
Centropomidae (F)	1	1
Total	*54*	*35*

* NISP = Number of Identified Specimens
**MNI = Minimum Number of Individuals
(M) Marine fish
(F) Fresh-water fish

Figure 5.10- Identification of fish families at Ashkelon, Afridar (from Lernau 2004: Table 1).

The site of Azor yielded one bone of the *Epinephalus* specie (*Serranidae*). It was recovered from EBI deposits and originates from the Mediterranean Sea (Horwitz 1999: 36). The EBA remains of Nahal Besor (Site H) on the other hand, revealed the presence of saw-like bones which were identified by Macdonald (1932) as the spine of a mudfish, probably the Nile catfish- *Claria gariepinus*. This freshwater fish inhabits coastal rivers and may have inhabited the Nahal Besor river system (Horwitz *et al.* 2002: 110; Goldberg and Rosen, 1987).

The EBA strata (3-5) of the site of Nizzanim produced a large amount of fish bones, in total 40, indicating a dependency on the sea when compared to the total number of animal bones from the site (Figure 5.11; Yekutieli and Gophna 1994: 180).

Type	*Stratum*			*Total*
	1	2	3–5	
Equus sp. (horse/donkey)	0	0	12	12
Bos taurus (cattle)	0	0	13	13
Ovis aries (sheep)	0	0	3	3
Capra hircus (goat)	0	1	2	3
Caprovine (sheep/goat)	7	8	15	30
Sus scrofa (pig)	1	5	8	14
Fish	0	0	40	40
Chelonia sp. (sea turtle)	0	1	0	1

Figure 5.11-Distribution frequency of animal bones from Nizzanim (from Yekutieli and Gophna 1994: Table 2).

Remains of fish were found in limited numbers from the EBIB phase at Taur Ikhbeineh. Only four fish bones were discovered with no detailed information available (Horwitz *et al.* 2002: 112-116). At the site of Tel Dalit, one fish bone was retrieved from Stratum V, suggested to be from dried fish (Gophna 1996: 157); however, no specie was attributed the fish bone (Horwitz *et al*. 1996: 196, Table 2). The site of Tel Gezer yielded a single quadrate bone of a fish (Legge 1988: 39), whilst fish remains from the EBA at Tel Hesi represent alongside wild mammals and birds no more than 6% of the total assemblage of animal bones (Peck-Janssen 2006: 69). No additional information about the different species is provided.

Fish remains from Tel Kabri amount to nine and belong to three families: the *Serranidae* (seabass) of which three specimens were recovered, the *Mugilidae* (grey mullets) of which one specimen was found and the *Moronidae* (temperate basses). The *Serranidae* discovered at Tel Kabri are young and small fish that tend to be found amongst rocks at a depth of 5 to 50m. These fish were either caught using fishing rods or speared. The Grey mullets are about 35 to 48 cm. They were either caught in the open sea or in coastal rivers when their young ascend the streams and return as adults to the sea (Kempinski 2002: 410-414).Worthy of note is that the *Mugilidae* fish was found in a burial.

As for the site of Tel Qashish, ten fish bones were identified. They represent two marine fish families: the seabream (*Sparus aurata*) and the grey mullet (*Mugil cephalus*). All fish in the Tel Qashish sample are small and were common in the Mediterranean Sea’s inshore coastal waters (Ben-Tor *et al.* 2003: 433).

Although details from EBA sites regarding fish remains and their quantities is restricted as per the description above (Table 5.4), the available information provides us with valuable insights. The abundance of fish from Tel Fadous-Kfarbida, Sidon and Ashkelon evidently implies that fishing contributed to subsistence strategies. Yet, in combination with the consumption of molluscs, there is a lack of evidence to substantiate the existence of exclusively maritime communities. The animal economy of the EBA period is one dominated by typical Mediterranean domesticates, e.g. cattle, sheep, goats and pigs (Chahoud and Vila, 2011) with a considerable support of marine and wild terrestrial fauna to the subsistence (Genz *et al.* 2016: 94). The evidence from Sidon of fish remains associated with an oven and the possibility of drying, salting and smoking of fish at Ashkelon only corroborate the contribution of fish to EBA populations' diet. While *Serranidae* and *Sparidae* fish taxa appear to dominate the assemblage of fish remains, the situation at Sidon differs with almost 70% of hand-collected fish remains belonging to sharks. This percentage is exceptional. In congruence with the high number of cartilaginous fish remains and the large carangids found at Tel Fadous-Kfarbida, we can be certain of offshore fishing activities during the EBA. This implies a skilled knowledge of fishing techniques to capture large fish and the usage of sufficiently large boats that can accommodate at least two fishermen and the quantity of fish caught. With such evidence at hand, there is no doubt that EBA communities engaged with the sea on a regular basis, on a local scale and for purposes other than specifically seaborne trade.

5.1.3 Use of coastal rocks

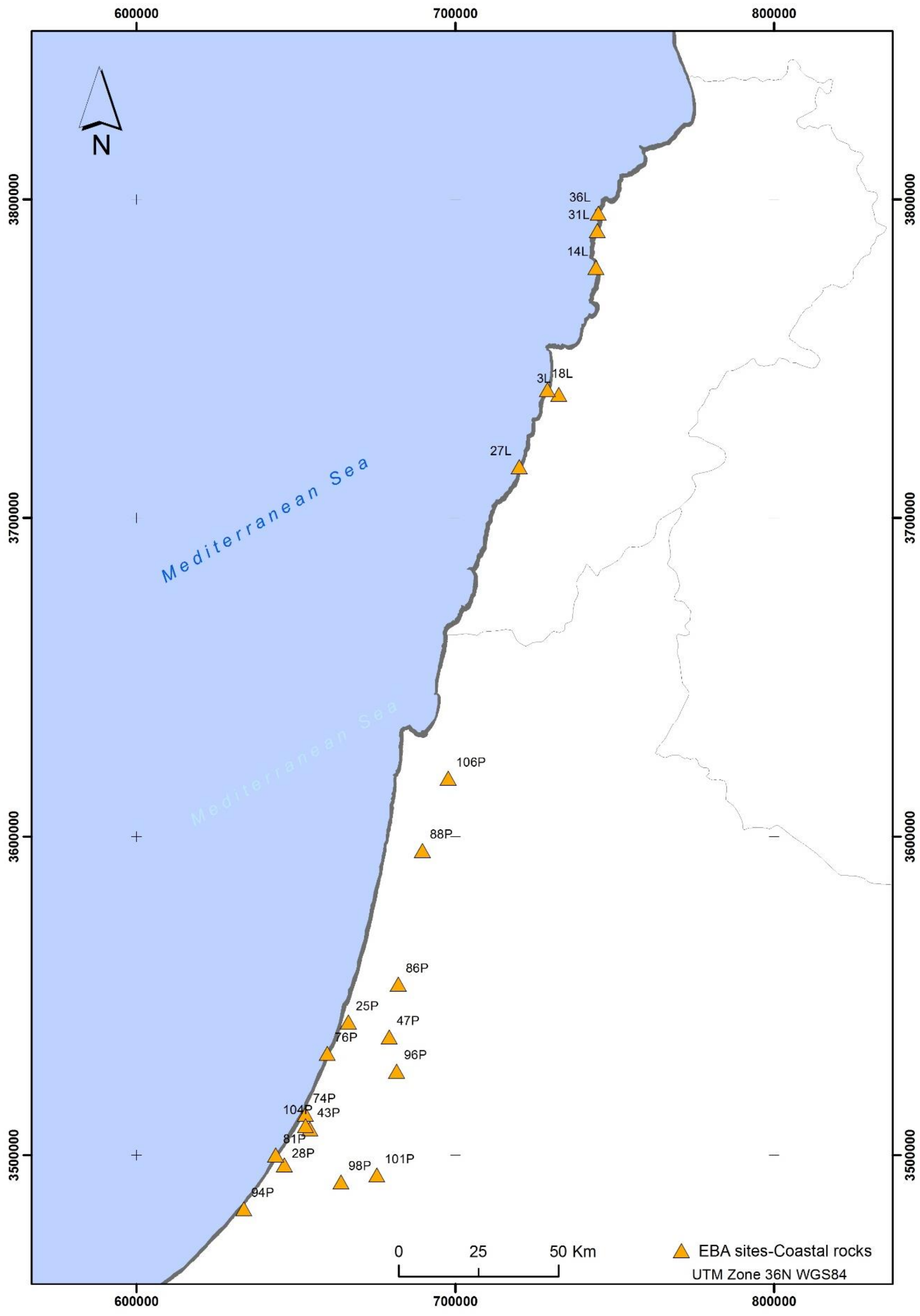
The geological formation of the Levantine coast is one dominated by limestone, which is not specific to the littoral zone but extends inland (Walsh 2013: 34). However, specific types of rock, in the form of coastal limestone (*Kurkar*, see below) and beach-rock are uniquely found in the coastal region (unless found inland via exchange). The significance of the use of coastal rocks here is in its direct association to the coastal area. Indeed, coastal rocks are located within easy access to the local inhabitants. Nonetheless, the use of coastal rocks for local purposes during the EBA suggests knowledge and appreciation of the coastal environment and its characteristics. Coastal rocks were used either in the building of structures or in the making of artefacts. This included the use of beach-rock or river pebbles and gravel, and a material known as *kurkar* or *ramleh* (Figure 5.12; Milevski 2005: 156). *Kurkar* is a coastal limestone rock composed of lithified sea sand dunes. *Ramleh* is the equivalent term for the same type of rock; however, the term *Ramleh* is employed mainly in the central Levant, Lebanon, whereas the term *kurkar* is predominantly employed in the southern Levant. *Kurkar* ridges are dunes formed parallel to the coastline under the force of the wind (Tsoar 2000: 189). The accumulation of sand occurred as far back during the Late Pleistocene and has been shaped ever since by changing sea-levels and wind patterns (Tsoar 2000: Fig.3). They were originally in the form of foredunes along the Levantine coast where vegetation managed to thrive. Nonetheless, because of human activity along the coast, these foredunes progressively eroded and transformed into transgressive dunes similar to the sand dunes found today along the Levantine littoral zone (Kadosh *et al*., 2004). Beach-rock on the other hand is a sedimentary rock located on the Mediterranean coast and composed of shells, pebbles, sand and kurkar (Mazor 1980: 132). Of the EBA sites that show evidence for more than three indicators for maritime activities, four sites attest for the use of coastal rocks as a building material, ten in the making of tools and three for ornamental purposes (Table 5.6, Map 5.4). It is worth noting here that the following data description relies on evident remains and on the availability of analyses regarding the make-up of material culture which clearly state the use of beach-rocks or *kurkar*.

Figure 5.12- Kurkar dune beneath Tel Ashkelon in the southern Levant. Credit: 2013 TrentandRebekah.com.

Table 5.6- Summary of coastal rocks found at EBA coastal Levantine sites.

ID	**Site**	**Brief Description**	**Building material**	**Tools**	**Decorative**
31L	Tell Fadouos Kfarabida	Beach pebbles, *ramleh* for the making of groundstone objects and beach rock for producing beads.	x	x	x
27L	Sidon (College Site)	Beach gravel was used for the making of chipped stone tools.		x	
14L	Byblos	River-smoothed pebbles were used in the floors.	x		
6P	Ashkelon, Afridar (west)	Mudbrick of circular structures included *kurkar* chips. Beach-rock and kurkar grinding tones and slabs.	x		
74P	Nizzanim	*Kurkar* stone piles and flat kurkar slabs as well as unhewn kurkar building stones. Perforated *kurkar* palette.	x		x
94P	Tell es Sakan	*Kurkar* grinding and heavy tools.		x	
106 P	Tel Qashish	Beach-rock artefacts, mainly grinding stones.		x	
47P	Lod	Beach-rock and *kurkar* artefacts.		x	x
76P	Palmahim	Beach-rock artefacts, mainly grinding stones.		x	

88P	Tel Assawir	Beach-rock artefacts, mainly grinding stones.		x	
96P	Tel Gezer	Beach-rock artefacts, mainly grinding stones.		x	
98P	Tel Hesi	Beach-rock artefacts, mainly grinding stones.		x	
101 P	Tel Lachish	Beach-rock artefacts, mainly grinding stones.		x	



Map 5.4- Distribution of all EBA coastal sites showing evidence of the use of coastal rocks.

Two sites along the southern Levantine coast demonstrate the use of *kurkar* or *ramleh* as part of the ensemble of building material. At Ashkelon Afridar (West), a site set on a *Kurkar* hill, the mudbrick of circular structures (later phase of the EBI) included *kurkar* chips. This mudbrick material composed of *Husmas* soil and white *kurkar* chips, according to Golani and Yannai (2016: 29-30), was durable and better suited to withstand the erosive forces of wind and rain. *Kurkar* stone piles and flat *kurkar* slabs as well as unhewn *kurkar* building stones were also found at the sites of Nizzanim (Gophna and Yekutieli 1994: 164).

Beach-rock material on the other hand was used in the making of tools and artefacts, and as part of the building material. At Tell Fadous-Kbarabida, beach pebbles were used for abrading and polishing, *ramleh* for the making of groundstone objects and beach-rock for the production of beads (Genz *et al*., 2009; Genz *et al*., 2016). Conversely, Byblos attests for river-smoothed pebbles, used in the floors of EBIA rectangular houses (Nigro 2007: 26). While at Sidon, beach gravel was used for the making of chipped stone tools (Doumet-Serhal 2006: 291). In the southern Levant, a perforated *kurkar* palette was found at Nizzanim, which may have formed a piece of a figurine (Gophna and Yekutieli 1994: Fig 17.1). The site of Lod shows evidence for the production of beach-rock and *kurkar* artefacts (EBI-II), representing respectively 4% and 1% of the ground-stones (Paz *et al.*, 2005; Milevski 2005: 205). Palmahim, Tel Aphek, Tel Assawir, Tel Gezer, Tel Hesi, Tel Lachish and Tel Qashish all have evidence for beach-rock artefacts, mainly grinding stones (Milevski 2005: 152; Kochavi *et al.*, 2000; Seger 1988; Neri, 1994; Ussishkin, 2004). From Tell es-Sakan, *kurkar* grinding and heavy tools were found (de Miroschedji *et al*. 2001: 89). Additionally, the site of Ashkelon, Afridar evidences for several beach-rock and *kurkar* grinding stones and slabs in Areas E, F, G and J (Braun and Gophna 2004: 216).

The distribution of beach-rock and *kurkar* objects extends further inland. As such, they indicate connections between coastal and inland sites. Milevski (2005: 156-159) traces the distribution of *kurkar* artefacts in the southern Levant. In his analysis, Milevski concludes that the distribution of *kurkar* is confined to an area no more than 35km from the coast. Hence, it was possible for people from sites at a distance from the coast to travel and quarry the material themselves[25]. Alternatively, Milevski suggests that local inhabitants controlled the quarries and were in charge of the quarrying and the production of objects.

The majority of coastal rocks according to the evidence described above and as shown in Table 5.6 were used as tools, mainly as grinding objects. Perhaps their use as a building material was less documented, or simply not observed. The use of coastal rocks nonetheless reveals an important,

[25] Unfortunately, to date, information about the scale of quarrying of coastal rocks and methods employed is lacking.

mundane connection with the coastal maritime space that does not necessarily suggest major occurrences; yet, it is in these local and small details, however, that an authentic engagement with the sea and with maritime space becomes known. The presence of coastal rocks at EBA sites is suggestive of the activity and practice of extracting these rocks (mainly *Kurkar* since it is a harder material than beach-rock), namely, investing effort and time in the coastal zone where these rocks are found, and the coming together of individuals in the performance of their tasks. The coast then becomes a hub, a place of practice, where many space-time paths amalgamate in Hägerstrand's (1973) terms, not only in the performance of certain types of activities such as fishing and shell gathering, but also for the extraction of coastal rocks. Thus, the use of coastal rocks during the EBA adds another layer of depth to our understanding of human engagement with the sea and with the coast.

5.1.4 Miscellaneous maritime evidence

A range of direct maritime indicators, distinct from the previous three sub-categories, was found at EBA coastal sites, though in scarcity (Table 5.7). This includes evidence for the remains of marine turtles, of hippopotamus, as well as anchors and island occupation. The value of these indicators, though not obvious apart from the anchors and island occupation, is in their association to small-scale coastal, maritime activities, which allows us to understand engagement with the sea in all of its forms. It is true that these indicators are not ground-breaking, but this is where the premise of this research lies, in representing and portraying the various folds of maritime activities in order to offer an alternative path(s) to broad accounts of EBA maritime engagement.

Marine turtles and hippopotamuses are aquatic resources that contributed to EBA subsistence life; they were also used in the making of artefacts, such as the use of hippopotamus ivory in cylinder seals. Sea turtles and hippopotamuses patterns of living differ greatly, but they both live in watery environments. Whereas sea turtles inhabit coastal areas and the sea, hippopotamuses live in areas abundant in water, on the coast, or next to rivers and lakes. Henceforth, their capture entails an engagement with aquatic life and an understanding of seasonal rhythms, especially for marine turtles, which can be caught while the females are nesting onshore during the nesting season.

Table 5.7- Summary of miscellaneous direct maritime evidence.

ID	Site	Turtle	Hippopotamus	Anchors	Island occupation
31L	Tell Fadouos Kfarabida	89 specimens (Green and Loggerhead turtles).	Hippopotamus ivory cylinder seal.		
27L	Sidon (College Site)	173 specimens mainly of the Green turtle.	Bones with signs of butchering.		
14L	Byblos			Anchors used in the construction of a step leading to a temple.	
41L	Tyre				Island occupied during the EBA
74P	Nizzanim	*Chelonia* species.			
94P	Tell es Sakan		Four butchered hippopotamus.		
90P	Tel Dalit		Bones from the EBII.		
96P	Tel Gezer		Bone remains.		

5.1.4.1 Sea Turtles

Sea turtles, although physiologically adapted to live at sea, depend on coastal environments during their most vital phases of nesting and incubation. Of the sea turtle species, the Green Turtle, *Chelonia mydas* and the Loggerhead turtle, *Caretta caretta*, are most abundant in Mediterranean waters (Figure 5.13; Camiñas *et al.*, 1995). The present standing of sea turtles in the Mediterranean is dependant on the scale and intensity of local exploitation combined with disruption to marine and coastal habitats (Casale and Margaritoulis, 2010). Knowledge of migration and nesting patterns, as well as the frequency of species in particular habitats from the EBA, is largely limited, if non-existent. Such a study requires a large database of sea turtle remains that can be spatially and temporally interrogated. Modern-day data relating to sea turtles' patterns of nesting and distribution differ significantly from past times. Figure 5.14 portrays the distribution of nesting sites of sea turtles in the Mediterranean. This distribution is based on a comparison between historical and modern data. It shows a distinct pattern of nesting for Green Turtles, which at present is restricted to the southeast coast of Turkey, whereas in previous times, the Levantine coast had afforded nesting sites. This striking temporal and spatial distinction prohibits any on-the-go comparison between ancient and modern sea turtle nesting and migration patterns. Henceforth, evidence for EBA sea turtle exploitation requires a comparison to patterns of that time which is, in this case, not feasible given the absence of a baseline study. Nonetheless, sea turtle exploitation during the EBA remains a strong indicator for engaging with marine and coastal life.


Figure 5.13- Mediterranean Loggerhead (left) and Green Turtle (right). (From IUCN, 2017).

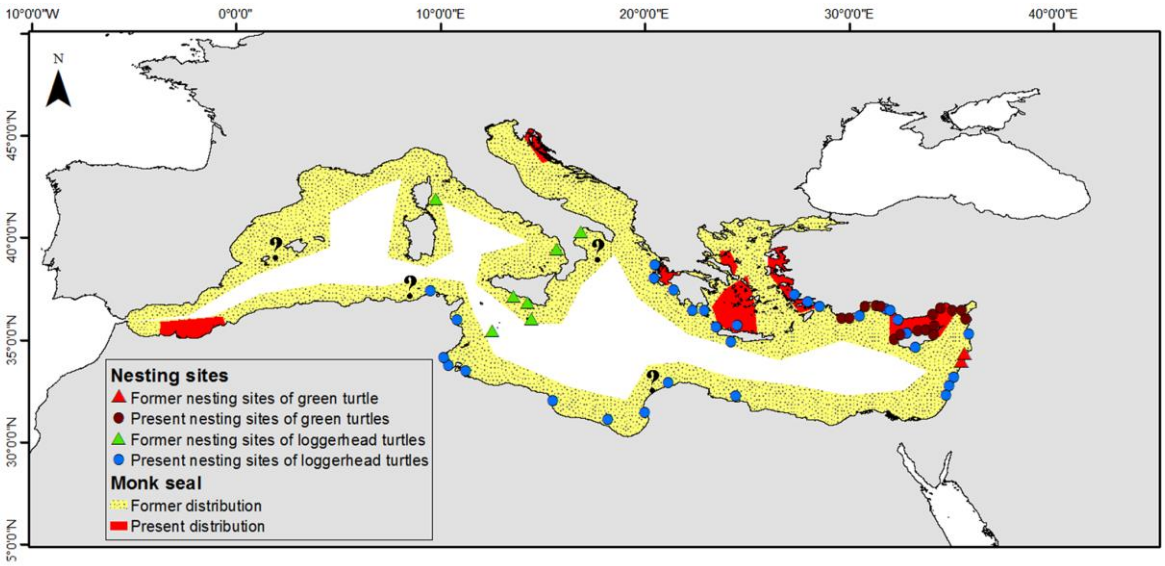


Figure 5.14-Distribution of nesting sites of sea turtles in the Mediterranean. Note the present and former nesting sites along the Levantine coast (from Coll *et al*. 2010: Figure 9).

Two sites on the central Levantine coast, Tell Fadous-Kfarabida and Sidon, yielded sea turtle remains from the EBA. At Tell Fadous-Kfarabida, 89 specimens represent marine turtles (*Cheloniidae*). Species identification was not carried out, however, the presence of *Chelonia mydas* (Green Turtle) and *Caretta caretta* (Loggerhead turtle) was verified (Genz *et al.* 2009: 90). According to the assemblage of skeletal remains of sea turtles at the site, especially the overrepresentation of forearms, Genz *et al.* (2009: 90) conclude that a degree of the schlepp effect[26] was in place whereby

[26] Schelpp effect indicates the butchering process in which the nutritional parts of the animal are piled on the lower limb bones and transported/dragged to the site.

the nutritional parts of the carcasses were transported more frequently to the settlement in contrast to the heavy and less nutritional parts of the shell. The turtles may have been caught offshore or onshore during the nesting season. Nonetheless, given the relatively small sample of remains and the absence of a large phalanx from a male turtle, turtle exploitation at the site cannot be fully understood yet.

At the site of Sidon, more than 173 specimens belonging to sea turtles were discovered. These mainly represent the *Chelonia mydas* species (Doumet-Serhal 2006: 315). The turtle bones show traces of butchering- knife cuts. They may have been caught offshore or during the spring season when the *Caretta caretta* and the *Chelonian mydas* are known to nest (Harrison 1968: 222-225). From the southern Levant, only the site of Nizzanim produced sea turtle bones of the *Chelonia* species (Yekutieli and Gophna 1994: 180).

5.1.4.2 Hippopotamus remains

The presence of hippopotamus remains at archaeological sites is rarely recognised as an indicator for maritime activities. However, hippopotamuses are aquatic mammals and their population is restricted to coastal and riverine habitats. Their ideal aquatic habitats are those with deep water and adjacent to grassland and reed beds. In Old Kingdom Egypt, hippopotamuses were hunted or speared from boats as is shown on the depiction from the wall relief of the EBA mastaba tomb of Ti (Figure 5.15).

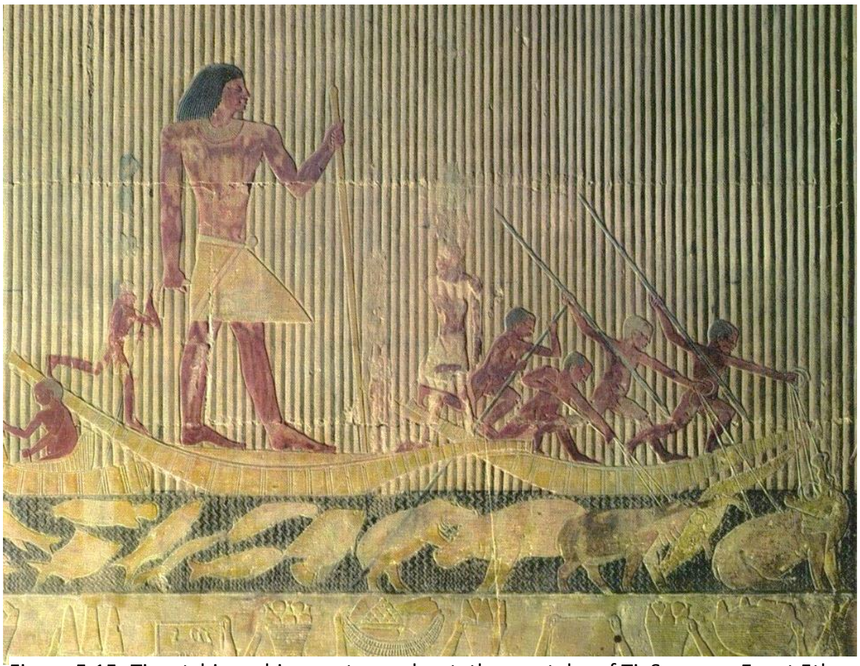


Figure 5.15- Ti watching a hippopotamus hunt, the mastaba of Ti, Saqqara, Egypt 5th dynasty. Painted relief on limestone. Credit: University of Pennsylvania Museum of Archaeology and Anthropology 2017.

Hippopotamus' populations are highly specialised and restricted in their mobility and habitat. They moved into the Levant from Africa during the Pliocene as documented in the archaeological record

(Martínez-Navarro 2004: 43). The presence of their bones at archaeological sites could indicate the animal's habitat proximity, whereas isolated teeth or worked ivory involves trading in that material (Horwitz and Tchernov, 1990).

Hippopotamus bones from the site of Tell Fadous-Kfarabida are absent; however, a cylinder seal made out of hippopotamus ivory was found (Figure 5.16). The seal's picture is framed by a herringbone motif. Between the frames are two registers of objects similar in shape to anchors. These were interpreted as rams head burcania (Genz *et al*., 2015). Another shape depicted on the cylinder seal can be interpreted as fish, which is common in the EBA glyptic of the Levant (Ben-Tor 1978: Figure 16:1-3; Thalmann 2013: 280). Given the absence of hippopotamus bones, this cylinder seal might be the object of trade, imported as a finished object or made out of imported raw ivory.

Figure 5.16-Cylinder seal made out of ivory. The impression depicts rams head and fish motifs (from Genz *et al*. 2015: Fig 26).

Sidon yielded several hippopotamus bones (13 to 20) that show signs of butchering (Doumet-Serhal 2006: 312). As for Tell Dalit in the southern Levant, hippopotamus bones were found in a broadroom from the EBII (Horwitz *et al.* 1996: 197). Tell es-Sakan produced the remains of four butchered hippopotamus (de Miroschedji *et al.* 2001: 98), while bone remains were found at Tel Gezer (Horwitz and Tchernov 1990: 71-78).

Although hippopotamus remains from the coastal Levant are not copious, and little information is present regarding how the animals were hunted on the coast, still their presence at coastal sites from the EBA is important to note for it implies the undertaking of hunting activities in an aquatic environment. Furthermore, the hippopotamus' tusks are a valuable source of ivory and their presence inland, although not in the scope of this research, can provide insights on coastal and inland trade and connections.

5.1.4.3 Anchors

Apart from the above turtle and hippopotamus remains, a significant find dating to the EBII-III was found at the site of Byblos. It consists of six chalk anchor replicas of non-uniform size and shape that were used in the construction of a step leading to the Tower Temple (Figure 5.17; Marcus 2002: 408; Frost 1969: 429, 1970: 384). Frost (1970: 384) notes that these anchors were never intended for use at sea; their surface is smoothly dressed unlike their unfinished backs. Their different sizes and shapes appear to reflect the stone anchors that are usually carried on a single boat. Although these anchors were used as steps, their presence at the entrance of a temple supports the importance role of seafaring in the lived, symbolic and experienced space of EBA inhabitants. This, most probably, was an intentional act of bridging one aspect of life and activities that took place on water to a symbolic, religious and ritualistic realm. Not only that, but these anchors also corroborate a tradition of seafaring that was well in place, pre-dating the temple which, according to Egyptian finds, is well-dated to the twenty-third century BC (Frost 1970: 384). Indeed, many anchors were found on the Levantine coast and offshore (Frost, 1970; Lucy Semaan pers. Com). However, anchors located on the seabed tend not to be associated with a particular context so as to assign them to a specific chronological period.

Figure 5.17-Five anchors forming a step leading to the Tower Temple at Byblos (Frost 1970: Plate 2A).

5.1.4.4 Island occupation

Occupation of islands during the EBA is a direct indicator for maritime activities as it implies transportation by boats between the island and mainland. The site of Tyre on the Levantine coast demonstrates this case. Although Tyre did not produce any remains that indicate direct maritime activities, the site's location is in itself an implication. Tyre is recognised during the Iron Age as one of the main Phoenician cities. It is first attested in the execration texts of the nineteenth century BC (Pritchard 1975: 329). Poidebard (1939) and Frost (1971) initiated the study of Tyre's harbour works; subsequently, multidisciplinary investigations have revealed the nature of its ancient harbour (Carayon *et al*., 2011; Noureddine, 2010; Noureddine and Helou, 2005, 2010; Marriner, 2009; Marriner *et al*., 2008). Tyre was an island until the arrival of Alexander the Great around 333 BC when a causeway was constructed from the mainland to the island in order to seize the city. The actual outline of the island from around 8000 BP to present day coastal morphology was reconstructed using geoarchaeological data (Figure 5.18; Marriner, 2009; Marriner *et al.*, 2008).

Earlier occupation dating to the EBA was confirmed during Bikai's survey and excavation in 1974-75. Strata XXVII to XXI constitute the EBA layers, and Strata XX to XIX represent the EBIV layers. Within these strata, Bikai uncovered a corner of a building in stratum XXII consisting of two walls, along with a plastered floor and pillar bases (Bikai 1978: 5-6). Other wall fragments were also uncovered and EBA pottery was recovered. Figure 5.19 shows Bikai's excavation area. Noticeably, the location of this excavation area at the westerly side of Tyre was, prior to Alexander the Great's causeway, an island. The EBA occupation was the earliest occupation discovered by Bikai. This indicates that during the EBA, regardless of how big of a settlement it was, Tyre, the island, was occupied, and its inhabitants had to cross a body of water, though shallow (3 to 15m of depth, see Figure 5.18), to reach the mainland counterpart. This information about Tyre during the EBA tends to be dismissed from archaeological narratives, though it can be ranked as one of the most important indicators of maritime activities from the Levantine coast. Tyre's inhabitants were able to cross the water on a regular basis, suggesting that a standing tradition of handling boats, of anchoring, of local knowledge of weather conditions and of maritime affordances was already in place.

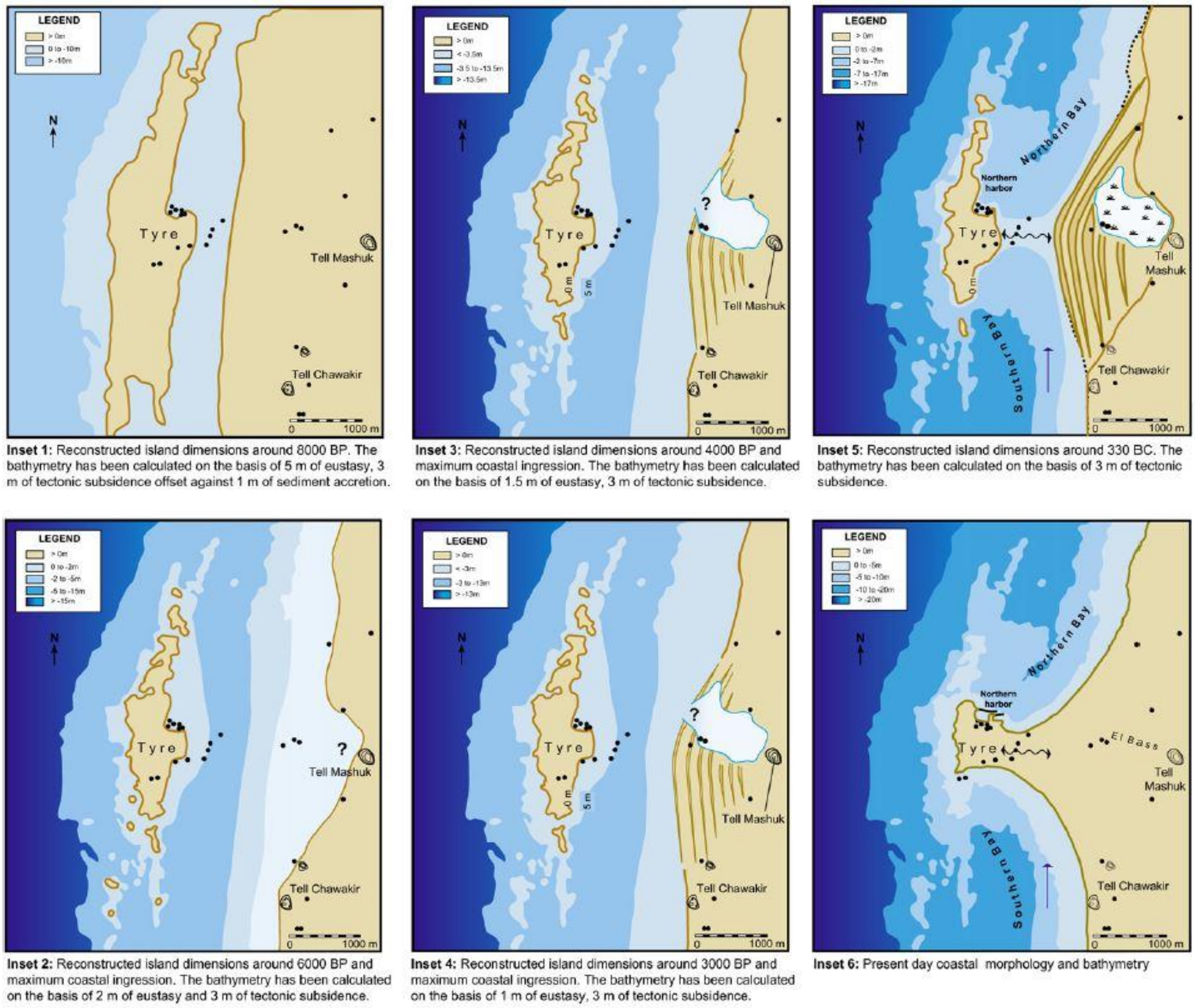


Figure 5.18- Tentative reconstruction of Tyre's ridge based on relative sea-level variations. Not the sea-level on Inset 1,2,3 which would cover the EBA period (from Marriner *et al.* 2008: Fig 11).

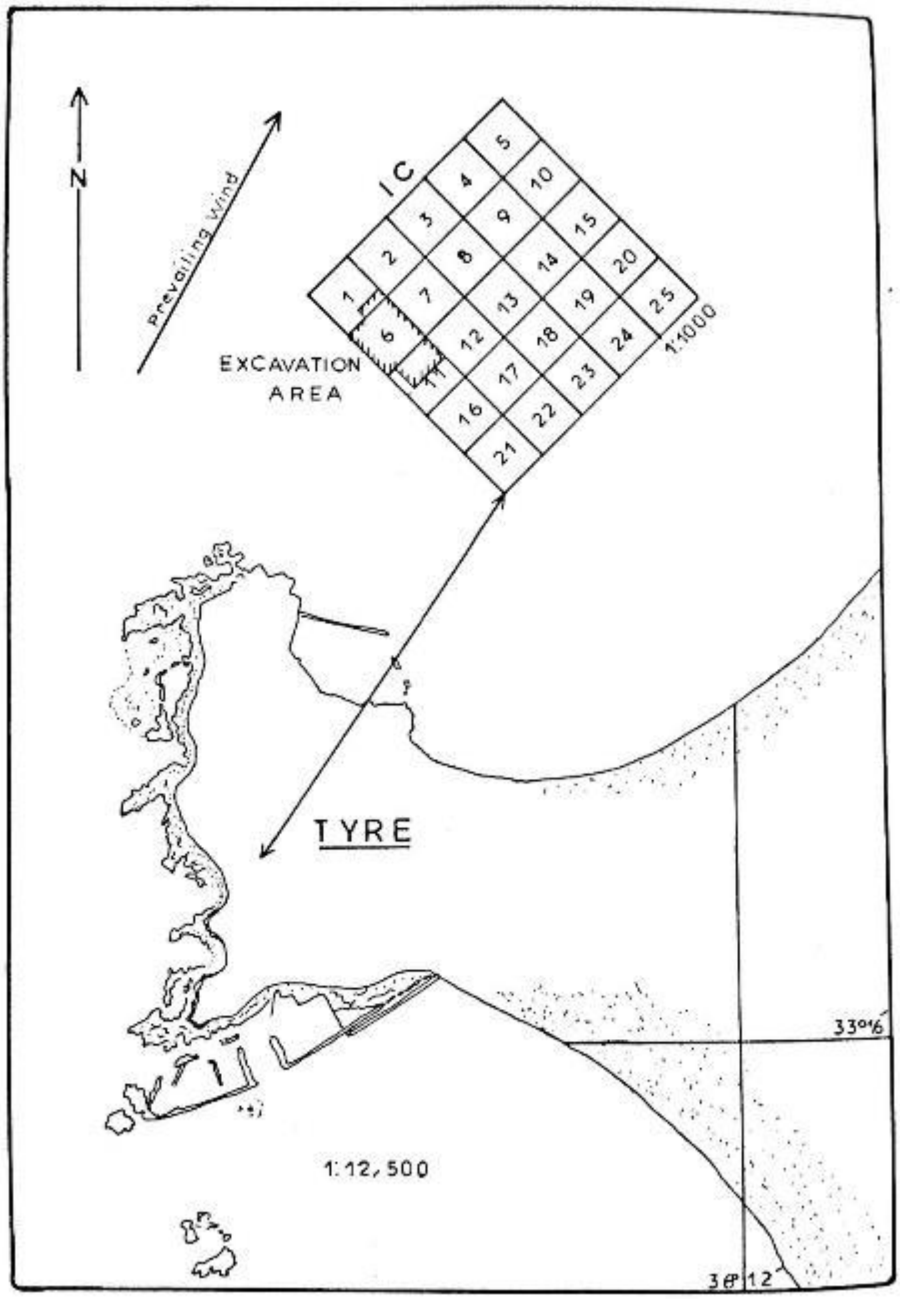


Figure 5.19- Map of Tyre's excavation area (from Bikai 1978: Plate LIX).

5.1 Bundles of maritime activities

The list of direct maritime evidence discussed so far reveals a strong engagement with the sea during the EBA that relates to local daily activities. Fishing, gathering shells, the use of coastal rocks, catching sea turtles, hunting hippopotamuses, displaying/using anchors and movement between the mainland and an island all reflect aspects of a lived and fluid space. These bundles of activities were narratively and spatially described, but how can they actually inform us about maritime specialisation, intensity of activities, integration and complexity during the EBA?

The nature of direct maritime activities is multi-faceted and its corresponding archaeological record is variable in space and in quantity. Nonetheless, we can infer that EBA maritime traditions were relatively developed. Fishing in open waters, as corroborated by the remains of sharks and large fish, implies the use of boats adapted for the requirements of this performance, and venturing out at sea. Furthermore, the island occupation of Tyre suggests a mundane use of boat transportation needed to commute back and forth to the mainland. The remains of shells, coastal rocks, turtles and hippopotamuses all indicate an adaptation to the coastal environment and an imbued knowledge of its affordances. For EBA inhabitants, land and sea were not two separate entities, they were the make-up of their lived space. The nature of engagement with the sea was not restricted to material/consumption/transportation needs. The ritualistic and ornamental use of shells and the placement of anchors at the entrance of a temple at Byblos denote that the maritime world infiltrated EBA representational spaces and had meaningful connotations to everyday life. Indeed, the nature of engagement with the sea during the EBA is least surprising since it began at much earlier times in the eastern Mediterranean (Broodbank 2002, 2006, 2013). Yet given the scarcity of archaeological evidence from the previous Neolithic period on the Levantine coast regarding maritime activities, and the trend in archaeological Levantine research of focusing on maritime activities indicative of trade, the local activities described in this chapter fill some gaps in archaeological representations of EBA communities. Furthermore, the sea's soundscape analysis of Chapter IV, Section 4.3.4, reveals 20 sites whose exposure to the sound of sea waves is significant. However, of these sites, only four sites show more than three types of direct maritime evidence. This may indicate the lack of engagement with the sea for all of the 16 sites, yet it more reasonably implicates the scarcity of data regarding maritime-related material culture from the EBA coastal Levant, and the need to further develop, in future endeavours, the maritime database.

The resolution of available data on direct maritime activities lacks consistency and information regarding the frequency of activities. Furthermore, the lack of evidence or its scarcity may be a by-product of recovery methods rather than an actual illustration of the EBA situation. These problems are common to archaeological studies especially those that deal with a variety of data and with more than one archaeological site, as well as sites excavated some years previously. In order to reconstruct or represent the rhythms of maritime activities and make inferences about the intensity of engagement with the sea, we require knowledge of time in relation to those activities. In such a way, a Time-Space Geography reconstruction becomes possible. However, the available record only informs us about the bundles of activities rather than time-space pathways. A time depth understanding of changes throughout the EBA, from the EBI to EBIV, is not feasible with the quality, dearth and resolution of available data. So far, these bundles of activities are somewhere in space and time as shown on Figure 5.20. The only valuable connection they have is to the spatial location of sites on a Cartesian plane. The bundles, however, constitute space-time surfaces of interaction, although undefined; hence, they are conductors of relations and associations between people.

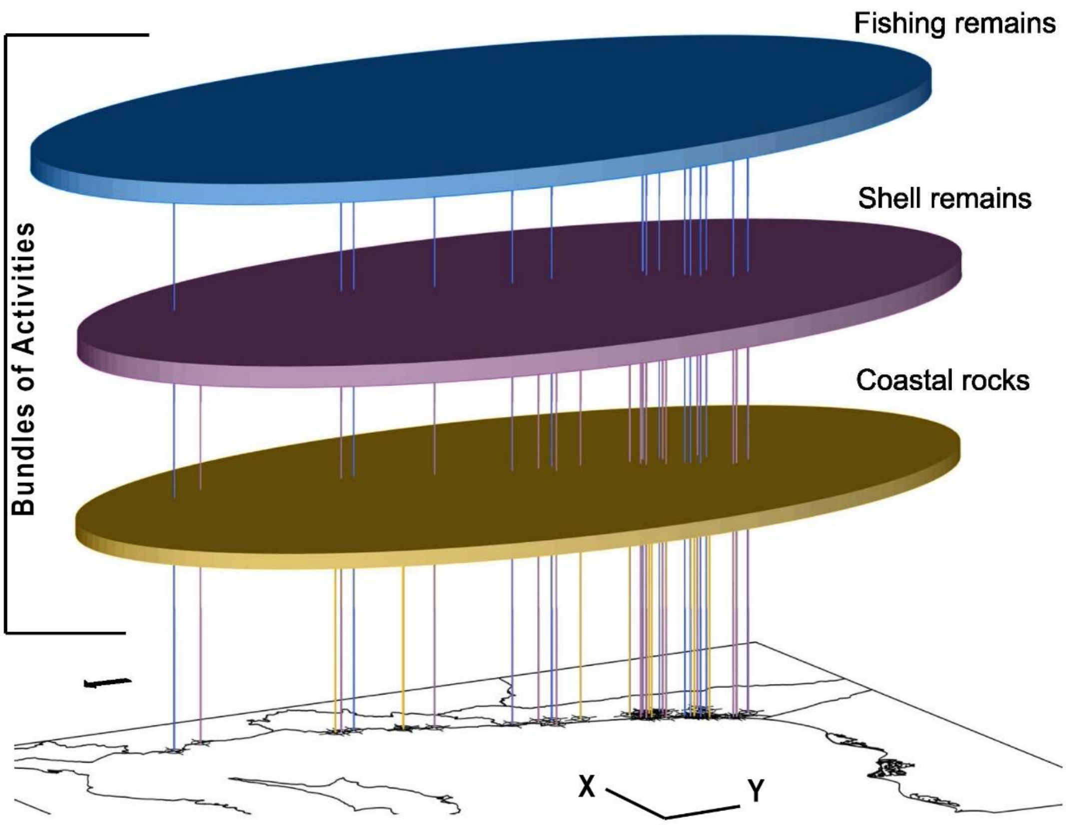


Figure 5.20- Model of the maritime activities' bundles (the three main maritime activities) in relation to the spatial location of EBA sites.

The three main direct maritime activities referenced on Figure 5.20 (according to the number of sites engaged in those activities) reveal an insight into the intensity of activities along the Levantine coast, when spatio-temporally mapped[27] (Map 5.5). The degree of density/intensity when relatively high can be interpreted as a disposition towards maritime specialisation, denoting places that are more likely to have developed maritime connections. A comparison between Map 4.5 (density of EBA sites within a 6 hours window of walking time) and Map 5.5 shows that high maritime density areas (density > 5 on Map 5.5) correspond to the third class (mean to +1/2SD) on Map 4.5. This entails that relatively intense maritime activity is occurring within a space that is densely settled. Indeed, this may simply be a reflection of the number and distribution of sites, however the evidence for maritime activity adds another layer that confirms the interconnectedness of sites.

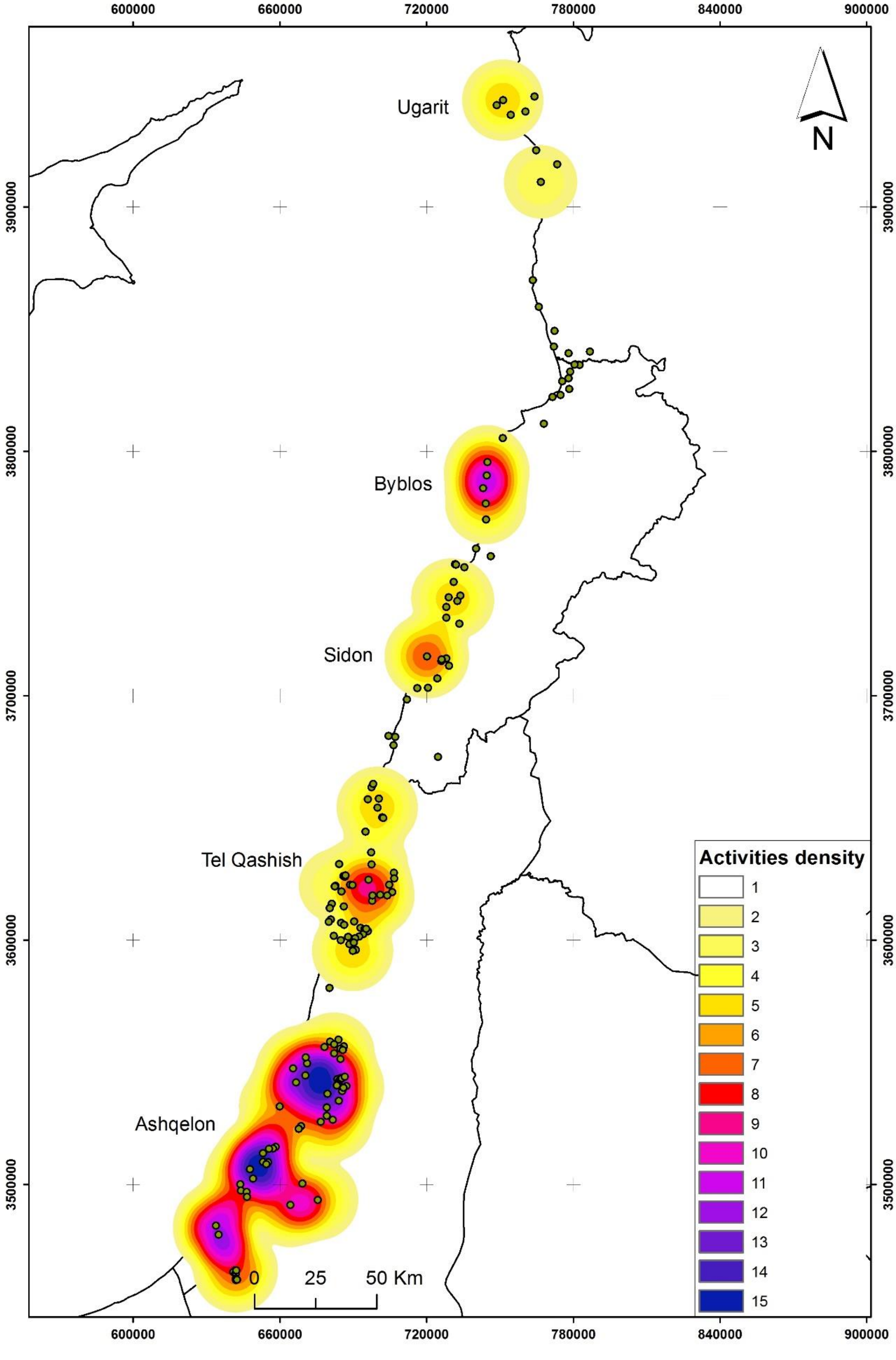
On Map 5.5, An apparent high intensity area lies in the south of the southern Levant, in the vicinity of Ashkelon. This area is known for its intense interaction with Egypt during the EBI (see Chapter II, Section 2.5.1) and have benefited from extensive excavations. Although there has been little consensus on the nature of that interaction, the contact between Egypt and the southern Levant peaked during the EBIB and declined thereafter (Sowada 2009: 11; de Vaux 1971: 232; Porat, 1989; Ward ,1991). The overland route between Egypt and this area of the southern Levant has been emphasised as the platform of connection (Stager 1992: 40; de Miroschedji 2002: 41), while the maritime Egyptian-Levantine route has been inferred rather than demonstrated for that chronological period (Galili *et al.*, 2013; Raban and Galili, 1985). Although this topic is better explored in light of the potential maritime evidence of the next section, it is worth noting here that the intensity of maritime activities in that region of the southern Levant known for its connection with Egypt (Map 5.5) during the EBI supports a maritime platform for transportation and connection, or alternatively an equal role for maritime transportation to land transportation. Furthermore, given that inhabitants of the coastal southern Levant engaged frequently with the sea according to the direct maritime evidence, a standing maritime tradition can be surmised. Therefore, it is within reason to consider that those maritime activities extended to involve seafaring especially with the presence of three natural harbours in that region, Tel es-Sakan, Ashqelon and Jaffa (see Appendix G).

Another dense area for maritime activities emerges in the southern Levant, but further north, in the confines of Tel Qashish. In this area, Tel Megadim serves as a known natural harbour (see Appendix G). Additionally, the stretch of this dense area is not far from the submerged Pre-Pottery Neolithic site dating to the end of the seventh millennia BC, Atlit Yam (Galili *et al.,* 1993). Atlit Yam is one of the earliest fishing villages on the Levantine coast with 6644 fish bones recovered from the site, the majority of which belong to the *Balistidae* family, triggerfishes. This fishing village exhibited a mix of subsistence strategies, as is known to the Levantine region, including herding, farming and fishing.

[27] Kernel Density analysis was carried out in GIS taking into consideration the same parameters as described in Chapter IV, Section 4.3.3. Hence, time of movement in the vicinity of sites was accounted for in the radius parameter of the density analysis.

This cumulative effect of fishing activities and engagement with the sea over a long period of time at this location indicates nothing less than well-founded maritime strategies and technologies (Galili *et al.,* 2004).

Further north on the Levantine coast, dense bubbles of maritime activities form near the EBA sites of Sidon, Byblos and Ugarit, known for their natural shelter. These sites have benefited from extensive archaeological research; knowledge of Byblos' relation to Egypt is widespread, and the importance of the maritimity of Sidon and Ugarit in later periods of the Bronze Age and Iron Age is well established (Redford, 1992). The bundles of maritime activities, however, break down the sole emphasis on these major sites; they present us with spaces where maritime integration took place. Regardless of the fact that Byblos, Sidon and Ugarit's later history points towards maritime specialisation, and they provided sufficient shelter for boats and ships, it is within the density areas that maritime interaction took place. Those activity bundles supported the movement of people and inter-relations, especially since maritime activities entail access to the sea and movement along the coast. While for instance the site of Tell Fadous-Kfarbida is considered to be second in tier to Byblos within a hierarchical system of economic and political organisation during the EBA (Genz 2014; Genz 2016), the considerable evidence for maritime activities at the site, significantly fishing, brings into focus maritime aspects of interactions between these sites, that are overlooked, but may have had a role in their political and economic organisation. Maritime specialisation could have taken several forms during the EBA and maritime interaction did not necessarily fall into a hierarchical system.



Map 5.5- Direct maritime activities density. Classes reflect a natural break classification into 15 divisions. The density analysis had as input EBA sites that show at least one direct maritime evidence of the main three types: shell remains, fish remains and use of coastal rocks. The number of types of evidence for every site constituted the scale factor for the density analysis.

5.3 Potential maritime evidence

Following on from the previous section on direct maritime evidence, which, at the most basic level, suggests that EBA people were active agents engaging with their marine surrounding, potential (indirect) maritime evidence will be presented here since it complements our understanding of maritime interactions, specialisation and intensity that has transpired thus far. Furthermore, potential evidence for maritime activities provides us with a better understanding of the possible connections and extant of the maritime world during the EBA. Whilst the previous section provided evidence that shows a direct physical engagement with the maritime environment, this section looks mainly at the network of connections between EBA sites and regions based on the provenance of material culture, since maritime transport may have been at the basis of the functioning of that network. Hence, this section presents the provenance of material culture, including pottery, lithics, stones, fauna and flora, when not sourced from the vicinity of sites. The body of evidence presented here will feed into the discussion in Chapter VII in light of the space-time mappings of the performance of seafaring put forth in Chapter VI.

In summary, 28 EBA sites reveal potential maritime evidence (Appendix F) relating to the non-local provenance of pottery (14 sites), of flint (8 sites), of fauna (13 sites), of stones (3 sites), of obsidian (2 sites) and of other artefacts such as figurines, axes, pins, etc. (11 sites). Data relating to the sourcing of material relies greatly on the availability of technical analysis such as petrographic reports that can associate artefacts to their source. However, these analyses are not available for many of the EBA sites. When this is the case, affiliations between sites and places reflecting similarities in the material culture are documented based on the available literature for each site. The potential evidence of maritime activities results in a network of maritime connections that more than likely have been in place during the EBA. Thus, when the material was sourced from further inland or from the vicinity of sites, such evidence does not relate to the purpose of this section and has been omitted from the discussion below (however, Appendix F lists all the data for the provenance of material culture).

5.3.1 Provenance of pottery

Non-local pottery in EBA Levantine sites appears to originate mainly from Egypt (Figure 5.21), Syria (Figure 5.22) and Anatolia (see Table 5.8 for summary). Pottery affiliations are demonstrated between Ugarit, Cilicia , northern Syria and Palestine, suggesting exchanges were in place between these regions (Yon 2001: 16). Whilst EBA pottery from Sidon shows affiliations and possible connections with Syria and Egypt (Doumet-Serhal 2006: 70).

The petrographic analysis from six EBA sites (Table 5.8) reveals a better understanding of the potential pattern of maritime exchange. At the site of Lod, Egyptian and Egyptianised pottery was found. The distinction between these two refers to the origin of the vessels and their shape. Egyptianised pottery is produced locally by imitating Egyptian styles and shapes (See Sowada 2009: 19-22). Remains of Egyptian style 'Wine Jars', cylindrical jars and bread moulds were discovered in the EBA layer at Lod (Paz *et al.* 2005*:* 146). Egyptian and Egyptianised pottery from EBI deposits at Lod, Strata IV and V, represent the highest percentage amongst other pottery sherds (Paz *et al*. 2005: Table 8). Petrographic analysis was carried out on nine vessels, taken from strata containing Egyptian or Egyptianised pottery. The results accord with Porat's (2002) analysis of pottery from a nearby excavation. Five groups of clay were identified. The first is Nile clay, characterised by a silty and clayey matrix (Paz *et al.* 2005: 148). The second group is Loess, characterised by a calcareous and very silty matrix. This type of sediment is found in the south of the coastal plain and along the Besor River. The third group is Taqia Marl, whose outcrops lay at a distance of 10km from the site. The fourth group of clay is Anatolia/Amuq. The geological setting suggested by the sample of this group is absent from the Levant and may be found in Anatolia and the Amuq or in the Cypriote Troodos Mountains (Paz *et al*. 2005: 149). Finally, the fifth group was identified as Moza Marl, the distribution of which is found in the central mountain ridge area. Despite the need for a larger sample for petrographic analysis, some of these nine samples prove to be imports either from Egypt or from Anatolia/Amuq and equally/likely from Cyprus. Furthermore, the site of Tel es-Sakan provides an excellent example for Egyptian pottery. Almost 90% of all recovered pottery from the site is either Egyptian or Egyptianised, dated to a period between Naqada IIIa and the beginning of the 1st Dynasty (Braun 2003: 24).

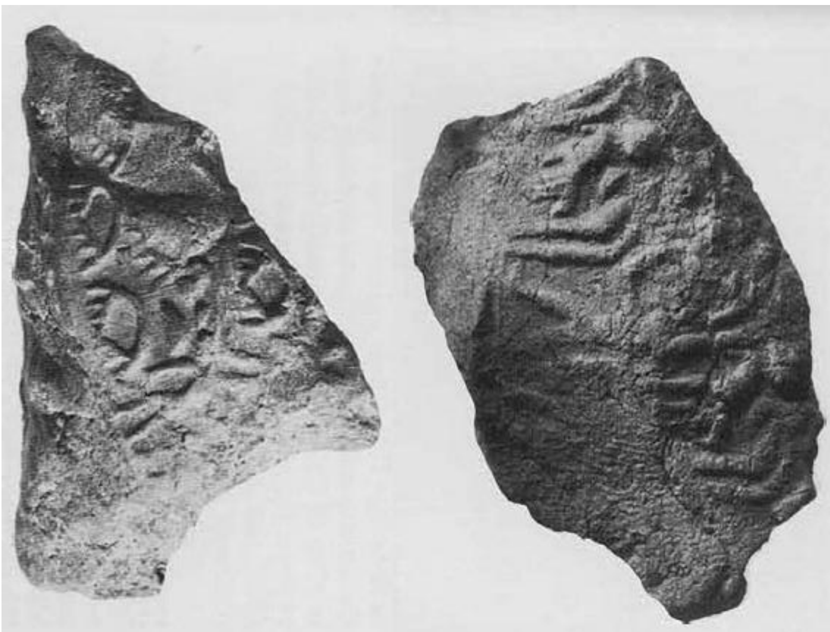


Figure 5.21- Impressions of First Dynasty seals from En Besor (from Gophna 1978: Fig 7-8).

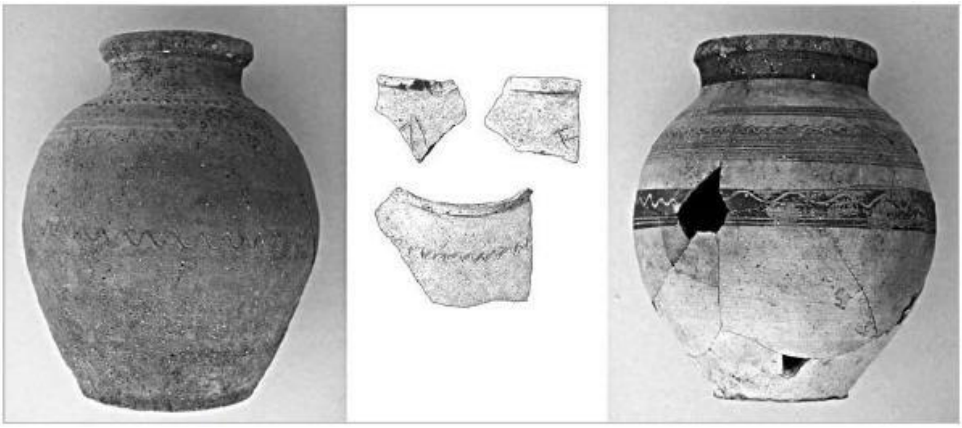


Figure 5.22- Syrian imports from Phase P Tell Arqa (from Thalmann 2009: Fig.7).

Table 5.8- Provenance of pottery for EBA coastal sites mentioned in Table 2.

ID	Site	Details	Source
14S	Ugarit	Pottery exchange (affiliation)	Cilicia; Palestine; Northern Syria
31L	Tell Fadous-Kfarabida	Metallic Ware (Fabric VI); Fabric V- non local pottery	Upper Galile (100km from the site); 20 km radius from the site or more (Fabric V)
27L	Sidon (College Site)	local juglet (affiliation)	Egypt; Syria
28L	Tell Arqa	Pottery imports from Phase P	Syria
6P	Ashkelon, Afridar (west)	Wine jar fragment	Egypt
47P	Lod	Nine vessels sampled for petrographic analysis from Area I; Egyptianised pottery	Egypt (Nile clay); Anatolia/Amuq OR the Cypriote Troodos Mountains
57P	Nahal Besor (Site H)	Petrographic analysis on groups of vessels; Egyptianised pottery	Egypt
74P	Nizzanim	Petrographic analysis of the EBIA pottery shows local manufacturing except for a couple of samples	Material common to the hilly region; Egypt
76P	Palmahim	Hybrid pithoi with a complete serekh incised before firing.	Egypt (Dynasty 0)
84P	Taur Ikhbeineh	Petrographic analysis concludes that EBI ceramic are represented by 3 groups: Canaanite, imported Egyptian and locally egyptianised.	Egypt
88P	Tel Assawir	Petrographic analysis from pottery in tombs	Egypt; Orontes Valley; Upper Euphrates
94P	Tel es-Sakan	90% of recovered ceramic is either Egyptian or Egyptianised (between Naqada IIIa and 1st Dynasty)	Egypt

Such evidence for the provenance of pottery from EBA coastal Levantine sites is of prime importance. Although most of the sources reflect connections with Egypt and Syria, the evidence from Lod, for instance, denoting possible connections with Anatolia or Cyprus, is significant for potential maritime connections. Furthermore, the data shows a north-south/south-west engagement along the coast. Northern Levantine sites reveal sourcing for pottery from the southern Levant and vice versa. This demonstrates that regular movement along the coast took place during the EBA, with Egypt, Anatolia and potentially Cyprus taking part in the network of exchange.

5.3.2 Provenance of stones, obsidian and copper

Little evidence is available about the provenance of flint, stone objects and obsidian found at coastal Levantine EBA sites (Table 5.9). Although the information is meagre, it remains crucial to further understand the dynamics of movement and connections between sites and within regions.

Table 5.9- Provenance of stones, obsidian and other material for EBA coastal sites mentioned in Table 2.

		Stones		**Obsidian**		**Other**	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
14L	Byblos	Carnelian; Ivory; Silver; Cylinder seal; Stone vases	Mesopotamia for cylinder seal; Egypt for stone vases	Obsidian in graves	?	Imported copper; Metal artefacts (affiliation)	Cyprus?; Northern Syria; Egypt
27L	Sidon (College Site)					Seals impressions of spiral motif (EBIIB) affiliation	Aegean world, Lerna in the Early Helladic Period
28L	Tell Arqa			23 obsidian artefacts	11 from central Anatolia; 2 from Nenezi Dag (EBIV), 4 pieces from Gollu Dag.	Copper pins (affiliations, EBIV)	Northern Syria- the middle Euphrates area
31L	Tell Fadous-Kfarabida	Steatite; Carnelian; cylinder seal made of Ivory; Stone vessel	Egypt; possibly Indus Valley; Mesopotamia; central and southeast Anatolia.				
88P	Tel Assawir					Pendant shape	Egypt
99P	Tel Kabri	Faience beads	Egypt?				

In terms of flint, non-local sources for raw material are within a maximum distance of 30km inland from EBA sites. Hence, they are not of direct significance, and thus not discussed here (but see Appendix F for details). Notwithstanding, the sourcing of material from up to 30km inland reflects a fundamental degree of mobility during the EBA. As for stones, especially precious stones such as Carnelian and Steatite, the difficulty lies in assigning an origin for the material. For instance, at the site of Tell Fadous-Kfarabida, which attests for a number of imported finds, of these are imported steatite beads (Figure 5.23) and a fragment of an Egyptian stone bowl (Figure 5.24). The seven steatite beads were collected from EBIII and EBIV layers. All seven were analysed with Optical Microscopy and other methods (Damick and Woodworth, 2015). Given that no steatite debitage or bead-making evidence was found at the site or in its vicinity, and the rarity of this raw material, Damick and Woodworth (2015: 613) reasonably assume that these beads were imported as finished objects. Steatite's primary sources are known in central and southeast Anatolia, the Indus Valley, Egypt, Oman and central Mesopotamia. No particular source for the Tell Fadous-Kfarabida steatite beads is given. However, foreign connections with the regions of primary sources were already in place during the EBA, yet it is unclear whether these connections were maritime or terrestrially based (Egypt: Sowada 2009; Wright 1988; Mesopotamia: Gernez 2007; Indus Valley: Bar-Yosef Mayer *et al*. 2004).

Figure 5.23-Steatite beads from Tell Fadous-Kfarabida (from Damick and Woodworth 2015: fig.4).

Figure 5.24-Fragment of an Egyptian stone bowl from Tell Fadous-Kfarabida (Genz *et al.* 2015: Figure 16).

Of the sites that reveal a number of imported stone, obsidian and other finds is Byblos. Yet, as previously mentioned, it is difficult to assign Byblite material to its chronological context given the ill-suited method of excavation. Saghieh (1983), however, conducted research on the third millennium BC at Byblos. Levels KI to KIV in Saghieh's (1983) study refer to the EBA period. From Level KIII at Byblos, fragments of an alabaster bowl were found, bearing the name of Nefer-Scehm-Ra, an Egyptian official from the 3rd Dynasty (Saghieh 1983: 384; Montet 1962: 87). Ward, however, dates the bowl to the 4th Dynasty (Ward 1964: 37-64). Furthermore, a Mesopotamian cylinder seal (Figure 5.25) was found in the KIII new temple with a hypostyle hall (Saghieh 1983: 276), and two stone vases may on stylistic grounds be of Egyptian origin from the 3rd Dynasty (Saghieh 1983: 384).

Figure 5.25- Mesopotamian cylinder seal from Byblos (from Saghieh 1983: PL XLVI: 4504).

From the EBI period at Byblos, commonly referred to as the Énéolithique Récent, a rich corpus of funerary goods was discovered. The site attests for 2097 tombs of which 2059 are burials in jars (Figure 5.26; Artin 2007: 72). A total of 3652 objects were found part of the grave goods assemblage. These include bones and ivory tools, human and animal figurines, amulets, beads, necklaces, and many other objects of art and ornaments. Amongst the lithic objects, 8% were made of obsidian (Artin 2007: 77). Ivory, on the other hand, makes up 9% of the majority of bone artefacts.

Furthermore, silver, shell, obsidian, copper and cornelian objects of art were recovered (Figure 5.27). Studies of provenance for this wealth of material is unfortunately lacking. Nonetheless, the presence of copper from the EBI in the form of daggers and hooks (Figure 5.28), amongst the many other materials and objects, points at any rate to a network of exchange of local goods. Cyprus is a possible source for copper, yet the question of provenance for all this material remains open (Artin, 2007). As for obsidian, Thalmann (2006: 4) notes that coastal Levantine obsidian mainly originates from southeastern Cappadocia, a site known as Gölü Dag-East in Anatolia, based on the material found at Tel Arqa, two blocks of obsidian as well as more than 300 fragments.

Figure 5.26- Burials in jars from Byblos (from Artin 2007: Fig. 2, after Fond Dunand, Geneva).

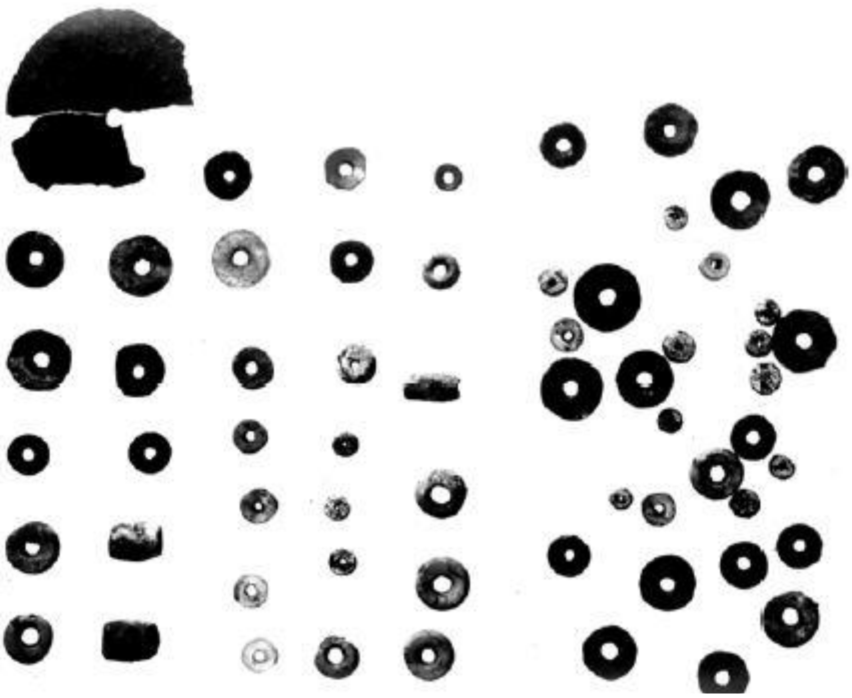


Figure 5.27- Ornaments from Tomb number 92 (from Artin 2007: Fig.6 after Fond Dunand, Geneva).

Figure 5.28- Copper hooks and daggers form the EBI Byblos
(from Dunand 1973, Plate CLX).

Although the bulk of material analysed from Tel Arqa dates to the fifth and sixth millennium BC, despite obsidian retrieved from the EBA layers[28], the sources of the obsidian, as mentioned above, point to southeastern Anatolia, Cappadocia, Gölü Dag-East. A number of obsidian samples were ascribed to another nearby site, Nenezi Dag. Importantly, however, Thalmann (2006: 7) proposes this sourcing of obsidian as one of the earliest evidence of maritime trade routes between the Levantine coast and Anatolia.

Furthermore, worthy of mention here is the site of Nahr Ibrahim where an Egyptian copper axe was found near the mouth of the river (Figure 5.29; Mallon, 1925). The hieroglyphic inscription on the axe mentions a royal boat crew and narrows down the date of the axe to the 4th and 5th Dynasties (Helck 1971: 22; Ward 1963: 25). This axe is often mentioned in reference to the procurement of wood by Egypt, primarily cedar, from Mount Lebanon (Helck 1971: 22; Rowe 1936: 288-289). Nonetheless, according to Genz's EBA database, the inscription on the axe itself does not refer to a lumberjack crew as has recurrently been stated (Helck 1971: 22; Wright 1988: 146). This Egyptian copper axe adds to the two axe-heads from Byblos (Deshayes 1960:246-247). According to Semaan (2016: 100), Egyptian axes were used as tools for woodworking and appear in naval construction scenes (Deshayes 1960: 247).

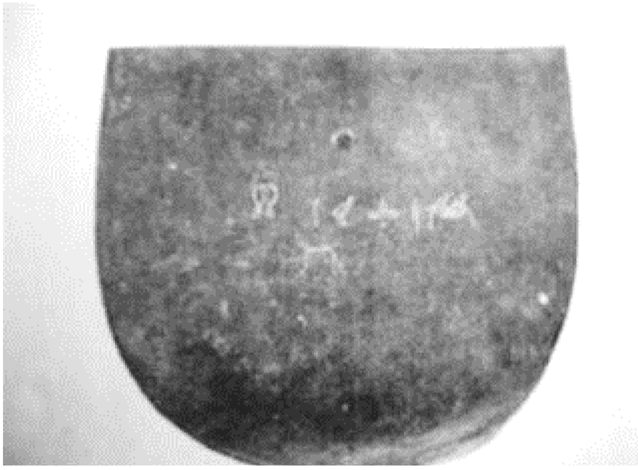


Figure 5.29- Copper axe blade found in Nahr Ibrahim (from Mallon 1925: Plate I)

The sourcing of stone, obsidian and other material from the EBA coastal Levant reflects a similar pattern of exchange to that of pottery material, in which Egypt, Anatolia, Cyprus and Mesopotamia play important roles. All these locations, although terrestrially accessible, are in fact within a maritime reach from the Levantine coast, which, compared to terrestrial movement, is much faster as will be demonstrated in the following two chapters.

[28] Obsidian was consistently found at Tell Arqa, mainly from the later third millennium levels 16 and 15. However, obsidian from this period was not analysed since at such a late date, obsidian did not constitute a significant part of the Levantine lithic assemblage (see Thalmann 2006: 6).

5.3.3 Provenance of fauna and flora

The presence of non-local flora and fauna at EBA coastal sites is an additional indicator for connections between sites and places that may have been viable via the sea. The main bulk of evidence derives solely from some southern Levantine EBA sites for which this data is available (Table 5.10). Information regarding non-local flora is restricted to one occurrence, specifically cedar wood found at Ashkelon, Afridar. Analysis of wood samples from the site revealed the presence of *Cedrus libani*, which was found at two areas in three locations (Liphschitz 2004: 309). *Cedrus Libani* was recovered alongside wood of *Quercus cerries*. These two arboreal species never grew in the southern Levant. *Cedrus libani* spread in the mountains of Lebanon, Turkey and Cyprus, while *Quercus cerries* covered the mountains of Turkey (west Anatolia and Taurus) as well as Lebanon. Hence, the wood found at Ashkelon was imported, most probably from Lebanese mountains. It is impossible, however, to evaluate what the wood was used for as the samples retrieved are small in size. According to Liphschitz (2004: 309), the presence of this wood from the EBIA at Ashkelon, along with the existence of olive groves for the production of olive oil, suggest that Ashkelon was functioning as a seaport. This is further supported by the presence of numerous olive oil jars of Metallic Combed Ware discovered in EBII-III strata at the site (See discussion regarding transport containers in Chapter VII).

Table 5.10- Summary of non-local flora and fauna found at EBA coastal sites.

ID	**Site**	**Details**	**Source**
6P	Ashkelon, Afridar (west)	Cedar; Lates niloticus (Nile perch)	Lebanese mountains; Nile River
7P	Azor	*Glycymeris insubrica; Donax trunculus; Lambis truncate; Chambardia rubens*	Mediterranean Sea; Red Sea; Nile River
15P	En Besor	*Aspatharia rubens*	Egypt
19P	Givatayim	*Nerita sanguinolenta*; Two Cypraea sp.	Red Sea; Mediterranean Sea?
47P	Lod	*Chambardia rubens*; *conus* species	Nile; Red Sea?
57P	Nahal Besor (Site H)	Shells (*Aspatharia rubens*); Fish-*Clarias gariepinus*	Red Sea; Nile River
84P	Taur Ikhbeineh	*Aspatharia rubens*	Nile River
76P	Palmahim	*Chambardia* sp	Nile River
88P	Tel Assawir	*Chambardia rubens*	Nile River
99P	Tel Kabri	*Chambardia rubens*	Nile River
106P	Tel Qashish	*Clarias garepinus* (Bile Catfish), *Tonna* sp shell	Nile River or clocal freshwater sources; Red Sea
103P	Tel Megadim	*Aspatharia rubens*	Nile River
101P	Tel Lachish	*Planaxis, Nerita and Ancilla ovalis*	Red Sea

In terms of fauna, the bulk of non-local evidence found at EBA sites comes from fish and shells originating in either the Nile River or the Red Sea. Nilotic fish taxa found at EBA coastal sites (see Van Neer *et al.,* 2004) consist mainly of the Nile perch (*Lates niloticus*) and Clariidae catfish (*Claria sp*.or *Clarias gariepinus*). Whereas the majority of non-Mediterranean molluscs is represented by the Nilotic freshwater bivalves, *Chambardia rubens* (formerly *Aspatharia rubens*). *Chambardia rubens* is a widespread species, inhabiting the Nile Basin all throughout to western Africa (IUCN, 2016). It was suggested however, that these shells might have been more accessible in the Levant when the Pelusiac branch of the Nile reached northern Sinai[29] (Rowan 2013: 231; Tronchère *et al*., 2011).

Numerous remains of *Chambardia rubens* were found at Ashkelon, Afridar, (Braun and Gophna 2004: 219), at Azor where a broken shell was located in Tomb 4 (Figure 5.30; Ben-Tor 1975: 28), at Lod from the EBI-EBII transition (Yannai and Marder, 2000), at Nahal Besor where 32 fragments were located (Site H) (Horwitz *et al.* 2002: 112), at Palmahim (Milevski 2005: 205) and at Tel Kabri (Kempinski 2002: 404).

As for Red Sea shells, these have been found in the form of *Lambis* truncate at Azor (Bar-Yosef Mayer 1999, 2002), perforated shells of *Nerita sanguinolenta* from Givatayim (Milevski 2005: 204), shells from the *Conus species* at Lod (Yannai and Marder, 2000), *Planaxis*, *Nerita* and *Ancilla ovalis* from Tel Lachish (Tufnell *et al*. 1958: 323-324; Milevski 2005: 206) and *Tonna species* from Tel Qashish found in Area A, Stratum XIIE (Ben-Tor *et al.* 2003: 420).

Figure 5.30- Broken shell of Chambardia rubens from Azor (from Ben-Tor 1975: Plate 24:3).

[29] The appearance of the Pelusiac branch of the Nile is dated to 5560±660 BP (4220-2900 BC) (Coutellier and Stanley, 1987; Tronchère *et al*., 2011).

Perhaps the most interesting example of non-local shells is the *Chambardia rubens* found in a the ceramic jar, on the seabed, 700m off the southern Levantine coast near the North Atlit Bay, and 1.5km southwest of the EBA site of Tel Megadim (Figure 5.31). The jar was found intact; petrographic analysis has shown that it is made of non-calcareous, alluvial Nile clay (Sharvit *et al.* 2002: 161). The jar contained within it and in its close vicinity eighteen shells of intact *Chambardia rubens* (Figures 5.33 and 5.32). The molluscs definitely originated from Egypt. Analysis of the shells reveals that they were most probably collected as live animals and placed alive in the jar or following some sort of preservation (pickled). The jar dates to Predynastic Egypt, corresponding to the early EBI, more precisely around 3720-3380 BC (Carmi and Boaretto, 2000). According to Sharvit *et al.* (2002: 164), the sea level at that time was 2 to 5m lower than present, while the jar was found on the lee side of a kurkar ridge that would have been partially exposed in the EBA. This fact, along with the Egyptian origin of the jar and its shells, strongly indicate maritime connections with Egypt. The North Atlit Bay (Figure 5.31) appears to have provided a suitable anchorage in the past since the remains of wrecked ships from different periods were found including lead sheathing, nails and fishing equipment (Galili and Sharvit 1999: 99-100). The bay is most likely to have been in use by Tel Megadim's inhabitants since it is the only site around that area to have been occupied during the EBI. The preserved bivalves could have supplied the crew of a ship with nourishing food, or used as baits for fishing whilst anchored (Sharvit *et al*; Gophna, 2002).

Figure 5.31- Atlit Bay on the southern Levantine coast. Credit Google Earth 2017.

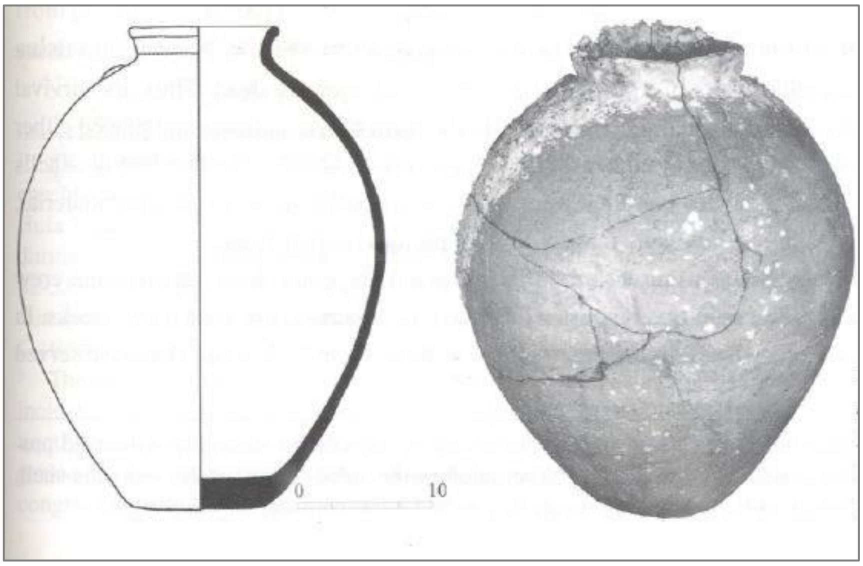


Figure 5.33- The submerged jar in North Atlit Bay (from Sharvit *et al.* 2002: Fig 3a-b).

Figure 5.32- Chambardia rubens from the submerged jar (from Sharvit *et al.*, 2002: Fig. 4).

Overall, the evidence for non-local flora and fauna from the Levantine coast strongly supports a maritime network of exchange as early as the EBIA. The remains of wood from Lebanese mountains at Ashkelon dating to the EBIA, along with the find off Atlit Bay of a ceramic jar with shells from the Nile River, imply that during the EBIA, maritime connections were well in place. In combination with the evidence from the sourcing of pottery, stones and obsidian, this maritime network dating to the beginning of the EBA seems to incorporate Egypt, Anatolia, Cyprus and the whole of the Levantine coast. Although maritime connectivity intensifies during the EBII-III when relations between Egypt and the northern Levant, specifically with Byblos, peak (Sowada 2009: 10-20), the evidence laid out in this chapter not only reveals a strong, intense engagement by EBA inhabitants on a mundane local basis with the sea, but also maritime-based connections from the beginning of the EBA. The connections within the Levantine Basin link Egypt to the southern Levant, the southern Levant to the northern Levant, the southern Levant to Anatolia, the northern Levant to Anatolia, the southern and northern Levant to Cyprus, etc. This is further supported, in the absence of any shipwrecks dating to the EBA from the Levant, by representational boat models and depictions.

5.3.4 Boat models and depictions

One possible boat depiction originates from the Chalcolithic ossuary at Azor (Perrot 1961: Fig 23:3). Although this predates the EBA, it is an occurrence of significance given the lack of such evidence. Baumgarten (1993), after Marcus (2002), proposes that the depiction represents a high-ended vessel, similar to foreign types, specifically those of Predynastic Egypt (Casson 1995: 12, n. 5; Basch 1987: 57). Marcus (2002: 406), however, suggests that while this identification fits the original line drawing, the roof of the ossuary was reconstructed with plaster, suggesting that the high-ended boat was a bi-product of a modern modification. It is instructive nonetheless, as Marcus (2002: 406) adds, that the ossuary is decorated by a sun or star motif that tends to occur in juxtaposition with maritime motifs. (Broodbank 1993: 327). Furthermore, a miniature clay boat model was identified at Tel Erani (Marcus 2002: 407). It was interpreted as a marker within an Egyptian administration at the site.

5.4 Levantine network

The nature of the direct and potential maritime evidence elucidated in this chapter raises questions regarding Levantine EBA interaction and complexity. This chapter has clearly shown and summarised maritime-related material culture, and it substantiated a significant degree of engagement with the sea during the EBA, despite issues with the availability of data, its quality and precision. The main question, however, is why such an important corpus of material culture and such evidence for maritime activities have been dismissed in archaeological narratives of the EBA Levant that focus on those specific events that relate important states such as Egypt to the Levantine coast, on terrestrial dynamics, or on listing the archaeological record without a targeted maritime analysis.

In order to get a better understanding of the possible maritime network linking the Levantine coast to other regions, an affiliation network (see Knappett 2013 for different examples on network analysis methods and applications) model based on the evidence presented in this chapter was constructed using the open source programme Gephi. The model takes as input EBA coastal sites and the sources of material culture described in Section 5.3 (summarised in Table 5.11). Hence, the network represents affiliations relating to importing material into the coastal Levant. Figures 5.34 and 5.35 show the geographical layout of the affiliation network. The size of the nodes is relative to the number of connections that are corroborated in the archaeological record that the site or the region has. According to the geographical layout of the affiliation network, the coastal Levant emerges with an elaborate mesh of links. Certainly, Egypt sustains its position as central and significant in the network of exchange; however, what the model actually reveals is the connectivity of the Levantine coast rather than that of Egypt, or Anatolia for instance. Tartaron (2013), in his analysis of maritime networks in the Mycenaean world, defines four spheres of maritime interactions: coastscapes, small worlds, regional interaction sphere and interregional sphere. While coastscapes refer to the everyday life, the territorial coastal zone, small worlds signify the habitual, the amalgamation of many connected coastscapes. The regional and interregional spheres are characterised by relatively infrequent movement and require more technological proficiency (Tartaron 2013: Table 6.1). In section 5.1, the direct evidence for maritime activities indicated those sites potentially engaged on a regular basis with the sea. Whereas the density of those bundles of activities revealed areas or clusters showing relatively high density/intensity zones. These density areas, following Tartaron's terminology, may be considered coastscapes, in the sense that they are characterised by an everyday engagement with the sea whether in the form of fishing or local maritime movement. The affiliation network model, however, is more indicative of small and regional worlds. Small worlds according to Tartaron are defined by geographic and environmental proximity, as well as by shared cultural traditions and economic ties (Tartaron 2013: 190). Broodbank (2000: 175) characterises them as 'culturally defined unities', the result of a conscious forged connection with neighbouring communities. It can be noted based on the model that the whole Levantine coast seems to be part of the same small maritime world of interaction. Yet, to what degree of certainty can we ascertain that, and based on what indicators other than the visual layout of the affiliation model?

Table 5.11- List of affliations and connections based on the potential evidence for maritime activities.

Affiliation to	***Affiliation from***						
Egypt	Ashkelon	Palmahim	Tyre	Sidon	Tell Sianu	Tel Assawir	Tel es-Sakan
Egypt	Tel Kabri	Nahr Ibrahim	Byblos	Taur Ikhbeineh	Azor	Nizzanim	

Egypt	Lod	Nahal Besor (Site H)	Tel Qashish	Tel Erani	En Besor	Lod		
Red Sea	Givatayim	Azor	Lod	Tel Lachish	Tel Qashish			
Cyprus	Kh. Shefeya	Lod	Byblos					
Anatolia	Ugarit	Lod	Tell Fadous-Kfarabida	Tel Arqa	Byblos			
Northern Levant	Ugarit	Sidon	En Besor	Tel Arqa	Byblos			
Central Levant	Ashkelon							
Mesopotamia	Tell Fadous-Kfarabida	Byblos						
Aegean	Sidon							

Prior to attempting at answering such questions and characterising maritime interactions during the EBA, a very important element in our understanding of the lived maritime space needs addressing. Tartaron, like Broodbank (2000: 175-210), raised the issue of small worlds in relation to geographical proximity on water. Geographical proximity is not only spatial, rather, it is spatio-temporal and depends on the mode of travel. When boats are involved, the time of sailing from one place to another becomes very crucial to how close or far places and sites are from one another. Henceforth, having mapped the maritime evidence of the EBA coastal Levant on land, this thesis continues into mapping the maritime space-time of seafaring in order to grasp how spatial representations of a flat sea may morph when the time of sailing, which is relative to environmental rhythms and the performance of a sailing vessel, is accounted for. By adhering to the approach of this thesis, thirding-as-othering via mapping, the next chapter elucidates the process and the outcome of mapping the maritime space-time of sailing in the Levantine Basin. Following that, an interpretative analysis is presented in Chapter VII that integrates all information put forth in this thesis, the Levantine EBA narratives and the mapping of land and sea.

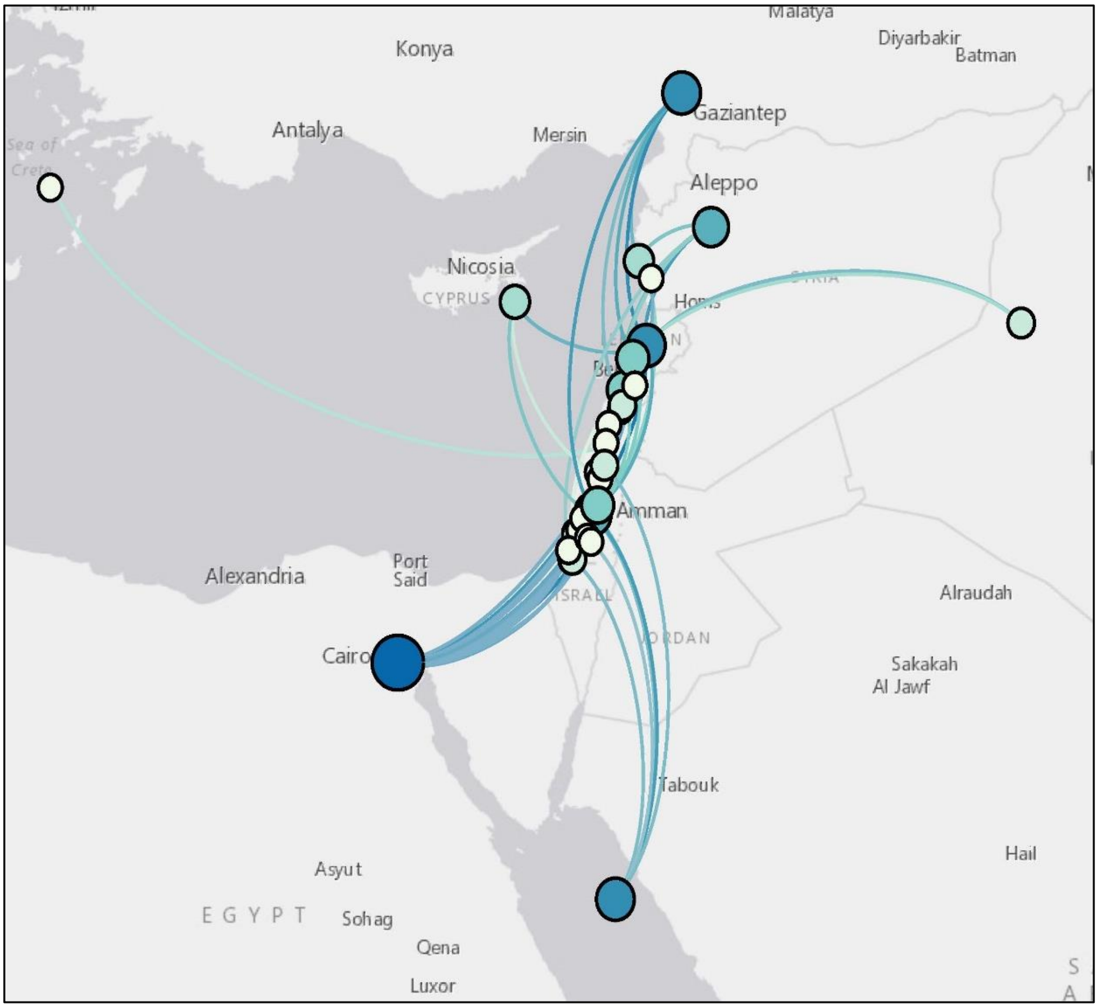


Figure 5.34-Social affiliation network model produced with Gephi based on the potential maritime evidence.

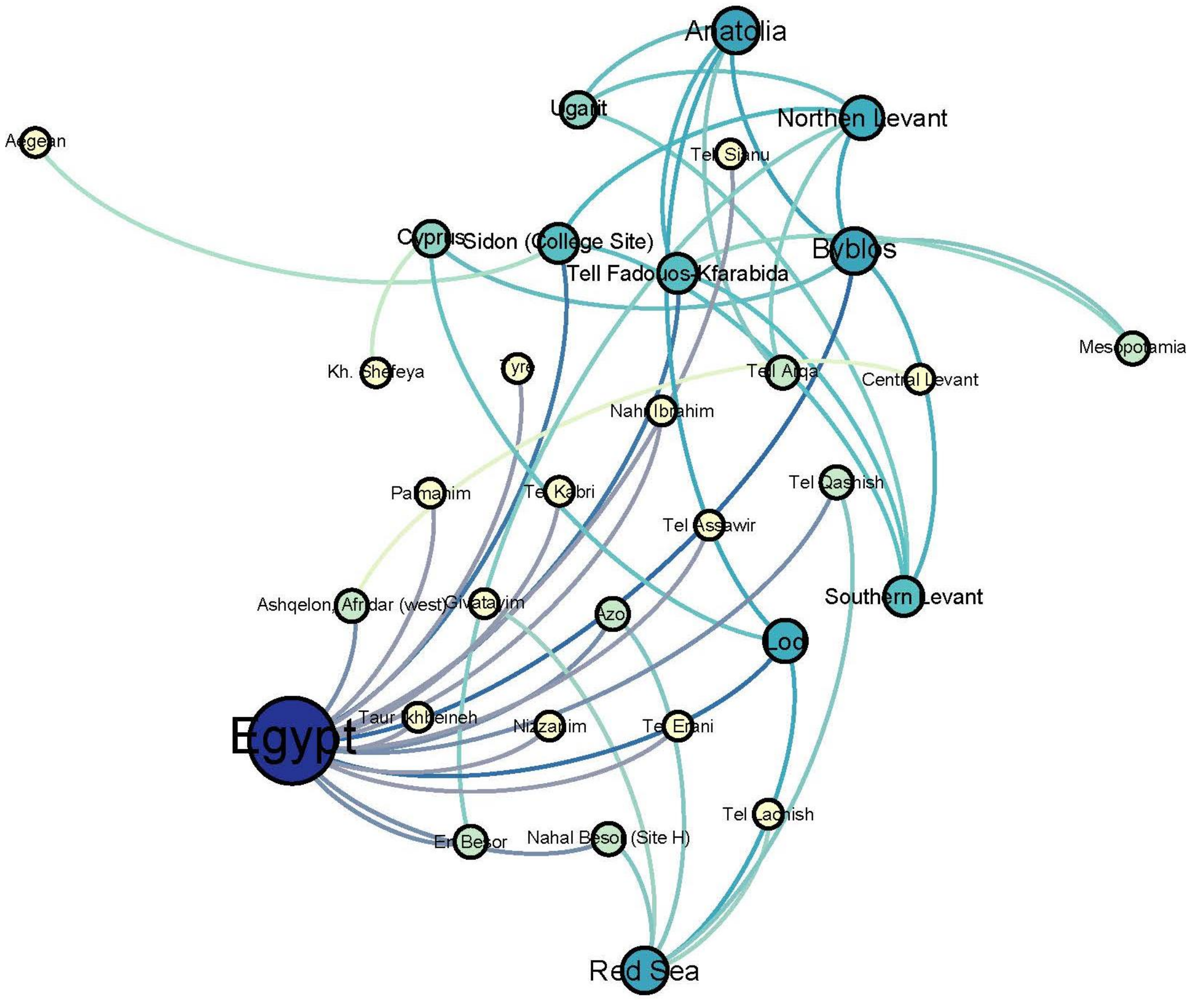


Figure 5.35-Affiliation network model produced with Gephi (geolayout).

CHAPTER VI: MAPPING THE MARITIME SPACE TIME OF THE LEVANTINE BASIN

Student: See, here's a map of the whole earth. Do you see? This is Athens.

Strepsiades: What say you? I don't believe you; for I do not see the Dicasts sitting.

Student: Sparta? Right over here.

Strepsiades: How near it is to us! Pay great attention to this, to remove it very far from us

Student: By Jupiter, it is not possible (Aristophanes, *The Clouds,* 200-210)

This scene from Aristophane's anti-Socratic comedy best portrays two ways of spatial thinking and spatial representation. The first is signified by the student's perception of the map as a representation of reality, as truth. The second, represented by Strepsiades' confusion, denotes his symbolic and aspiring representation of space. It is as if Strepisades believes that a change of place on a map could alter reality. This is a testimony to the power of maps, and their political connotations advocated by many cartographers and geographers (Harley, 1989; Pickles, 2004; Akerman, 2009). On a parallel tangent, however, the scene brings to the forefront the perception/experience of space versus the objective representation of space. In other words, Lefebvre's conceived and lived spaces (see Chapter III, Section 3.3.2). This dichotomy raises crucial questions in terms of how we can, as archaeologists, geographers or cartographers, as humans interested –but not exclusively- in humans, map other humans' cognitive representation of space, how we can transcend or evade the Euclidean hegemony of maps in order to reflect human variables, and what variables can we use. To this end, in Chapter III, I suggest the thirding-as-othering strategy via mapping. By mapping, I refer to post-representational practices whereby the maps are always in a state of 'becoming' (del Casino and Hanna, 2006; Kitchen and Doge, 2007; Kitchen *et al.,* 2013), are de-ontologised in contrast to the ontological secure maps of the empirical and critical cartographies (Kitchen and Dodge, 2007). Post-representational cartography's main interest rests in the subjective dimension of maps, on maps as process, be it from the mapmakers' perspective, the engaging population, or that engaged with in the process of map making. It is of relevance in this research because of its capacity to bridge cognitive and representational cartographies, and enable the combination of critical and empiricist cartographies (Caquard, 2015; Rosetto, 2013).

Chapters IV and V presented spatio-temporal mappings of the study area (mapping land) and of maritime activities (mapping activities) on the coastal Levant. However, Euclidean distances and Cartesian representations of terrestrial space restricted these mappings. Notwithstanding, via mapping the density of settlements, their exposure to the sound of sea waves, the density bundles of maritime activities and the potential maritime network, a humanised space of the coastal Levant emerges in the form of various folds of the lived maritime space of EBA inhabitants. This chapter, of mapping the Levantine Basin of seafaring, is yet another fold of the lived maritime space, but it deconstructs Euclidean hegemony to mediate the space and time of sailing.

Henceforth, this chapter sets out by reviewing and discussing the different forms of maps and mappings employed in mediating the archaeological past in order to highlight how we can map differently and how mapping as mediation of the maritime space of seafaring, of the sea, will be used in this thesis, complementing therefore the methodology of thirding-as-othering with mapping (Chapter III) and the spatio-temporal mappings of land and activities (Chapters IV and V). As stated in Chapter III, the methods employed in this thesis correspond to the nature of data at hand and to the purpose of mapping. The purpose of mapping the navigable Levantine Basin in this chapter is to get a step closer to the lived space of the EBA coastal Levant through the performance of seafaring. In fact, all the mappings and discussions put forth in this thesis, aim to built a lived, relational space that cannot be restricted to one representation or fold, but that would emerge through the many pathways and mediations expanded on. In order to mediate the space-time of seafaring during the EBA, it is crucial to review the variables and elements involved in being at sea, and how these tangle together in an emergent maritime space. This includes natural rhythms such as winds and currents that greatly affect navigation on sea, and navigational aids that are paramount to the successful relationship of humans and sea. In such a way, this chapter establishes a methodology to engage with maritime spaces and to evaluate the maritime connectivity of the Levantine coast via mediation with mapping, as thirding-as-othering. The final section of this chapter introduces a model for mapping space-time of the Levantine Basin, according to the variables involved in being at sea, and in line with the theoretical and analytical basis of this research. However, by no means is this model an end-point of analysis. In fact, it merely represents one of many kinds of mapping. It is a heuristic tool that enables different ways of engaging with the maritime space of the EBA Levant.

6.1 Mediation with maps

Archaeological theory has shifted and mutated from the processual and post-processual thinking and preoccupations that dominated the discipline over the past 30 years. This coincides with archaeology's full engagement in the humanities' philosophical and theoretical debates. As such, the so-called 'material-turn', which resonated across the disciplines of humanities in the twenty-first century, is a recurrent indicator of archaeological theory today and an emblem for a bag of theories taking on archaeology's main concerns. The way that this material-turn and its emerging perspectives, such as new materialism (Coole and Frost, 2010) and object-oriented philosophies (Bennett, 2010; Olsen *et al.,* 2012; Olsen 2012), is unfolding in archaeology is perplex. Thomas (2015) provides a great synopsis of some of the concepts and their difficulties, and outlines how the new materialism came to be different from post-processual thinking. This difference transpires in the rejection of anthropocentrism (Thomas 2015: 1288; Rae 2013: 3; Wolfendale 2014: 165), and the rise of a flat ontology associated with the recognition of things, animals and humans as all actively involved in the world (Bogost 2012: 17; Bennet 2006: 17; Hodder, 2012).

Symmetrical archaeology, the first archaeological movement to advocate for a flat ontology (Thomas 2015: 1289), argues against dividing reality up. Its central message is that people, places, animals and materials all have lives, effects of their own, there should be no division between the social and the material and a levelling of relationships between all entities is fundamental (Shanks, 2007; Webmoor, 2007; Webmoor and Witmore, 2008; Olsen 2003, 2012). The shift away from privileging entities over each other, e.g. human over things, brings attention to the relations between entities, to processes and interpretation. The appreciation of the relational nature of entities is reflected in several frameworks and examples such as assemblages (e.g. Deleuze and Guattari, 1987; Lucas, 2012; Bennett, 2005), networks (e.g. Latour 1999, 2005), meshworks (Ingold, 2011; DeLanda, 1997) and entanglement (Barad 2007; Hodder, 2012).

In Chapter III, I argued for a relational, lived space as a framework to approach maritime spaces and to study the Levantine Basin and coastal Levant during the EBA. This relational space emerges from relationships between things, people, places, materials, properties, ideas, etc. It is, however, the mediation of this relational space that is of importance, as a means of producing an understanding of the past. Coupling the material-turn in archaeology, an increasing awareness was placed on the medium of knowledge since it inherently shapes the questions we ask, the way we think, the evidence parameters and the outcome. As Webmoor (2005: 53) words it, "'The *medium is the message' has become part of familiar parlance*". Fowler (2013: 2), in his book *The Emergent Past*, strongly argues that "*the concepts, terms, theories, typologies, and techniques that we deploy are as much part of the reality we are studying, and studying within, as the material remains of the past*".

Furthermore, Fowler (2013: 2) states, and I concur with his argument, that "*archaeology changes the past as it works on it, changing the assembled evidence, and in so doing it changes the present: it is a transformation of reality*".

In accordance with this view of archaeology, this research rejects a 'correspondence theory of truth'. A correspondence theory of truth applies broadly to any view that embraces the idea that truth consists in relation (in the form of correspondence, congruence, representation, signification, etc.) to reality (in the form of facts, events, properties, conditions, etc.) (Marian, 2016). In simpler words, *x* is true if *x* corresponds to some fact. This assumes that there exists an objective reality independent of any observer. In archaeological terms, this means that the nature of the reality that we encounter, e.g. material culture, and what we produce e.g. scientific data, site plans, maps, reports, narratives, 3D reconstructions, etc., correspond to an objective reality that is the past, and so the medium we use must be in fidelity with that past. The problem with this theoretical position as Fowler (2013: 1) argues is that we cannot directly access the reality we encounter without some sort of mediation such as theories and equipment. Hence, there can be no separation between interpretation and reality.

Shanks and Webmoor (2013: 94-95) further expand on the notion of a mimetic representation of the past and a one-to-one notion of representation. In attempting to produce accurate representations of the past, peers evaluated these representations as better and superior according to how good they fit the past. This conception is very difficult to work with, or rather as Shanks and Webmoor (2013: 95) state, its "*knowledge claims do work; they just don't work by demonstrating any epistemologically privileged relationship with an external and removed reality*". Hence, if we sidestep this epistemology we can avoid a theory of correspondence of truth grounded in a faith in representations. Rather than agreeing to mimetic correspondence as feasible, archaeological work can be better thought of not as representing, modelling, simulating and mimesis, but "*as fundamentally transforming mediation or translation, work done in the spaces between past and present*" (Shanks and Webmoor 2013: 96). Henceforth, the medium becomes a mode of engagement. A photograph of a pot, for instance, translates the pot, maintaining and extending some of its properties. It is a medium, a mode of engagement that fosters different relations and understandings, a 'circulating reference' (Latour 1999: 69)[30]. The same can be said of mapping and maps. Archaeological analysis, therefore, "*involves the simultaneous translation of the material media of the past, the techniques of study, and the conceptualization of the past as these are*

[30] Latour (1999) frames the entities we study as an actant and as a reference that circulates in a chain of interaction with other actants and is translated in the process. The translation promotes and reduces some of the properties of the entity under study. The circulating reference refers to the repeated translation of actants (Latour, 1999: 69-76).

articulated with one another" (Fowler 2013: 31). It is in this context that mapping in this research is employed, as a medium to challenge and re-wire our understandings of the maritime space. Instead of maps as end-points and representations, in this research they will be treated as invitations to disrupt and promote explorations and engagements, and to de-familiarise pre-established concepts of maritime space.

6.1.1 Maps in archaeology

The use of maps has a long standing in archaeological practice. Even though, as Witmore (2013: 128) notes, it is remarkable how little work has been carried out on what maps actually do in the process of archaeological knowledge production (with exceptions, see for example Bender, 2006; Smith, 2005; Webmoor, 2005; Witmore, 2006). Witmore (2013: 131) treats maps as things, and "*as things, maps gather"*. Maps draw together the relations and connections between locales, things, people, experiences, etc. The purpose for this gathering via maps is not uniform across all maps. A military map designed to represent the surface of the earth in proportionate distances that would allow navigation on land does not serve the same purpose as a map designed to highlight particular features. For instance, Sir George Wheler's map of Athens Greece, a late seventeenth-century map (Figure 6.1), shows inconsistent distances between features. However, its purpose is best described as an inventory of what is worthy of observation (see Witmore, 2013: 132). Hence, as Turnbull (1994: 41) argues, "*the accuracy can only be assessed in light of the purposes for which the map was intended*".

In archaeology, the standardised translation of the material world onto a flat map, via the use of standardised tools and platforms such as survey instruments and GIS, provides us with a repeatable mode of engagement with sites, locales and features. Nonetheless, this particular mode of engagement is not exclusive; there exists various other modes of engagements, translations and mediations. As an example, *Mapwork* (Webmoor, 2005) brings attention to two phenomenon in archaeological cartographic practice. The first considers the use of media as transformations, but rather than removing the map from what it represents, *Mapwork* aims to tag the process of transformation of an experiential reality into the encoding of a map. The second calls attention to how maps operate in respect to practical navigation. Hence, *Mapwork* aims to open up the operation of maps to both the reality (experiential space) and to representation (space mediated with maps). For instance, Webmoor (2005) assembled the Millon map of the Teotihuacán Mapping Project (Millon, 1973) and images of the sites (Figure 6.2), arguing that the mutual constitution of the map and images affords an enhanced framework to work within (Webmoor 2005: 69).

Deep maps equally portray maps as modes of engagement. The term deep maps was first coined in relation to William Least Heat-Moon's *PrairyErth* (1991). Essentially deep mapping is an exercise of juxtaposition and layering of materials that has to do with a place. It reflects

> "*eighteenth-century antiquarian approaches to place which included history, folklore, natural history and hearsay, the deep map attempts to record and represent the grain and patina of place through juxtapositions and interpenetrations of the historical and the contemporary, the political and the poetic, the factual and the fictional, the discursive and the sensual; the conflation of oral testimony, anthology, memoir, biography, natural history and everything you might ever want to say about a place.*" (Pearson and Shanks 2001: 64-65)

The Three Landscape Project, a collaborative project between archaeologist Michael Shanks, Theologian Dorian Llywelyn, and late artist Clifford McLucas, aimed to investigate three landscapes in Sicily, Wales and California via deep mapping. As a component of this project, McLucas produced a large graphic map of thirteen panels, arranged side by side, of the San Andreas Fault. The panels conflated diverse information, Cartesian and linguistic, juxtaposed by a Spanish text, a notebook in English and a Welsh journal (see Witmore, 2013: 145-147). *Looking for the San Andreas Fault* is an installation that not only presents the fault but the multiplicity of places that coexist along the line. Moreover, due to its sheer scale, this deep map demanded a moving engagement and a corporeal exchange on the part of the participant-observer.

The two examples of *Mapwork* and deep mapping demonstrate alternative modes of engagement with maps. So far, this chapter has shown how mapping as mediation, not mimesis, can open up discourse, can challenge our understanding as archaeologists of the past, and can assume various modes of engagements not necessarily restricted to standardised methods. Whilst Chapters IV and V incorporated spatio-temporal mapping of the coastal Levant, of land and of activities, the results were nonetheless Cartesian/Euclidean by nature. In respect to the interest of this chapter, which is mediating the maritime space of the Levantine Basin, a space as far as the author is aware has not been the subject of a translation process via mapping apart from Cartesian representations, it is of high relevance to consider the entities and relations from which this maritime space emerges. To be more specific, however, and to narrow down the scope of this research, the marine navigable space is of focus here for it lies at the heart of the connectivity of the Mediterranean Sea, and responds to the research aim of this thesis -how was maritime space lived and exploited during the EBA- as well as to one of the research objectives that seeks to mediate how we can conceive of the maritime space of seafaring. This marine navigable space is associated with the act of seafaring, henceforth the elements and variables affecting that performance need to be accounted for. This chapter continues by pulling apart the relations, entities and rhythms that affect seafaring. The next section discusses the variables of the navigable space. Here, environmental rhythms that play an important part in the process of seafaring, and archaeological evidence for navigational aids from the EBA Levant are elucidated. This chapter ultimately aims to explore mapping not merely as a mediation of the marine navigable space, but more precisely as a translation of not only physical variables but of human variables as well, for only then can we approach or attempt to approach lived spaces (see Chapter III Section 3.3.2).

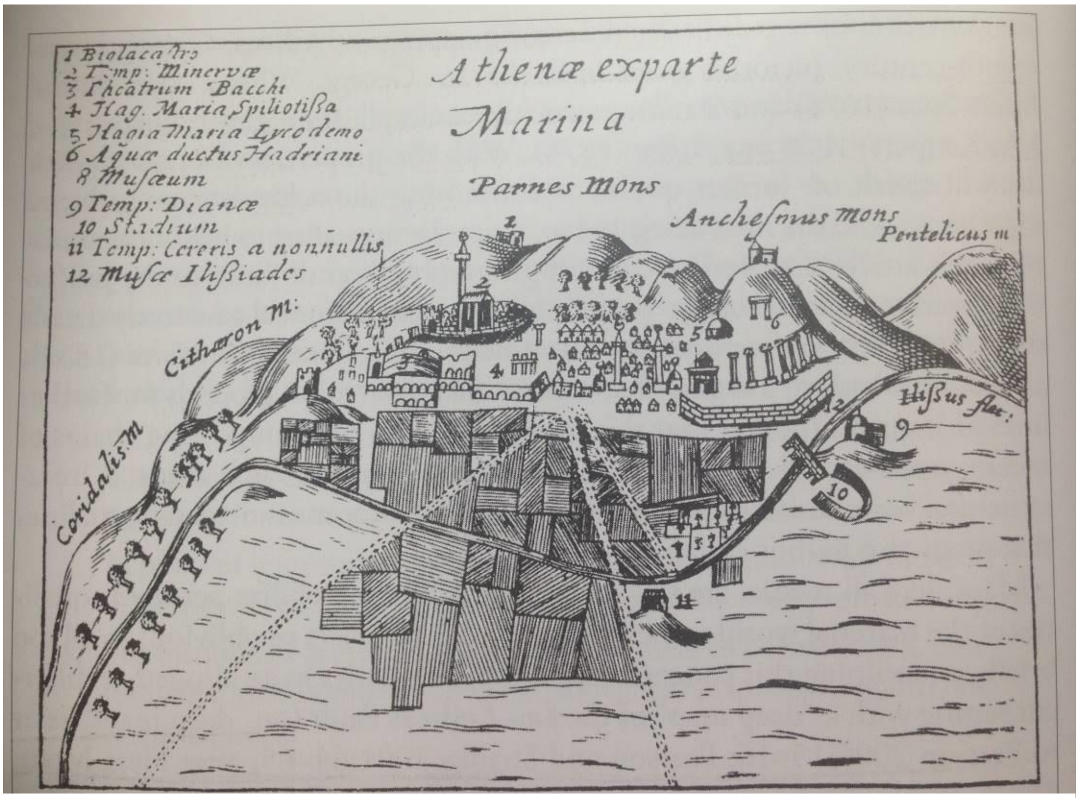


Figure 6.1- Sir George Whele late seventeenth-century map of Athens (from Witmore 2013: Figure 9.2)

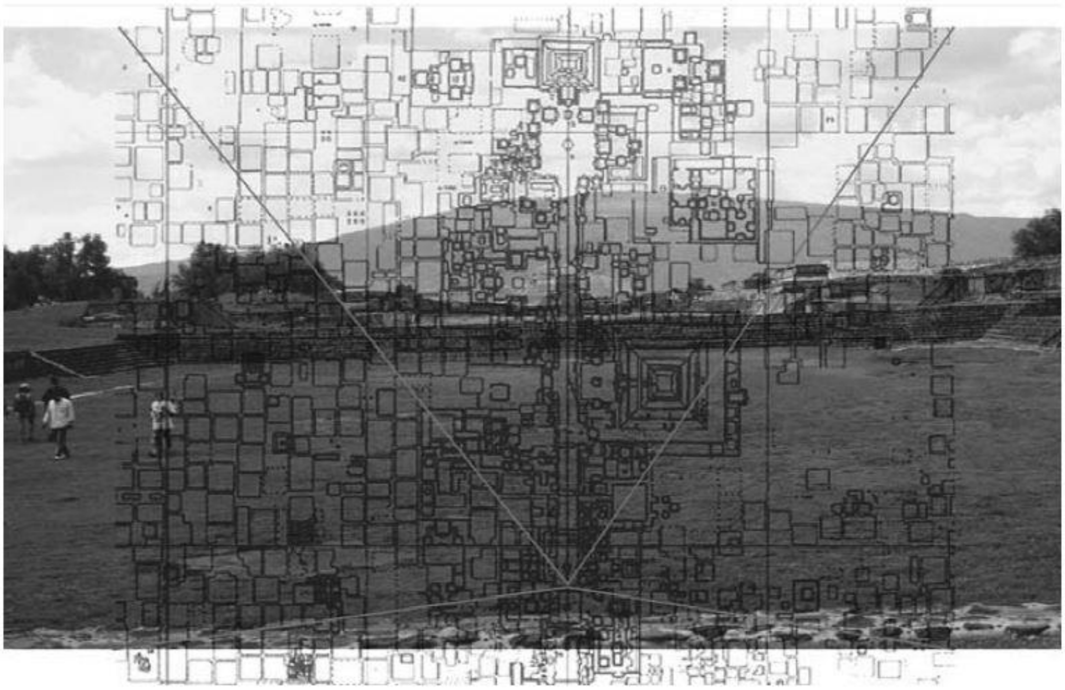


Figure 6.2- Example of Mapwork. Map overlaying picture of the site (from Webmoor 2005: Figure 3)

6.2 Variables of the navigable sea

While the quest for finding longitude at sea in the seventeenth-eighteenth century climaxed, seafarers were struggling to locate their ships accurately in open waters and the location of their destination. Days lost at sea, human lives lost to the sea, the dangers of wrecking and the importance of sea routes for the movement of commodities all prompted a dedicated scientific search for ways to accurately measure longitude (see Sobel, 1995). Knowledge of where a ship is at sea and knowledge of the space and time involved in sea journeys are fundamentally important for successful voyages for modern and ancient seafarers. while in the twenty-first century, determining latitude and longitude is conducted in a matter of seconds using transportable and user-friendly devices, navigating a perilous sea in prehistoric times relied on dead reckoning.

Farr (2010: 21) points out that sea journeys and crossings necessitate a "*conceptual understanding of space and distance, an understanding of seasonality, affecting prevailing winds and currents, speed and directionality".* This understanding is crucial to navigation and sea explorations be it at the time of the earliest evidence for prehistoric seafaring which marks the dispersal of humans to Sahul around 60,000 years ago (Irwin, 1992), or in the Mediterranean during the EBA. Horden and Purcell (2000: 137-141) stress on pilotage as the main method of sailing in the Mediterranean, which is sailing by hugging the coast in visual proximity to land. However, although pilotage is viable, allowing for short journeys in any direction, open seas crossing -termed *voyaging*- were equally feasible but would involve refined navigational skills, and local knowledge of the prevailing patterns (Broodbank 2000: 94). This knowledge and set of skills hence lies at the heart of mariners' dead reckoning abilities. In the absence of modern equipment, finding ones' way by dead reckoning was an essential skill. Dead reckoning is defined as "*the steps by which a navigator can calculate direction and distance from experiences and observations along the route*" (Cornell and Heth 2004: 197). It not only requires spatial awareness but also a temporal one (Farr 2010: 23). Just as modern equipment and the use of digital navigation changes a mariner's perception and conception of space (see November *et al.*, 2010), so navigation by dead reckoning involves an understanding of space stored and processed via the mariners' mental maps. Evidence for nautical charts and sailing directions, if they did exist, failed to survive in the archaeological record prior to the *periploi* from the fifth century BC[31]. Hence, in order to understand the ancient navigator's tool kit, and variables involved in the performance of seafaring, we ought to look at other means of wayfinding on board the ship and in the environment.

[31] From the Greek Periplous meaning 'circumnavigation', see Marcotte (2002). Periplus presents textual descriptions of sea travels from and to ports giving information regarding winds, distances and customs. Of the earliest surviving periplus is that of Hanno c. 450 B.C. going from Gibraltar to the west coast of Africa (Blomquist, 1979).

This section starts by discussing natural rhythms such as winds and currents of the eastern Mediterranean which were pivotal for successful sea journeys, and briefly presents a range of navigational aids that might have been employed and used during seafaring. It is of significance to highlight these elements here as part of the cognitive tool kit of ancient seafarers and as relations taking place on board a ship between humans and their environment, which will hereafter feed into the proposed mapping model in this chapter. Rhythms of sea and winds exercise a power in that they dictate to a certain degree which direction and at what speed a vessel can travel, whereas navigational aids can assist in the undertaking of sea journeys and learning about the environment.

6.2.1 Natural rhythms

Knowledge of the maritime space includes most significantly patterns of winds, waves, currents and tides. These natural rhythms dictate to a degree the direction and speed of sailing, which in turn partake in the seafarers' dead reckoning practices to evaluate distance and time at sea. Arnaud (2005: 14) states that man remains in control of his own destiny; the key lies not in the natural conditions of seafaring but in their knowledge. Sailing is harnessing the power of winds; the importance of winds for instance, is confirmed by its incorporation in religious ideology. The Linear B tablets of Knossos mention the "Priestess of the Winds" (Ventris and Chadwick, 1973). Similarly, New Kingdom Egypt praised a "Lady of the Winds" and a "Lord of the Winds" (Budge, 1960). Prior to Herodotus, Homer could comment on the winds of his time, and in the third and fourth centuries BC, Aristotle, Theophrastus and Aratus wrote studies of weather and winds in relation to seafaring (Webster, 2000). This chapter continues by exploring the characteristics of these rhythms and navigational aids (Section 6.2.2) in the eastern Mediterranean, as part of the variables of the navigable sea.

6.2.1.1 Tides and currents

The Mediterranean tides –the rise and fall of the sea - and their outcome, the currents, are a result of non-tidal forces rather than lunar influence. Lunar generated tides are negligible especially in the eastern Mediterranean (Heikell, 1994: 24). The non-tidal force that produces currents in the Mediterranean is evaporation. Given the few rivers that flow into the Mediterranean, only one-third of the Mediterranean's evaporated water is replenished (Davis, 2001). Hence, equilibrium is maintained by the flow of the Atlantic waters via the Straits of Gibraltar into the western basin which leads to the production of currents (Figure 6.3). During summer time, this current maintains a steady flow. It flows eastward to the Strait of Sicily where it begins to meander towards Egypt. At the

Egyptian coast, the current receives a boost from the Nile floods during spring and summer[32]. From the Nile Delta, the general current flows north towards Cyprus, rotating counter-clockwise along the Levantine coast and Anatolia. Although the Mediterranean's current is predictable, it is relatively weak unless constrained in a delimited area such as straits, often reaching a rate of 12 to 20km/day in the summer (The United Kingdom Hydrographic Office, 1999). The exploitation of these currents, however, was secondary to the winds after the widespread use of sail.

Steady winds can also generate tides and currents. This is particularly the case in the northern Mediterranean where winds funnel between vertical landmasses (The United Kingdom Hydrographic Office, 1999). In general, the Mediterranean currents rarely exceed 1 knot, though when aligned with the direction of the prevailing winds and narrow straits, they can reach up to 7 knots since restrictions increase the rate of flow of the currents, e.g. the narrows between the Greek mainland and Euboea (Heikell 1994: 24). Even though the Mediterranean currents are hardly comparable to the Atlantic currents, they do exert a substantial influence on the speed of ships. Arnaud (2005: 23) explains that if two ships are traveling in opposite directions at a speed of 4 knots, one along with the current and one against it, they reach a difference of 1 knot between their speed, a quarter of the rated speed.

In 2013-2014, under the umbrella of Envi-Med Regional Programme, Iridium drifters were deployed offshore south of Lebanon, around the area of Tyre, in the context of studying currents in the Eastern Mediterranean. Nine buoys were deployed in 2013 and three drifters in 2014. The mapped out results reveal the behaviour of surface currents (Figure 6.5 and Figure 6.7). An argo float, deployed offshore south of Lebanon in 2014, reveals the trajectory of subsurface currents at depth (Figure 6.8). The trajectories of these buoys and drifters are of significance since the direction and flow of the current, although weak, affect a seagoing vessel[33].

[32] Prior to the construction of the Aswan High Dam. Today, surface currents along the Nile delta rarely reach 0.5 knots (Defense mapping Agency hydrographic/Topographic Center, 1991).

[33] For additional information on the buoys and drifters see http://nettuno.ogs.trieste.it/sire/drifter/project.php?country_www=ALTIFLOAT. http://www.coriolis.eu.org/Data-Products/Data-Delivery/Argo-floats-by-WMO-number .

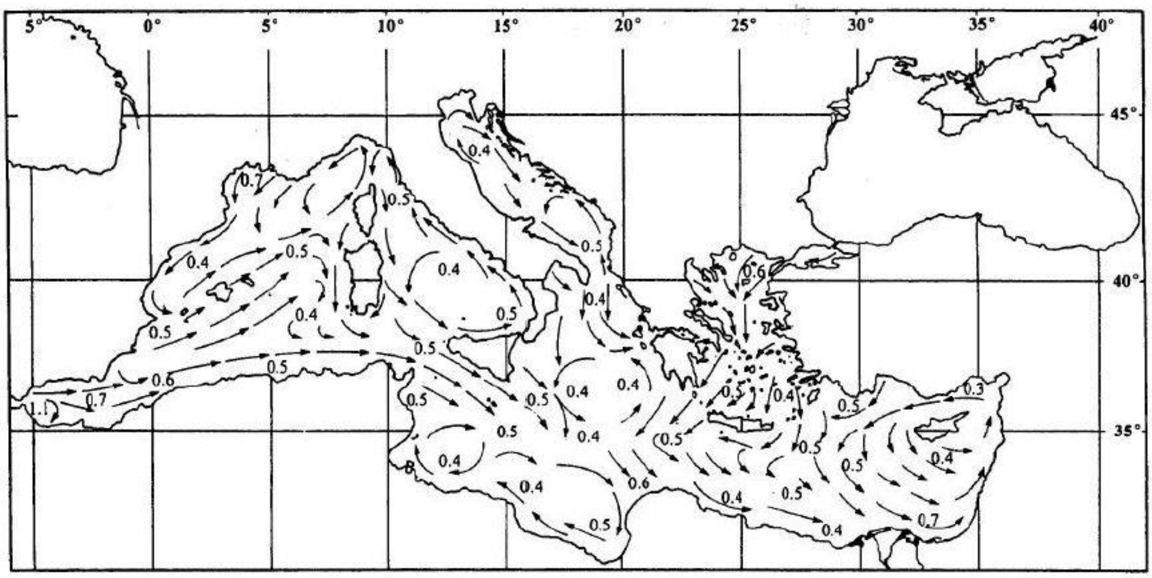


Figure 6.3- Surface currents of the Mediterranean (from the Defence Mapping Agency Hydrographic/Topographic Centre, 1991)

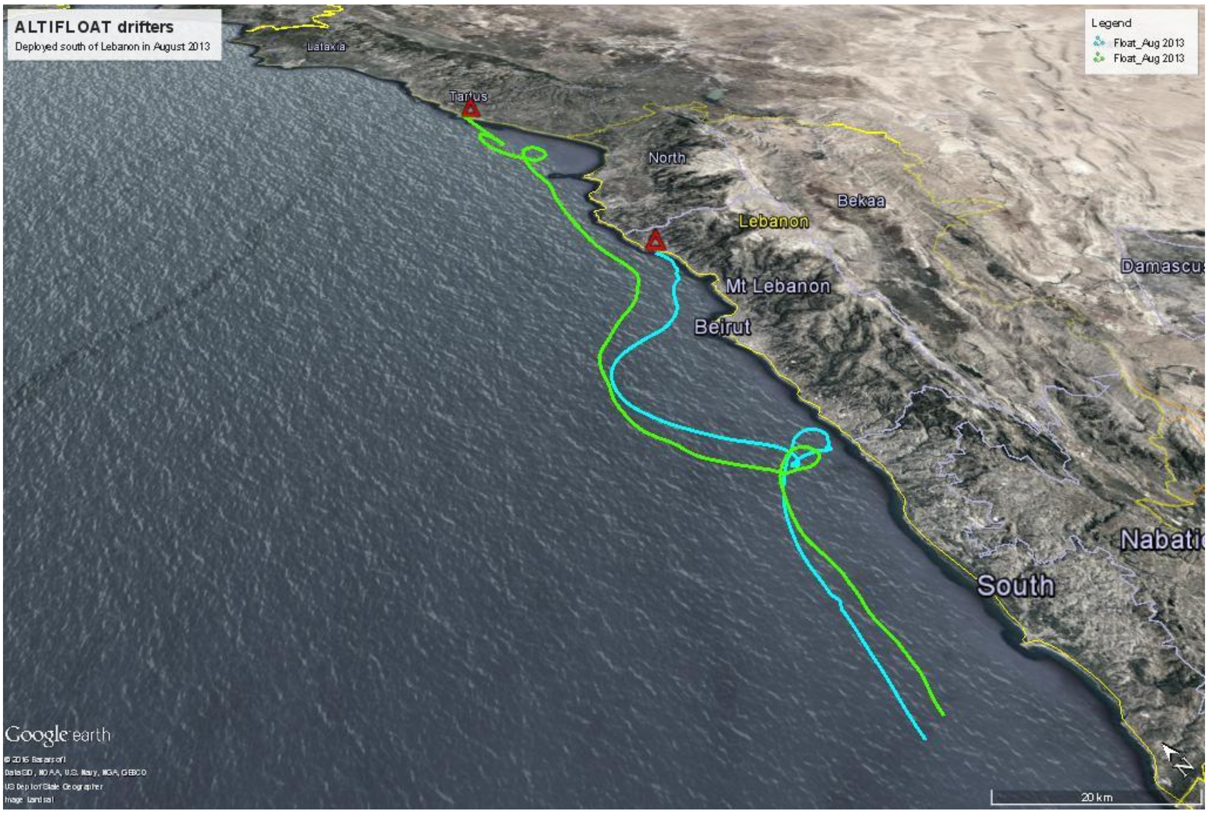


Figure 6.5- ALTIFLOAT drifters deployed offshore south of Lebanon around Tyre in August 2013. Red triangles mark the end of the drifters' trajectories. Data retrieved from Istituto Nazionale di Oceanografia e di Geofisica Sperimentale.

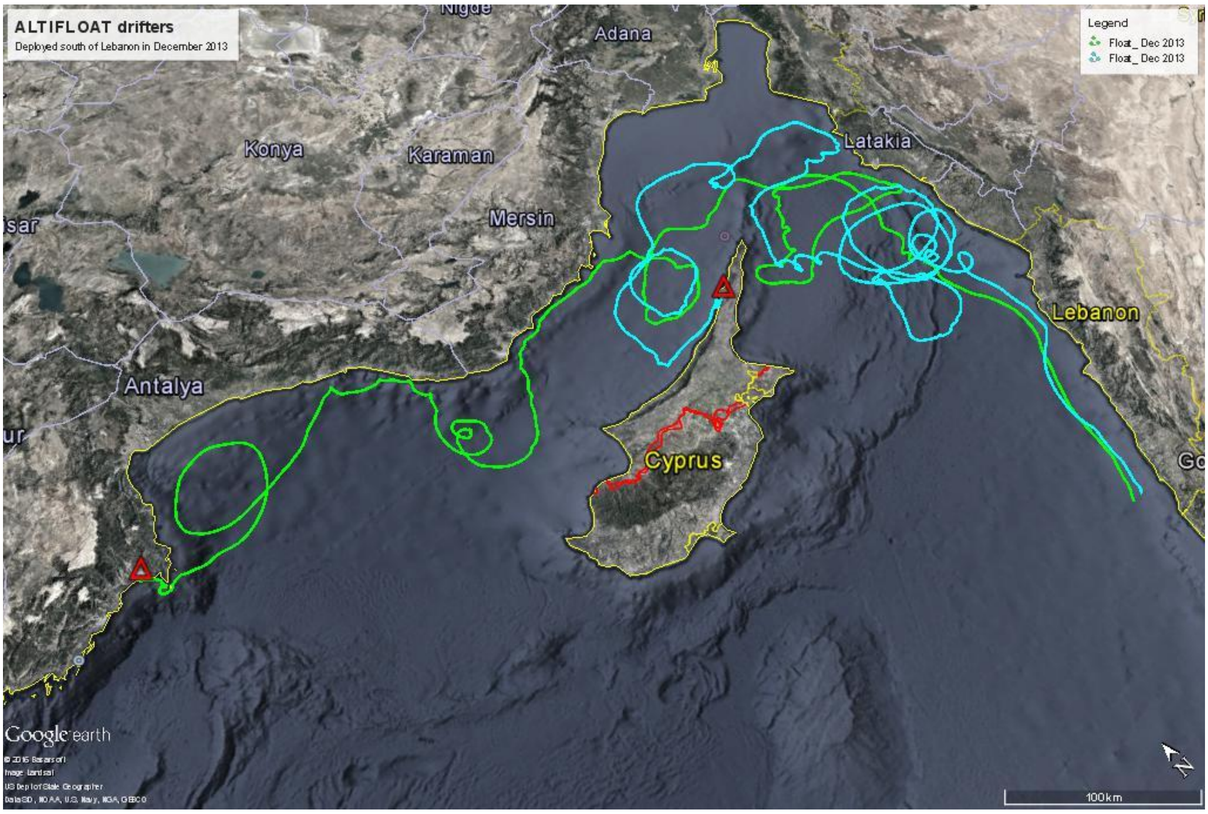


Figure 6.4- ALTIFLOAT drifters deployed offshore south of Lebanon around Tyre in December 2013. Red triangles mark the end of the drifters' trajectories. Data retrieved from Istituto Nazionale di Oceanografia e di Geofisica Sperimentale.

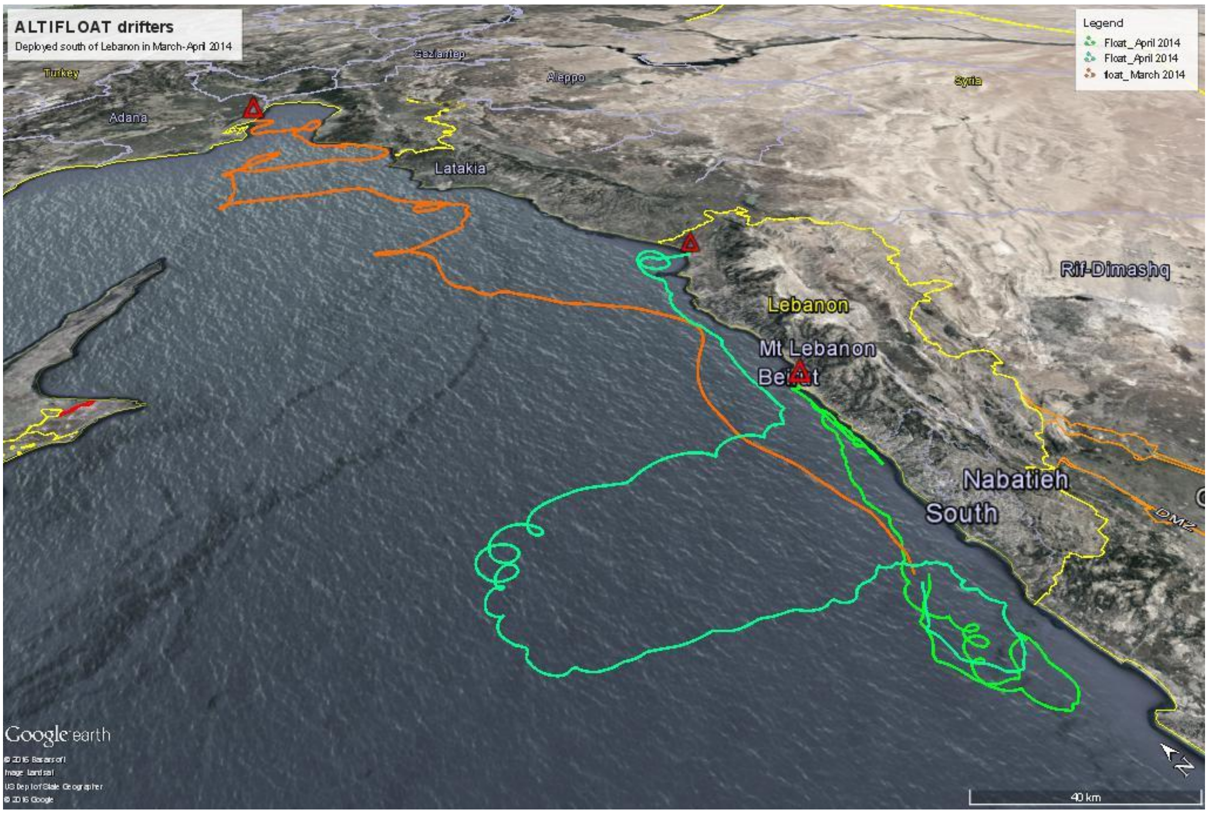


Figure 6.6- ALTIFLOAT drifters deployed offshore south of Lebanon around Tyre in March-April 2014. Red triangles mark the end of the drifters' trajectories. Data retrieved from Istituto Nazionale di Oceanografia e di Geofisica Sperimentale.

Figure 6.7- ALTIFLOAT drifters deployed offshore south of Lebanon around Tyre in June-August 2014. Red triangles mark the end of the drifters' trajectories. Data retrieved from Istituto Nazionale di Oceanografia e di Geofisica Sperimentale.

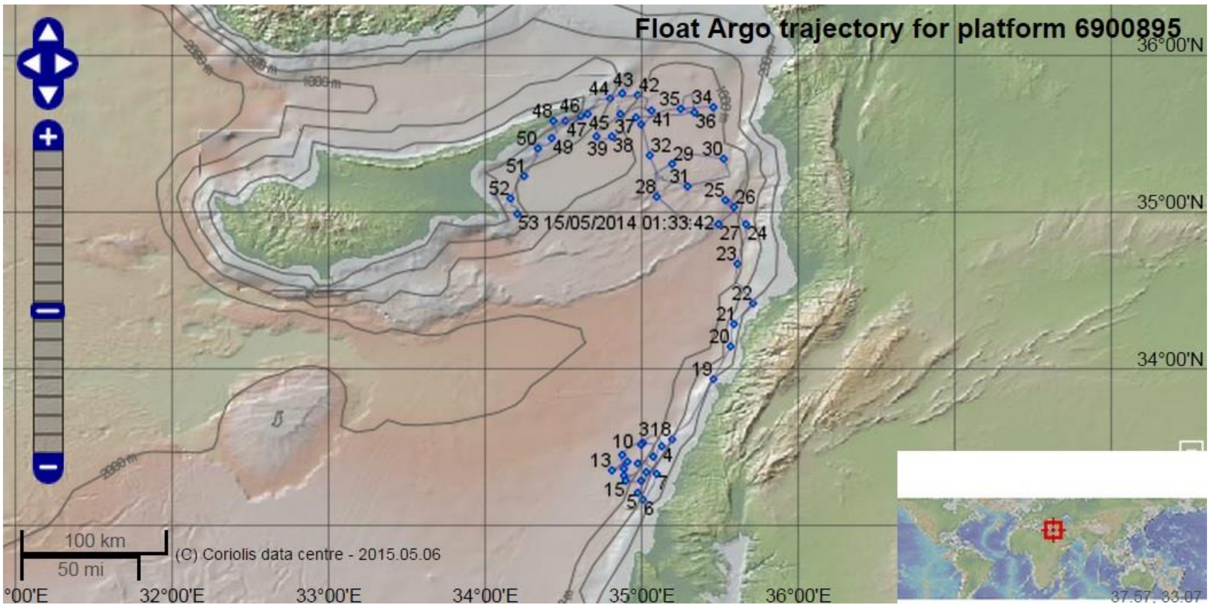


Figure 6.8- Trajectory of an Argo float deployed offshore south of Lebanon. Note that the float reached southeastern Cyprus. Data retrieved from Coriolis Operational Oceanography.

6.2.1.2 Winds

Sailing is essentially using the wind direction and intensity to manoeuvre a vessel; hence, wind speed and direction play an important role in dictating sea routes and ports of call. Particularly in the Mediterranean where currents are, to an extent, weak, the wind is a controlling parameter in maritime activities. In a sail dominated world, knowledge of the local peculiarities and the pattern of offshore and onshore breezes was necessary when embarking on a journey or seeking an anchorage or harbour. Beyond sight of land, seafarers relied on the wind's signature and the sun's position to obtain their bearing. Homer recognised four winds that correspond to cardinal directions: Boreas (north), Notos (south), Apeliotes (east), and Zephyros (west), while Aristotle identified more than eleven, which he arranged into a wind rose (*Aristotle*- Meteorology). The Etesians, however, blowing in the eastern Mediterranean, were the most influential upon seafaring (Davis 2001:15).

The Etesians or meltemi winds (Figure 6.9) are perhaps the most notorious wind regimes in the eastern Mediterranean. They are northerly winds that originate from the upper Balkan Peninsula. They blow down the Aegean in a south-easterly direction until reaching the latitude of Crete where they veer more easterly, and become predominantly northwesterly by the time they reach the Central Levantine Basin. The Etesians blow regularly from mid-May to October and they maintain their force until they encounter another wind regime that alters their speed (Defense Mapping Agency Hydrographic/Topographic Center, 1991). By the time the Etesians arrive to the Levant, their strength is weaker than in the Aegean. Hence, ships sailing north and south between Egypt and Levantine harbours could veer and tack up and down the coast, though they were sailing along a lee shore considered dangerous for mariners not being able to sail clear of it (Davis 2001: 23; Blue, 1995: 268). When heading westward towards the Aegean or Cyprus, ships waited for the Etesians to weaken, taking advantage of the evening land breezes[34]. Mariners could have also utilised a number of regional winds that rise from the east or south. The generic name of these winds is Scirocco. One variety of these winds is the Khamsin, a name derived from Arabic meaning fifty since it blows for approximately fifty days around mid-March (The United Kingdom Hydrographic Office 1999: 34-5). This southern wind blows intermittently from Egypt and Gaza onto the Mediterranean. Similarly, the Simoom, a sand-laden wind which blows off the Palestinian and Egyptian coasts, may have been used to exit Levantine anchorages and harbours. These winds, however, could turn violent. The two Phoenician shipwrecks located more than 30km off the coast of Ashkelon, in deep water, might have sank as a result of violent weather (Beresford, 2013: 67; Stager, 2003). In addition to these regional winds, diurnal winds, known as the land and sea breezes and which fluctuate during a 24hr day,

[34] Wenamun on his departure from Byblos, waited for the night to fall to utilize convenient land breezes (Simpson and Ritner, 2003 :145-146).

affect sailing close to land. The diurnal winds are the result of the difference in temperatures of land and sea, between the morning and the evening. During the day, the land’s temperature rises and draws colder air from the sea. While during the evening, the land's temperature decreases and causes an offshore breeze. These coastal winds are more pronounced in warm seasons, they can be felt for up to 30km offshore (Beresford 2013: 85). There is no doubt that the diurnal winds were very advantageous for ancient seafarers engaged in coastwise voyages; they would have allowed vessels to sail in either direction parallel to the shore.

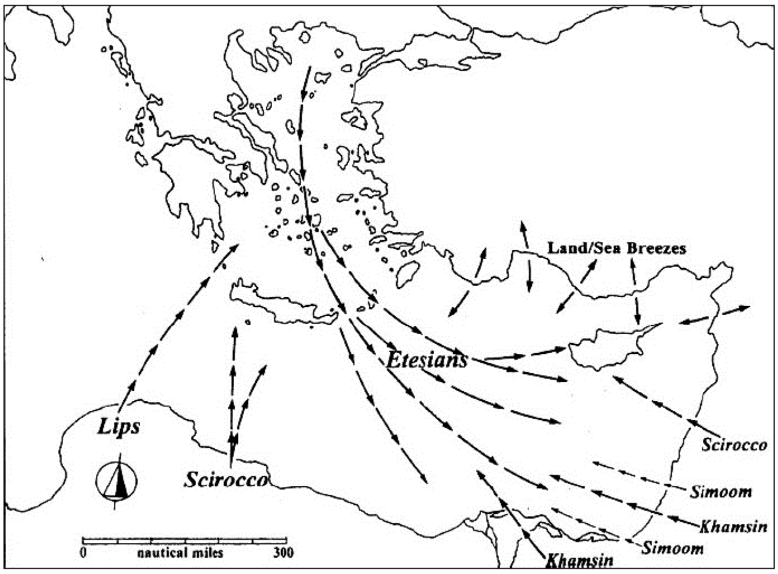


Figure 6.9- Summertime winds blowing in the eastern Mediterranean (from Davis, 2001: Fig 2.3. Based on Defense and Mapping Agency Hydrographic/Topographhic Centre 1991: 74).

Although these wind patterns are widely recognised, they tend to simplify a complex process and disregard other potential wind patterns and regional variations. Recent models of wind speed and direction along the Levantine Basin, based on data from the Wind and Wave Atlas of the Mediterranean, reveal variations in wind speed and direction otherwise unnoticed (Safadi, 2016). They show seasonal variations in wind speed and direction, and daily variations (morning and afternoon) based on offshore and coastal wind data points. These wind speed and direction models incorporate diurnal winds. Knowledge of these variations must have been essential for seafarers who had to resort to local wind patterns and temporal fluctuations in order to plan and undertake sea journeys (Figures 6.10 and 6.11).

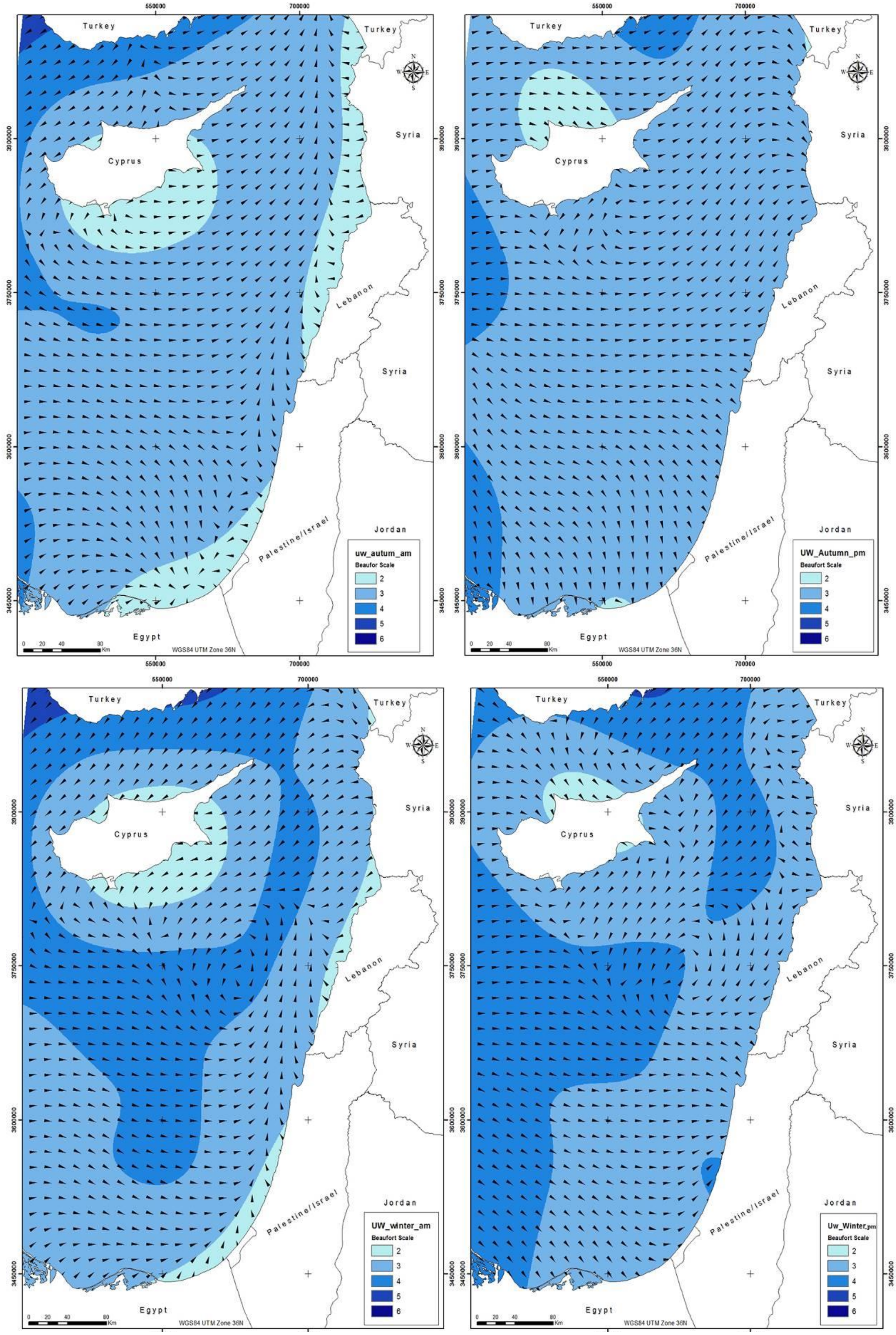


Figure 6.10- Wind speed and direction models for the autumn (top) and winter (bottom) in the morning (left) and evening (right). Wind speed is classified in terms of Beaufort scale (from Safadi 2016: Fig.4-5).

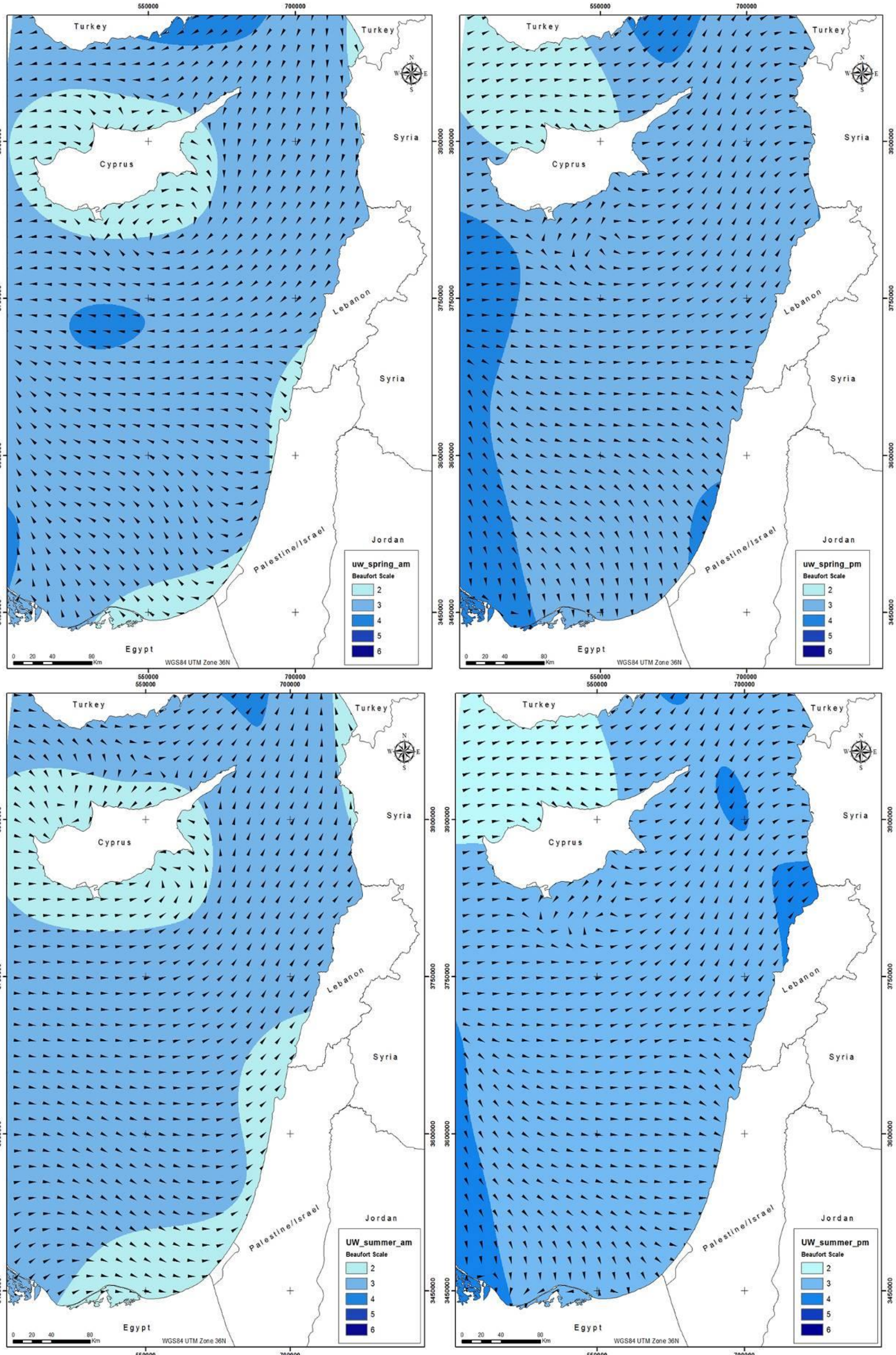


Figure 6.11-Wind speed and direction models for the spring (top) and summer (bottom) in the morning (left) and evening (right). Wind speed is classified in terms of Beaufort scale (from Safadi 2016: Fig.6-7).

6.2.1.3 Seasonality

The seasonality of seafaring is generally recognised and highlighted in many works (e.g. Morton, 2001; McCormick 2001: 98). The sailing season is assumed to have lasted from late spring to early autumn. Hesiod, the earliest source on the subject, stated that the sailing season lasted for 50 days after the summer solstice (Wender, 1973). It is probably convenient to assume that ancient seafaring slowed down with stormy weather and heavy seas. After all, ships and their cargoes needed to be protected against wrecking, meaning it was more conductive to sail during fairer months. However, other textual sources point to winter sailing and activities. Thucydides wrote that the Athenian and Spartan galleys engaged frequently in warfare and commerce throughout the Ionian and Aegean Seas during the winter (Casson 1995: 270). Moreover, an Aramaic papyrus from the Egyptian city of Elephantine records the dates of forty foreign ships (Table 6.1), thirty-six of which were Ionian and six listed as Phoenicians, arriving and departing from an Egyptian port in 475 or 454 BC (Porten and Yardeni, 1993).

Table 6.1- Sailing schedule of Ionian and Phoenician ships based on the Ahiqar scroll of 475 BC. (from Davis 2001: Table 2.2, based on Porten and Yardeni, 1993: xx-xxi).

Egyptian months	**Ionian ships**		**Phoenician Ships**		**Total Sailings**
	Arrivals	**Departures**	**Arrivals**	**Departures**	
Athyr Feb. 18- Mar. 19	3	2	-	-	5
Choiak Mar. 20-Apri. 18	3	3	-	-	6
Tybi May 19-Jun. 17	3	3	-	-	6
Mehir May 19-Jun.17	3	3	-	-	6
Phamenoth Jun. 18-Jul. 17	4	4	-	-	8
Pharmuthi Jul. 18- Aug. 16	4	5	-	-	9
Pahons Aug. 17-Sep. 15	5	5	-	-	10
Payni Sep. 16-Oct. 15	4	4	1	1	10
Epiph Oct. 16- Nov. 14	3	3	3	3	12
Mesore Nov. 15-Dec. 14	4	4	2	2	12

According to the Elephantine Palimpset, the ships arrived and departed the port during the course of a sailing season that began around March 6, when the Ionian vessel departed, and stretched until early winter when a vessel departed on December 14. These dates are very important in understanding the ancient sailing season, attesting for year-round navigation in the eastern Mediterranean except for January and February[35].

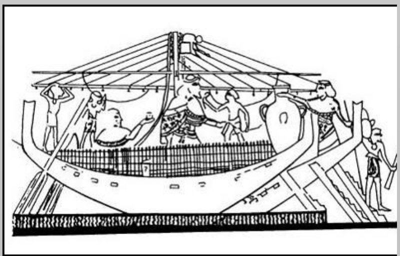
It is therefore essential, according to Arnaud (2005:28), to react against a form of neo-determinism, supported by many authors (e.g. Pryor, 1992), that tends to focus solely on the prevailing winds of the summer season to constrain ancient Mediterranean sailing to two coastal itineraries, a southern and a northern one, thereby excluding any other cross sailing. Indeed other solutions and navigation patterns existed as long as skilful mariners meticulously examined the conditions at hand.

Henceforth, in light of the rhythms of winds and currents discussed, it is essential to account for seasonal changes, and how these variations affect sailing in the Levantine Basin year-round. Consequently, it is insufficient to focus on one particular season, e.g. summer time, in order to evaluate and understand the maritime space of seafaring and therefore maritime connectivity of the Levantine coast. We require instead an approach that can incorporate temporal changes, as these are crucial to the experience and dynamics of seafaring.

6.2.2 Navigational aids

Apart from the natural rhythms affecting seafaring and described above, navigational aids were employed to assist seafarers on their journeys, e.g. the employment and migration of birds, the crow's nest (see Text-box 1), use of sounding leads, use of visible markers on land (see Text-box 2 below), following the stars, the sun and moon, movement and presence of clouds, changes in water colour, etc. The evidence for navigational aids in the archaeological record, however, is meagre. This is due to a couple of reasons, mainly the lack so far of an EBA shipwreck from the eastern Mediterranean, and the rarity of textual and iconographic evidence relating to the performance of seafaring during the EBA from the eastern Mediterranean. Nonetheless, we can refer here to a couple of navigational aids whose employment might have been significant for mariners. The value of birds, for instance, for

The crow's nest offers an elevated vantage point on board the ship that increases the visibility over the sea surface, and allows for spotting other ships and land. Crow's nests start appearing in the archaeological record of the Late Bronze Age. Examples of crow's nests are depicted in two scenes from Egypt of Levantine merchant ships. One is from the tomb of Kenamun (Wachsmann 1998: 42-45) and another from the tomb of Iniwia (Wachsmann 1998: 56-60).



Ships from the Kenamum scene (from Davies and Faulkner 1947: pl.8)

Text-box 1- The Crow's nest

[35] Tammuz (2005:151) notes that the date the first Ionian ship arrived to the Egyptian port is unknown. It left however by the 6th of March, leading to think that it must have arrived a week or two before, in February.

ancient navigators at a practical level is undeniable (McGrail 1991, 1983). The direction of flight and behaviour of birds is a reliable wayfinding method (Hornell, 1946). The behaviour of ground-breeding species such as gulls and terns, flying away from land to fishing grounds and returning to their roost, did not go unnoticed. Sighting one is a sign of nearby land (Lewis 1994: 205). Shore-sighting birds on the other hand, whose response upon release is to look for land (Gatty, 1943: 8-9), could well have been employed. The earliest written evidence of employment is in the book of *Genesis*, the story of Noah (Gen 8: 6-12). There also exists an Akkadian parallel to this account in the Epic of Gilgamesh (Pritchard 1975: 69-70). Examples of the potential importance of birds in navigation are in the form of birds' depictions on seals (Figure 6.12), e.g. a cylinder seal from the Early Dynastic Period ca. 2800 BC depicting a raven-like bird on the prow of a boat (Frankfort, 1939: pl. 11m), on frescos, e.g. appearance of a dove on the Late Cycladic I fresco of the Ship Procession at Thera (Morgan 1988: pl. 9 and 11) and on ship models, e.g. a Middle Cypriot I terra-cotta model of a ship containing two birds sitting atop the cap rail (Wachsmann 1998: fig. 4.1).

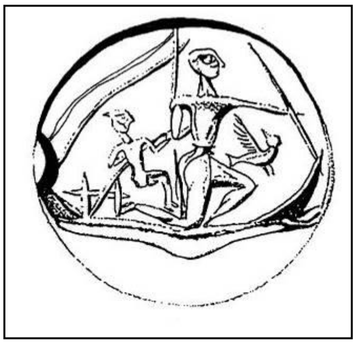


Figure 6.12- Late Bronze Age Aegean seal stone showing a dove above the bow of a ship (from Pini 1975: no. 184)

Equally important for seafarers was knowledge of the type of sea-bottom and depth at sea. This is where sounding weights are of practical importance. They facilitate gauging the depth of water, hence permitting safer navigation particularly in shoal waters. Sticky substance applied to the sounding weights such as tallow can retrieve a sample of the seabed, allowing seafarers to evaluate the type of the sea bottom and its potential of holding a ship's anchor. Only the Uluburun shipwreck from the Late Bronze Age shows evidence for what may resemble a sounding weight (Pulak 1988: 33). Although it can be confused with a net weight, with no other sample of a sounding weight from the Bronze Age, it is difficult to determine what they looked like (Davis 2001: 111). Stone artefacts, identified as fishing gear sinkers (Frost, 2001; Galili *et al.,* 2002), might have been used as sounding weights according to Galili and Rosen (2009: 343). In Polynesia, for instance, fishing weights were used as sounding weights while navigating offshore (Gladwin 1970: 58). Numerous sounding weights

Text-box 2- Seamarks and landmarks

Seamarks, erected to point out submerged and shallow reefs, reduce the dangers of wrecking. Man-made structures however, exposed to rough seas, could hardly withstand a significant amount of time. In one instance, from 480 BC, the account of Herodotus 7.183 mentions foreigners having brought a pillar of stone and placed it on a reef where three ships, belonging to the Xerxes fleet, had dashed themselves. Moreover, seafarers relied on the recognition of headlands, capes, peaks and mountains. This is evident in the *Epic of Gilgamesh*: "*Now, Urshanabi, which is [the road to Utnapishtim] ? What are its markers? Give me, O give [me, its markers]! If it be seemly, the sea I will cross; If it be not seemly, [over the steppe I will range].*" (Pritchard, 1969: 91). Although this mention of wayfinding is Mesopotamian in origin, and dates to the Third Dynasty Ur, ca. 2100 BC, the use of landmarks during the Bronze Age of the eastern Mediterranean is very viable (see Pritchard 1969: 228). Apart from natural landmarks, EBA walled towns on the coast could have served as visual markers for seafarers in adjacent waters (see Frost, 2000: Yon. 1990).

were recovered from the coast of Israel (see Galili and Rosen 2009 for detailed description). However, the earliest ones in the assemblage date to shipwrecks from the Hellenistic period.

6.3 Distance and Time

The rhythms involved in seafaring, their knowledge and use, constitute fragments of a much wider, more complex relational space. Frake (1985: 256) stated regarding studies of Pacific Islanders in Micronesia that

> *"the lesson to be drawn from these studies is that the islanders' seafaring exploits do not depend on some uncanny intuitive powers, not on personality quirks driving people to seek danger, not on the luck of lost sailors adrift at sea, nor even on rote-learners 'local knowledge'. Instead these navigational abilities depend on a profound general knowledge of the sea, the sky and the wind; on a superb understanding of the principles of boat building and sailing; and on cognitive devices- all in the head- for recording and processing vast quantities of ever changing information.* " (see also Gladwin, 1970; Finney, 1976)

Hence, seafaring not only involves knowledge and understanding of a range of variables, but an active process of cognitive mapping as means of storing information and accessing wayfinding clues, in other words, as a means of dead reckoning. This act of cognitive mapping comprises the process of producing internal spatial representations of the surrounding environment (Pérush *et al.* 2000: 108). Gell (1985) argues that cognitive maps are understood against a Cartesian background of spatial representation. Geographers and psychologists, however, rarely sustain this point of view since experiments have shown that cognitive maps are subjective and distorted when compared to Cartesian maps (Hallpike *et al*. 1986: 343). Ingold (2000: 223-225) asserts that our interaction with space is 'indexical', i.e. based on a personal 'view *in* the world', whereas maps are 'non-indexical', offering a generic view of the world.

This difference has prompted a growing interest in studying cognitive relationships with maps via ethnographic, on-site methodologies (e.g. Andrews, 2012; Ben-Ze'ev, 2012; Del Casino and Hanna, 2006). Furthermore, different mapping practices have emerged, which aim to map out emotions, perceptions and memories, e.g. 'carte sensible' –sensitive map- by Elyse Olmedo (2011), and the practice of artist Ariane Littman (2012) who has been bandaging and sewing pieces of maps of Palestine and Israel around the world. In this context, Caquard (2015) raises a very significant issue: " *[…] since our mental spatial models are not 'map like' and that maps are not 'world like', the use of maps as the intermediary between these mental spatial models and the world is at best inaccurate* *and at worst irrelevant; either way, it needs to be reconsidered*". Nevertheless, the maps that Caquard is referring to are different from the multiplicity of mappings, as discussed earlier in this chapter. As argued, mapping distorts, challenges, evokes and mediates lived and conceived spaces. How can we then employ mapping to visualise, imagine, portray and mediate a relational space, a space emerging from relations taking place at sea, which include as actants natural rhythms, the environment, the land and sea, the technology used, etc.? To this end, the task is two-sided.

On the one hand, it requires working through variables of the navigable space and processes taking place at sea, and on the other hand, it must be methodologically feasible. Since our knowledge of many of the navigational aids and aspects of the mental maps of ancient seafarers is very limited, this task requires resorting to workable processes such as rhythms of winds and currents, and sailing characteristics. Nonetheless, the interest here is not in rhythms and processes as independent actants, but in their relations and interactions, for the purpose of mapping the navigable maritime space. Therefore, this necessitates a shift in focus to the dynamics of seafaring and how relations between processes affect those dynamics. This is where the two elements, distance and time, that qualify the performance of seafaring, which is the act of navigating from one location to a destination, come into play. The notion of distance, as Farr (2010: 22) maintains in regards to trans-Adriatic crossings, is tangled with the passage of time. Predicting the time it takes to reach a destination was an important and difficult aspect of navigation. Seafaring-related written texts often refer to the number of days' sailing when referring to distances of sea journeys (see Casson 1995: 282-290). This is evident in the *Periploi* in which the time a trip should take and the distance between points were synonymous. Journey distances in terms of days' sailing, as in the *Periploi,* were estimates for an average vessel in suitable winds (Morton 2001: 218-221). However, seafarers could relatively estimate the speed of their vessels based on how weather and sea conditions were affecting their ship. The employment of days' sailing as an indicator of distance is a corroboration of the significance of time in order to estimate speed, plan and undertake journeys and, most importantly, as a cognitive and realistic variable affecting the seafarers' perception and understanding of the marine space.

> *The voyage from Cyrenaea to Criumetopon takes two days and nights, and the distance from Cimarus to Taenarum is seven hundred stadia, Cythera lying between them; and the voyage from Samonium to Aegypt takes four days and nights, though some say three.*
>
> Strabo. Geographica. 10.4.5

> *Now Egypt lies about opposite to the mountainous part of Cilicia; from there, it is a straight five days' journey for an unencumbered man to Sinope on the Euxine; and Sinope lies opposite the place where the Ister falls into the sea. Thus I suppose the course of the Nile in its passage through Libya to be like the course of the Ister.*
> Herodotus II.34

Time is not only an indicator of the length of a sea journeys, but also of changes in the conditions and in the environment that seafarers encounter. Braudel's (1972) seminal and pioneering work distinguished three levels of time. The first is the long term *structure- longue durée*, representing geological time, thousands of years and long-term environmental changes. The second is the medium term *conjuncture- moyenne durée*, which refers to time periods of hundreds of years, to social and economic time. The third is the short term, *evenement - courte durée*, which marks days, weeks and political time. Metaphorically, the first level stands for the ocean's deep unmoving water; the second for the slow perceptible rhythms of the tides, and the third reflects the froth of waves (Macfarlane 1996: 2). The final effect of Braudel's three-levelled division of time was to dissect history into planes, into geographical, social and individual time (Braudel 1972: 21). Braudel realises the prominence of time for understanding the history of the Mediterranean and its dynamism. Adopting Braudel's structure of time to the performance of seafaring highlights the importance of coastlines undergoing a *longue durée* of metamorphosis to reach a state that we can define with a shape and spatiality. It brings to the forefront the cycles and rhythms of weather and marine environment as they reprise in patterns throughout a month, a year and years. It emphasises the choices made by seafarers on water, the sociality of seafaring, and all its economic and political implications.

Time then glues and tangles the processes and variables unfolding in space to the performance of seafaring. Weather conditions, direction and speed of winds and currents, the vessel's characteristics, rig-plan, hull form, sailing directions, etc., all these factors represent and render time, which in turn reflects how ancient seafarers might have conceived of their space while engaged in the act of sailing from one location to the other. Henceforth, mapping the marine navigable space translates into mapping sailing space-time of the Levantine Basin during the EBA. The use of cartograms, or distorted thematic mapping, renders this mapping exercise feasible. The next section explores cartograms as a practical mean of making this mapping exercise of the sailing space-time of the Levantine Basin feasible. Thereafter, a model that accounts for the variables at sea is put forth in the aim of mediating the marine navigable space.

6.4 Cartograms

All maps inevitably result in a degree of distortion, due to projections, as the area of the earth is mapped onto a flat surface. The Mercator projection for instance, produces a considerable visual bias; it stretches the areas closer to the poles. Thus, Greenland, for example, appears much larger than India, while in reality India is about seven times the area of Greenland. The degree to which the distortion of a map is acceptable depends on the map's application. Cartograms can be defined as "*maps in which at least one scalar aspect, such as distance or area, is deliberately distorted to be drawn in proportion to a socioeconomic or demographic or any other 'human' variable of interest*." (Ballas and Dorling 2011: 179). They are also known as diagrammatic maps (Raisz, 1962), a representation where "*spatial geometry is distorted to reflect a theme*" (Slocum *et al.*, 2005). The distortion involved in cartograms is based on mathematical and statistical calculation such a bidimensional regression. Cartograms' distortion aims at generating a deeper understanding and examination of research questions and problems. Unlike conventional maps, which can be characterised as equal area cartograms, any variable of interest can be the source of distortion of a cartogram, e.g. human population (Figure 6.13), number of voters. In this case, sailing time is the variable that is of interest to map. Mapping the space-time of the Levantine Basin not only serves as a visual aid for understanding the EBA seafaring dynamics, but also facilitates the evaluation of the connectivity of the eastern Mediterranean during the EBA and the maritime connectivity of EBA sites. Additionally, this mapping exercise constitutes a tool with which to compare archaeological data.

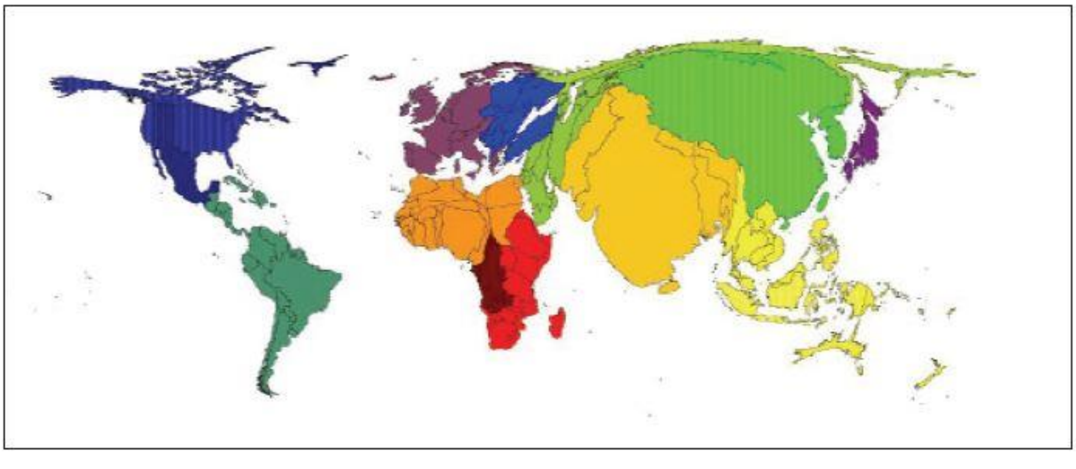


Figure 6.13- World population cartogram from 2002 (from Dorling 2006: Figure 6)

There exists many forms of cartograms such as area cartograms, linear cartograms, contiguous and non-contiguous. Tobler (2004) offers a thorough review of cartograms over the past 35 years. For additional work following Tobler, see Henriques *et al.* (2009), Dorling (2006) and Dorling *et al.* (2006). In area cartograms, the area is scaled and distorted according to the variable of interest, whereas in a linear cartogram, the distance undergoes distortion. Linear cartograms apply best for the aim of this research whereby they permit the distortion of space and distance according to sailing time.

Linear and area cartograms started appearing in the mid-nineteenth century. The earliest known was Levasseur's cartogram of Europe from the 1870 (Figure 6.14). However, it was only in the 1930s with the work of Dr Waldo Tobler on cartographic production and automated methods that cartograms became widespread and easily drawn (see Tobler, 1973).

Figure 6.14- Levasseur's cartogram of Europe (from Tobler 2004: Figure 2).

With the introduction of new modes of transport, geographers and engineers engaged in the production of space-time cartograms that would cartographically represent the difference in time between different modes of transportation. Of the earliest of these attempts is "l*a carte de l'imaginaire*" of Constantin-Pecqueur from 1839. This cartogram aimed at showing the dimension of France travelled by rail in contrast to the use of chariots as a mode of transport (Bretagnolle 2005: Figure 1). Other modes of exploring space-time and modes of transportation were developed such as Hägerstrand's (1973) time-space geography, discussed in Chapter III. Hägerstrand's method, however, demands knowledge of precise times and places, whilst such data for the EBA Levant is non-existent. Isochrone maps, although these are not necessarily distorted maps, reflect time as isochrones overlaying space. Francis Galton was first to devise in the late 1860s an isochrones map of the world based on how much time it take to travel from London by boat (Figure 6.15)[36]. A much more recent piece of work by di Piazza (2014) employs isochrones maps based on experimental time of sea-travel by canoe, accounting for wind speed and direction, in order to deduce space-time cartograms for the island of Ta'u in West Polynesia (Figure 6.16). It is on similar lines to that of di Piazza (2014) that this research develops cartograms for the sailing space-time for the Levantine Basin during the EBA. This entails a distortion of space of the Levantine Basin, meaning distance, via cartograms, according to sailing time, which accounts for variables and rhythms that affect the sailing performance.

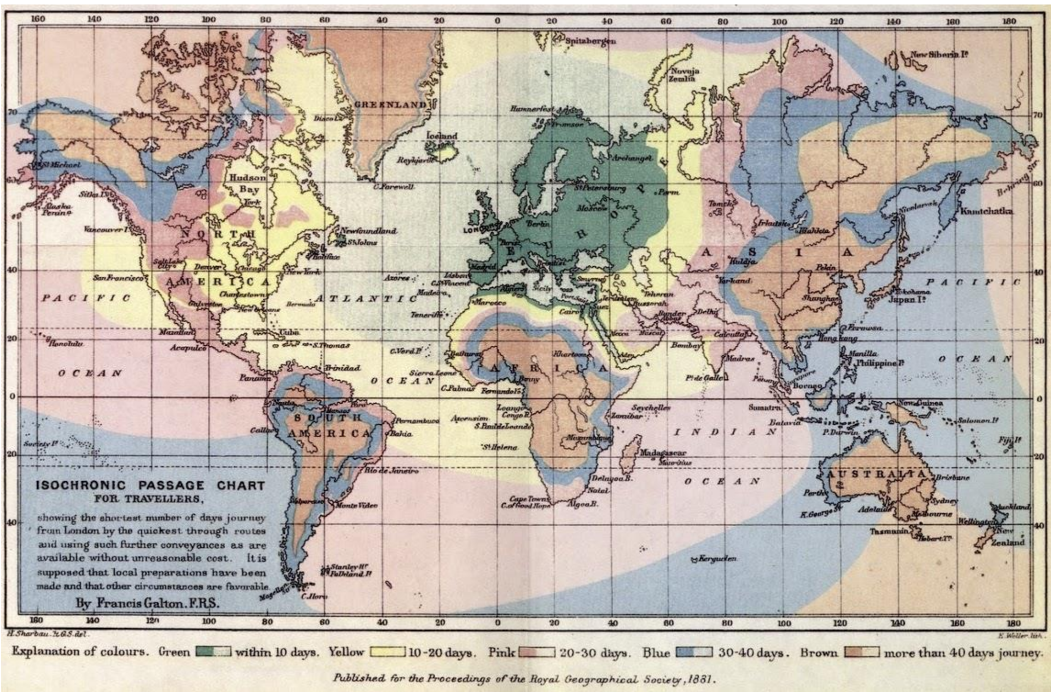


Figure 6.15- Isochrone map by Francis Galton from 1881. The different colours refer to travel time from London by boat. (from Bretagnolle 2005: Figure 4)

[36] For a full review of the earliest space-time cartograms and isochrones maps see Bretagnolle (2005), Bretagnolle and Robic (2005).

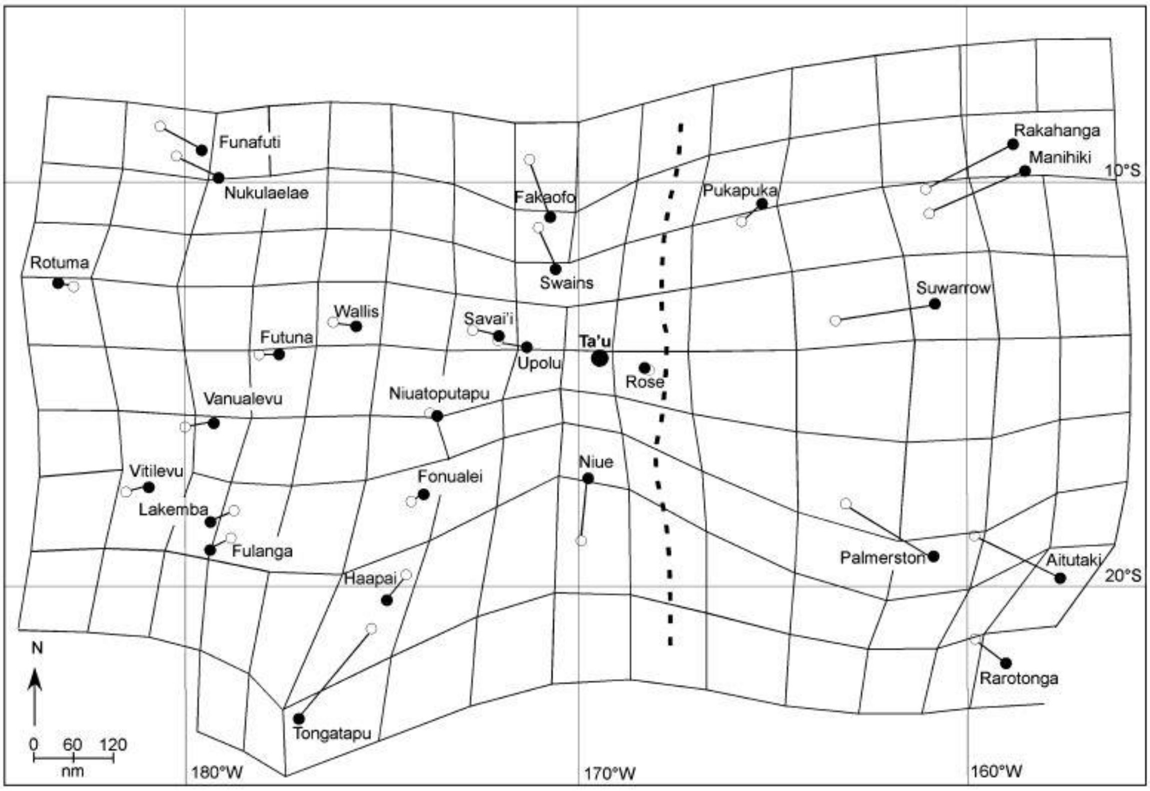


Figure 6.16-Cartogram of the fastest voyages from Ta'u. The grid distortion reflects sailing time. (from di Piazza 2014: Figure 9).

The production of space-time cartograms necessitates two sets of data. First are the source points representing set locations (destinations) in the geographic space for which the sailing time according to a generic base map, e.g. 4 knots speed of sailing, from a specific site, is known. Second are image points. Image points represent displaced source points whereby the displacement corresponds to the new sailing time calculated according to environmental and seasonal conditions. Henceforth, whereas source points can be easily generated according to a generic cost surface in ArcGIS, image points require calculating the influence of seasonal data of winds and currents of the Levantine Basin on sailing time. Moreover, the production of cartograms is restricted to specific locations of origin. In other words, when accounting for sailing time to produce distorted space-time maps, that sailing time must refer to the time it takes to sail from a point of origin. Hence, the next section explores the data and criteria affecting sailing time, and points out the choices and assumptions made by the author. Importantly, however, this mapping exercise does not aim to predict maritime routes between EBA sites and the broader eastern Mediterranean, rather it aims to provide a translation of the sailing space-time, which on the one hand brings us closer to the conceived and lived space of sailing by ancient seafarers, and on the other hand provides a platform for further analysis.

6.5 Considerations for sailing time

Many factors influence the performance of a sea-going vessel, thereby the sailing time of a journey. Of the most important of these factors is the speed of the vessel which in turn is a reflection of the rig-plan, the rigging material, the hull form, the type of propulsion, the start and destination of the journey, the number of stops along the voyage, the weather conditions and sea-state, whether rowing was involved, human decisions, mariners' experience and risk assessments. Since shipwrecks of the EBA from the eastern Mediterranean have not been discovered to date, knowledge of the majority of these factors depends on later periods and on robust and logical assumptions.

6.5.1 The sail

The oldest documented rig-plan known to date is the single-masted square-sail. The evidence comes from the proto-dynastic period in Egypt where drawings on pots identify its use from around 3100 BC (Figure 6.17. Whitewright 2008: 146; Casson 1995: 12; McGrail 2001: 19). Although the sail was known in Egypt from the fourth millennium BC, and arguably in the Arabian Gulf from the sixth millennium BC[37] (Carter, 2006), evidence of its use in the Mediterranean only appears c. 2100 BC. However, as McGrail (2001: 113) points out, it is more than likely that the sail was in use on the Levantine coast at a much earlier date, despite that the earliest depiction of its use is an eighteenth century BC engraving on a Syrian seal (Figure 6.18). It is fair to assume with reliable evidence, that the square-sail rig was the main propulsion for Mediterranean ships throughout the Bronze Age (Whitewright 2008: 146; McGrail 2001: 113-114).

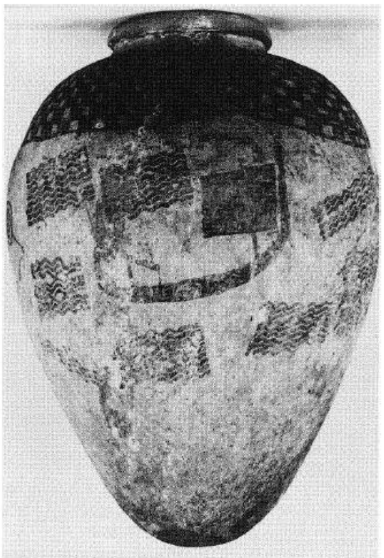


Figure 6.17-- Egyptian Vase from about 3100 BC, Naqada 3 period, showing single square sail (from McGrail 2001: Fig 2.5).

Figure 6.18- Depiction of a ship on an eighteenth century BC cylinder seal from Tel el Dab'a (From McGrail 2001: Fig. 4.15).

[37] A painted disc depicting a sailing boat was found at As-Sabiyeh site in Kuwait, dating to c. 5000 BC (Carter, 2006).

6.5.2 Watercrafts

In terms of watercraft, maritime activities and trade could not have prospered without navigable vessels that can accommodate the needs of ancient seafarers and societies. These vessels must have been structurally integral boats, capable of undergoing journeys in the Mediterranean Sea. Physical evidence for EBA boats is non-exitent. Whilst the earliest evidence of a boat from the Mediterranean is a Neolithic canoe from the site of La Marmotta, on Lake Bracciano (Fugazzola *et al*., 1995; see also Robb 2007: 255), succeeding physical evidence only appears in the Late Bronze Age, with the Uluburun shipwreck (Pulak, 1998). Nothwithstanding, remnants of boats from Egypt, as well as indirect textual and iconographic evidence provide a better understanding of the capability of seagoing vessels in the Mediterranean during the EBA. Of the earliest riverine boats from Egypt is the Cheops ship, or Khufu I (c. 2566 BC). The Khufu vessel (Figure 6.19) was constructed using the shell-first technique. It is the best example of ancient Egyptian boatbuilding, discovered in 1954 (Lipke, 1984). It consists of c. 38 tons of Lebanese cedar with an overall length of 43.63m. The vessel's hull planking is edge-joined, flush-laid planking, with mortise-and-tenon joints (Mark, 2009). The Abydos boat graves are another example of Egyptian riverine boats. The site of Abydos was discovered in the 1990s in southern Egypt, yielding fourteen royal funerary boats from the 1st Dynasty (c. 3000-2800 BC). According to Ward (2006), one of the Abydos boats reveals a codification of technologies as early as 3300-3100 BC. Although Egyptian boats are deemed to be riverine, evidence from Ayn Sukhna on the western bank of the Suez Gulf, provides compelling evidence that Egyptian shipbuilding techniques were employed for seagoing vessels on the Red Sea. At Ayn Sukhna, two Middle Kingdom ships were uncovered with up to five layers of cedar planks, stacked in parallel rows. These planks bear traces of mortise-and-tenon joints with ligatures (characteristic of Egyptian technique). According to Tallet (2012b), the use of double joints is a feature of seagoing vessels.

Figure 6.19- The interior of the Khufu I vessel showing frames and lashed planks (from McGrail 2001: Figure 2.11).

Further evidence of boats from the EBA is textual and iconographic. Sneferu's inscription on the Palermo Stone, one of the fragments of a stele recognised as the Royal Annals of the Old Kingdom of Ancient Egypt, dates to c. 2600 BC and discloses the transport of forty ships filled with cedar wood from Byblos to Egypt (Broodank 2010: 291; Pritchard, 1975: 227; Sasson, 1966: 127). The first solid evidence of seagoing ships is a relief from Pharaoh Sahure's pyramid in Egypt, c. 2475 BC (Casson 1995: 20-21; McGrail 2001: 30). The relief (Figure 6.20) portrays the return of an expedition from the Levant to Egypt. The hull is long and slender, planks are depicted edge-joined and the rig a tall narrow square sail.

The physical evidence of boats, along with indirect evidence proves that EBA boats were seagoing vessels benefiting from a square-sail rig. This is further supported by two and three dimensional representations from the Aegean (Broodbank 2013: 326-329, 2000: 96-102).

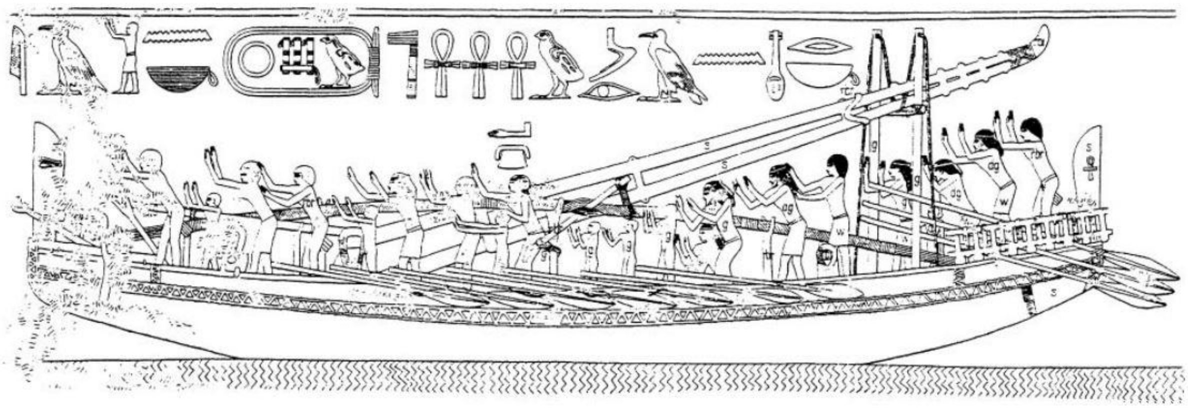


Figure 6.20- Ship depicted on a relief in Sahure's burial temple (from McGrail 2001: Fig. 2.14).

6.5.3 Performance of seagoing vessels

The performance of square-sail ships in different weather and sea-state conditions determines the speed of the vessel, which then can be used to derive sailing time. Indeed, the performance, as stated earlier, depends on many factors, but given the restricted data available on EBA sailing vessels as mentioned above, we need to resort to studies and information within reach. It has been established that during the EBA, a square-sail vessel was in use; any additional factors regarding the vessel itself which influence sailing speed and time must be surmised. Following such a general starting point, the task at hand, of modelling space according to the time of sailing seems unattainable. However, the work conducted by Whitewright (2011) is of substantial importance here since it details the performance of a square-sail vessel according to wind directions, therefore binding environmental conditions to the sailing vessel. Whitewright deduced the Vmg (Velocity Made Good) of Mediterranean square-sail vessels according to historical references and experimental voyages. The Vmg is the absolute speed of a vessel from the origin to the destination based on the distance made good (Figure 6.21). Vmg accounts for tacking and wearing ship. The principle aim of Whitewright's work was to establish and compare the performance characteristics of square-sail and lateen/settee rigs. Whitewright relied on a series of historical voyages (Whitewright 2011: Table 1), which, although not sufficiently detailed, allow for a start in assessing the sails' performance. Where data regarding weather conditions of sailing, e.g. favourable or unfavourable winds, is lacking from historical sources, Whitewright relied on predictable weather patterns and on details from reconstructed square-sail vessels (Whitewright 2011: Table 3). In summary, Figure 6.22 shows a diagram of sailing performance (Vmg) of Mediterranean square-sail and lateen/settee rigs under different wind directions.

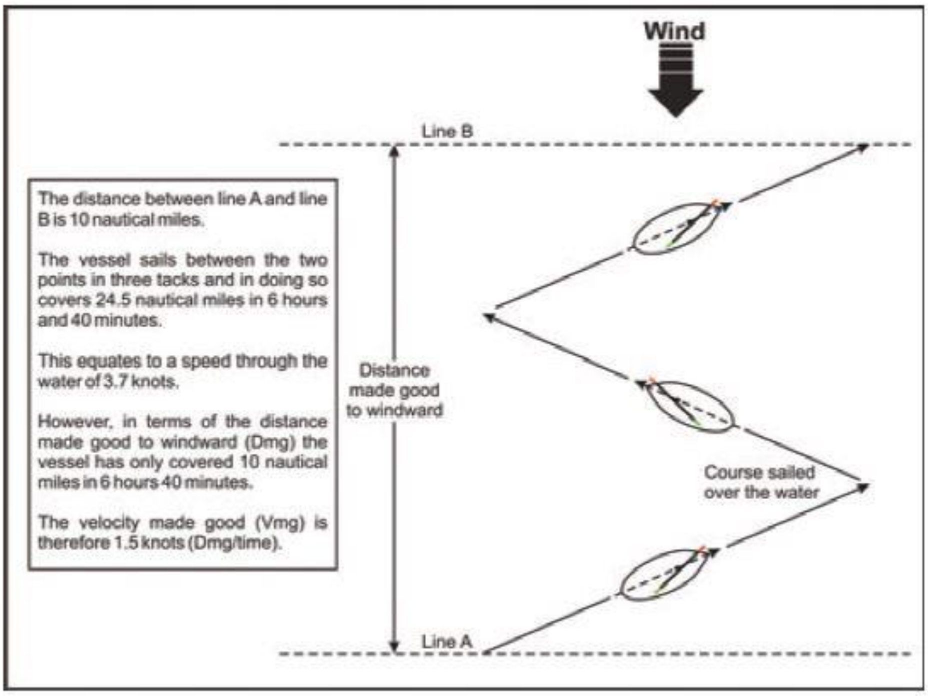


Figure 6.21- Velocity Made Good explained (from Whitewright 2011: Figure 2).

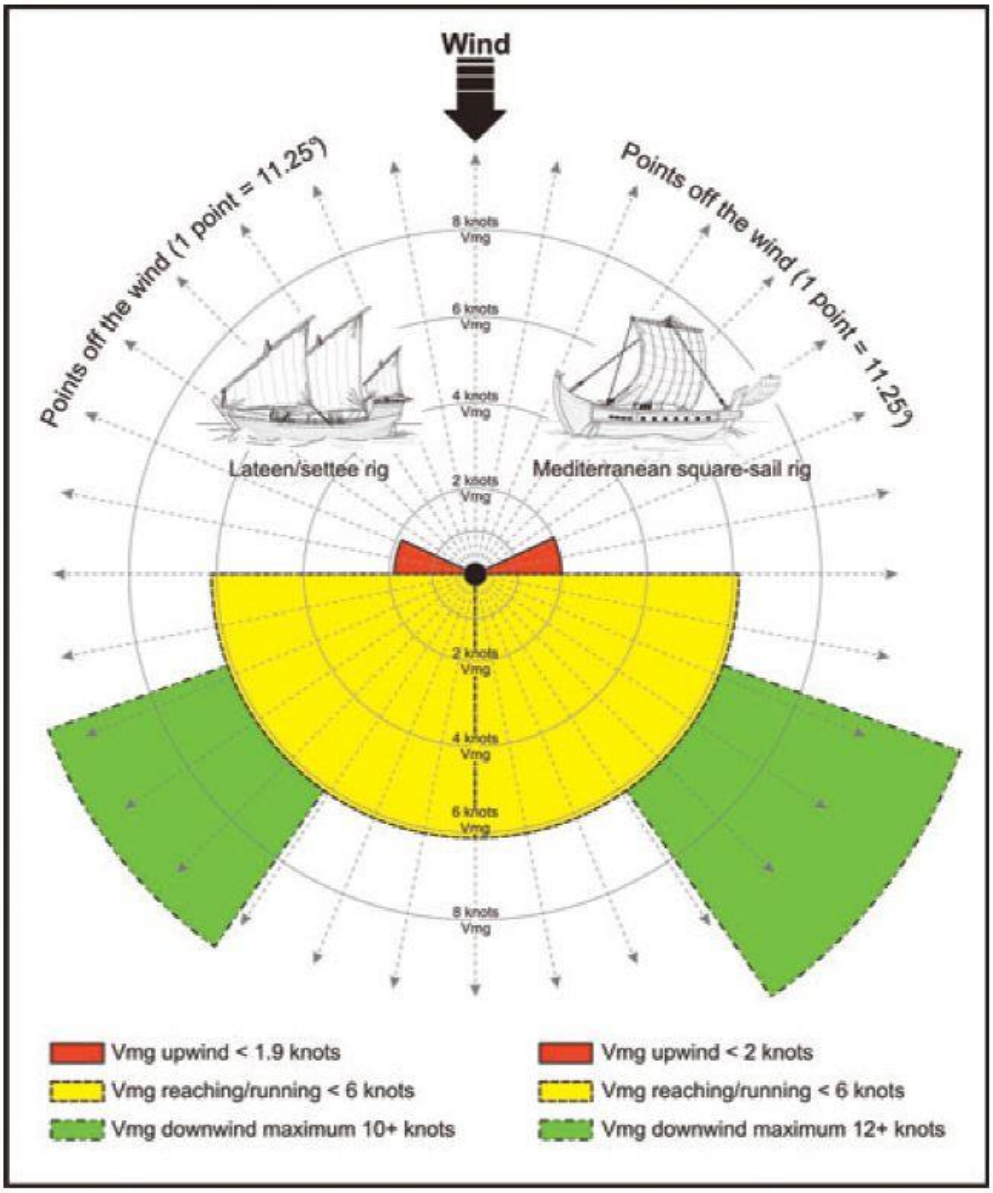


Figure 6.22- Diagram showing the comparative performance of Mediterranean square-sail and lateen/settee vessels on different courses in respect to wind direction. (from Whitewright 2011: Figure 5).

Although Whitewright's diagram provides sufficient information regarding the dynamics between wind directions and sailing performance, wind speed must be further accounted for since it affects the speed of the vessel, therefore the time of the journey. The experimental voyages of the KYRENIA II ship offer insight on this matter. The KYRENIA II is a replica of a Greek merchant ship from the fourth century BC, excavated off the north coast of Cyprus. In November 1982, work began to build an authentic replica of the ship, and in 1986 the KYRENIA II was launched under an experimental archaeology project (Katzev, 1987). The KYRENIA II sailed from Greece to Cyprus, stopping at specific ports. Summarised description on the KYRENIA II sailing speed in different weather conditions provide insights on the performance of a square-sail rig. Table 6.2 offers a rough approximation of its sailing performance according to wind speed. Although KYRENIA II is a replica of a ship from the fourth century BC, it remains the earliest replica to date of a square-sail vessel whoses journeys have been documented and reported on.

Table 6.2- Summary of observations from the experimental voyages of Kyrenia.

Wind speed (Beaufort scale)	Point of sail	Vessel speed
4-6	Broad reach	4-5 knots
4-6	Beam reach	4-5 knots
3-4	Quarter reach	3-4 knots
2-3	Broad to quarter reach	3 knots
3	Beam reach	2.1 knots

Consequently, considering the data above, it is possible to conceive a model that details the Vmg of a square-sail vessel according to wind speed and direction and points of sail. The model, however, depends on the sailing direction of a vessel, for only then can we infer the point of sail according to the wind direction. Prior to providing the details of the model, its basis requires elucidating. As previously established, knowledge of the speed of the vessel allows us to deduce sailing time and thereafter produce space-time cartograms. The production of cartograms requires source and image points as well as points of origin of sea journeys. Henceforth, the following choices are made by the author (Table 6.3); these will be discussed in more details in the next section.

Table 6.3- Criteria and choices made by the author as the basis of a model to produce space-time maps.

Criteria for deducing sailing time and production of cartograms	Choices and assumptions
Rig plan	Mediterranean square-sail.
Origin of sailing	Coastal fronts on the Levantine coast, represented by known EBA sites (Ugarit, Byblos, Ashkelon and Egypt), as well as points located at sea, in the vicinity of Cyprus and within the Levantine Basin (Map 6.1).
Sailing directions	Eight traditional sailing directions.
Speed of vessel	Velocity Made Good calculations based on Whitewright (2011) and the experimental voyages of Kyrenia ship.
Weather and marine conditions	Wind speed and direction models (Safadi, 2016). Current speed and direction for the eastern Mediterranean.

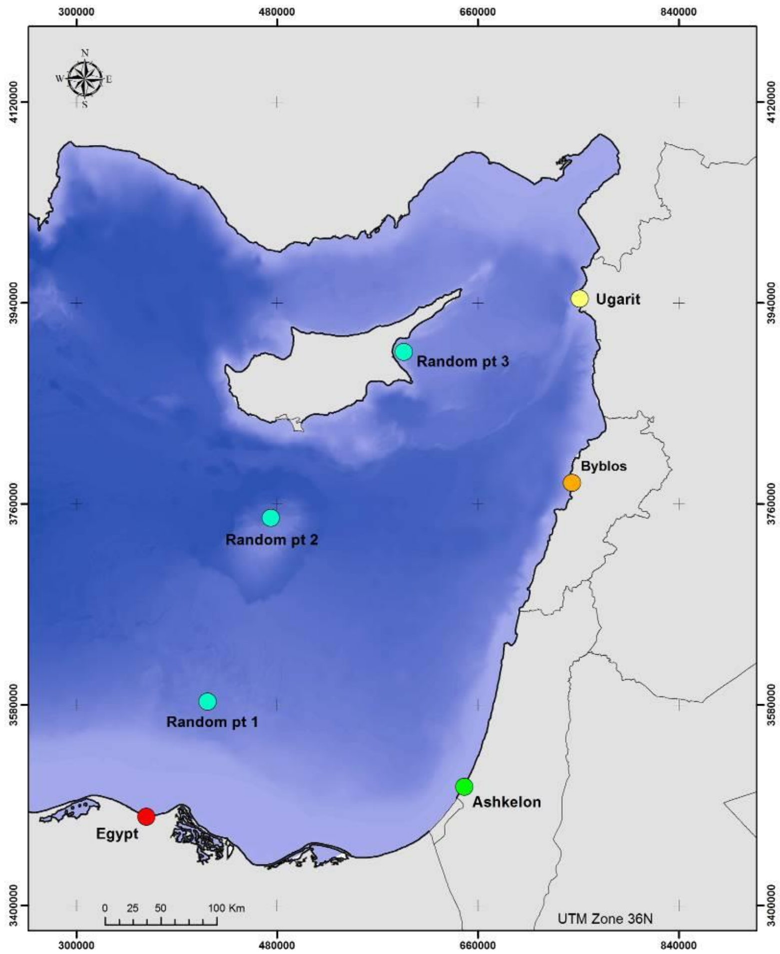
6.6 Modelling space-time

This section outlines the details, choices and assumptions involved in establishing a model for mapping the sailing space-time of the Levantine Basin during the EBA. The model accounts for the variables of the navigable sea discussed in previous sections, but it is important to bear that there is inevitably a degree of simplification of the performance of seafaring given that specific and accurate measures in terms of how and where people sailed is unattainable. Primarily, the model accounts for the wind and current speed and directions of the Levantine Basin, since that data is readily available, and how these influence the sailing performance, in time and space, of a square sail-rig vessel. The environmental conditions of winds and currents represent cyclical rhythms which, when integrated in the model, produce changes to the sailing performance throughout a temporal resolution of a year, thence permitting the detection of temporal changes in the navigable space-time of the Levantine Basin. Therefore, the model aims to deform space according to sailing time, which is in turn a reflection of natural rhythms and variables. This mapping exercise helps visualise and conceive the space-time of the Levantine Basin, and reveals temporal changes in the dynamics of connectivity of the Levantine coast throughout seasonal variations in the morning and afternoon of winter, autumn, spring and summer.

The model discussion hereafter moves on systematically, detailing the choices, data and methods applied for the production of cartograms of sailing time for the Levantine Basin. The explanation of the model, however, is not quantitatively heavy since it aims to generate an understanding of the methodology employed. Two main software were employed in this analysis, ArcGIS 10.4 (accessed via the University of Southampton), and Darcy 2.0 open software for the generation of distance cartograms. The reader can refer to Appendix A, for the metadata of the software and data used.

6.6.1 Points of departure

The production of space-time cartograms must relate to specific locations that mark the origin of sailing journeys. These can be anywhere on the coast and on sea. According to Chapter V, many coastal EBA sites demonstrate an engagement with the sea, some showing more evidence for maritime activities than others did. Hence, specific EBA sites that evidence for at least three types of direct maritime activities during the EBA, were selected as sites of origin. These sites must be spread along the Levantine coast in order to reflect the northern, central and southern Levantine sub regions. One site representative of each of those sub regions was selected. The sites chosen as nodes of origin are: Byblos in the central Levant (Byblos is known to have had significant maritime relations with Egypt), Ugarit in the northern Levant (Ugarit is one of the few sites in the northern Levant that shows evidence for maritime activities), and Ashkelon in the southern Levant (Ashkelon reveals significant engagement with the sea and non-local material suggestive of maritime trade). Egypt was also selected as an additional node given the significant role that it has played with the southern and northern Levant during the EBA. Points of origin located at sea were also appended[38]. These enable us to generate a translation of the navigable space, as perhaps conceived while at sea and approaching land. The nodes at sea were chosen by the author, in such a way that their layout covers most of the Levantine Basin and the vicinity of Cyprus. The points of departure are by no means representative of all EBA sites along the Levantine coast. However, given that the EBA period is traditionally studied by reference to the central, northern and southern Levant, it proves logical to select sites along those coastlines and sites whose record reveals more maritime activities than others do. Furthermore, it is worth noting that this is a mapping exercise, which can, at later stages in the future and in other works, incorporate other sites of interest. In total, seven locations were selected for this model (Map 6.1). Space-time cartograms according to seasonal variations were generated for each of those locations.



Map 6.1- Map showing the distribution of the seven locations for which space-time maps are generated.

[38] All source and image points must be located within the computational area of analysis as defined by the extension of the wind speed and direction grids (discussed in the following sections).

6.6.2 Sailing directions and vessel speed

A ship may sail in any direction from a particular location. Indeed weather conditions limit the direction of sailing but they are not unsurmountable when an experienced crew is manoeuvring the ship. Furthermore, a crew could resort to rowing while awaiting favourable winds. In order to make this model achievable, the research will focus on the eight main sailing directions from an origin/site. For instance, according to Whitewright's diagram (Figure 6.22), if a ship is sailing on a bearing of 315 degrees and the wind is blowing from ±60 degrees from that bearing, i.e. wind blowing anywhere from 247.5 degree to 22.5 degree, then the vessel would be sailing upwind. By restricting the direction of sailing to eight bearings, we can then infer the points of sail according to wind direction. Henceforth, the model accounts for four conditions in respect to points of sail. Each of those conditions in turn depends on the sailing direction and wind direction. Figure 6.23 is an example of those conditions for a bearing of sailing of 315 degrees. For all of the eight bearings of sailing, a similar diagram was devised. The four conditions of sailing for each bearing then relate to wind directions. However, the speed of the vessel is of interest here in order to infer sailing time. Therefore, those conditions must in turn be associated with relative vessel speed. Taking into account Whitewright's Vmg values in relation to wind direction, and KYRENIA II observations in relation to wind speed, I divided wind speed into two categories, Beaufort 2-3 and Beaufort 4-6[39], to each of those categories I assigned Vmg values according to the four conditions of sailing (Table 6.4).

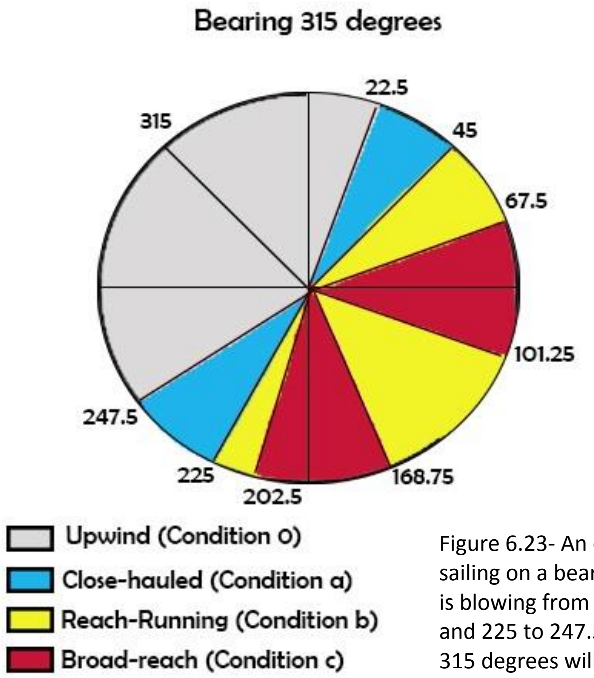


Figure 6.23- An example of the conditions of sailing on a bearing of 315 degrees. If the wind is blowing from anywhere between 22.5 to 45 and 225 to 247.5, then sailing on a bearing of 315 degrees will have to be closed-hauled.

[39] Since vessel speed observations of the KYRENIA II are mostly grouped according to wind speed of less or greater than Beaufort 4, a choice was made to work with two categories of wind speed in this model, Beaufort less than 4 and greater than 4.

Henceforth, the vessel's speed now relates not only to wind direction but also to wind speed. The four conditions represent Vmg values that are conservative. For instance, in Figure 6.22, the Vmg of a square-sail vessel sailing downwind or on broad-reach is of a maximum of 12 knots, yet on Table 6.4, the Vmg of the same condition, even under a wind speed of Beaufort 4 to 6 is only 7 knots. Of course, under such speed, the rig sustains substantial pressure. Furthermore, the manoeuvrability of the vessel becomes more difficult with increasing speed. The physics of sailing and the influence of wind on sailing speed is intricate. The forces that the wind exerts on a sail have two components: the drag and the lift (Wilson, 2010). The drag pushes the sail in the wind direction and the lift pushes the sail perpendicularly to the wind. Furthermore, there is a drag force exerted by the water on the keel. Hence, vessel speed and time of sailing is dependent on these variables. However, the forces of drag and lift are contingent to the size of the sail, the hull shape and the keel. These variables are not accounted for in this model as there is no data and information as of yet that provides such specifics regarding EBA boats. Additionally, the four conditions put forth do not account for the speed of the vessel whilst rowing rather than sailing; rowing may have been practiced when faced with unfavourable winds. In order to incorporate the influence of rowing on the time of sea journeys, information regarding when and how rowing is performed needs to be accessible. It is hoped that future research can build on the conditions and models presented here to incorporate the many more variables that influence sailing speed and time, in light of new data.

Table 6.4- Summary of Vmg in knots according to wind speed and points of sail.

Points of sail	**Wind speed of Beaufort 2-3**	**Wind speed of Beaufort 4-5-6**
Condition 0 (Upwind)	0 knots	0 knots
Condition a (Close-hauled)	0.5 knots	1.5 knots
Condition b (Reach-Running)	3.5 knots	5.5 knots
Condition c (Broad-reach)	5 knots	7 knots

6.6.3 Weather and marine data

The winds and currents of the eastern Mediterranean discussed in Section 6.2.1 provide the basis of variations affecting the relative speed of vessels and sailing time. The models of wind speed and direction are in the form of grids of data whereby the wind speed reflects, for each grid, the value in knots, and the wind direction points to the direction the wind is blowing from in degrees (Safadi, 2016). These models offer a seasonal and daily (morning 8am and afternoon 2pm) temporal resolution, integrating diurnal winds. Therefore, incorporating these models in a GIS, according to the conditions already established in the previous sections, enables the computation of cost surfaces of vessel speed for the four seasons of a year and for the daily morning and afternoon temporal resolution.

Wind speed and direction rasters were interpolated from point data (20 in total, 10 onshore and 10 offshore) located 50km apart in the Mediterranean Sea and on the eastern Mediterranean coast (Safadi, 2016). The rasters' resolution is 15km. The interpolation method used was Spline. Considering that winds do not change abruptly between adjacent places, this change in resolution - from 50km point data to 15km cells- does not significantly affect the results. The only issue with the wind speed and direction rasters is their geographic extension. As Figure 6.10 and Figure 6.11 show, the wind speed and direction models do not extend as far north to the southern coast of Turkey. This northerly region, however, is not required for the model since the focus here is on the Levantine coast and basin. The extension of the wind speed and direction rasters sets the computational area for all the grids produced throughout this model.

Although the Mediterranean current is deemed weak, still it exercises a direction and power of flow that have the potential of reducing or increasing a vessel's speed. Henceforth, it is worthy to include the current speed and direction as a variable affecting sailing time. Current data was derived from the gateway of European environmental information, Copernicus, in the form of a meridional (V) and zonal (U) current grids. This data was compiled between 1987 and 2013[40]. It has a resolution of 0.0625 degrees, about 7 km. It was necessary to convert the two sets of current data, the meridional and zonal, into current speed and direction in a GIS. To this end, the following formulas were employed in map algebra based on Butler (2013).

Current Speed (Map 6.3):

SquareRoot(Power ("Zonal Current", 2) + Power ("Meridional Current", 2))

The resulting grid is in m/s which then divided by 0.51444 (1 knot=0.5144m/s), results in current speed raster in knots.

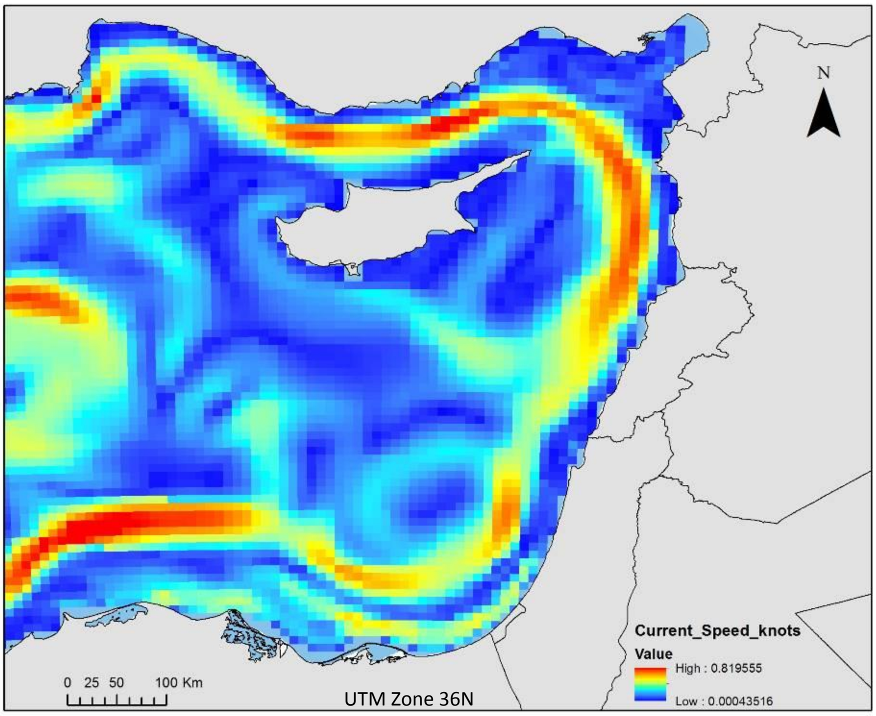
Current direction (Map 6.2):

*Con ("Zonal current" > 0, 90-(180 /3.14) *(ATan ("Meridional current "/" Zonal current ")) + 180, 90-(180 / 3.14) * (ATan ("Meridional current "/" Zonal current ")))*

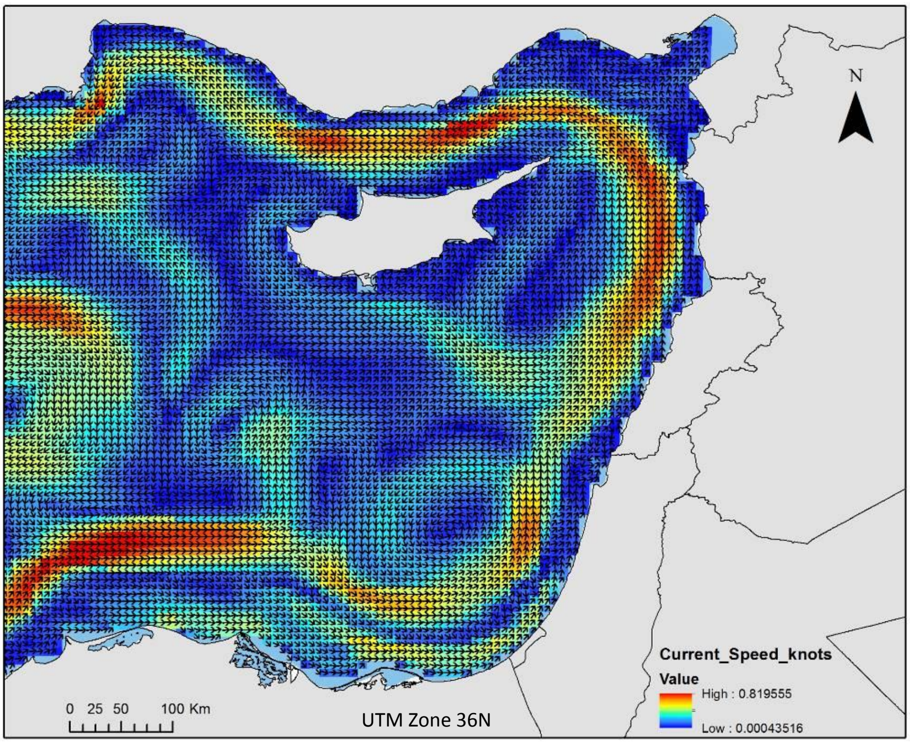
[40] Wind and current speed and direction data reflect modern conditions. However, such data is not available for the ancient past, and as discussed in Safadi (2016), modern wind patterns equate to a degree ancient patterns. This is the case as well for current speed and direction data.

In order to adjust the current direction for the 0 and 360 degrees to point north, the following formula was further employed:

Con (("current_direction" >= 0) & ("current_direction" <= 180),"current_direction" +180, Abs ("current_direction" - 180))



Map 6.3- Current speed in knots.



Map 6.2- Current speed and direction (arrows).

Similar to wind speed and direction, the effect of current speed and direction on sailing time needs to be established. Arnaud (2005: 23) explains that if two ships are traveling in opposite directions at a speed of 4 knots, one with the current and one against it, whilst the speed of the current is 0.5 knots, the two ships reach a difference of 1 knot between their speed. The one traveling with the current gains the speed of the current, and the speed of the one sailing against the current is reduced by the current's speed. Hence, four conditions associating sailing to current flow were formulated. These conditions again depend on sailing directions (Table 6.5). The first condition defines sailing against the current, where the current direction is ±60 degrees from the bearing of sailing. The influence of current on sailing speed, under this condition, is negative the speed of the current. The second condition is consistent with the close-hauled condition of wind direction. For current direction alike the wind direction of the close-hauled condition, the vessel's speed is reduced by half of the current speed. The third condition is defined by the reach-running condition of the wind direction with a slight difference (see Figure 6.24). In this case, the current exerts half of its speed on the sailing speed. The last condition is sailing with the current's flow. The sailing speed then increases by the current's speed.

Table 6.5- The conditions associating current flow with sailing direction and sailing speed. Note these are the author's own assumptions as no information or study has related thus far current flow to the performance of a square-sail vessel (except for sailing with or against the current which follows Arnaud's (2005: 23) explanation).

Sailing direction in relation to current flow	**Effect of current speed on sailing speed**
Against the current (Condition 0)	-Current speed
Negative current flow (Condition a)	-1/2 current speed
Positive current flow (condition b)	+1/2 current speed
With the current (condition c)	+ current speed

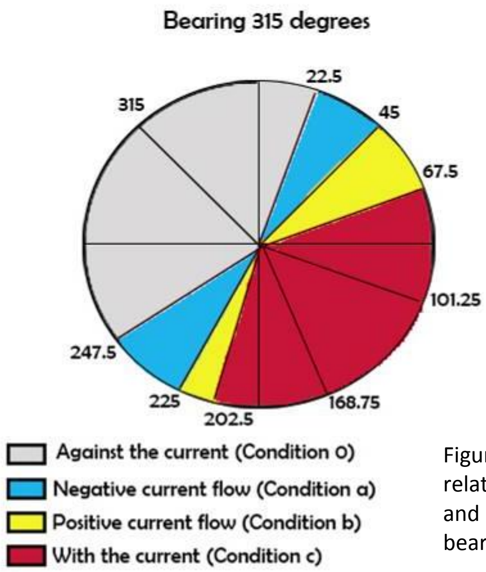


Figure 6.24- Diagram showing the relationship between current direction and conditions affecting sailing on bearing of sailing of 315 degrees.

Hereafter, having established how the wind speed and direction, along with the current speed and direction, influence sailing speed, it becomes possible to integrate all the data in a GIS and produce a model whereby the conditions put forth can be used to generate sailing speed grids. These rasters are for each bearing of sailing, adding to that the available temporal resolution of the wind models. This totals to sixty-four sailing speed (Vmg) grids (eight for the bearings, multiplied by four for the seasons and 2 for the morning and afternoon temporal resolution).

6.6.4 Working the model

The wind speed and direction grids, as well as the current speed and direction outputs, were integrated in GIS. Wind speed models were reclassified in two categories, less than Beaufort scale 4 and greater than Beaufort scale 4. These reclassified wind models were transformed to polygons, vector layers, in order to clip the wind direction grids according to the wind speed. The result is wind direction rasters divided between those associated with wind speed less than or greater than Beaufort scale 4. This facilitates applying the conditional statement that relates wind speed and direction to sailing speed. In an excel sheet, the values of wind direction associated with each condition, as per Figure 6.23 and Table 6.4, according to the bearing of sailing, were noted, along with the relative speed of sailing under those conditions. Two of such tables were generated, one for wind speed less than Beaufort scale 4 and one for wind speed greater than Beaufort scale 4. Using model builder in ArcGIS 10.4, the rows of the excel table were iterated and their values were incorporated as input and output in a conditional statement using map algebra, which also takes the clipped rasters of the wind direction as input. This GIS model generates sailing speed rasters for each bearing, for the four seasons and for the morning and afternoon, all divided into two sets, one for the wind speed of less than Beaufort scale 4 and one for the wind speed greater than Beaufort scale 4. Next, the corresponding sailing speed rasters of the two sets were merged together. Appendix H describes visually these steps.

On similar lines, grids equal to the effect of current speed and direction on sailing speed were generated for each bearing of sailing. A conditional statement was applied that takes as input the current direction raster and generates a value in knots based on the established conditions, e.g. whether sailing against or with the current (see Table 6.5 and Figure 6.24). New rasters were then computed for each bearing of sailing from the addition of the grids of the current's effect on sailing to the sailing speed rasters generated from the wind's influence on sailing (Figure 6.25).

Henceforth, the final result is sixty-four Vmg grids, at a resolution of 15km, that account for wind speed and direction, and current speed and direction in the Levantine Basin. These rasters can then be used to extract time via the simple formula relating speed to time (Figure 6.26):

$$T = \frac{1.0}{Vmg * 1852}$$

Since the Vmg grids are in knots, multiplying by the value 1852 gives the time in hours. The time grids are then used as cost surfaces in the Cost Distance tool in ArcGIS, hence computing cost rasters in time (hours) for each point of departure. Since the Cost Distance tool does not work with negative or null values, and the cost surfaces of time incorporate cells where time is null or negative[41], these values were substituted by a value of one hour prior to applying the Cost Distance tool. In such a way, these grids cells reflect a higher sailing time cost. For each site, or point of departure, sixty-four cost distance rasters were generated (per bearing, per season, per morning and afternoon). These grids offer the basis for extracting the sailing time, associated with image points, in order to produce space-time deformed maps. The sailing time of source points, however, must be based upon a generic cost surface that does not account for winds and currents and seasonal variations. To this end, a sailing speed of 4 knots was chosen[42]. A cost raster of time was generated from the generic sailing speed surface following the same steps above, and thereafter cost distance rasters in time for each site/ point of departure were produced. These grids then permit extracting sailing time for the source points in the process of cartograms' creation.

[41] This is due to the pre-established conditions where in the case of condition 0 for instance sailing speed is 0 knots as a vessel would be sailing upwind.

[42]A combination of archaeological, experimental, textual and iconographic evidence indicates that a speed of 4 to 6 knots is an optimal speed of sailing in the Mediterranean (Casson 1995:282-291; Whitewright 2011: 10).

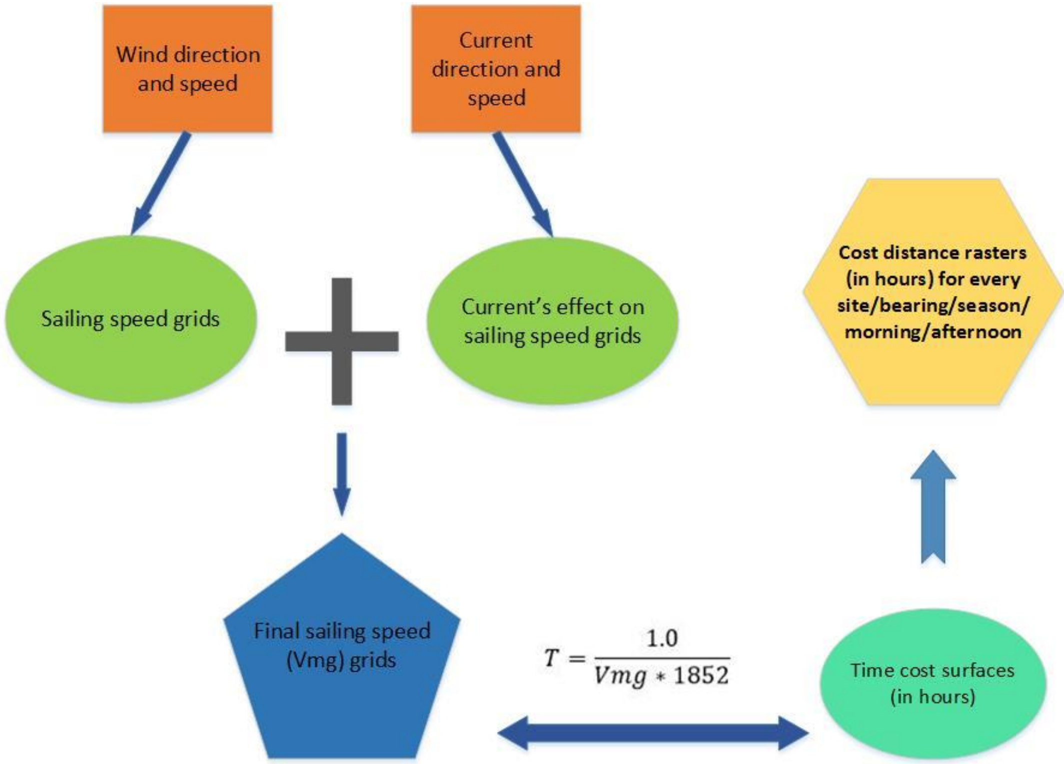


Figure 6.25- Diagram describing the steps of generating the final sailing time grids taking into account the effect of winds and currents.

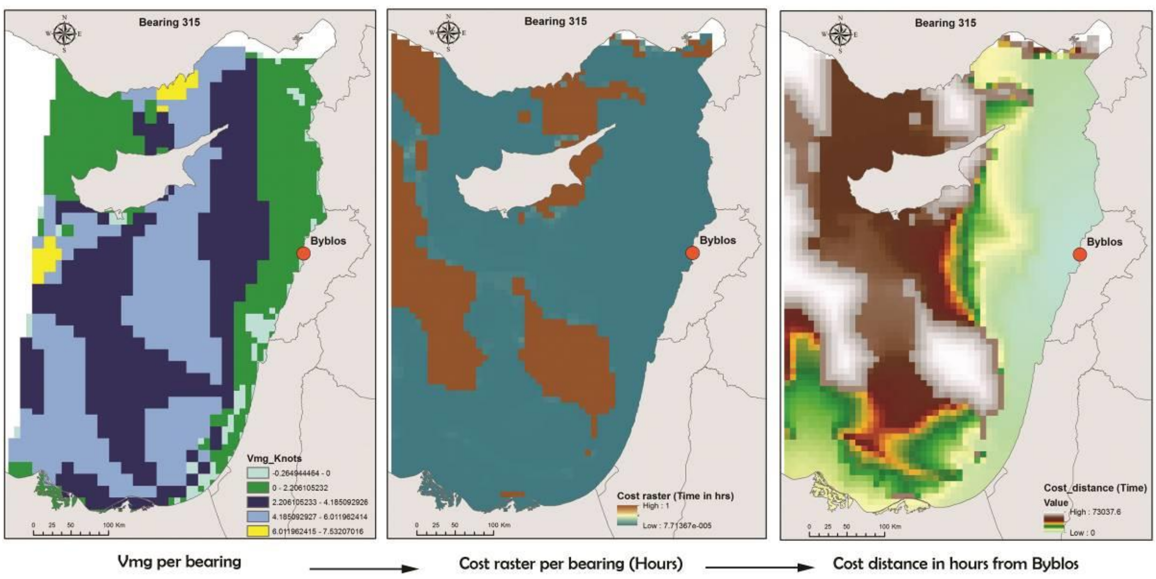


Figure 6.26- Maps depicting the process of generating a cost surface and cost distance raster in time from sailing speed raster (Vmg) for the site of Byblos where sailing direction is on a bearing of 315 degrees.

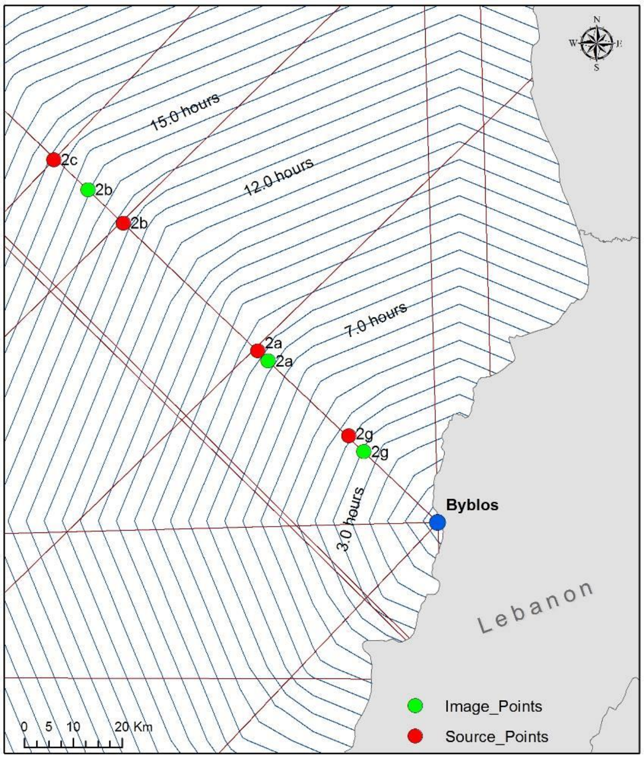
6.6.5 Mapping with cartograms

As previously mentioned, the production of cartograms necessitates source and image points. Source points can be specific locations or random points, while image points represent the image of the source points according to the newly calculated sailing time that accounts for environmental rhythms. Since the grids of sailing time are associated with the bearings of sailing, a matrix constituted of the bearings of sailing from every site/point of departure was generated. This matrix facilitates the choice of source points. For every site, random source points located on the matrix were selected; at least six source points on each bearing, although that number can change according to the location of site/point of departure, since some bearings of sailing coincide with land. The cost distance grids based on the generic 4 knots speed of sailing allow us to extract the generic time to sail to these locations from the points of departure, whereas the sailing time grids accounting for winds and currents permit the extraction of the actual sailing time it takes to reach those sources points. Henceforth, via a mere linear extension from the source points, image points were geographically located in GIS on the grid value that correspond to the new calculated sailing time. For instance, Map 6.4 shows source and image points located on a bearing of 315 degrees from the site of Byblos. The contour lines reflect the generic sailing time from Byblos. Each source point corresponds to the image point by its ID. It takes four hours to sail from Byblos to source point '2g' according to the generic sailing time, whereas according to the sailing time accounting for winds and currents, for the autumn season in the morning, it takes three hours. Thence, the image point of '2g' should be located on the same bearing but on the three hours contour line. The same procedure was executed for each source point working through the different sailing time grids according to the bearings, seasons and time of the day. This resulted in a set of source and image points for each site/point of departure for the four seasons and for the morning and afternoon[43].

Although software developed for the production of area cartograms are numerous, those for linear cartograms are not yet widely implemented. One specific software, however, freely available, permits applying Tobler's bidimensional regression for the production of linear cartograms. Darcy 2.0 written in Java by Gilles Vuidel in 2009 is a simple interface that takes as input source and image points, as well as a shapefile that defines the background. Darcy executes two steps. The first is a Euclidean adjustment of the source and image points. The second is the interpolation of a distorted background and grid. The size of the grid can be specified, a grid size of 4 was chosen, which corresponds to 25km for a non-distorted cell. Darcy 2.0 was used to produce all of the cartograms

[43] Some image points are associated with an exceedingly high sailing time, e.g. 10,000 hours. Hence, beyond the 500 hours contour line, all image points kept their relative geographical distance to other image points on a bearing, but their location on the time isochrones is not very exact.

for every site and season. The results were exported in Svg format, which preserves vector lines. Cartograms in appendices I to O are the end-result of this model, eight cartograms or space-time deformations for each site/point of departure.



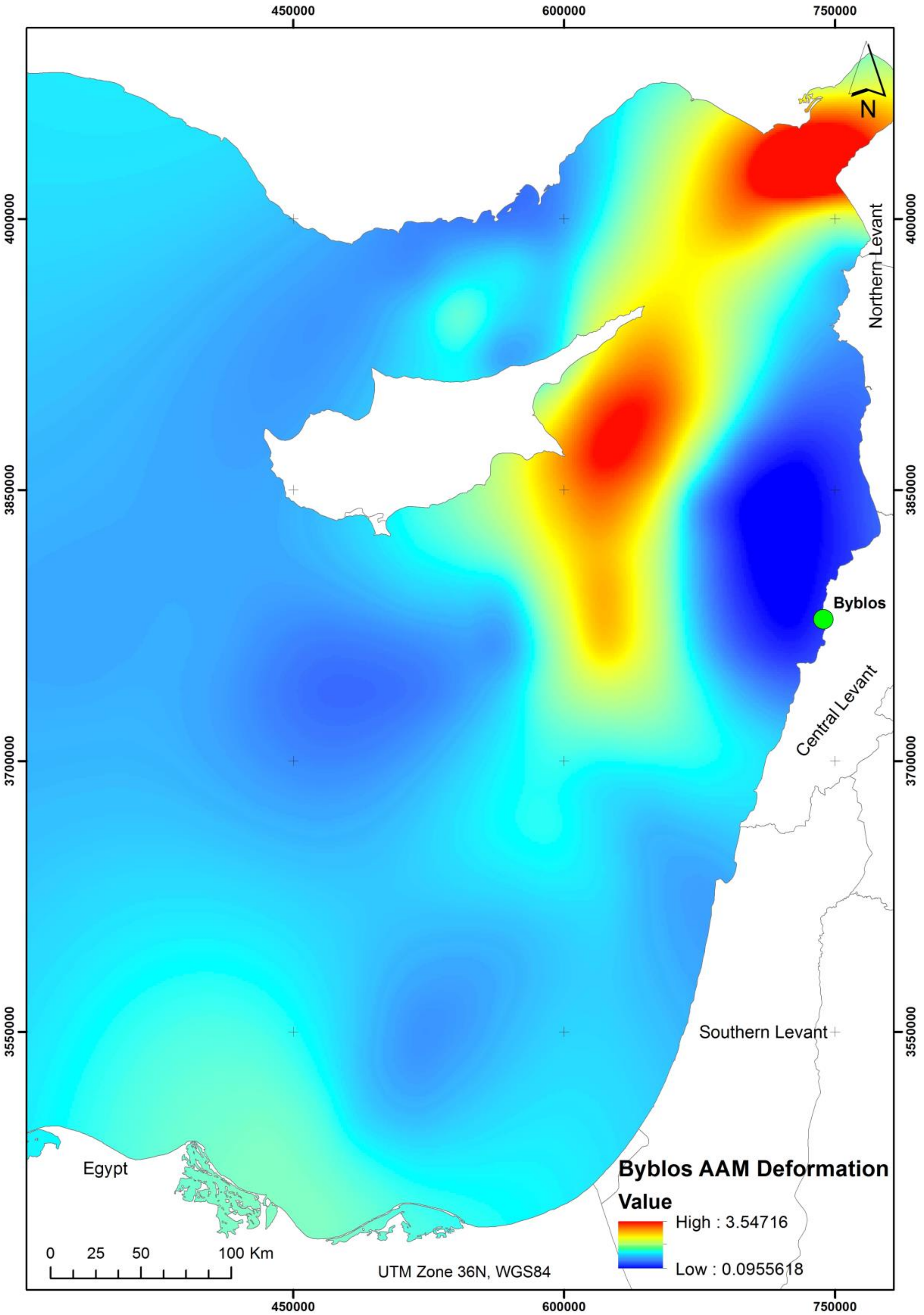
Map 6.4- The source and image points, and contour lines referring to generic sailing time from the site of Byblos on a bearing of 315 degrees for the autumn season in the morning.

The generated cartograms offer a powerful conceptualisation of the navigable space-time of the Levantine Basin during the EBA. In fact, the methodology proposed could apply to different maritime spaces and different chronological periods, hence its significance for evaluating and understanding maritime spaces. On a general level, these deformed maps attest for the importance of such an analysis for any maritime space since on the one hand, they portray archaeologists' conceived spaces given that they are based on data that archaeologists employ and on the other hand, they constitute a heuristic tool that can aid in better understanding the archaeological record.

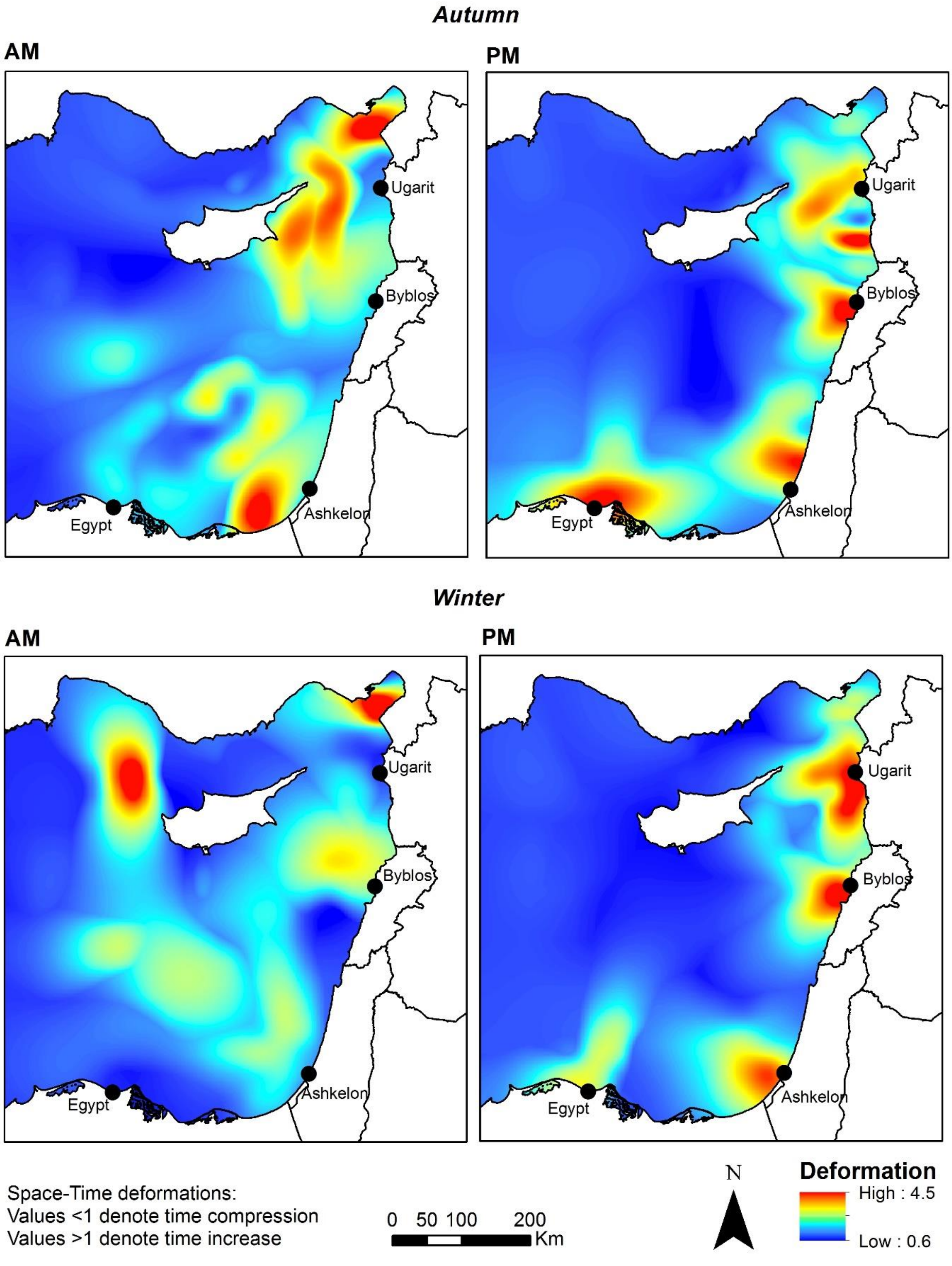
The changes witnessed according to the temporal unit, e.g. summer, winter, spring, are profound. Take, for instance, the cartograms of Byblos (Appendix J) for the autumn (am) and winter (am). The difference is evident. While the sailing time from the site of Byblos during the autumn (am) stretches out the distance of the Levantine Basin making Cyprus much further distant from the Levantine coast, during winter (am), the sailing time from Byblos in fact brings Cyprus quite close to the Levantine coast of Lebanon. However, the whole Levantine coast is vertically stretched. Thence, winter time seems to afford better conditions, in terms of sailing time, to undertake journeys across the eastern Mediterranean, for instance to Cyprus, rather than relying on coastal pilotage along the

Levantine coast and solely summer time for sailing. This relatively simple evaluation comparing the cartograms of one site at different times throughout the year, testifies to the nature of information we can extract from these mappings, but not without further analysis since, for instance, winter time affords quicker journeys but it inevitably was a more dangerous time to sail. In comparison to Byblos' cartograms, the deformations of Egypt for instance (Appendix L), during the autumn (am), distort the southern Levant to almost one horizontal line across from Egypt, making the central and northern Levantine coasts fall closer to Egypt. Henceforth, these mappings not only provide a heuristic tool to evaluate the connectivity of one site within a temporal unit, but allow us to compare between different sites. In such a way, they expand our understanding of the study area during the EBA, and possibly challenge, in some instances, what we conceive of seafaring in the eastern Mediterranean.

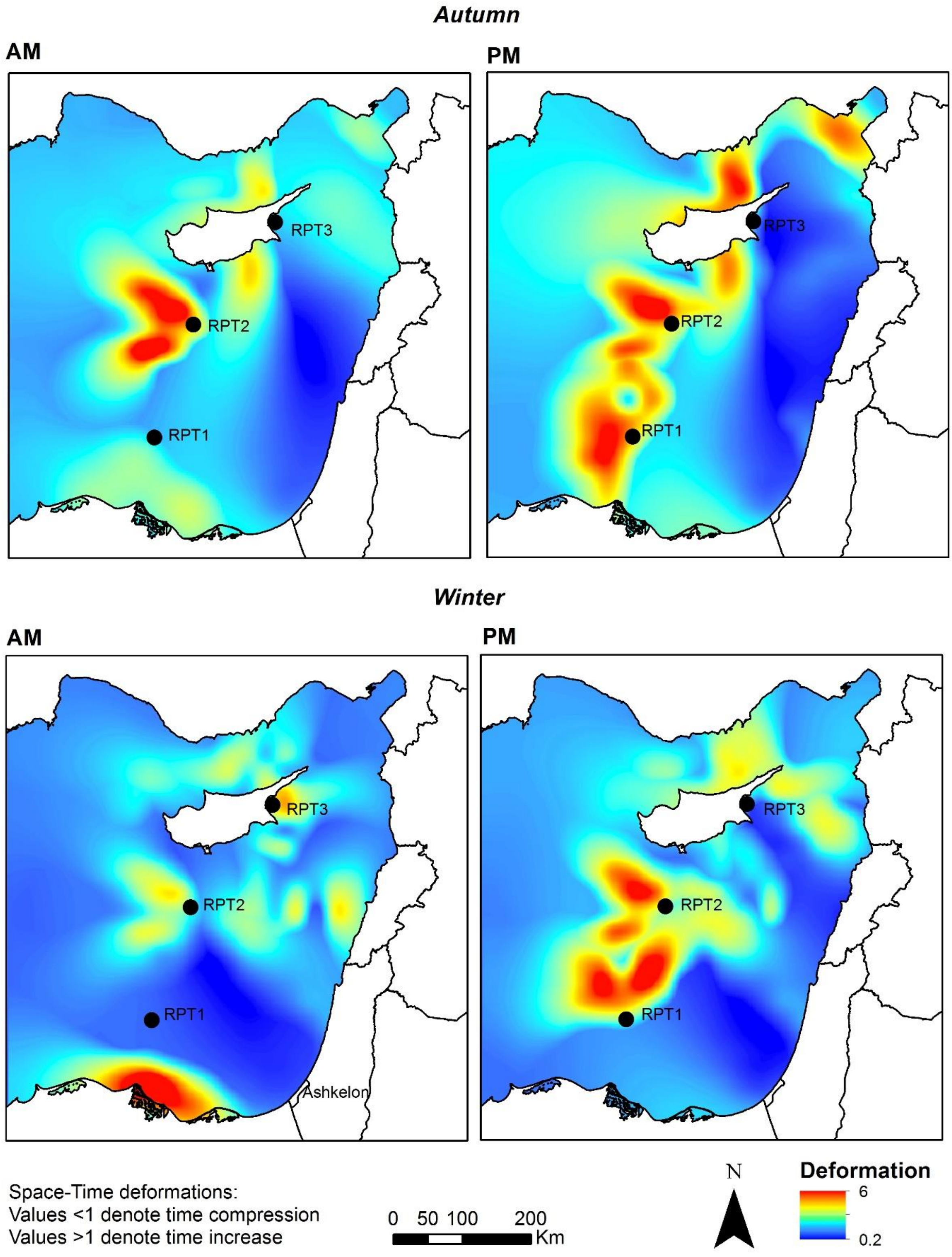
Although these cartograms can be deemed visually centred, providing no more than a qualitative and comparative evaluation, in fact they offer quantitative insight on sailing time and sailing cost between locations (see Chapter 7, Section 7.2). One of the additional outputs of the cartogram production via Darcy 2.0 is a raster covering the cartogram basemap and depicting, for each cell, its deformation value (Map 6.5). The deformation value represents how much space was transformed according to time based on the source and image points for each origin. Values higher than 1 denote the stretching of space-time, i.e. more time is allocated for movement in those cells, in other words the sailing vessel is traveling at a speed slower than 4 knots. On the other hand, values less than 1 indicate space-time compression, i.e. less time is allocated for movement in those cells, and in other words, the sailing vessel is traveling at a speed quicker than 4 knots. The deformation rasters for all sites can then be mosaiced together in order to generate cumulative rasters that depict the deformation for each season and for the morning and afternoon (Map 6.6 and Map 6.7). These are divided between cumulative rasters representing space-time deformations per season for sailing away from the coastline (Map 6.6) (according to the deformation rasters for coastal points of origin) and cumulative rasters of deformations per season based on sailing towards the Levantine coast (Map 6.7) (according to the deformation rasters for the origin points at sea). Three-dimensional maps of the maritime space-time of the Levantine Basin can then be generated from the cumulative rasters (Maps 6.8 and 6.9). Hence, in these three-dimensional mappings, the sea regains its space-time volume; elevated areas represent space-time obstacles whilst depressions or low elevations indicate space-time facilitated movement on the sea. These three dimensional deformations render a topography of the sea, invisible to the eyes, intangible, but one that was nonetheless potentially experienced and known to seafarers engaged in those waters. The sea is no longer a flat surface of water, its rhythms and characteristics extend in space and time. This exercise of mediation of the sea in space and time responds to the fundamental question of this thesis of how the maritime space was lived. Indeed, it does not offer us conclusive answers and is bound by limitations to the model, but the mapping of the sea of seafaring translates one of the manifolds of spaces that EBA inhabitants and seamen were part of and engaged with. Furthermore, the value of these mappings rests in the insights they provide when analysed conjunctionally with the archaeological evidence for maritime activities. Henceforth, the next chapter aims at bridging the mapping of land and sea with the mapping of maritime activities of the EBA Levant.



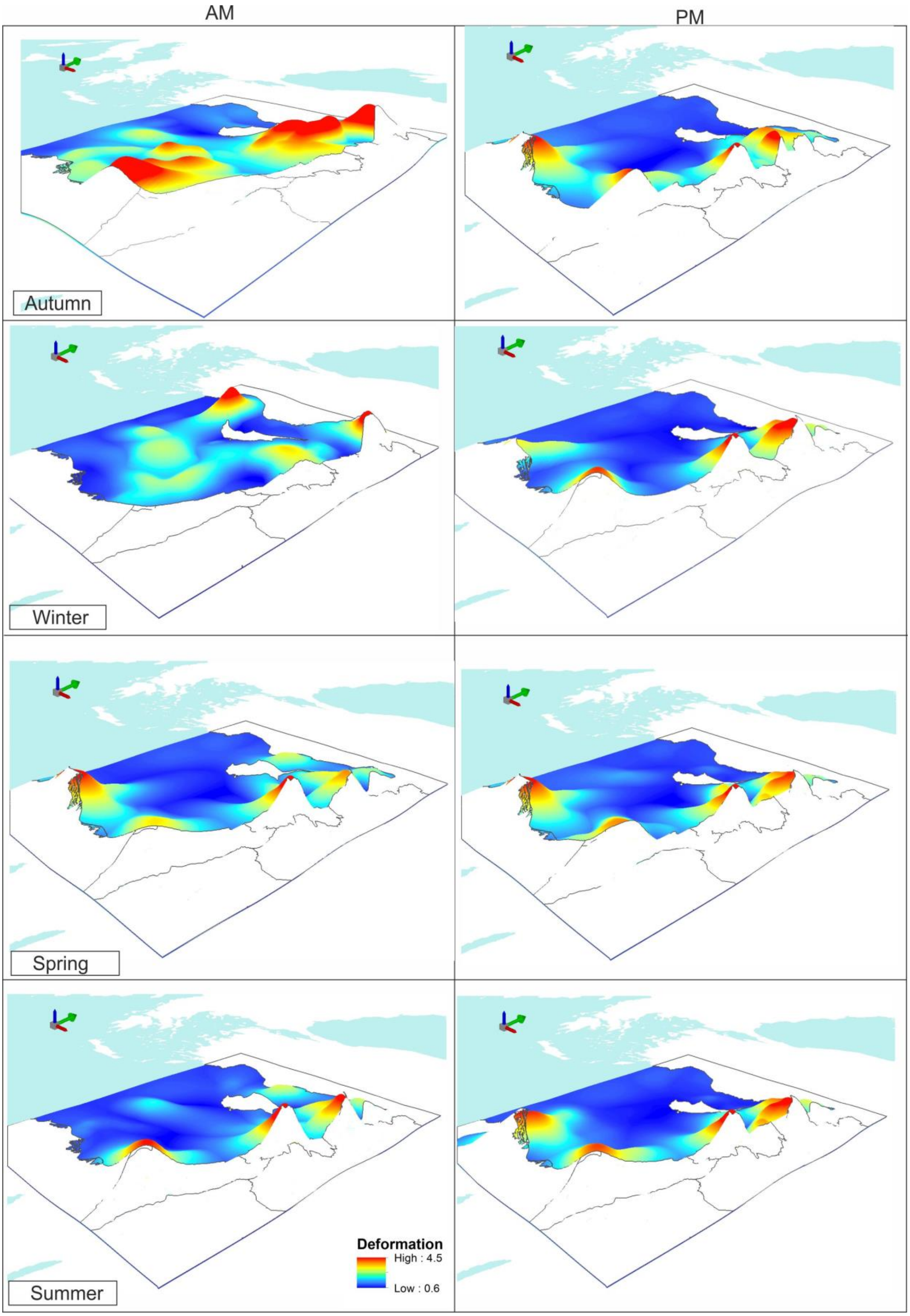
Map 6.5- Map of the space-time deformation for Byblos in the autumn in the morning. Deformation values higher than 1 denote the stretching of space-time whereas values less than 1 suggest time-space compression.



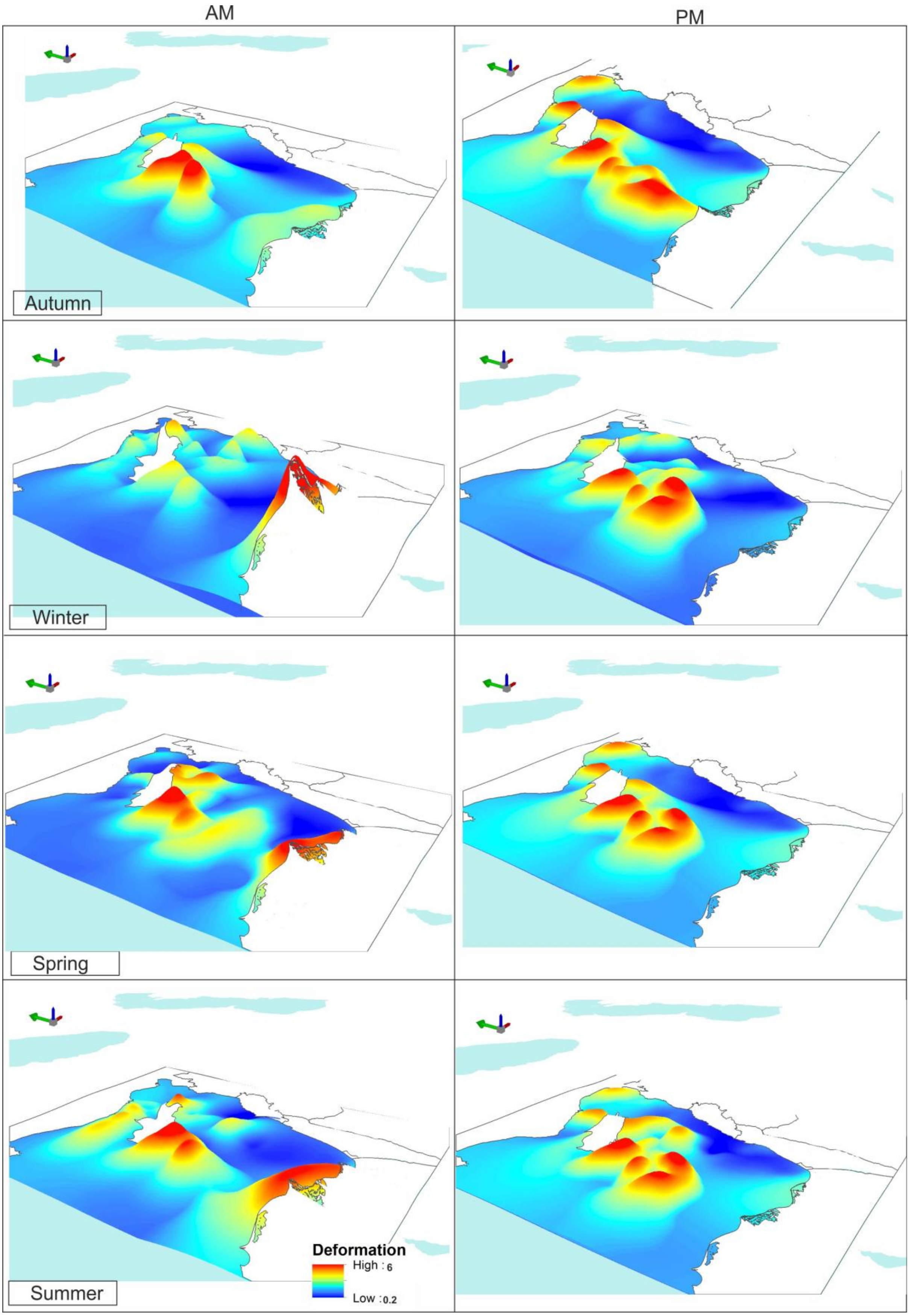
Map 6.6- Cumulative deformation for coastal sites.



Map 6.7- Cumulative deformation for sites at sea.



Map 6.8- Cumulative deformation, three dimensional, based on coastal sites of origin.



Map 6.9- Cumulative deformation, three dimensional, based on origin sites at sea (Random points 1, 2 and 3).

CHAPTER VII: THE MARITIME WORLD OF THE EARLY BRONZE AGE LEVANT

Thus far, this research has demonstrated the extant of maritime-related material evidence from the coastal Levant, and proposed and executed space-time models for ancient seafaring that substitute any Cartesian conception of maritime space of the Levantine Basin with a fluid, distorted representation that changes with time and environmental conditions. Albeit these pathways, based on the archaeological material record and on mediation with mapping, may appear to oppose one another, distilling no coherence in results, in reality, they constitute folds of the manifolds of the lived space of the EBA Levant. Aiming to overlap these folds, and forcing them onto one plane for the sake of a totalising result and understanding is against the approach set forth in this thesis. Nonetheless, whilst in parallel, these folds have a more substantial contribution, resting in the inter-links that bind them and relate them to one another. It is in these delicate connections that we can generate not one but many observations and interpretations. This chapter offers an attempt at pulling out these observations, generating interpretations and discussions, all undisputedly relative, to the folds, to the inter-links, to the author, to the time and state of writing, to the many many folds of present and past spaces.

This thesis set out with the premise of exploring how the maritime space of the coastal Levant was lived and exploited. Building on a relational space-time, fluid and of manifolds, the methodology of mapping was employed as a means of mapping land (Chapter IV, Section 4.3), mapping activities (Chapter V) and mapping the sea (Chapter VI). By mapping land, the traditional, political divisions of the Levant were challenged. Space-time bundles reflecting the density of settlement on a daily basis of time allowance proved that the boundaries and patterns of the coastal Levant are flexible and porous. Furthermore, the exploration of sound analysis allows us to move beyond static narratives to try and mediate the EBA coastal Levant in different forms. Mapping land translates the space-time of the coastal Levant on a fundamental basis, i.e. according to site location and time allowance. Mapping maritime activities, on the other hand, consolidated a substantial database of archaeological evidence, the first of its kind for the whole Levantine coast, in order to establish the extant and breadth of available evidence. This consolidation of data firstly targets the lacuna in our EBA knowledge of maritime activities, which is primarily skewed towards general and broad events, and secondly it marks a starting point for serious considerations of maritime space and activities in EBA interpretations. Hence, mapping activities provides yet another facet of how the maritime space was lived and exploited according to the archaeological record. Finally, mapping the Levantine Basin mediates, potentially, how the lived space-time of seafaring was experienced; the sea regains its volume. Mapping the sea is a uniquely a heuristic tool that sets out a platform for archaeologists to conceive of maritime spaces. Apart from that, however, the distortions and deformations can highlight the connectivity of the Levantine coast during the EBA.

In the first instance, this chapter presents interpretations based on the archaeological evidence for maritime activities. It then moves on to explore the connectivity of the Levantine coast and the EBA Levantine network to ultimately reflect on EBA social complexity and urbanisation in light of the maritime signature of the Levant.

7.1 Implications based on direct maritime evidence

Human engagement with the sea during the EBA, as explored in Chapter V, shows an important maritime signature, despite the fragmentary nature of the data. The importance of this evidence, however, is in the insights it provides regarding the EBA Levant since maritime evidence apart from broad activities tends to be overlooked in EBA narratives. Zohar (2017) confirms that the significance of aquatic habitats and maritime activities in the Levant have yet to benefit from scholarly attention.

According to the archaeological evidence, during the EBA, the following interpretations about maritime activities transpire: First, coastal inhabitants were engaged on a regular basis with the sea[44] either in fishing activities, gathering shells, usage of coastal rocks, etc. The evidence for fishing activities, especially that of pelagic fish such as from Sidon, is noteworthy. Pelagic fish of at least 2m in length were found at Sidon. This indicates that fishermen had sufficient skills and technology to capture fish in the open sea. Although the presence of pelagic fish in EBA remains is considered to be the result of seasonal fishing (Zohar 2017: 372; Genz *et al.* 2009: 88) when fish is caught in shallow waters, the fact that pelagic fish appear first during the EBA is notable. Had it been the case of seasonal fishing, remains of pelagic fish would have been found much prior to the EBA period[45]. Furthermore, in respect to fishing activities, the data provided in this thesis is unique since few studies attempt at consolidating fish remains from the Levant (Van Neer *et al.* 2005; Van Neer *et al.* 2004). In those studies, the EBA period is represented by no more than a couple of sites, whereas this research has shown that 16 sites were engaged in fishing activities during the EBA. Had there been more excavations carried out on the Levantine coast, and a better practice employed in the past for recovering fish remains, the number of sites engaged in fishing would likely be higher.

[44] It is difficult to ascertain how regular that engagement was given the lack of substantial data that can provide insights on the temporal depth of maritime-related material culture.

[45] To date there are no pelagic fish found in archaeological sites prior to the EBA (see Van neer *et al*., 2005). This may relate to taphonomic processes, e.g. the rate of discovery, the scarcity of Neolithic coastal settlements and the probability of preservation. At this stage however, building on available data, we can surmise that pelagic fishing intensified if not began during the EBA.

Additionally, according to Van Neer *et al.* (2005: 145), the previous Chalcolithic period lacks any substantial fish remains, apart from one site on the Levantine coast. This has been attributed to the scarcity of coastal Chalcolithic sites, changing landscapes and inappropriate recovery methods. Nonetheless, following such scarcity in evidence, the EBA period paints a different image. Marine fishing activities are known to have intensified in the Levant during the Natufian period (Figure 7.1; Zohar, 2017), yet in the EBA, on the basis of the Van Neer *et al.* (2005) database for previous periods, which is the only one available for the coastal Levant, the intensity of fishing activities changes markedly (Figure 7.2). This increase in fishing activities can only suggest an intensification in human engagement with the sea and an understanding of seasonal rhythms, of weather patterns and the availability of requirements that would allow for such an intensification, e.g. fishing equipment and robust boats. The diversity in fish species, when identified from EBA sites, further attests for a regular engagement with the sea. The most common fish specifies from the EBA, according to Chapter V, Section 5.1.2, are the *Serranidae*, *Sparidae*, *Carangidae* and *Mugilidae*. Galili *et. al* (2004) investigated the habitats of fish families and species in respect to the submerged PPNC fishing village of 'Atlit Yam in the southern Levant. Based on their findings, fish species, which are common during the EBA, are present all year round in the Mediterranean but tend to be present in abundance in specific time of the year (Table 7.1). Since EBA sites demonstrate evidence for more than one specie when faunal analysis is carried out, this potentially indicates that fishing activities took place all year round or during the months when the species are found in abundance in the sea, which covers a period from April to December (see Table 7.1).

The regular basis of engagement with the sea is further reflected by the situation of Tyre, an island, where EBA occupation was found. The condition of Tyre, especially since its EBA remains do not indicate a large self-sufficient settlement, suggests that inhabitants living on Tyre had to access the mainland where they could acquire their needs for subsistence. Henceforth, this access to the mainland must have been facilitated by boats plying the shallow coastal waters on a daily routine.

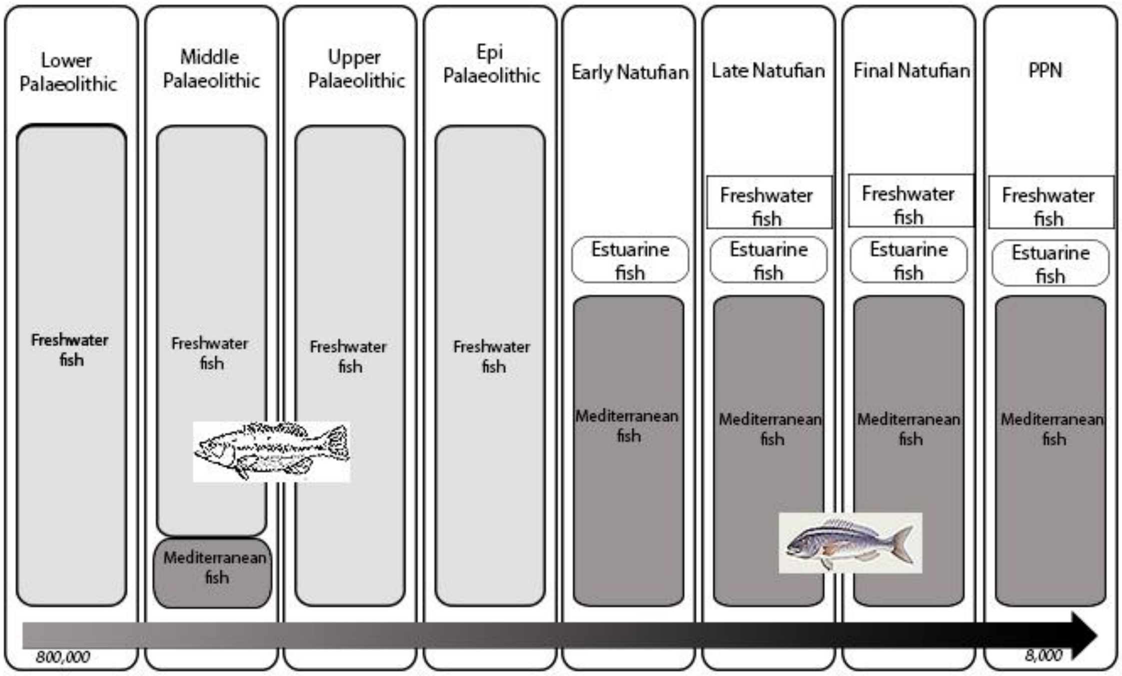


Figure 7.1- Exploitation of fish throughout chronological periods in the Levant (adapted from Zohar 2017: Figure 43.1).

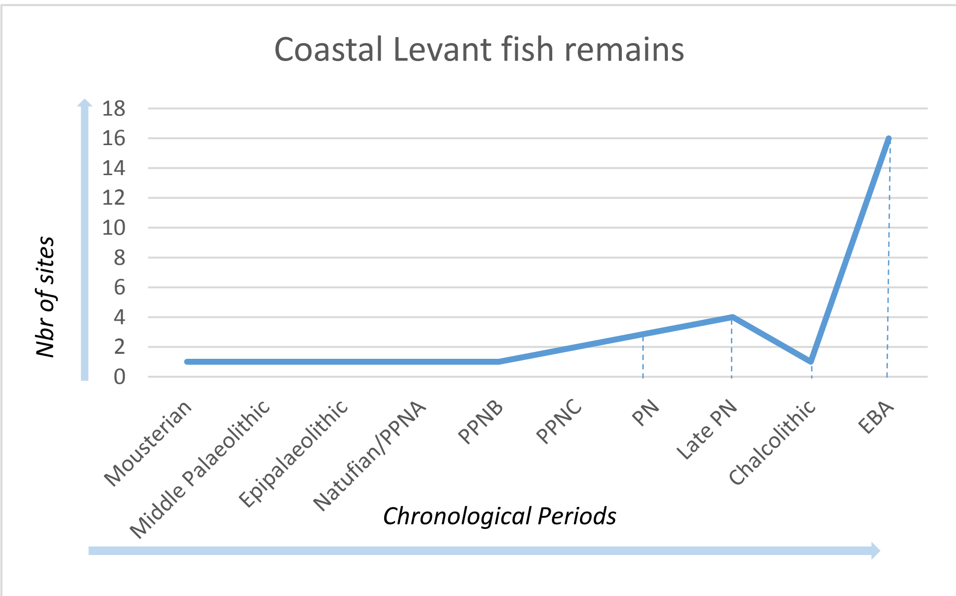


Figure 7.2- Graph showing the increase during the EBA in fish remains, implying a potential increase in fishing activities. Data based on Van Neer *et al*. (2005).

Table 7.1- Habitats of fish species in the Mediterranean (adapted from Galili *et al.* 2004: Table 7)

Fish Species: Genus and/or Family	**Methods of Fishing**	**Behaviour Patterns During Fishing**	**Period of Presence in Coastal Waters**
Serranidae: *Epinephelus aeneus*	Trawling, long line, single hook and line, gill nets after storms or at night, rarely caught by spear	Escapes divers rather than enter a cave. Enters cave only to evade a chasing diver. If frightened, batters and tears the net	Present all year round, approaches coasts in April–May, Nov., Dec.
Sparidae: *Sparus aurata*	Single hook and line, long line, gill net set after storms and at night, rarely with surrounding nets, spear Fishing	In the presence of diver or net, hides under the sand or lies horizontally at the bottom to avoid the net, capable of escaping on its side under the foot rope	Present all year round, mostly Sept.–Nov.
Mugilidae: *Mugil cephalus*	Cast net, hook and line from coast, gill net set at night, surrounding net, traps in tidal zone. Sometimes beaches on dry land to escape predatory fish	Capable of escaping by leaping in the air over net buoys	Present all year round, common Aug.–Sept.
Carangidae: *Trachurus sp.*	Purse seine, gill net	Rapid swimmer	

Second, human engagement with the sea did not only satisfy basic needs in terms of resources, but was an element of the representational space of EBA inhabitants. The ornamental use of shells and pebbles and the presence of stone anchors at the footstep of a temple at Byblos indicate that the sea and maritime space shaped the symbolic and representational space of individuals and communities. Although textual sources and depictions for EBA maritime activities of the Levant were found in Egypt (Marcus 2002: 208), the lack of such evidence from the Levant must not suggest a lesser society, unable to conceive of maritime space. What this implies, however, is that the nature of representational evidence we seek for the Levant is unique and may emerge in different forms. For instance, inland in the Levant, the site of Tel Bet Yerah (Khirbet el Kerak), located on the southern shore of the Sea of Galilee and bordered to the west by the Jordan River, provides the perfect example for representational maritime spaces gone unnoticed and underestimated. Tel Bet Yerah was occupied throughout the EBA, when, in the EBII, it witnessed a significant change with the integration of fortifications, walls, streets and houses (Greenberg 2011: 41-43). At the gate of the site, dated to the EBII, on the south-eastern side of the Tel, a shrine is located on the right doorpost, consisting of a large anchor (described as a pierced stela) and stone blocks that presumably served as offering tables (Greenberg 2011: 44). A concentration of similar anchors is found in and around Tel Bet Yerah (Vinogradov, 1993). The anchors clearly testify to a strong relationship between the inhabitants and the sea (Figure 7.3). These anchors, however, have only received little attention thus far (Wachsmann 1998: 262-265). They are locally called *shfifon* and tend to be very large. Though they are too large to carry on lake boats, Marcus (2002: 408-409) suggests that the occasional powerful winds may have demanded such large anchors. In any case, although Tel Bet Yerah inhabitants essentially relied on the use of boats since the site may have been almost an island during the EBA (Esse 1991: 36-37), the anchors, their symbolic presence at the gate of the site, and the maritimity of the Tel have received no archaeological analysis as of yet. Since the focus in maritime accounts heavily concentrates on listing the remains of boats, textual references, depictions, etc. devoid of an explanatory model, such evidence from Tel Bet Yerah and possibly from other sites around the Levant stands unexplored; thereby its contribution to our knowledge of the EBA Levant and of the lived maritime space is as of yet lacking. The exploration of the urbanisation of Tel Bet Yerah, for instance, does not account for the strong relationship of its inhabitants with the sea and how that can alter human's perception and conceptualisation of their space. Although, the apparent absence of a waterside gate, leaving maritime approaches open, have led scholars to presume that the watersides of the Tel were perceived as the lifeline of the settlement (Greenberg and Paz 2005: 99).

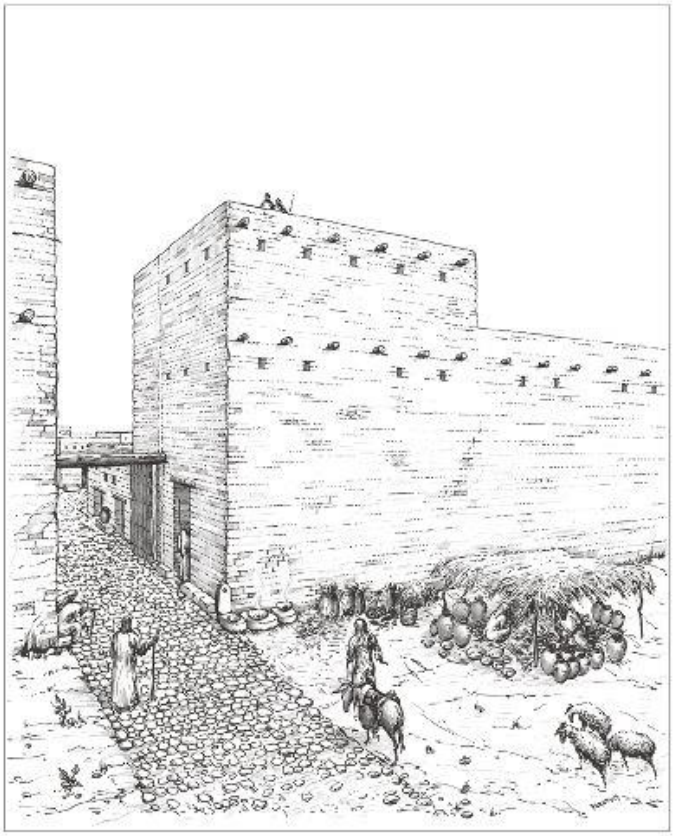


Figure 7.3- Artistic representation of the Tel Bet Yerah EBII gate. Note the shrine and the anchor at the bottom right of the gate (from Greenberg 2011: Figure 4. Drawing by Dov Porotsky).

Third, maritime activities during the EBA, based on the intensity/density analysis, concentrate in space-time bundles that provide a platform for interaction for communities and individuals. Within those maritime bundles that incorporate many archaeological sites (Map 5.5), access to the sea was viable on a regular basis for all inhabitants. Although fortification on land starts occurring during the EBII, control over the sea, over maritime areas, is a notion even difficult to satisfy nowadays (Steinberg, 2001) and there is no evidence for such control during the EBA. Henceforth, fishermen from different sites may well have met on the same fishing grounds. They must have relied on a community of maritime skilled people to help launch their boats and return to shore, to assist in transporting and distributing their catch and in preparations on shore[46]. An ethnographic research on artisanal fishing practices in Aceh, Indonesia, shows that fishermen consider fishing grounds not to be restricted based on residency, ethnicity or kinship; they are open spaces (Quimby 2012: 29). Furthermore, there exist unarticulated practices amongst fishermen such as respecting ‘first come’ privileges and self-spacing. Fishermen in Aceh tend not to frequent the fishing grounds of other fishermen on the same day. They inform each other of the places where they fished so that they ensure not to overlap areas and thereby guarantee the presence of sufficient fish for them to catch (Quimbi 2012: 36). Indeed this is not to say that the same practices apply to EBA Levantine fishing,

[46] Although temporally and geographically distant from the EBA Levant, an ethnographic study on fishing in Scotland, discusses the division of labour in fishing communities (Cerón-Carrasco, 2011).

however, we can infer that the community of maritime skilled individuals along the Levantine coast did not necessarily belong to one site but formed across the maritime space-time bundles. Thus, the bundles provided a platform for interaction and integration. Although far from the EBA, an ethnographic study looking at fishermen's traditions at Anfeh in the central Levant, Lebanon, provides valuable insights about maritime communities. The Anfeh Maritime Ethnography project sought to record the tangible and intangible maritime heritage of Anfeh (van Rensburg, 2014); twenty fishermen were interviewed during the project. These fishermen relayed their traditions about weather, navigation, fishing practices, vessels, etc. In terms of weather, the fishermen can tell the forecast based on the type of clouds on top of the mountain. Their fishing activities greatly depend on winds, which dictate when, where and how they will go about their routine. As for navigation, they rely on landmarks to find their position, whist celestial navigation had been used but it has become a lost tradition. The use of fishing equipment, traps, troll lines, and long lines, depends on the prevailing winds and seasons of the year (van Rensburg, 2014). Their boats range in size, less than 6m or between 6m and 12m in length (Majdalani, 2004), they are wooden vessels and commissioned in Tripoli, further north from Anfeh. Economically, the fishermen either hold a second job or rely on fishing as a full time job; their catch is either sold in a local fish market, to individuals or sold in an auction in Tripoli. Beliefs and music are also part of the fishermen's traditions, e.g. sea shanties while dragging the boat onto the shore. Although these traditions are based on a modern-day fishing community, they nonetheless depict a reality that may not have been that far from the EBA since the essence of the activity remains the same, primarily in that the reliance on marine resources in the past and today belongs to the same pattern in which these resources are not fundamental for the economy and diet but they do contribute to a general Mediterranean diet (See Chapter V Section 5.1.2). As Cerón-Carrasco (2011: 62) states, "*any culture is a mixture of old and new, and traditions endure when they can function under new conditions*". Certainly, this is not to say present traditions mirror past ones, especially with the modern introduction of motorised and larger boats, however, old traditions may seep through time, but in the lack of extensive ethnographic research on of the Levantine coast, definitive statements cannot be made.

These three aspects that characterise human engagement with the sea during the EBA do not reconstruct daily time-space paths in Hägerstrand's terms (Hägerstrand 1970, 1973). Nor do they discuss how and when EBA inhabitants engaged with the sea and what what their main drive so as to allow for a rhythmanalysis study (Lefebvre, 2004). For such understandings, a more precise and substantial record for maritime activities must exist. They do, however, present us with an understanding of the distribution of maritime encounters across space and time (Giddens 1986: 112-

113,135). To further understand these encounters or space-time bundles, we must explore the constraints that act upon them and the maritime connections that bind them.

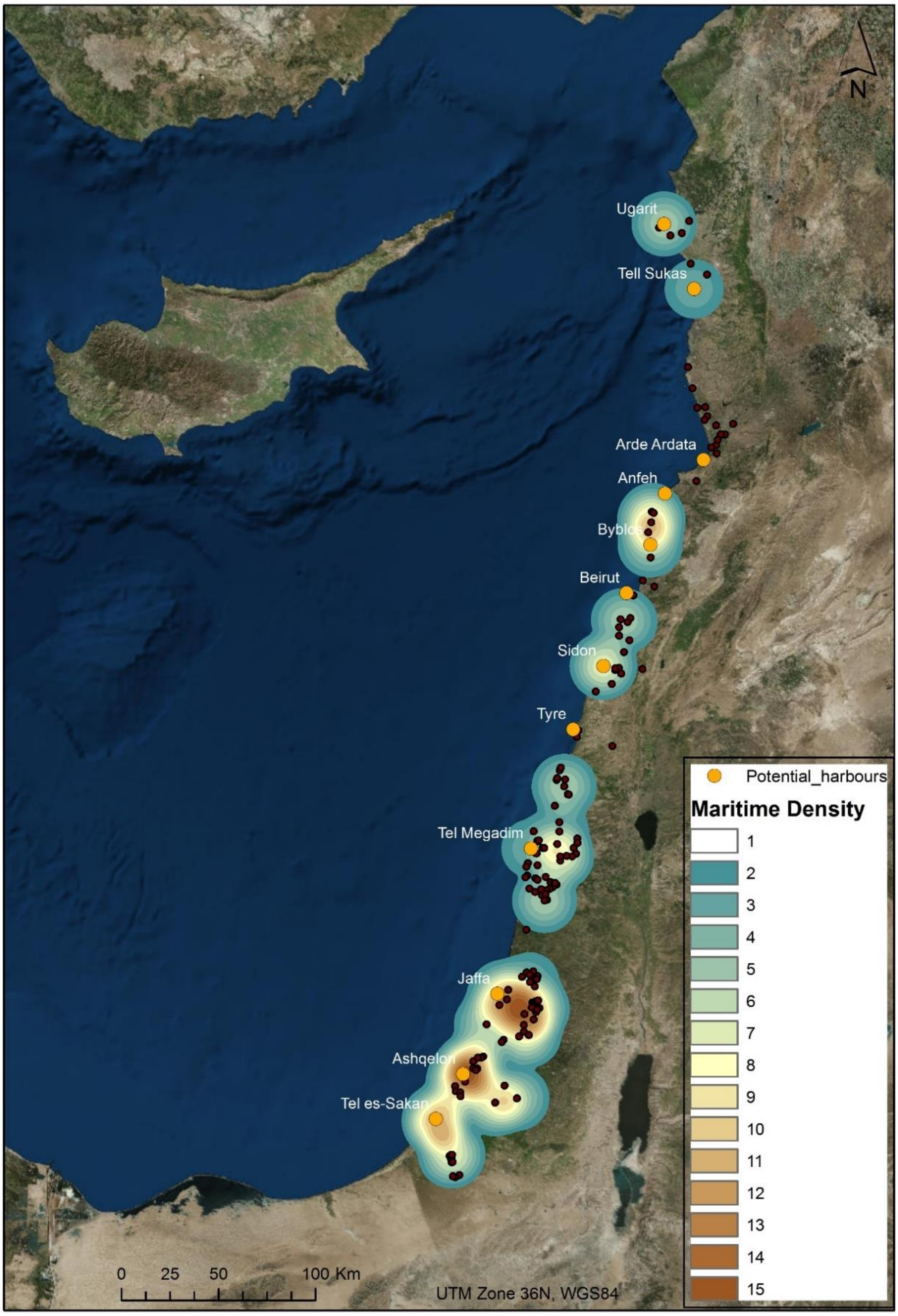
7.2 Space-Time constraints

So far, this thesis incorporated daily time allowance as a constraint on maritime activities; the location of sites demonstrating evidence for such activities was an additional spatial constraint. However, several other constraints act upon and impact maritime activities. Of those constraints are the presence of safe havens to launch boats and return to shore, the availability/abundance of marine resources, seasonal environmental changes in terms of weather and socio-economic constraints (e.g. Morton, 2001). Each one of those constraints is a thesis of its own. The availability of aquatic resources during the EBA and its seasonal patterns require an abundance of data in order to reconstruct the environment, which will hopefully be available in the future. As for the presence of safe havens, in a previous research, I investigated the natural affordances of Bronze Age and Iron Age harbours in the central Levant in respect to their maritime accessibility (safadi, 2016). The northern Levant benefits from Blue's (1995) research that incorporates the whole of the eastern Mediterranean, whereas Gophna (2002) proposes the location of safe havens in the southern Levant for the EBA period. The EBA potential natural harbours on the Levantine coast, according to these references are listed on Appendix G. Their geographical location was deduced based on the archaeological sites they represent, e.g. Byblos' EBA natural harbour has the same geographical location as the site of Byblos incorporated in this thesis.[47]. The resulting distribution of EBA potential natural harbour is shown on Map 7.1.

Interestingly, the distribution of natural potential harbours coincides with the bundles of high intensity in maritime activities. These safe havens may have been a focal point not only for one site, but for micro-regions, composed of several sites, to carry out maritime activities. They may have functioned, for instance, as places of refuge for boats and for different communities of fishermen out in the water in bad weather. This, however, does not eradicate the presence of other locations that may have equally been used, for large and small boats. In order to make better inferences, a full reconstruction of the EBA Levantine coastline is required, as well as a more substantial database of archaeological material since the usage of sites and locations as safe havens did not solely rely on environmental characteristics but is also a matter of human agency. For instance, Byblos is a site that shows pronounced maritime accessibility; yet, several other sites along that coastline show equally

[47] Although the location of some potential natural harbours is not necessarily identified, such as the Bronze Age harbour of Byblos, and some may be partly submerged, a general geographic location that corresponds to the location of EBA sites was assumed since it does not impinge on the discussion presented here given that harbours operated in conjunction to a terrestrial site.

pronounced accessibility (safadi, 2016). However, Byblos is unique in that it is known to have had intensive maritime interactions with Egypt during the EBA (Sowada, 2009). This suggests that several non-environmental variables led Byblos to occupy an important position in connection with Egypt, of which Byblos' community and its readiness and openness for such encounters.



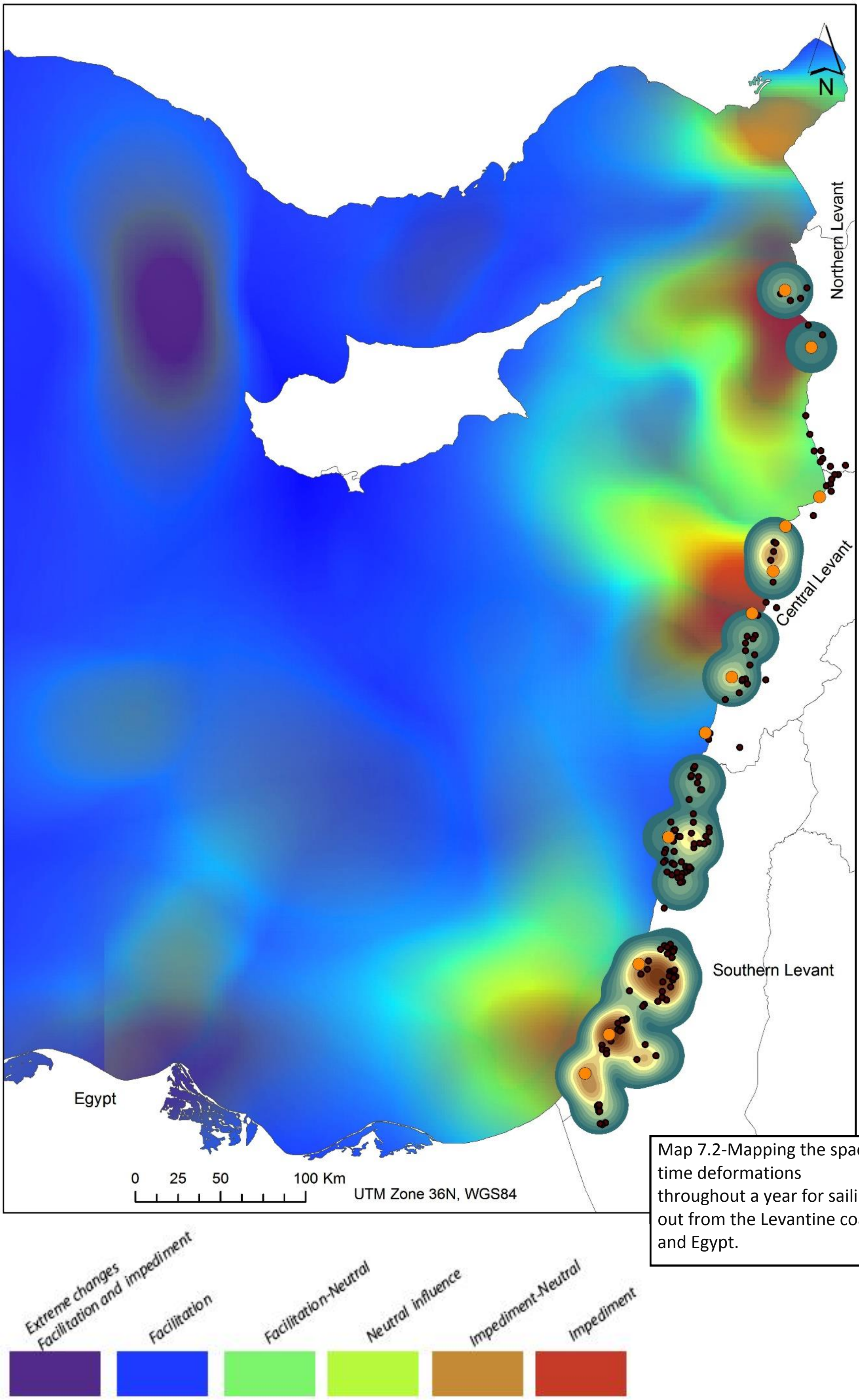
Map 7.1-Distribution of potential natural harbours during the EBA along with the intensity/density of maritime activities.

The weather pattern as a constraint and facilitator for maritime activities was investigated via the space-time cartograms/distortions of Chapter VI. The cartograms are not an absolute representation of constraints on seafaring, for despite foul winds and having to undergo a lengthy journey, ancient seafarers were capable and had the freedom to sail and venture in spite of those conditions. However, the cartograms provide some insights about maritime activities, especially in light of the exchange network (Figure 5.34). Map 6.6 and Map 6.7 represent the deformations/distortions of the Levantine Basin by seasons and by the morning and afternoon. However, in order to get a better grasp on the nature of change in deformations throughout the year, an overlaying of those maps was generated in two groups, one for the deformations based on coastal sites (Map 7.2) and one for the deformations based on sites at sea (Map 7.3). The overlaying of maps allows us to visualise the yearly changes in the space-time of sailing via colour coding (see the symbology on Map 7.2). Regions that undergo a change throughout the year between extremes are depicted in purple, as a combination of red and blue (see Map 6.6 and Map 6.7 for the association of those colours to levels of distortions), at times facilitating the performance of seafaring and at times impeding it. Areas that sustain a temporal constraint on seafaring are depicted in red; yellow areas represent spaces where the temporality of seafaring is not notably distorted all year round, whereas green represents areas where space-time distortions are either not significant or facilitate movement (yellow and blue). Orange on the other hand is a combination of red (high constraints) and yellow (neutral). Henceforth on Map 7.2 and Map 7.3, a green area suggests that throughout the year, it undergoes an alternation between a slight inhibitor to a facilitator of seafaring in terms of the time it takes to sail through it. The red regions coincide with important Bronze Age centres, around Byblos in the central Levant and Ugarit to the north. Whereas in the southern Levant, sailing away from the coast is not as time consuming. Worth noting on Map 7.2 the apparent green and blue channel that links the northern part of the central Levant and southern part of the northern Levant to Cyprus. Furthermore, the space-time deformation around Byblos is high all year round; this, however, did not hinder it from becoming an important maritime centre during the EBA. What this proposes is that despite the fact that sailing by hugging the coast is considered to be the main approach in ancient times (Horden and Purcell 2000: 137-141), the yearly deformations of the Levantine Basin suggest that circumnavigating away from the shore to evade lengthy journeys in close vicinity to the coast may have been the more appropriate option. Furthermore, seafarers were not only aware of their environment, but overcame environmentally restricting conditions on sailing. Additionally, the vicinity of Egypt seems to be a zone easy and difficult to sail out from at different times (spring and summer PM, see Map 6.6). As for the yearly changes in space-time deformations for approaching the Levantine coast from the sea, Map 7.3 shows a dominance of blue colour, indicating ease of navigation towards the coastline (based on the position of the random points at sea, see Map 6.1) apart from the area surrounding Byblos (in purple).

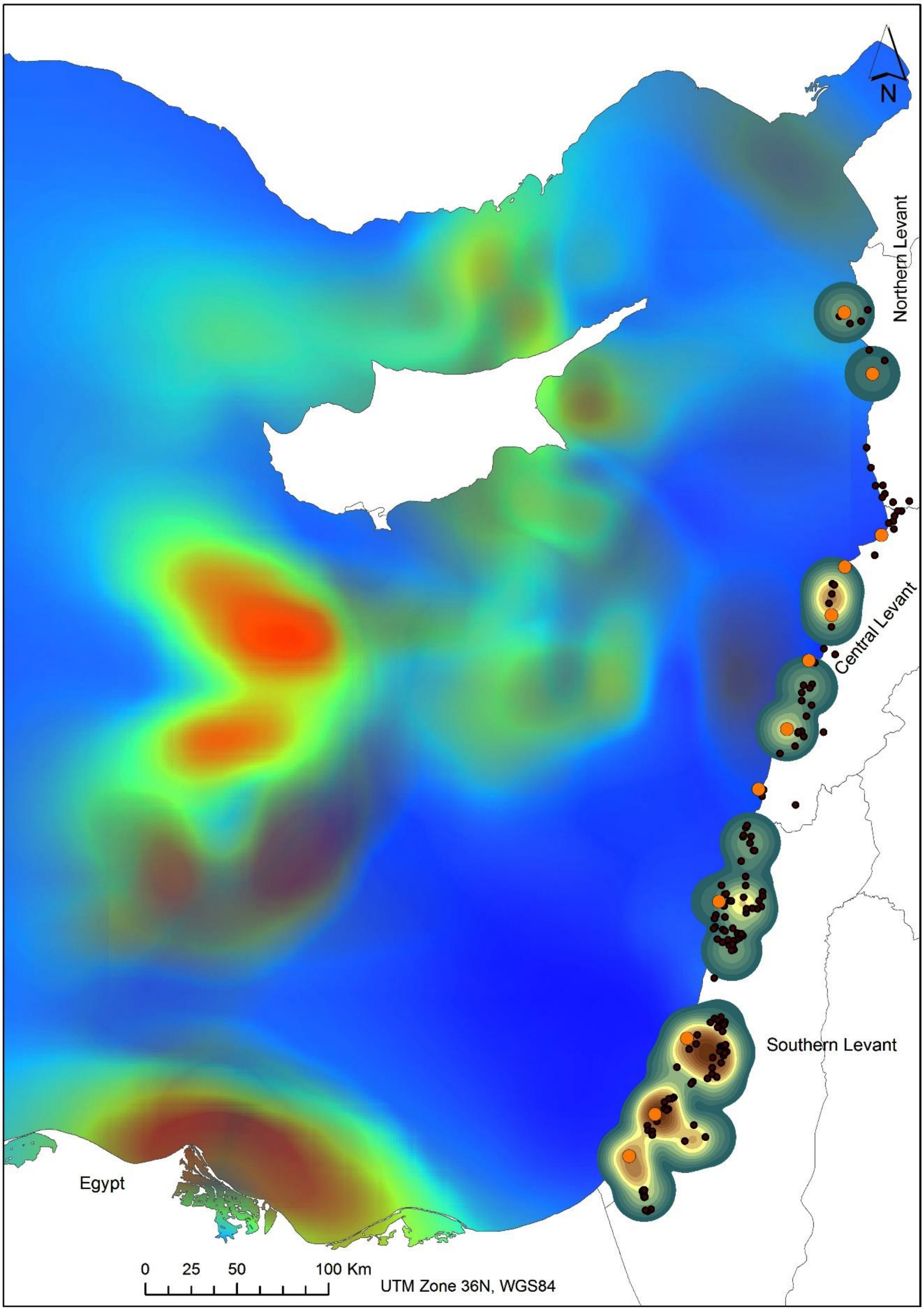
Unfortunately, thus far, there are no remains of EBA wrecks in order to test these propositions against the yearly space-time changes. For the purpose of a general understanding, however, modern shipwrecks plotted against the yearly distortions can be used. Indeed, modern ships are far removed from the technology and capability of a sailing vessel during the EBA, but they can be integrated for the sole purpose of exploring possible patterns in the data[48]. A modern shipwreck database for the eastern Mediterranean was acquired from EMODnet portal[49], through which two maps were generated. Map 7.4 shows the distribution of the wrecks against the yearly deformations for sailing out from the Levantine coast, and Map 7.5 shows the same distribution against the deformations for sailing towards the coast. The pattern of wreck distribution relates to the deformation on Map 7.4 in five main areas. The main concentration of shipwrecks, however, is in areas hugging the coastline, which reasonably present the most danger for ships entering shallow waters, facing underwater features, e.g. reefs, and having to find their way into harbours (approaches to ports and harbours, modern and old, are hazardous). Area A shows a concentration of modern wrecks and is a region of conflicting deformation. Areas B and F are rather interesting. In terms of deformations, they reveal an ease of navigation away from the coast, yet they show a higher concentration of wrecks than the more difficult Areas C and D. This situation can have four explanations: first, the distribution of modern shipwrecks realistically does not relate in an away to space-time deformations based on the performance of sailing vessels; second, the space-time deformations lack precise data to show more variations, which in fact they do since the deformations do not account for storms and abrupt events; third, due to the ease of navigation in Areas B and F, an increasing amount of ships were navigating those waters, hence the high numbers of wrecks; fourth, we tend to see patterns where there are no patterns. In any case, these explanations do not prevent an attempt to explore the data, as long as the author and readers are aware of the spectrum of options and the constraints within the data and the data analysis. The distribution of wrecks in areas C and D, on the other hand, coincide with the nature of deformations in those regions. Additionally, on Map 7.5, the presence of wrecks in Area E concentrates in a region of alternating deformation (green, orange, purple).

[48] The Oxford Roman Economy Project (Strauss, 2013) provides a database of shipwrecks across the Mediterranean up to 1500 AD. However, having examined the dataset, shipwrecks in the Levantine Basin are missing/not accounted for. The majority of shipwrecks concetrates in the Aegean and the western Mediterranean. Such lack from the Levantine Basin may simply relate to the absence of systematic surveys to identify and locate shipwrecks. Furthermore, many of the shipwrecks referenced in the Oxford Roman Economy Project have no spatial coordinates.

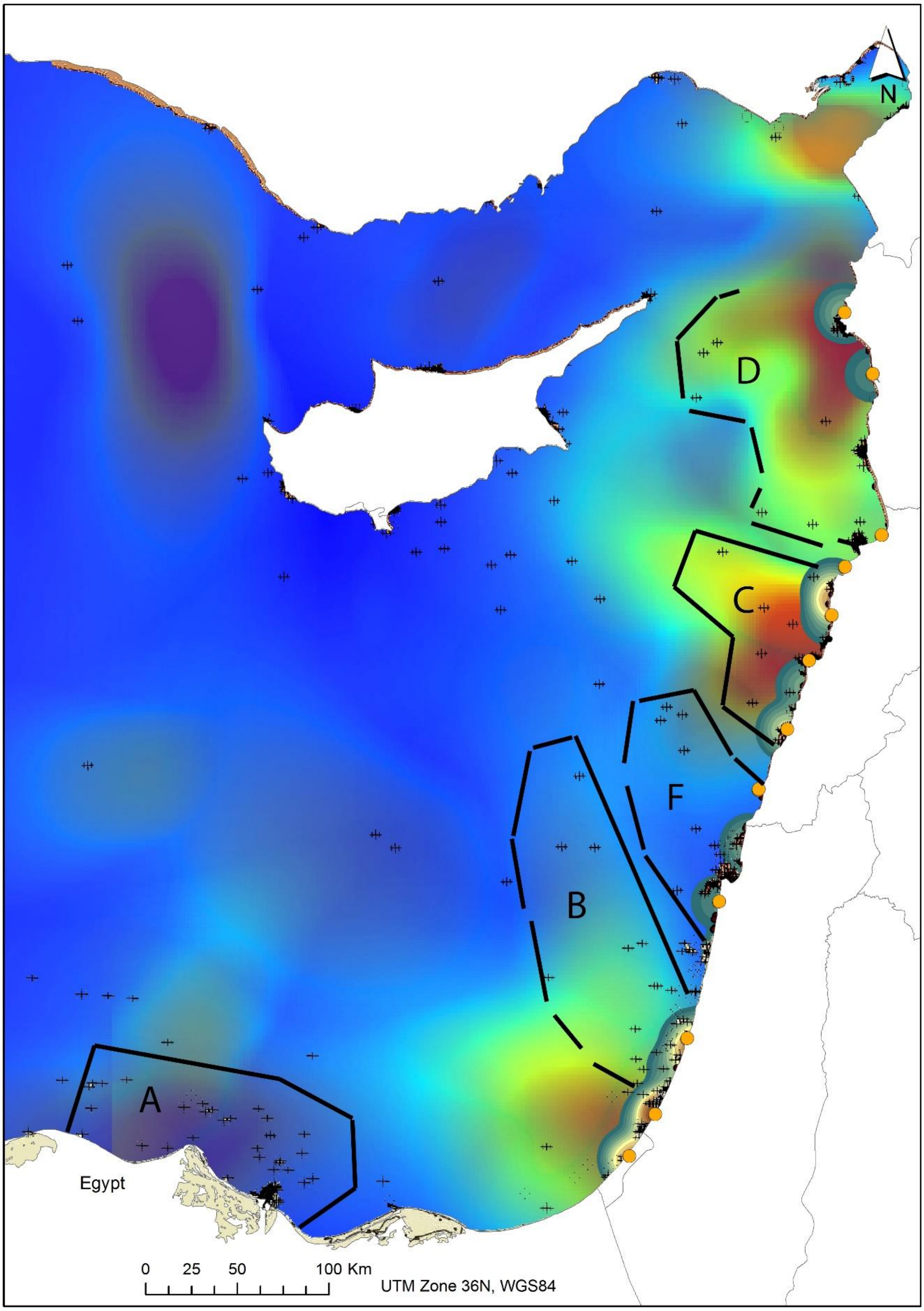
[49] EMODnet portal is accessible on http://www.emodnet.eu/



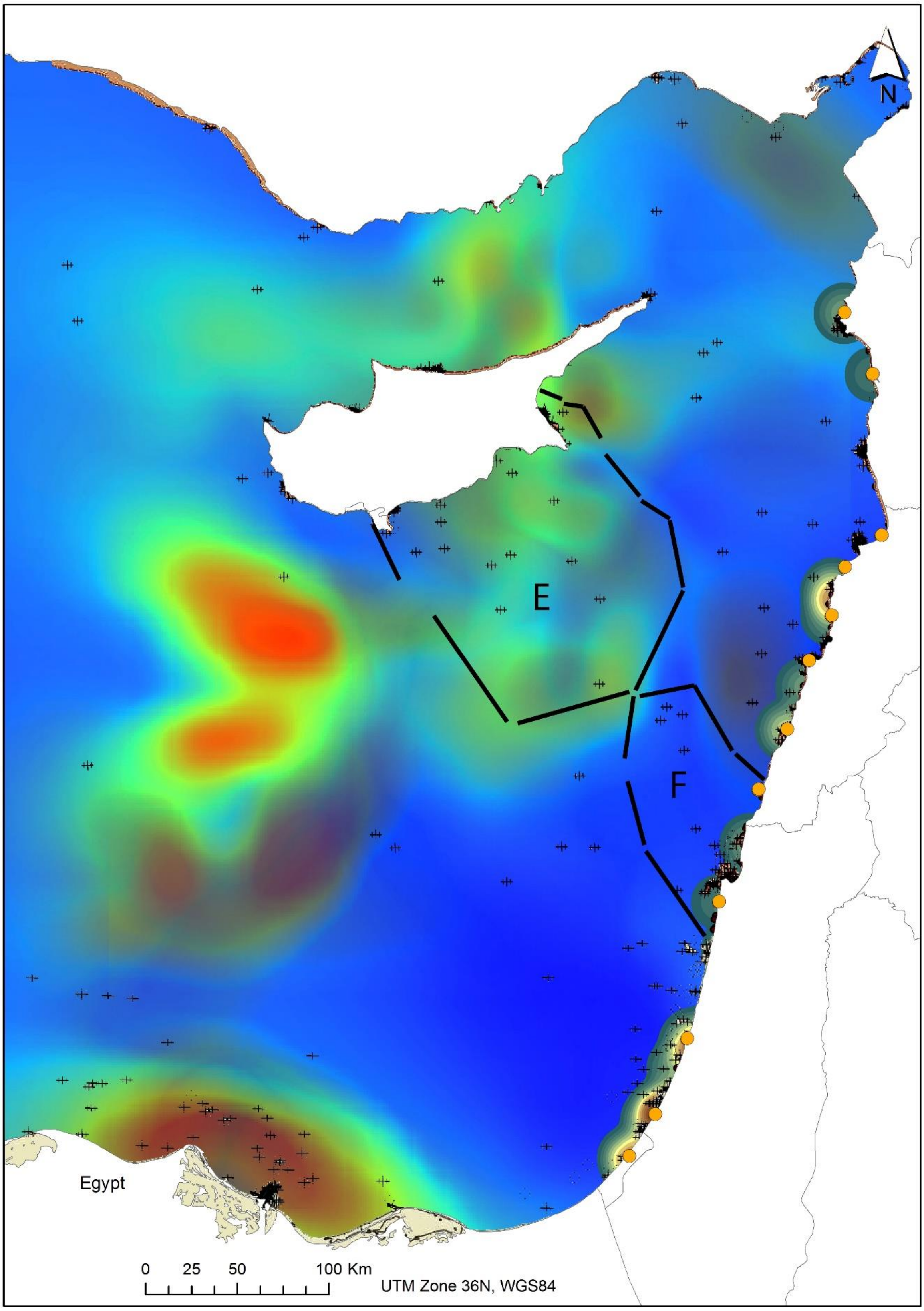
Map 7.2-Mapping the space-time deformations throughout a year for sailing out from the Levantine coast and Egypt.



Map 7.3-Mapping the space-time deformations throughout a year for sailing towards the Levantine coast and Egypt. (See Map 7.2 for the symbology).



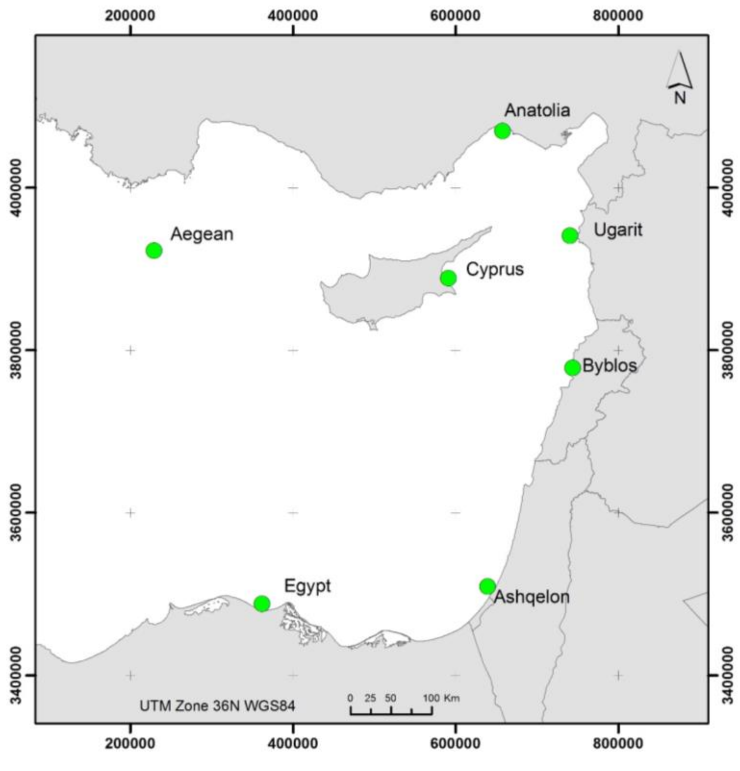
Map 7.4- Distribution of modern shipwrecks (EMODnet portal) set against the yearly space-time deformation for sailing out from the Levantine coast and Egypt. The map shows areas of interest discussed in the chapter. (See Map 7.2 for the legend).



Map 7.5-Distribution of modern shipwrecks (EMODnet portal) set against the yearly space-time deformation for sailing towards the Levantine coast and Egypt. The map shows areas of interest discussed in the chapter. (See Map 7.2 for the legend).

7.3 Maritime connections

The previous trends in constraints relating to the location of potential natural harbours and yearly deformations of the Levantine Basin offer a general outlook on EBA maritime space. However, this still does not provide a better grasp of maritime connections and the difference in time for sailing between EBA sites. To this end, cost distance rasters were generated in GIS for the sites of Egypt, Ugarit, Byblos and Ashkelon, taking as input their respective deformation grids (e.g. Map 6.5, see Chapter 6, Section 6.6.5) for the seasons of autumn and summer in the morning (see Appendix P for winter and spring results in the morning)[50]. These grids allow us to compare the cost for sailing out from these sites to chosen destinations, for even though, spatially, the origin and destination of a sailing journey might be in close proximity, the cartograms already proved that when the temporal dimension is accounted for, space loses its Euclidean representation. The destinations selected for this analysis comply with the EBA potential network of exchange (Chapter V, Section 5.4 and Table 5.11). Apart from Egypt, Ugarit, Byblos and Ashkelon, they include the Aegean, Cyprus and Anatolia based on information displayed in Table 5.11 and Figure 5.35[51] (Map 7.6).



Map 7.6- The location of origin and destinations for the cost distance analysis. The geographical locations of Anatolia, the Aegean and Cyprus were approximated as no single point can represent these regions.

[50] The choice of seasons was restricted to summer and autumn in the text, since they reveal significant distortions in maritime space. The values of the deformation results for spring and winter are available in Appendix P; however, they are not elaboratly discussed in the text unless referenced. The morning spatial deformations were selected instead of the afternoon in order to limit the analyses to an achievable outcome.

[51] The gepgraphical positions of the Aegean, Anatolia and Cyprus were chosen by the author as best representative of their general location. Indeed, Anatolia, the Aegean and Cyprus cannot be restricted to a single location; however, for ease of carrying out the analysis, a position had to be selected.

The cost distance values (from and to) are shown in Tables 7.2 and 7.3 (see Appendix P for the cost values of the winter and spring seasons); they represent the cost of sailing from the sites of Ugarit, Byblos, Ashkelon and Egypt[52]. The highlighted values represent the lowest costs based on the space-time deformations to sail from and to, per table column, whereas the hashed cells display the least cost values to sail from and to per table row. For instance, sailing out from Ashkelon during the autumn AM (Table *7.2*) is least costly towards Egypt (in comparison to sailing to Egypt from the remaining sites) and the Aegean in the autumn AM (per column), whereas sailing from Ashkelon to Cyprus is the least costly between all the sailing destinations from that site (per row). Tables 7.4 and 7.5 present the summary of the best courses for sailing to and from and vice versa.

Table 7.2- The cost values for sailing from and to origin and destination locations in the Levantine Basin, during the autumn in the morning, based on the space-time deformations.

Autumn AM							
FROM\TO	***Ugarit***	***Byblos***	***Ashkelon***	***Egypt***	***Aegean***	***Anatolia***	***Cyprus***
Ugarit	N/A	100005	408616	627147	526329	117474	267821
Byblos	57943	N/A	235434	450609	487494	310248	236468
Ashkelon	320568	382255	N/A	320419	392698	340016	243273
Egypt	522806	358814	235434	N/A	487494	310248	361667

Table 7.3-The cost values for sailing from and to origin and destination locations in the Levantine Basin, during the summer in the morning, based on the space-time deformations.

Summer AM							
FROM\TO	***Ugarit***	***Byblos***	***Ashkelon***	***Egypt***	***Aegean***	***Anatolia***	***Cyprus***
Ugarit	N/A	372041	558930	675279	520643	170810	267821
Byblos	124497	N/A	535320	586924	605602	248020	159174
Ashkelon	551715	522670	N/A	484283	568686	629065	480473
Egypt	353535	216827	535320	N/A	605602	248020	323045

[52] Cost distance rasters were only generated for the sites of Ugarit, Byblos, Ashkelon and Egypt. Although sailing from the Aegean, Anatolia and Cyprus is equally important to understand EBA maritime connectivity and dynamics, this thesis focuses on the Levantine coast. Appending more sites to this analysis will be the subject of future research.

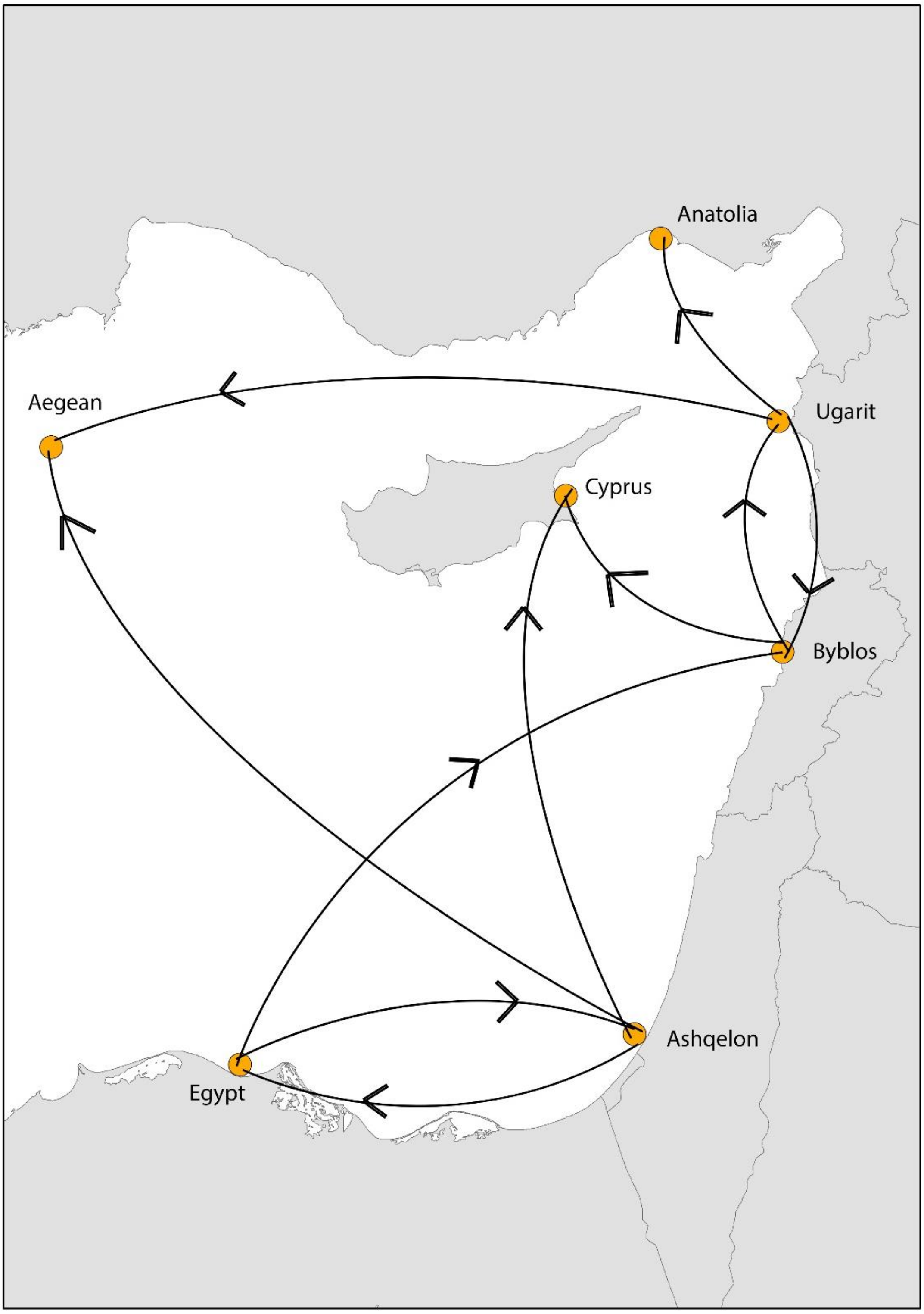
Table 7.4- Summary of least cost courses (from/to) according to the cost distance rasters of the autumn and summer in the morning. Green shadowed cells show those courses that compress space according to time.

Least cost courses		
FROM\TO	**Autumn AM**	**Summer AM**
Ugarit	Byblos	Anatolia
Byblos	Ugarit	Ugarit
Ashkelon	Cyprus	Cyprus
Egypt	Ashkelon	Byblos

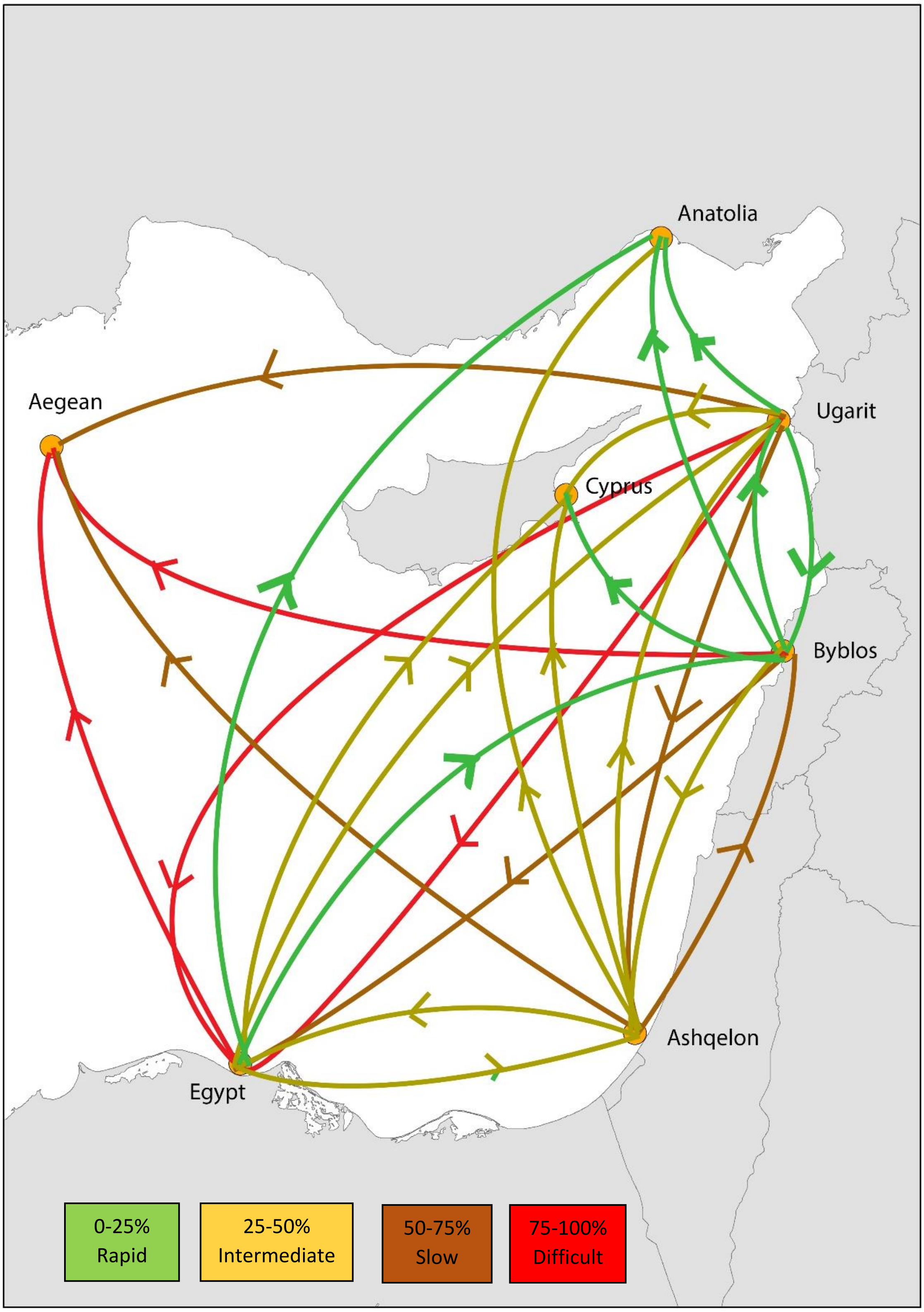
Table 7.5-Summary of least cost courses (to/from) according to the cost distance rasters of the autumn and summer in the morning. Green shadowed cells show those courses that compress space according to time.

Least cost courses		
TO\FROM	**Autumn AM**	**Summer AM**
Ugarit	Byblos	Byblos
Byblos	Ugarit	Egypt
Ashkelon	Byblos and Egypt	Byblos and Egypt
Egypt	Ashkelon	Ashkelon
Aegean	Ashkelon	Ugarit
Anatolia	Ugarit	Ugarit
Cyprus	Byblos	Byblos

The results of these tables reveal interesting patterns and a network of maritime connections in the Levantine Basin. Based on least costly journeys, i.e. yellow highlighted and hashed cells on Table 7.2 and Table 7.3, and the resulting Table 7.4 andTable 7.5, a best course network of connections was devised as shown on Map 7.7 (according to space-time distortions) for the summer and autumn when sailing out from the sites of Ugarit, Byblos, Ashkelon and Egypt. Furthermore, in Appendix Q, the values in Table 7.2 and Table 7.3 are classified by percentage of cost (0-25%, 25-50%, 50-75%, and 75-100%), thereby representing the fastest and most difficult maritime connections. The network of maritime connections, for the autumn and summer, according to the percentage values, are displayed in Map 7.8.



Map 7.7- Best course network showing the least costly connections between Levantine sites, Egypt, Cyprus, Anatolia and the Aegean. The links do not show the actual paths of journeys.



Map 7.8- Networks of maritime connections displayed on a range from rapid to difficult according to cost values in percentage classification from Appendix Q (for the summer and autumn).

7.3.1 The Levant, Anatolia and Egypt

The network of best courses (Map 7.7) shows a reciprocal facilitation of maritime connections between Byblos and Ugarit and between Ugarit and Anatolia. Already in the potential evidence for maritime activities, relations between these areas were highlighted via affiliations and trade items (see Table 5.8 and Table 5.9). Ugarit seems at the centre of a maritime network between Anatolia and the central and southern Levant[53]. In light of the provenance of obsidian at Levantine coastal sites (Thalmann 2006b: 7; Chapter V, Section 5.3.2), the facilitated journeys between Ugarit, Byblos and Anatolia only further reinforce Thalmann's (2006b: 7) proposition that the sourcing of obsidian is one of the earliest evidence for maritime trade between the Levant and Anatolia (see also Philip 2002). In contrast to traversing land, which, based on an average of a normal walking speed of 5km/h[54] would have taken, for instance, more than 43 hours between Byblos and Ugarit, sailing between those places under a time compression beyond 4 knots (7.408km/h)[55] would have required much less than half of that time. Maritime connections rendered rapid must have been favoured over land routes, facilitating the movement of obsidian to the Levantine coast. This facilitated maritime connection between the northern Levant, Anatolia and central Levant may as well have influenced the distribution of the Khirbet Kerak Ware (KKW). As described in Chapter II, Section 2.5.3, KKW was first noticed at Tel Bet Yerah (Albright 1935: 200); it showed clear affiliations to Anatolian pottery to the extent that immigrant groups from Anatolia were thought to be the source of this type of pottery (Figure 2.15; Mazar, 1992; Stager, 1992). In essence, KKW was considered as a manifestation of relations between Anatolia-Transcaucasian and the Levant (Braidwood and Braidwood 1960: 510-520). Its distribution stretches along the Levantine coast and inland. Philip (1999) argues based on the chronology of the ware's distribution that the pattern is in favour of maritime connections. Not all scholars agree with Philip's (1999) argument, e.g. Milevski (2005: 87). Furthermore, this research is not in a position to corroborate or disprove Philip's statement. However, since an obsidian network of trade was already in place prior to the EBA (Thalmann 2006b: 7), and maritime connections between the Levant and Anatolia were facilitated (as represented in the best course network, Map 7.7) by the environment, the occurrence of KKW and its Anatolia-Transcaucasian affiliation during the EBIII must have built on preceding traditions and relations made feasible and effortless via maritime ways. The less time consuming it is to access places, in this

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[53] Al-Maqdissi (2013: 78-79) argues that by the MBA, Ugarit and other harbours as far as Byblos were in full development. Also see Bordreuil *et al.* (1984), Yon (2006: 16), Knapp and Demesticha (2016: 19).

[54] Indeed, walking time is much dependant on the nature of the terrain but for mere comparison a generic value for walking speed is considered here.

[55] The space-time distortions were based on a base map of 4 knot speed, hence any space-time compression entails a speed quicker than that.

case sailing between the Levant and Anatolia, the more reinforced is the movement of people and ideas.

The facilitation of maritime ways between Ugarit, Byblos and Egypt can shed insight on the Uruk contact discussed in Chapter II, Section 2.5.2. The Uruk expansion had influence on Egyptian developments in the late fourth millennium BC (Wilkinson, 2002), considered to be meditated via the Euphrates Valley and the Levantine coast (Joffe, 2000). Philip (2002: 223) suggests that the network of the Uruk world is an extension of earlier maritime networks focused on the Levantine coast and via which connections with Egypt were established. The problem, however, was the lack of Urukian influence and material in the Levantine coast. Wilkinson (2002), in the face of this problem, advocates that Mesopotamian elements were adopted in regions where elites were emerging, such as in Egypt. At Byblos, Mesopotamian influences are found during the EBIII (Chapter V, Section 5.3.2); potential connections may have been established prior, but the evidence is problematic due to ill-suited excavation methods of the site and publication of results. Nonetheless, Byblos during the EBI yields evidence for a growing control on goods and exchange in the appearance of a series of seals in stone, clay and bone/ivory showing animal and geometric motives (Dunand 1945: 23-58 plates), as well as cylinder seals (Dunand 1973: 328, Fig 203). Hence, at Byblos, a growing administrative practice may have attracted and been attracted to Mesopotamian developments. In light of the best course maritime network (Map 7.7), Byblos appears at a focal point, facilitating relations between the northern Levant and Egypt (see also Map 7.8; the majority of connections from and to Byblos are qualified as rapid or intermediate). The sailing time compression allowing for an ease of access to Byblos from Egypt, and Byblos to Ugarit reciprocally, must have played an important role in mediating connections with the Mesopotamian world via the Levantine coast[56]. In fact, sailing to Byblos from Egypt is even less costly than sailing to its close neighbour, Ashkelon and the southern Levant (see Table 7.3, sailing from Egypt to Byblos, the cost value is less than that to sail from Egypt to Ashkelon in summer and autumn). Whilst sailing from Byblos to Egypt is less costly than from Asheklon if we include winter sailing (see Appendix Q from Byblos to Egypt in winter). Indeed winter sailing can be dangerous, however as explained in Chapter VI, Section 6.2.1.3, we cannot eradicate the possibility that sailing took place throughout the year. This brings us to the relation between Egypt and the southern Levant during the EBI and the shift towards Byblos and the northern Levant during the EBII.

[56] The terrestrial network of the Levantine coast is not discussed in this thesis since it is an immense subject of research and to date, no studies have looked at the EBA terrestrial network binding the Levantine coast to the hinterland. it is important to note, however, that for a full understanding of maritime connections and networks, terrestrial movement must be considered.

During the EBI, as discussed in Chapter II, Section 2.5.1, Egypt had a strong connection with and influence on the southern Levant, evidenced by Egyptian and Egyptianised material found in the southern Levant (Braun 2002, see also Chapter V, Section 5.3), as well as Canaanite objects found in Egypt (Amiran and Gophna, 1992: 358; Kantor, 1992: 13). The general consensus assumes that the Egyptian state spread its control to the southern Levant, where it established outposts that involved the movement of Egyptians into southern Canaan resulting in administrative centres at Tell es-Sakan and En Besor (Sowada 2009: 245)[57]. The platform for movement between Egypt and the southern Levant remains unclear, but more emphasis is placed on the overland route (de Miroschedji 2003: 40-44). However, in light of different factors, including those mentioned in Chapter II, Section 2.5.1 such as the Egyptian ceramic jar from the EBI found offshore at North Atlit Bay holding non-local shells and the EBIA cedar pieces found at Ashkelon from the central Levant, there is a strong suggestion that maritime connections between Egypt, the southern Levant and the central Levant were in place. This is not a new notion. Many scholars advocated, dubiously, for maritime connections based on long-distance trade items as early as the EBI between Egypt, the southern and northern Levant (Gophna and Liphschitz, 1996; Sharvit *et al.*, 2002; Sowada, 2009). However, this notion was never corroborated based on the performance of sailing vessels and on time of sailing as modelled in this thesis. The network of least cost connections provides an additional proof and greatly reinforces the validity of maritime connections in this context. The distortions of the maritime space-time result in a pattern mimicking the archaeological evidence, hence suggesting that the facilitated maritime connections bridged those areas together, mediating the movement of artefacts (see Map 7.7 in comparison to Map 2.3). The least costly journeys on Map 7.7 show space-time compression between Byblos, Ashkelon and Egypt. In fact, the archaeological record hints for a potential maritime connection between Egypt and Byblos as early as the Naqada IIC/D. Tantalising evidence suggests that large cedar logs from the Lebanese mountains recovered from Hierakonpolis in Egypt may have been used for the façade of a cultic building (Sowada 2009: 26). Furthermore, a cedar box dating to the Naqada IIC/D was found in the Abydos tomb U-127. This is the earliest evidence for an object made of cedar in Egypt (Sowada 2009: 26). If the evidence from Hierakonpolis is verified, then maritime connections between Egypt and Byblos for the procurement of wood started as early as the late fourth millennium BC. Egypt and Byblos relations are known mostly from the EBII period, when Egypt shifts its attention to the northern Levant, for the acquisition of exotic goods (see Chapter II, Section 2.5.2, Map 2.3). This coincides with the Early Dynastic Egypt, under the reign of Djer. Compared to the previous EBI, the volume of Egyptian material and presence in the southern Levant contracts. The reasons for this change is unclear and still debated. Some of the

[57] For a more detailed account of Egypt's relation to the southern Levant during the EBI see Sowada (2009: 10-16).

proposed reasons relate to Egypt's growing political and administrative structures that required the construction of monumental architecture and greater acquisition of exotic goods (Oren 1989: 403; Hendrickx and Bavay, 2002; Sowada, 2009). The primary motivator, however, as suggested by Sowada (2009: 30), was the large scale seaborne traffic to ship heavy timbers and cedar from the Levantine coast (Prag 1986: 50-60; Stager 1992: 40; de Miroschedji, 1998; Marcus 2002: 407-408). The pre-eminence of Byblos in this trade with Egypt during the EBII is undisputable. Old Kingdom inscriptions bear the word *kbn*, translated as Byblos (Helck, 1971; Wright 1998: 146-148). Amongst these inscriptions is a 6th Dynasty text of Khnum-hotep speaking of official trips to Byblos (Ward 1963: 27). The discovery of Old Kingdom Egyptian stone vessels at Byblos inscribed with the names of rulers supports its superior position (Ward, 1963; Chéhab, 1969; Sparks, 2003). During the Old Kingdom, the sea-route is known to have been in favour and ships plying the Levantine Basin were known as *kbn.t*-ships (Redford 1992: 38-10; Marcus 2002: 408). Cedar imports are known to be the prime instigator for the relation between Byblos and Egypt (for an in depth analysis, see Sowada 2009: 2-33). This is attested in the archaeological and textual record given Byblos' position, a gateway for the procurement of cedar from the Lebanese cedar forests (Helck, 1971; Marfoe, 1987). An inscription on Snefru's Palermo Stone from the 4th Dynasty, c. 2600 BC, describes the transport of forty ships filled with cedar wood from Byblos to Egypt (Pritchard 1975: 227; Sasson 1966: 127, see also Tallet (2012a) for mentions of *kbn-t* ships on OK inscriptions from Ayn Sukhna). Furthermore, a number of Combed Ware jars found in Giza, Egypt, were identified to originate from Byblos, indicating the trade in the commodity they contained, e.g. resin (Lucas and Harris 1989: 320). An analysis of the timber used as roofing for the Abydos tomb of Horus Aha shows that it is made of cedar beams (Gale *et al*. 2000: 349). While the size of the timber beams is unknown, this find highlights the existence of a maritime network to acquire cedar during the 1st Dynasty (much earlier than the Snefru inscription). The size of the beams, if they were indeed coniferous and measured over 6m as according to Petri (1900: 9), would have required them to be transported by sea for the majority of the journey (Gale *et al.* 2000: 349-52).

The narratives about the relations between Egypt and Byblos have always focused on the Egyptian perspective. In other words, the instigators for these relations were always thought to represent Egyptian motives (e.g. Sowada 2009: 7-15; de Miroschedji 2003: 41-46; Ben-Tor, 1989; Wright, 1988; Ward, 1963). Such reasoning, however, only mediates one aspect of those relations and is not supposed to be conclusive. Byblos, as mentioned earlier, was already growing administratively and economically. It occupied a distinct location in terms of maritime accessibility to the northern Levant and Anatolia as well as the southern Levant and Cyprus (Map 7.7 and Map 7.8). The Egyptian shift of attention to Byblos may very well be labelled instead a Byblite growth in commerce. Furthermore, such growth and connections need to account for the maritime space. On Map 7.7, Map 7.8, and Table *7.2*,Table *7.3* we clearly observe that accessing Byblos from Egypt was least costly in comparison to all other sites, even Ashkelon in the close vicinity of Egypt in the southern Levant. Hence, Egypt's interest in Byblos and the transport of timber was very much expedited by the nature of maritime space. Had maritime space not fostered such connections, one would wonder what other relations may have taken place. Hence, one of the many reasons behind this shift in attention that shows a strong signature during the EBII is the easiness of the maritime access to the northern Levant from Egypt in comparison to the southern Levant, and the facilitated maritime connection from Byblos to Egypt (Appendix P)[58]. The best course network emphasised and promoted seaborne connections linking the northern Levant, Anatolia, the southern Levant and Egypt.

7.3.2 The Levant and the wider Mediterranean

Egyptian connections are known to have extended to the Aegean, based on the presence of stone vessels at Knossos (Evans 1935: 984; Reisner, 1931; see also Liliquist, 1996; Bevan, 2003). The consensus regarding Egyptian items in the Aegean and Anatolia is that it was either the product of a 'down the line' trade or mediated from the Levant via Cyprus (Sowada 2009: 10; Ward 1963; Bevan 2003). The best course network strongly supports the latter; Byblos benefited from facilitated maritime connections with Cyprus, and so did Ashkelon whose maritime access to the Aegean and Cyprus was also rapid. This situates the Levantine coast as a mediator of trade with the rest of the Mediterranean, as commonly recognised in archaeological research, particularly of later periods. Levantine and Near Eastern influences spread towards the Aegean. According to Broodbank (2000: 283), the reach of material and ideas from the orient is unquestionable. Examples of material comprise an Anatolian ivory cylinder seal at Pliochni (Bernabò-Brea 1976: plate 254), Levantine faience beads at Chalkidiki, Troy, and other sites in Crete (Peltenburg 1996: 19), and flasks of Syrian types at Troy and Palamari (Theochari *et al*. 1993: 191). Broodbank (2006: 283) notes that the prominent thing about the distribution of this material is its concentration at important sites and, in some cases, at sites that acted as foci for maritime trade. While the list of imports to the Aegean is scant, Genz (2015: 847) mentions that during the EBIII, a number of Near Eastern influences can be traced in the Aegean including the use of the potters' wheel, the spread of tin bronzes, the practice of cylinder seal impressions, etc. (Genz, 2003; Efe, 2007). Furthermore, Aegean weights are known to be based on Near Eastern metrological standards (Bobokhyan, 2008; Genz, 2015). Up until recently, however, Aegean weights predated their widespread use in the Levant and Syria. Yet, a unique find at Tell Fadous-Kfarabida of a scale beam dating to the first half of the third millennium

[58] Note that on Map 7.8, sailing from Byblos to Egypt is categorised as slow rather than difficult. This entails that the journey would not have faced substantial hindrance and was therefore feasible.

BC rectified this issue as it predated the Aegean examples (Figure 7.4). The scale beam is a significant find; it is the first of its kind in the Levant, and according to Genz (2015), the fact that it was found at Tell Fadous-Kfarabida, a small settlement, hints to the common practice of weighting during the EBA. This evidence for Levantine and Near Eastern influences and material in the Aegean finds basis in the best course network from the Levant (Map 7.7, Appendix P). Facilitated/rapid maritime connections lie between the northern and southern Levant towards the Aegean (see Ashkelon and Ugarit's connection to the Aegean on Map 7.7, and Appendix P for winter and spring sailing, especially the least costly journeys from Byblos and Egypt to the Aegean). Modelling of the return journeys, from the Aegean towards the Levant, is required to better understand the maritime dynamics; such modelling will hopefully be the outcome of a future project that expands on the concepts and models presented in this thesis.

Figure 7.4- Bone scale beam from Tell Fadous-Kfarabida, Phase III (from Genz 2015: Figure 6).

In Cyprus, Levantine imports during the EBA are rare. An imported EBA Levantine jar, thought to originate from the northern Levant, was discovered in a tomb at Bellapais-Vounos in northern Cyprus (Bolger 2013: 5; Knapp 1990: Table 3). The jar was initially reported by Stewart (1939) and similar examples were found at sites in the northern Levant (Holland 1976, 1977). The find was discovered near the head of one of the two individuals in a double-chambered tomb. Bolger (2013) suggests that this placement must relate to the status of the individual, reinforced by the vessel's content likely to be liquid, e.g. wine, oil or perfume. Cypriot exports, on the other hand, are found in Anatolia and Cilicia in the form of pottery (Knapp 1990: Table 3). Despite the rarity of Levantine imports, Levantine influences on developments in Cyprus were discussed by Bolger (2013), of which potential Levantine or Anatolian influence on the acquisition of technological skills in metallurgy and the making of faience beads (Peltenburg, 2011). A copper axe was discovered in an EBII context at Pella, Jordan, though much further in land; its lead isotope analysis suggested for a Cypriot source (Philip *et al.* 2003: 87). Along with evidence from Crete, the cemetery of Ayia Photia, where copper of a Cypriot origin was reported (Webb *et al*. 2006; Peltenburg 2011), Bodger (2013: 4) proposes that these finds, if proven accurate with further testing, oblige for a reconsideration of Cypriot involvement in long-distance trade networks with the Levant and the Aegean during the EBA, i.e. Cyprus' mediatory role. The black polished vessels at Byblos from the EBIII, which are potentially of a Cypriot origin (Negbi 1972: 98-99), further contribute to the dynamics of exchange between Cyprus and the Levant. Based on the best course network, Cyprus spatio-temporally is in close vicinity to the Levantine coast. Its access from Byblos, Ashkelon and Ugarit, sailing wise, is least costly (Map 7.7, Appendix P). In addition, Cyprus is located on the way between the Aegean and the northern Levantine coast. This indicates that despite the rarity of imports on Cyprus, it was part of a wider system of interactions. But rather than importing objects of trade, communities in Cyprus integrated Levantine and Anatolian traditions, e.g. the so-called Philia Phase represented by new pottery types, decorations and metalworking practices (Peltenburg, 2007; Peltenburg *et al.* 1998: 256-258). Knapp and Demesticha (2016: 32) conclude that Cyprus belonged to a couple of eastern Mediterranean sub regions: the central-northern Levant, Egypt and the southern Levant, and the Anatolian southern coast. The best course network in fact reaffirms those observations. Access to and from Cyprus was maritime bound; hence seafaring must have played an important role in its history and colonisation. In fact, one of the important values of the best course network is that it shows the least costly connections that may well have facilitated the spread of farming from the Near East to Cyprus and to Europe (Vigne, 2013; Vigne *et al*., 2013). A maritime colonisation at the origins of farming in the west Mediterranean is not without supporters (Fernández *et al.*, 2014; Zilhão, 2001). The spatio-temporal deformations and cost analysis confirm the closeness in time Cyprus and the Aegean worlds are in relation to the Levant.

7.3.3 Maritime transport containers

In light of these maritime connections, the question as to how goods were being transported is an important one. Knapp and Demesticha (2016: 42-56) trace the use of maritime transport containers (MTC) in the Mediterranean Bronze and Iron Ages. By the onset of the EBA, potters in the southern Levant were adapting attributes of the common storage jar which would have made them suitable for transport (Knapp and Demesticha 2016: 43). Ledge and loop handled jars from the EBIB were transported to Egypt along with their contents (Hartung 2002: 440). By the EBII-III, most of the pottery vessels imported into Egypt were loop-handled jars. Similar to later MTCs, they were manufactured with thick walls and bases and an elongated body. Knapp and Demesticha (2016: 44) suggest that such features may have developed to meet the demands of maritime trade. The standardisation and spread of the combed storage jars and the red polished jars throughout the Levant testify to international networks and the need to control the process of importing and exporting. Perhaps, as Knapp and Demesticha (2016: 44) indicate, such standardisation in the combed (Metallic Ware) jars was even associated with ships' capacity. The Metallic Ware jars of the EBII-III may have held wine, olive oil and resins (Sowada 2009: 248-255). They may have been mass-produced inland as well as on the central Levantine coast (Thalmann and Sowada, 2014). A scene from an Old Kigdom tomb at Giza shows a Levantine two-handled jar next to an Egyptian storage jar; the inscribed label indicates that it may have contained 'sweet oil' (Kantor 1992: 20). Furthermore, petrographic analysis of EBII-III Metallic Ware vessels from tombs at Helwan (near Memphis) and of EBIII sherds of combed jars shows that they originate from the northern Levantine coast, in the vicinity of Tell Arqa and Byblos, and Lebanon in general for the Combed Ware (Ownby 2012: 24; Köhler and Ownby 2011: 43). The Levantine Combed Ware were characterised by a strong but lightweight body, highly fired, less permeable and with loop handles, all factors which rendered these containers ideal for transport and packing (Greenberg and Porat 1996: 10-11). These jars, once they were refined in design, became the icon of trade with Old Kingdom Egypt (Thalmann and Sowada 2014: 369). The emergence of specialised workshops for the production of commercial vessels in the Levant, as Marcus (2002: 410) aptly notes, suggests that long-distance trade, e.g. with Egypt, was in place, and EBA communities were oriented towards seaborne exchanges[59]. Knapp and Demesticha (2016: 46) conclude that during the EBA, the typological and technological characteristics of pottery vessels indicate that they were produced for the transport of liquid in large

[59] The study of Levantine vessels found in Egypt reveals a chronological trend in their height from Small Light Faced Painted Ware jugs and juglets to large Red Polished Ware jugs and larger Combed Ware jars (Esse 1991: 115; Marcus 2002: 410).

ships. Henceforth, not only was the network of maritime connections facilitated by the nature of maritime space and environment in the Levantine Basin, EBA inhabitants were harnessing this affordance and producing a material signature that conforms to their needs for seaborne trade.

In consideration of the direct evidence for maritime activities and inter-Mediterranean and Levantine relations during the EBA, the role of maritime space and connections in the EBA developments ensues. The facilitated maritime network provided a platform that was apprehended by EBA communities for the purpose of exchange, trade and interactions. Furthermore, EBA inhabitants overcame the environment. For instance, maritime access from Byblos to Egypt was facilitated in winter time (Appendix P); hence, despite the dangers of winter sailing, seafarers may have taken to the sea, thus accelerating their journey to Egypt, they may have equally sailed under unfavourable winds, or were satisfied to sail with a slow speed (Map 7.8), unrestricted by the environmental conditions they faced. The facilitated maritime networks presented in this chapter only reinforce the significance of human choices; thus, we can never with certitude claim that seafarers did not sail in winter, or that the journeys were restricted to coastal hugging. Peltenburg (2007: 143) refers to the EBA of the Mediterranean as a period of an 'international spirit'. This international spirit takes a specific form during the EBII, when maritime activities on land and on sea intensify.

7.4 The role of maritime space

Time has always been regarded as the dimension that transforms geographical space, the element required to understand maritime connections, the variable that can define interactions. Agouridis (1997: 19) pointed out that environmental parameters change the geographical proximity of regions and islands in respect to the potential of interaction. Knapp and Demesitcha (2016: 32) accounted for maritime travel time based on later textual sources and, on that ground, proposed to situate Cyprus in certain interaction spheres as mentioned above. Knappett *et al.* (2008: 1021) stressed that travel times must replace physical distances in a maritime network. Leidwanger (2011) made a start at calculating travel time based on winds and currents. Congruently, this thesis expanded on the importance of time and incorporated it in the form of rhythms, not for the purpose of reconstructing specific journeys, but to mediate a relational space and a deconstructed geographical space. The resulting distortions of Cartesian space reflect how space-time might have been conceived and experienced but, most importantly, they provide a heuristic tool with which we can examine maritime worlds and networks of the EBA Levant. The relations evidenced in the archaeological record between sites and regions testify to the accuracy of the best course network based on the space-time deformations. The time compression between places of origin and destination brings these together into interaction spheres. Whereas the space-time maritime bundles of activities on the Levantine littoral are regarded as coastscapes (Chapter V, Section 5.4), the whole of the coastal Levant, along with Egypt and Anatolia, according to the facilitated maritime network, appears to be in one small world of interaction signifying the amalgamation of many connected coastscapes (Tartaton 2013: 190-194). The coastal Levant holds no further its division into a southern, central and northern Levantine sub regions, but is constituted by a series of coastscapes integrated into a small world of encounters. This without a doubt bears influence on EBA developments, social complexity and urbanisation. Time-space compression, as Harvey (1989; see Chapter III, Section 3.3.3) discussed, has consequences on the economy and structure of societies. The intensified maritime spaces of the EBII-II, acted as a catalyst, as 'new' spaces, which, coinciding with a maritime technological ability grounded in a history of human engagement with the sea, altered social organisation and economies.

Urbanisation during the EBA is a subject of lively debate (Chapter II Section 2.6). Scholarship on the EBA Levant, however, struggles to characterise the transition from the EBI agglomerated villages to the EBII walled settlements, especially since the latter lacks any functional characteristics. In a recent publication, Greenberg and Paz (2016) evaluated the inception of street planning and conception at Tel Bet Yerah in light of its role in EBA urbanisation. They showed that the street system built on EBI practices but was not a mere extension of earlier traits. Rather, it was a new way of organising space (Greenberg and Paz 2016: 216), "*an intentional innovation that involved irreversible change in the organization of built space and of patterns of movement and interaction within it*" (Greenberg and Paz 2016: 197). This planning, accentuated by the beginning of site fortification during the EBII, suggests that a profound change in the conception and representation of space was unfolding. Indeed, such an alteration is not instant; rather it builds up over long periods. It is true that settlement design, organisation, pattern and economy all influence social complexity and urbanisation, but specifically the role of maritime space in this transition from the EBI to the EBII has been surprisingly unaccounted for. Harvey's time-space compression generates a feeling of the world 'speeding up', yet it also generates another experience of an expanding world and space. The maritime activities and relations, having intensified during the EBII, brought interactions and exchange closer to home. The world ran faster and space opened up; essentially, a mini globalisation was in place. But when such a process is manifesting, a parallel phenomenon on another fold of space surges: the desire for control, security, demarcating space, for territoriality, i.e. settlement fortification and organisation. Changes in spatial organisation and representation in turn affect technological developments, societal structure and economies and efforts for further world speeding and expanding. Whether the EBA situation can be termed urbanisation or not, since urbanisation is first a modern concept being used in an ancient context, is a distinct matter. Indeed there were changes that took place between the EBI and EBII-III. Chesson (2015) urges to drop the notion of 'urban' in EBA studies, suggesting that each site should be discussed in its own terms, yet the term has not been abandoned and Chesson herself returns to it repeatedly (Chesson and Goodale, 2014). Urbanisation has been profusely used in EBA narratives that to drop the term unanimously is hard to conceive of, yet, Greenberg and Paz (2016) put forward the first step in the right direction, a method, verb and process that this thesis builds on, that is space, conceived, represented and lived (Chapter III). Instead of EBA urbanisation, scholarly attention needs to be drawn to EBA space, space-time, spatial organisations and spatial representations, because space is not a container, it is made of relations that we as archaeologists seek to unravel. Only by turning to space can we appreciate the myriads of processes unfolding, interconnected and in parallel, all influencing one another and leading to a web of entanglement for which we only have access to limited aspects in the archaeological record. It is in the archaeological imagination, however, that that web of entanglements takes form and mutates; from that imagination, the EBA of the Levant rewrites itself.

CHAPTER VIII: CONCLUSION

In a recent edited volume about post-Braudelian approaches to the ancient eastern Mediterranean (Concannon and Mazurek, 2016), the authors suggest a path for archaeological Mediterranean scholarship that integrates Braudel's notable contribution as well as later Mediterranean theses alike Horden and Purcell (2003) and Harris (2005). The path is one of unstable geographies, of temporalities, inspired by Deleuze and Guattari's (1987) vision of spaces of flows, where things come together and fall apart, of a web of connections. Certainly, it is across the post-Braudelian corrupting sea that this thesis takes shape. The Braudelian Long Durée dictating geographical configurations and topographies, the conjuncture time of rhythms of currents and winds shaped by climatic changes over millions of years and the events of maritime activities brought by humans engaging with the sea, are bridged together in this thesis to reinstitute the importance of time to the notion of Mediterranean connectivity during the EBA, and to societal integration. This thesis does so by mediating folds of the manifolds of EBA space and time.

The Mediterranean Sea is recognised as a surface connecting places and regions (Horden and Purcell 2000: 123). Mediterraneanism spurs from the idea of an inner sea facilitating fractures and crossings. On the one hand, the sea links spaces and societies, and on the other hand, exchange and interaction between societies across the sea reproduce difference as societies transform whether they embrace or resist the other (Steinberg, 2014; Giaccaria and Minca, 2011). Mediterraneanism has been deployed as a metaphor around the world, such as in the Gulf of Mexico and the Caribbean and in the Arctic, where the idea was translated to suggest an underlying space of maritime unity, a space of crossings. Despite this instilled notion of the Mediterranean Sea, it is vital to remember that the sea is constructed of experiences, a material space encountered by practices (Steinberg 2014: 33). Hence, any perspectives that focus primarily on terrestrial communities in such a way that they are merely linked or divided by the Mediterranean Sea, without engaging with maritime space, are fundamentally incomplete. Thus, this thesis aimed to level the imbalance in EBA Levantine scholarship by targeting the signature of maritimity in the archaeological record and mediating the sea, not as a flat surface of connectivity but as an experienced, lived and conceived space and time embodied in the performance of seafaring. In doing so, the connectivity of the Mediterranean Sea during the EBA was proved rather than presumed, since that notion in itself is a construct of western thought and of later archaeological periods that may not have necessarily reflected the EBA situation.

This thesis embraced the methodology of thirding-as-othering via mapping. This mediation with mapping conforms to post-modern geographies and rejects a correspondence of truth theory as well as the concept of mimetic representations. Hence, the act of mediation is part of the past that is studied. There lies no objective real past about the EBA Levant that this research is trying to unravel, rather, via mediation, different perspectives and folds emerge not about the past but with the past and with mediation. On the impossibility of drawing a map of a theoretical empire on a 1 to 1 scale, Umberto Eco in his essay of this farcical deliberate attempt finds three corollaries: first, every 1 to 1 map reproduces the territory unfaithfully; second, the moment the map is produced, the empire becomes unreproducible; third, every 1 to 1 map of an empire decrees the end of the empire and therefore is the map of a territory that is not an empire (Eco, 1994: 95-106). It is from this understanding that the methodology of this thesis develops.

This research posed the question of how was maritime space lived and exploited on the Levantine coast during the EBA. To this end, an approach based on a relational, lived space, that bridges land and sea was put forth. By doing so, this research transcended the political division of the Levant into southern, central and northern, and broke from the tradition of focusing solely on one of those regions by taking the whole Levantine coast as a study area. This, not only has bearing on EBA studies, but on modern political geographies, urging to envision a porous space in place of rigid boundaries. Via the methodology of mediation with mapping, three pillars were set, of mapping land (Chapter IV), mapping maritime activities (Chapter V) and mapping the sea (Chapter VI). Mapping land has shown that the political division of the Levant does not conform to the daily rhythms of settlement interaction during the EBA. Furthermore, it has mediated the space-time of the Levant in various ways, each revealing one of the manifolds of spaces that EBA inhabitants were engaged with. Mapping maritime activities built on a consolidation of EBA direct and potential evidence for maritime practices. These have shown substantial evidence to confirm a maritime baseline, intensifying in the EBII-III. Evidence for maritime activities revealed bundles of intensity that must be accounted for in investigating EBA interactions and dynamics since coastal ecologies combined with long-term maritime interactions result, according to Gillis (2012), in coastal communities having more in common with each other than with the immediate hinterland. Knowledge of maritime interaction and practices remains limited, however, given the fragmented and uneven nature of the archaeological record. Yet, with more archaeological studies realising the importance of aquatic environments and maritime practices in understanding ancient societies, and with the current increase in coastal surveys and projects in the Levant, the near future will inevitably hold a finer and more balanced coastal archaeological record that will enhance our knowledge of EBA engagement with the sea.

Mapping the sea proposed a model for conceiving of the maritime space-time of seafaring, distorting space according to time in such a way that Cartesian representations lose ground and space takes on new forms induced by the performance of seafaring. The space-time representations of the Levantine Basin render an intangible space-time topography of the sea that may well have been experienced by ancient seafarers. The mapping of the sea, crucially, offers a heuristic tool with which archaeologists can study and mediate maritime spaces. On a practical and archaeological level, the space-time deformations provide insights into Levantine EBA connectivity, demonstrating the presence of a facilitated network of interconnectivity that bridges internally the whole of the Levantine littoral and externally binds it with Egypt, Cyprus and Anatolia. This facilitated network of interconnections finds ground in the archaeological record of the EBA Levant. Henceforth, EBA inhabitants were in tune to the rhythms of the sea and followed the natural cycles of connectivity.

The model and platform presented in this thesis for mediating maritime spaces expand our knowledge of the EBA Mediterranean, but it also has potential when deployed for other chronological periods and other spaces. The space-time model and resulting analyses were limited to the Levantine Basin, yet future work can benefit from expanding the study area to look at Mediterranean dynamics. This thesis offers an opportunity to incorporate time when evaluating Mediterranean connectivity; this inevitably alters our understanding of the Mediterranean, and how and why specific coastal archaeological sites and relations prospered and waned. Furthermore, in light of the results presented in this research, there is ample venues to explore in more depth specific case studies such as Byblos' connection with Egypt throughout the Bronze Age. Crucially, the results of this thesis, especially the closeness in sailing time Cyprus is to the Levantine basin, bid attention to the history of maritime movement between these two regions. This is a topic not yet widely explored but is of prime significance, particularly when we consider the role of the Levantine littoral, not only in the Bronze Age but in earlier periods, as one of the major corridors for the spread of humans out from Africa and the spread of farming to Europe.

In conclusion, the maritime signature of the EBA Levant as well as evidence for maritime connectivity influence our understanding of EBA complexity and urbanisation. The intensification of maritime activities and contacts during the EBII coincides with the emergence of settlement fortification and planning. Thus, the compression of space and time brought about by maritime endeavours inevitably affected the conception and representation of space on the Levantine coast. The role of maritime space is therefore evident and any EBA Levantine study of complexity and urbanisation, especially for the coastal area, must take it into consideration. This thesis has therefore re-instituted the role of maritime space in EBA narratives.

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APPENDICES

Appendix A: Metadata

Software	
Details	**Source**
ArcGIS 10.4	Accessed via the University of Southampton. All geospatial data was projected to coordinate system UTM Zone 36N.
Darcy 2.0	Open source software available at https://sourceforge.net/projects/jdarcy/?source=directory
Adobe Photoshop CS6	Accessed via the University of Southampton.
CorelDRAW x7	Accessed via the University of Southampton.
Gephi	Open source network analysis software available at: https://gephi.org/

Geographic Data		
Geographic Data	**Description**	**Source**
Coastline shapefile	High resolution vector layer of the world's coastline, based on the extension of the seas. Relatively small islands are included.	Free access acquired from the National Oceanic and Atmospheric Administration (NOAA).
Country boundaries shapefiles	High resolution vector layer of countries' boundaries. Specific administrative boundaries for Levantine countries.	Free access from the National Oceanic and Atmospheric Administration (NOAA), and DIVA-GIS platform (http://www.diva-gis.org/)
Inland water shapefiles	High resolution vector layer of inland water. Specific inland water shapefiles for Levantine countries.	Free access from the National Oceanic and Atmospheric Administration (NOAA), and DIVA-GIS platform (http://www.diva-gis.org/).
Digital Elevation Model (DEM) of the Levant	Shuttle Radar Topography Mission. Produced from a joint shuttle mission. C-Band and X-Band topographic radar systems were used i by (NASA) and the National Geospatial-Intelligence Agency (NGA), 30m resolution DEM tiles that were mosaicked.	Free access from USGS Earth Explorer (http://earthexplorer.usgs.gov/).
Bathymetry	Global Bathymetric Chart of the Oceans (GEBCO) bathymetry data, one-arc minutes resolution, corresponding to about 2km.	Free access from GEBCO platform (http://www.gebco.net/data_and_products/gridded_bathymetry_data/gebco_one_minute_grid/).
Wind speed and Direction	Raster data of 15km resolution for the Levantine Basin. Wind direction values in degrees. Speed values in knots.	Produced by the author, see Safadi (2016).
Mediterranean currents	Raster data for the Mediterranean Meridional (northward, V element) and Zonal (eastward, U element) currents at a resolution of 0.0625 degrees, about 7km.	Free access from COPERNICUS-Marine Environment Monitoring Service.
Mediterranean shipwrecks	Point data with coordinates for modern shipwrecks in the Mediterranean	EMODnet portal available at: http://www.emodnet.eu/geoviewer/#!/

Appendix B: Travel time

The method chosen for the computation of a friction surface rests on the Hiking function that was estimated by Gorenflo and Gale (1990) based on empirical data from Tobler (Tobler, 1993). The Hiking function calculates the velocity of walking in a landscape as a function of slope. Friction surfaces can be either isotropic or anisotropic. The friction map generated for this study is isotropic (independent of movement direction). Given the varied topographical features on the Levantine coast, an anisotropic surface is more suitable, which would account for walking time downhill and uphill. However, since this analysis is not fundamental for this thesis, rather it is evoked for the sole purpose of providing an estimate for walking time away from the coast, the isotropic analysis is sufficient. The Hiking formula is given by:

$$V = 6.0e^{-2.5|s+0.05|}$$

Where *s* is the slope map in percent divided by 100 and *V* is the velocity. Map algebra in ArcMap 10.4 was used to compute this function and transform the result (from Km/h to m/h) to generate a friction map that gives out a value for each cell in hour per meter.

See Appendix A for details on the DEM used to generate the slope surface.

Appendix C: Relative Topographic Position

Several methods exist in GIS to generate such a surface for the relative topographic position. The work of Marcus Llobera on topographic prominence in Yorkshire Wolds, 2001, builds on the relative topographic position analysis and is a pilot study in this regard. Llobera identified the local topography of archaeological features by the means of the elevation percentile (PCTL). PCTL, as defined by Wilson and Gallant (2000), measures the ranking of a central point relative to the DEM cell values in a predetermined neighbourhood. Hence, in Llobera's case, topographic prominence, in other words the elevation percentiles, was computed in different neighbourhoods of radius *r*. It thus allowed the exploration of the cultural landscape and the identification of the scale at which topographic prominence is attested. Similar studies that have targeted topographic prominence and other relative topographic indexes are those of Fairén-Jiménez (2007), Christopherson (2003), Bevan and Conolly (2002), and Roughley (2001).

Alternative methods of measuring the relative topographic position are also valid. PCTL calculations proved to be computationally disadvantageous according to De Reu *et al*. (2011), Llobera (2001) and Wilson and Gallant (2000), especially for large study areas. Accordingly, the analysis of the relative topographic position for the Levantine coastal zone will rely on the DIFF function derived from the DEM. The DIFF (difference from mean elevation), calculates the difference from the mean elevation of a central point in a predetermined neighborhood r (Wilson and Gallant 2000: 74). It produces a metric value that represents the exact difference in heights between the central point and the average elevation within the chosen neighborhood of radius r (see Figure 0.1). Hence, when the value is positive, it indicates that the central point is higher than the average mean in the selected neighborhood. Negative values signify a lower position of the central point from the mean elevation in the predetermined neighborhood. The scale of the neighborhood, as in any other spatial analysis study, is significant. Small scales will thereby highlight the difference between the central point and micro-topographic features. Large scales on the other hand denote major landscape units.

Method	Algorithm	Comment
Mean elevation (MEAN, $\bar{z}$)	$\frac{1}{n_R}\sum_{i\in R} z_i$	Calculates the mean (average value) of the cell values in a DEM, around a central point (z_0), within a predetermined neighborhood (R).
Elevation range (*RANGE*)	$\max_{i\in R} z_i - \min_{i\in R} z_i$	Calculates the range (difference between highest and lowest value) of the cell values in a DEM, around a central point (z_0), within a predetermined neighborhood (R).
Standard deviation of elevation (*SD*)	$\sqrt{\frac{1}{n_R-1}\sum_{i=1}(z_i-\bar{z})^2}$	Calculates the standard deviation (variability) of the cell values in a DEM, around a central point (z_0), within a predetermined neighborhood (R).
Percentile as percentage of elevation range (*PCTG*)	$100\frac{z_0-\min_{i\in R} z_i}{RANGE}$	The ranking of the central point (z_0), as a percentage of the elevation range (RANGE), within a predetermined neighborhood (R).
(Elevation) percentile (*PCTL*)	$\frac{100}{n_R}\text{count}_{i\in R}(z_i < z_0)$	The ranking of the central point (z_0), relative to the cell values in a DEM, within a predetermined neighborhood (R).
Difference from mean elevation (*DIFF*)	$z_0 - \bar{z}$	Calculates the difference between the central point and the mean elevation around this central point (z_0), within a predetermined neighborhood (R).
Deviation from mean elevation (*DEV*)	$\frac{z_0-\bar{z}}{SD}$	Calculates the relative topographic position of the central point (z_0), as the difference from the mean elevation divided by the standard deviation of the elevation, within a predetermined neighborhood (R).

Figure 0.1-Index of relative topographic analysis (from De Reu *et al.* 2011: Table 1. Adapted from Gallant and Wilson, 2000).

The radius for the generation of a DIFF surface is a metric value. However, since this research focuses on space and time, the time of travel on land must be taken into consideration. In fact, travel time can indicate the accessible land in the surrounding environment of EBA inhabitants within a daily rhythm of routine. Following from Chapter IV, Section 4.2 and according to Hägerstrand's restrictions on space-time processes, a window of 6 hours dedicated for transport/travel fits well daily rhythms of needs and activities. Yet how can we translate this time value to a metric figure that will allow characterising landforms according to their partaking in the immediate and accessible surrounding of the lived space of EBA inhabitants?

The friction surface generated as in Chapter IV, Section 4.2 denotes the hours per meter of walking. A cost surface that incorporates EBA sites and the friction surface as inputs can be produced in GIS. This cost surface then represents the cumulative time in hours away from EBA sites. The surface is a raster that was transformed into polygons each representing a one-hour interval. The DEM and the friction surface were clipped to the area that coincides with the 6 hours polygon. The clipped friction surface, divided by 1.0, represents the meter per hours of walking. Hence, the mean statistics of this surface provides us with the mean meter per hour of walking within a 6 hours window away from EBA sites. The mean statistics is rounded at 3km. This value can then be used as a radius to generate the relative topographic position.

The DIFF calculation in GIS is straightforward. Employing the Focal Statistics tool, a mean elevation surface is generated from the clipped DEM (Figure 0.2). Following that, using map algebra, the DIFF surface is computed by subtracting the DEM surface from the mean elevation surface.

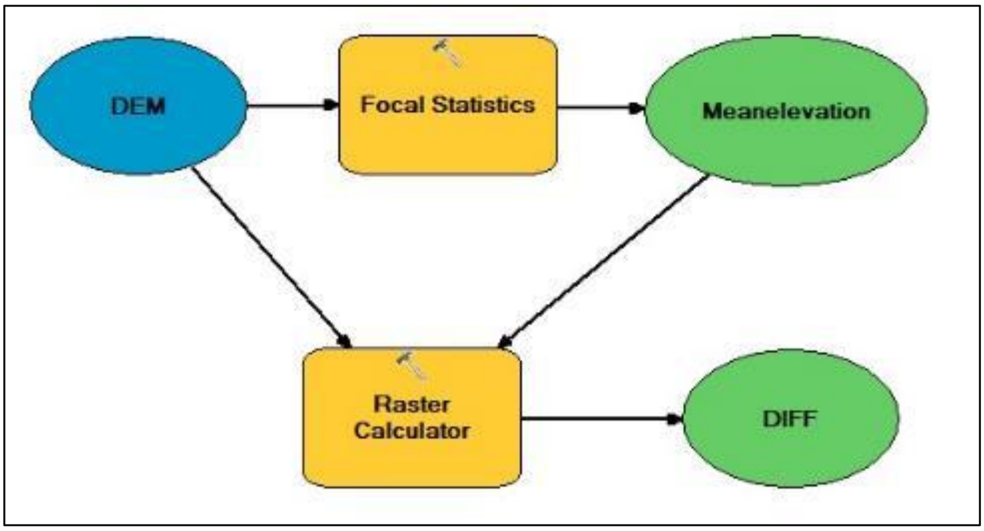


Figure 0.2- GIS model for the computation of the DIFF surface.

The DIFF surface was classified according to the standard deviation values. This method is based on Weiss (2001) and Tagil and Jenness (2008).The topographic Position Index (TPI) is another terminology that signifies the DIFF, the difference between the elevation at a cell and the average elevation within a predetermined neighbourhood. The DIFF or TPI values were used to classify landforms into slope position classes as per Figure 0.3. TPI values of ±1SD highlight ridges and valleys. Depending on the neighbourhood size, what appears to be a valley at a small scale might in fact be a small valley on a hilltop at a large scale of scrutiny. The DIFF values were classified according to Figure 0.3.

Class	Description	Breakpoints
1	ridge	> + 1 STDEV
2	upper slope	> 0.5 STDV =< 1 STDV
3	middle slope	> -0.5 STDV, < 0.5 STDV, slope > 5 deg
4	flats slope	>= -0.5 STDV, =< 0.5 STDV , slope <= 5 deg
5	lower slopes	>= -1.0 STDEV, < 0.5 STDV
6	valleys	< -1.0 STDV

Figure 0.3- Classification based on the standard deviation of the TPI (Weiss 2001).

Appendix D: EBA sites general information

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
1S	Amrit	N/A	Tell	Yes	N/A	N/A	Occupied from the end of the third millennium BC. Amrit is first of all known as a typical site of the Phoenician period in Syria.	N/A	35.91	34.84
2S	Qalaat ar-Rus	N/A	Tell	NO	N/A	N/A	N/A	Combed Ware, painted fragments, Red-Slipped Burnished Ware, Burnished Stone-Ware.	35.92	35.42
3S	Qalaat Syriani	Qal'at Siriani	Tell	NO	Traces of a low town quarter.	N/A	N/A	Flat base jars and Combed Ware.	35.92	35.61
4S	Ras Ibn Hani	N/A	Settlement-t	YES	N/A	EBA finds but none relate to a stratified layer. Occupation must have ceased since no material from the first half of the second millennium BC was found.	The main occupation is from the Late Bronze Age.	Broken EBA sherds, pots and jars. Must have covered the whole of the third millennium since the material is diverse.	35.74	35.59
5S	Rouesset al-Amir	Ruway-ssat al-Amīr	Tell	NO	N/A	Surface finds near the river. Artefacts were found because of a profile cut by the river.	N/A	Characteristic EBA pottery. EBI: Burnishing patterns, EBII: Khirbet Kerak Ware (KKW), EBIII: combed decorated jars similar to Ras Shamra.	35.87	35.56

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
6S	Tell Bisnada	Tell Sheikh Nabha-n	Tell	NO	N/A	N/A	N/A	Beginning of the third millennium BC: fragments of lustered yellowish ceramic. By the end of third millennium, the pottery is characteristic of the Syrian coast: flat bottom jars, various combing, horizontal vertical and oblique. Painted pottery with horizontal lines.	35.81	35.55
7S	Tell Bsayssa	N/A	Tell	NO	N/A	N/A	N/A	N/A	36.03	34.67
8S	Tell Daruk	N/A	Tell	YES	Stones and pebbles but no presence of structures.	No specific layers could be assigned to the EBA.	N/A	N/A	35.88	34.94
9S	Tell Jamous	N/A	Tell	NO	N/A	N/A	N/A	N/A	36.13	34.67
10S	Tell Laha	N/A	Tell	NO	N/A	N/A	N/A	N/A	35.97	34.69
11S	Tell Sianu	Tell Iyanu	Tell	Yes	Residential quarter from the end of the third millennium BC.	Densely occupied during the EBI with at least three phases of construction that testify to the importance of the site during that time. Absence of any evidence from 2250-2000 BC.	N/A	EBIV: Combed Ware, flat bottom jars, goblets.	36.01	35.36

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
12 S	Tell Simiryan	Tall Simāriyān, Abu 'Alī Tall	Tell	Yes	N/A	Traces of walls and floors. The stratigraphy is disturbed therefore the assemblage of artefacts probably represents Several hundred years of occupation within the EBA.	Several hundred years of EBA occupation but no stratigraphy was devised from the sounding carried out by Braidwood.	Caliciform series, teapots, assemblage of sherds with black wash. White reserved-slip wares. Combed impressed wares.	35.97	34.75
13 S	Tell Sukas	N/A	Tell	YES	Stone walls, scatters of stones, plastered mudbrick may have formed the upper part of the walls (mudbrick on stone foundation). Carbonised planks and wooden fragments in the vicinity of walls. Most planks were flat. One had an oval section, one with rounded sides and flattened surface (wooden plans are unusual to use as roof covering; hence the fragments must be part of furniture). Thin layer of decayed reeds or branches. Postholes. Possible town wall.	Houses usually indicated by rows of stones that are supposed to outline the bases for mudbrick walls.	N/A	Painted wares, slipped and burnished, hole-mouth jars, cooking pots, bowls, jars. GBW, Combed Ware, Syrian jug. Mottled Ware and Burnished un-slipped Ware (EBI-II). KKW	35.93	35.30

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
14 S	Ugarit	Ras Shamr-a	Tell	YES	The settlement begins to take on a truly urban character, complete with narrow streets and a rampart. The use of unbaked clay bricks in the architecture (Early Bronze Age I) gives way to the increasing use of stone, especially in defensive constructions. Lots of wood remain from the EBI. EBIII: walls, floors, streets and enclosures.	Two small streams run along the north and south sides of the tell; the Nahr Shbayyeb to the north, and the Nahr ed-Delbeh to the south. They meet to the west of the Tell to form Nahr al-Fidd, which runs into the bay of Minet el-Beida. The final phase of Level III (Level III A) corresponds to the Early Bronze Age.	Rash Shamra IIIA 1-3	Large combed jars, KKW, pithoi, pattern burnishing, goblets, bowls, and globular bowls.	35.77	35.60
1L	Aalma ech Chaab	N/A	Scatter	NO	N/A	N/A	N/A	Pottery scatter.	35.12	33.10
2L	Adloun III	N/A	Scatter	NO	N/A	N/A	N/A		35.28	33.40
3L	Aramoun	N/A	Scatter	NO	N/A	N/A	N/A	Abundant sherds of red, EBA Combed Ware in various patterns: criss-cross, smoothed after combing, similar to some found on Khan Khalde Tell; alternate vertical/horizontal combing in bands; rough and wide chevron design.	35.51	33.76

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
4L	Ard Ardousie	Tell Kastin-a	Tell	YES	N/A	Likely to have been occupied in the EBA, large mound known for prehistoric deposits. Completely covered by refugee village.			35.96	34.51
5L	Arde-Ardata	Ardé, Ardata	Tell	YES	N/A	N/A	N/A	EBA pottery, combed decoration.	35.91	34.41
6L	Bchemou-n	N/A	Scatter	NO	N/A	N/A	N/A	Sherds are of a thick, hand-made, well-fired red or grey ware, and thinner pink ware with lattice-burnishing. One lug-handle, various loop handles and rims were found. Material examined and dated to an early phase of EB by M. Dunand.	35.52	33.78

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
7L	Bey 003	Bey XIII	Occupatio-n	YES	EBII-III domestic structure. Possible EBA fortification system.	N/A	EBA II-III occupation	**EBII-III** pottery consisting of large platter type commonly found on the coast from north Syria to Palestine. Fragments of pithoi rims were also collected. Storage jars rims. **EBIII-IV:** platters, bowls and combed decorated sherds.	35.51	33.90
8L	Bey 013	N/A	Occupatio-n	YES	N/A	N/A	N/A	EBIV horizontal combed pottery.	35.51	33.90
9	Bey 020	N/A	Occupatio-n	YES	N/A	N/A	N/A	Combed pottery decoration.	35.51	33.90
10L	Bey 023	Bey XII	Occupatio-n	YES	Possible ancient watercourse (deposit)	Preliminary interpretation of an ancient watercourse. Presence of flint and ceramics in the deposit suggests an early date.	N/A	Flint and ceramic.	35.51	33.90
11L	Bey VII	N/A	Occupatio-n	YES	N/A	N/A	N/A	EBA Combed Ware.	35.50	33.90
12L	Bnaaful	N/A	Funerary caves	YES	N/A	N/A	EBIV site		35.41	33.48

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
13 L	Burj Hamoud	N/A	Funerary caves	NO	N/A	?	N/A	N/A	35.55	33.89
14 L	Byblos		Tell	YES	EBIA: installations scattered on the northern upper mound and southwest towards the sea. End of EBIA: the erection of the Enceinte Sacrée with its temenos and the flanking stone-paved street. At the end of the EBIA, the sacred compound is delimitated by a solid temenos. EBIB: new rectangular houses on top and in between circular architecture. Reconfiguration of the settlement into a town. Rectangular buildings around central courtyards.	N/A	EBI referred to as éneolithique recent by Dunand (1945, 1952, 1973) and époque proto-urbaines by Lauffray (2008).	EBIA: Pottery shapes inventory is comparable with EBI Palestinian traditions: bowls, one handled, and highlooped cups, two-handled jars and small globular jars. Jugs and jars are usually decorated by stroke bands on the neck/shoulders.	35.65	34.12
15 L	Jiita I	N/A	Cave	NO	N/A	N/A	N/A	Combed-ware sherd, similar to those found in the EBA levels at Byblos.	35.66	33.93
16 L	Kafer Jarra I (Gelal-en-Nammous)	N/A	Rock-cut tomb	YES	Open chamber tomb.	Open chamber in a cliff.	Material comparable to éneolithique Byblos.	Handmade ceramic vessels.	35.43	33.54
17 L	Kafer Jarra II (Roueisse)	N/A	Tomb/Sca-tter	NO	N/A	N/A	N/A	Combed ware.	35.43	33.55

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
18 L	Khalde II	N/A	Tell	NO	Remains of oval buildings possibly apsidal. A flat-based jar between two walls contained a child skeleton. The great quantity of sherds point to a large EBA settlement.	N/A	N/A	Great quantity of EBA sherds scattered over the mound. Incised EBA potsherds.	35.47	33.78
19 L	Lebea	N/A	Settlemen-t with many tombs	YES	Rock-cut chamber with two superimposed floors.	N/A	N/A	Sixty-one wheelmade ceramic vessels. Potmarks.Red slip on some pottery.	35.46	33.55
20 L	Naame	Khald-e IV	Scatter	NO	N/A	N/A	N/A	Pottery scatter.	35.46	33.74
21 L	Nahr Damour	N/A	Scatter	NO	N/A	N/A	N/A	Abundant EBA sherds. Combed red and grey ware- thick-walled, flatbased jars. Chevron and criss-cross patterns are identical to Byblos patterns.	35.46	33.70
22 L	Nahr Ibrahim	N/A	Scatter (one find)	NO	N/A	An Egyptian (?) bronze axe	N/A	N/A	35.65	34.06
23 L	Qaabrine	N/A	Settlemen-t	NO	N/A	N/A	N/A	EBA pottery.	36.03	34.57
24 L	Ras el-Kelb III	Nahr el-Kelb	Tombs/Ca-ve	NO	N/A	N/A	N/A	EBA pottery.	35.60	33.96
25 L	Sarafand-Baissariye	N/A	Settlemen-t and funerary caves.	YES	Settlement and funerary caves.	N/A	EBIV site.	N/A	35.32	33.45

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
26 L	Sarjbal	Sarğb-acl	Scatter (one find)	NO	N/A	A bronze idol was found in a field in the village or Sarjbal, with other prehistoric objects.	Potential EBA site (one find only).	N/A	35.52	33.68
27 L	Sidon (College Site)	N/A	Settlemen-t	YES	Mud-brick buildings, storage facilities. Timber house covers.		Six layers of occupation.	Bowls, jars and jugs, Hole-mouth jars, grey and red burnishing, red and black slip decoration and combed decorations. Cooking pots, lamps, Painted decoration in vertical and net-pattern. Incised decoration herringbone pattern. Twenty-two cylinder seal impressions, they appear on heavy pottery jars. Impressions include horned animals, lions and net pattern.	35.37	33.56
	Tell Arqa	N/A	Tell	YES	Stratified third millennium sequence. All the mudbrick houses had an upper story, supported by internal timber framework. All excavated structures belong to a dwelling quarter of densely built houses separated by a narrow street. All posts and main beams are of cedar, while different woods (e.g., oak and olive tree) were also used for the smaller rafters.		Level 18 is the earliest level. Phase S burnt down c. 2750 BC. Level 16 -between 2500 and 2400 BC- burnt down c. 2200 BC.	Cooking pots, storage vessels, bowls and platters. Phases S and R pottery (EBII-III) slender pattern-combed jars, spherical holemouth cooking pots. EBIV (Phase P) pottery includes large ovoid, horizontally combed and flat-bottomed jars with or without handles.	36.03	34.53

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
30 L	Tell Biri	N/A	Tell	NO	N/A	N/A	N/A	EBA sherds.	36.06	34.62
31 L	Tell Fadaous-Kfarabida	N/A	Tell	YES	Rooms and entire houses, beams for houses and roofs. Buildings separated by narrow streets. Mostly represent domestic units except for building 4, which is of monumental size (EBII-III). Massive bases for wooden columns in the corner of rooms and along the walls. Limestone walls and mudbricks. A flight of five stairs leading to upper rooms. Existence of upper stories.	N/A	Earliest settlement dates to the Chalcolithic/EBI. Tell inhabited during all of the EBA phases. EBIV only attested by sherds and fragments from pits.	Globular cooking pots. Cylinder seal impressions on jar handle and storage vessels. Four spouted lamp. Bowls for eating and drinking. Goblets with stump bases, bottles, and white-painted decoration on vessels.	35.65	34.22
32 L	Tell Hayat	N/A	Tell	NO	N/A	N/A	N/A	EBA pottery.	36.00	34.56
33 L	Tell Hmeira	N/A	Scatter	NO	N/A	N/A	N/A	EBA sherds.	36.08	34.62
34 L	Tell Khan Khalde	N/A	Tell	YES	N/A	N/A	N/A	N/A	35.50	33.83
35 L	Tell Kirri	N/A	Tell	NO	EBA deposits near the base of the Tell.	N/A	N/A	EBA pottery consisting of inverted-rim platter fragments, strongly combed sherds and others lightly combed in criss-cross or circular patterns, and a painted (red on cream) sherd.	36.04	34.60

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
36 L	Tell Koubba	Koubb-a II, Ras Qubba, Kubb-ah 1	Tell	YES	Little associated architecture (EBII). Substantial architecture from EBIII and potentially EBIV. In situ vats and stone installation. Industrial area.	Settlement shifts 500m inland during the EBIII.	N/A	Platter bowls. Cylinder seal impression. Combed Ware pottery.	35.66	34.27
37 L	Tell Maashuq	N/A	Tell	NO	N/A	N/A	Potential EBA site.	EBA sherds?	35.22	33.27
38 L	Tell Rachidiyeh	N/A	Tell	YES	N/A	N/A	N/A	EBA deposits.	35.22	33.24
39 L	Tell Sabael	N/A	Settlemen-t	NO	N/A	N/A	N/A	EBA pottery.	35.99	34.51
40 L	Tibnin	Tibnīn	Scatter	NO	N/A	N/A	N/A	Pottery scatter.	35.41	33.19
41 L	Tyre	N/A	Settlemen-t	YES	In stratum XXII, a corner of a building was found in area IC 11A, consisting of the two walls, built of large stones, and associated to a plaster floor. Stone slabs seem to represent pillar bases. Other walls seem to be associated to the same building.	Pottery was found immediately on the bedrock which was reached at a level of 60 to 100cm asl.	Based on pottery correlations, it seems that Tyre was first occupied sometime after 2900 BC.	Pottery of Strata XXVII-XXI can be dated to the EBAII-III. The pottery of strata XX and XIX shows clear EBIV characteristics such as teapots, amphoriskoi and envelope ledge handles. Metallic Combed Ware jars, inverted rim bowls, sherds of hole-mouth jars.	35.20	33.27
42 L	Wadi Halloueh	N/A	Scatter	NO	N/A	N/A	N/A	N/A	35.64	34.18
43 L	Wadi Limoun	N/A	Tombs	YES	N/A	N/A	EBIV site	EBA pottery.	35.47	33.53

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
44L	Zahrani I	N/A	Scatter	NO	N/A	N/A	N/A	EBA combed ware.	35.37	33.45
45L	Anfeh	N/A	Settlement	YES	N/A	Actual settlement not identified yet.	EBII-III	EBA pottery, Combed Ware.	35.73	34.36
1P	(59) Map-Atlit-26	N/A	Quarry	NO	N/A	N/A	N/A	EBA Pottery.	34.95	32.72
2P	(95) Map: Atlit-26	N/A	Scatter	NO	N/A	N/A	N/A	EBA Pottery.	34.98	32.70
3P	Abu edh Dhahab (M*)	N/A	Scatter	NO	N/A	Large pottery scatter (20 dunams), on broad hillrock east of the alluvial plain. Surface finds include no structural remains, because of deep ploughing.	EBIA, EBIB, EBII-III	Two significant EBA sherds of crumbly clay with red slip, similar to EBIB ware, bearing stamps of a cylinder seal. Grey Burnished Ware (GBW), Holemouth jars, pithoi.	35.15	33.04
4P	Abu el Hubban (M)	N/A	Scatter	NO	N/A	Pottery scatter on the slope of a hill descending west to Nahal Natuf (currently in cultivated area). Site severely damaged by later quarrying activity.	N/A	EBA Pottery.	34.96	31.97

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
5P	Ain Umm Hmeid (M)	N/A	Scatter	NO	N/A	N/A	N/A	EBA Pottery	35.20	32.77
6P	Ashqelon, Afridar (west)	N/A	Settlement	YES	EBI houses in the southern zone of Area G were built on the southeastern slope of the kurkar hill. Circular stones buildings of the EBI (later phase) made out of Kurkar probably set into mud mortar. Earlier EBI mudbrick structures.	All bricks identified at this site were of local, sandy, yellow-brown soil, with no evidence for the use of vegetal temper. Evidence of copper working industry.	EBIA, EBIB	Egyptian wine jar Fragment. Pottery typical of EBI.	34.56	31.68
7P	Azor	N/A	Settlement	YES	Shaft tombs.	N/A	Finds in tomb date to EBI and EBIV.	GBW, EBA decorated pottery.	34.80	32.03
8P	Bareqet	Et Tierh (S); Et Tierh (M)	Settlement	NO	N/A	N/A	N/A	EB pottery.	34.97	32.02
9P	Bet 'Uziel (West)	N/A	Scatter	NO	N/A	A site located on an alluvial plain where flint, pottery sherds and numerous river pebbles are spread across an area of c. 1 dunam.	N/A	EBA Pottery.	35.16	32.97
10P	Bet Ha`emeq Site	T. Beth ha-Emeq	Settlement	YES	Possible indication of EBA city wall. Two buildings were exposed with one end being round, apsidal buildings, or elliptical. A silo lined up with stone slabs.	Site connected to the EBA burial cave located 300m west.	EBIA, EBIB, EBII. Apsidal building dates to the transition between the EBI and EBII. The silo dates to the EBII-III.	Holemouth jars, pithos, bows, metallic bowls. Stamped impressions on metallic jar.	34.89	31.87
11P	Bir et-Tata (Mül)	N/A	Settlement	NO	Structural remains.	N/A	N/A	EBA pottery.	34.98	32.58

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
12 P	Dhaharat el ‘Ein (M)	N/A	Stone heap	NO	Circular stone piles.	N/A	N/A	EBA pottery.	35.09	32.55
13 P	Ein Hevraya	Ein el Hawwara (M); Huwârah (S)	Settlemen-t	NO	N/A	Remains of an ancient hilltop settlement.	N/A	EBA pottery.	35.18	32.72
14 P	El Khirba (M)	N/A	Settlemen-t	YES	N/A	Remains of settlement on rocky hill.	N/A	EBA pottery.	34.95	32.00
15 P	En Besor	N/A	Tell	YES	Four occupational strata have been exposed. Earliest dated to end of EBI (by the time Site H was deserted). Sun-dried bricks laid directly on the ground without stone foundations typical of local architecture (Building A). Dimensions of bricks are uncommon but identical to those in Egypt during the First Dynasty. Stone foundation of walls.	Three settlements existed during the EBI at en besor oasis (north and south of the springs). En Besor mainly EBIB (stratum III mainly Egyptian occupied at the end of EBI and did not continue into the EBII).	EBIB, EBII-III	All the pottery vessels (excluding some local EBA hole-mouth jars which have been found in Stratum III seem to be of Egyptian origin (Egyptian types); some are typical of the Archaic Period (Dynasties I-II): storage jars, cylindrical jars, bag-shaped jars, and the so-called "baking bowls".	34.49	31.31
16 P	En Qedem	En Qedem (151)	Scatter	NO	N/A	Rock-cuttings and installations (c. 25 dunams) on rocky slope: vats, cupmarks, shallow depressions and scatters of flint tools and potsherds.	N/A	EBA Pottery.	34.99	32.76

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
17 P	Esh Sheikh Suleiman (M)	Kh. es Sulimân (S); Ch. Sheikh Sliman (Mül)	Settlemen-t	NO	Remains of six oval structures preserved two courses high.	N/A	N/A	EBA pottery, holemouth jars.	34.99	32.76
18 P	Even Yizhaq (Gal'ed) (northwest)	N/A	Stone heap	NO	Stone-built installations.	N/A	N/A	EBA pottery.	35.07	32.56
19 P	Givatayim	N/A	Funerary caves	YES	One burial cave dating to the EBI. Reused caves from the Chalcolithic.	N/A	EBI	EBA pottery.	34.81	32.07
20 P	H. Merar	El Mughar (S) , al-Magh-ar	Funerary caves/tom-b	YES	Shaft tomb, burial cave.	Round and ovoid shaft tombs, EBA sherds next to it. Cemetery for a settlement during the EBA.	EBAI?	EBA pottery.	34.78	31.84
21 P	H. Nemal Akhziv	N/A	Settlemen-t	YES	EBA occupation layers.	Severely damaged by sea waves.	N/A	EBA Pottery.	35.10	33.04
22 P	H. Tafat (north)	Kh. el Mazra'a (M); El Mezrah, Kh. el	Settlemen-t	NO	Remains of buildings constructed of large stones.	N/A	N/A	EBA Pottery.	34.93	32.60

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
		Mezrah (S)								
23 P	H. Zeror	Kh. Musrāra (M); Kh. Mustarah (S)	Settlemen-t	NO	Many building stones scattered across the surface.	N/A	N/A	EBA Pottery.	35.14	32.69
24 P	Ha-Bonim (west)	N/A	Rock-hewn installatio-n	NO	Rock-hewn installation. Rectangular vat approached by a channel. During high tide, the vat fills up with sea water.	N/A	N/A	EBA Pottery.	34.92	32.64
25 P	Holon 5	N/A	Settlemen-t	YES	Sections of walls built of kurkar stones and pits filled with pottery sherds were found at the site. Remains of mudbrick construction.	N/A	EB	EBA pottery.	34.76	32.00
26 P	Holot Ashdod	N/A	Scatter	NO	N/A	Pottery scatter (c. 0.5 dunam) in area of sand dunes.	EB?	EBA pottery.	34.64	31.76
27 P	Holot Ashqelon	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.57	31.65
28 P	Holot Karmiyya	N/A	Settlemen-t	NO	Remains of structure built with kurkar.	N/A	N/A	EBA pottery.	34.54	31.60

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
29 P	Horbat Gilan (west)	Khirbat Ghilānīya (M) (west)	Funerary caves/ Rock-hewn installations	YES	Rock-hewn installations and burial caves.	Stone piles, a cave and potsherd scatter on the site.	N/A	EBA pottery.	35.03	32.48
30 P	Horbat Sibkhi	Khŭrbet el ’Abharîyeh (S)	Settlement	YES	N/A	Rock-hewn cave, stone piles.	N/A	EBA pottery.	35.07	32.54
31 P	Jaffa	Tel Aviv, old Yafo	Tell	YES	N/A	N/A	EBI	EBA pottery.	34.75	32.05
32 P	Jaljulye	N/A	Tell	YES	N/A	N/A	N/A	EBA pottery.	34.95	32.15
33 P	Jazirat Dawud (M)	N/A	Tell	NO	N/A	N/A	N/A	EBA pottery.	35.03	32.59
34 P	Kafr Qasim	N/A	Settlement	YES	N/A	N/A	N/A	EBA pottery.	34.97	32.12
35 P	Kefar Glickson	N/A	Settlement	YES	N/A	A rock-hewn tomb used in the Early and Intermediate Bronze Age.	N/A	EBA pottery.	35.01	32.51
36 P	Kefar Ha-No‘ar Ha-Dati	N/A	Rock-hewn installations	NO	N/A	Rock-hewn installations and burial caves. Rock-cuttings.	N/A	EBA pottery.	35.09	32.74

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
37 P	Kefar Rosh ha-Niqra	Kh. el Mecherfi (G); Kh. el Musheirefeh (S); Et Tabaiq (M*)	Tell	YES	EBI buildings. Large rock surfaces such as floors, cobbled terraces. Course of stone and mudbrick. EBII: a fortified gateway. Walls protected the eastern access. Main building is square. Rock hewn tomb South of the mound.	Stratified settlement. After the destruction of the fortification, the site was abandoned and never reoccupied.	EBIA, EBIB, EBII, EBIII	EBI: Coarse storage vessels, hole mouth jars, decorated lug handles, loop handles. EBII-III: Khirbet Kerak Ware	35.12	33.08
38 P	Kfar Bara (1)	N/A	Tell	NO	N/A	N/A	N/A	EBA pottery.	34.97	32.13
39 P	Kfar Monash	N/A	Finds	NO	N/A	A hoard of metal objects hidden just below the surface of the ground. No other finds were discovered.	N/A	N/A	34.92	32.35
40 P	Kh. Belas (s)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.64	31.71
41 P	Kh. Burnat (northwest)	N/A	Tell	NO	N/A	N/A	N/A	EBA pottery.	34.96	32.01
42 P	Kh. el Bornat (S)	Kh. Burnat (M)	Settlemen-t	NO	N/A	N/A	N/A	EBA pottery.	34.96	32.01
43 P	Kh. el Musalla (M)	Kh. el Msalle	Settlemen-t	NO	N/A	Remains of a settlement.	N/A	EBA pottery.	34.63	31.70
44 P	Kh. Kafr Hatta	N/A	Scatter	NO	N/A	Scattering of flint implements and sherds on slopes.	N/A	EBA pottery.	34.96	32.12

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
45 P	Kh. Shallala (M)	Kh. Shallâl-eh (S)	Tell	NO	N/A	Pottery scatter, caves and city gate built of stone (not necessarily EB)	N/A	EBA pottery.	35.01	32.73
46 P	Kh. Shefeya	Shefei-a (S); Kh. Shefey-a, Kh. Shefei-ya (M)	Settlement	YES	Wall segments, burial cave.	N/A	EBII, EBIII	EBA pottery.	34.97	32.59
47 P	Lod	Ludd (S); Lydda (M)	Tell	YES	Floors and walls, occupation layers. In Area I: Stratum III, IV, V, VI. Mudbrick wall (impressive architecture-stratum III).	N/A	EBIB in area I.	Holemouth jars, candle bow, pantry bowl, hemispheric bows, red slipped holemouth jars, Pithoi, chalices, amphoriskoi, pierced pillar handles, painted sherd. Egyptianised: wine jars. Storage vessels with a gutter, bread moulds.	34.90	31.96
48 P	Me'arat Ornit	Esh Sheikh Sulei-man (M); 'Arak - esch - Sheikh (Mül)	Cave	YES	N/A	N/A	N/A	EBA pottery.	34.99	32.76
49 P	Mizpe Zevulun	Kh. el-Mush-eirifa (M)	Tell	NO	N/A	N/A	EBI, EBII	EBA pottery.	35.21	32.75

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
50 P	Naḥal 'Ada	N/A	Stone heap	NO	N/A	N/A	N/A	N/A	35.05	32.53
51 P	Naḥal Besor (38)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.48	31.30
52 P	Naḥal Besor (44)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.49	31.30
53 P	Naḥal Besor (52)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.49	31.30
54 P	Naḥal Besor (70)	N/A	Scatter	NO	N/A	N/A	N/A	N/A	34.49	31.27
55 P	Naḥal Besor (71)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.49	31.28
56 P	Naḥal Besor (77)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.50	31.28
57 P	Nahal Besor (Site H)	Site H	Settlemen-t	YES	All building remains were almost eroded and washed out. The site's size is 50 dunam.	Gesher HaBesor was first located and excavated in the 1930s; it was termed 'Site H' or 'Shell al Bridge'.	EBIA	Bag shaped Jar of Egyptian type. Mixture of Egyptian and local techniques. Rope decorated holemouth jars and juglets and ledge handled jars.	34.49	31.31
58 P	Nahal Bet Arif' (102)	N/A	Rock-hewn installatio-n	NO	N/A	N/A	Deserted around the end of the EBI.	EBA pottery.	34.95	31.99
59 P	Nahal Bet Arif' (125)	N/A	Cave	YES	N/A	Served as burial in the chalcolithic but converted into a dwelling during the EBI, deserted later on in this period.	N/A	EBA pottery.	34.94	31.99

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
60 P	Nahal Bet Arif' (126)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.94	32.01
61 P	Nahal Daliya	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.92	32.59
62 P	Nahal Lakhish (105)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.67	31.76
63 P	Nahal Maharal (2)	N/A	Scatter	NO	N/A	N/A	N/A	N/A	34.93	32.66
64 P	Nahal Maharal (36)	N/A	Scatter	NO	N/A	N/A	N/A	N/A	34.98	32.65
65 P	Nahal Nevallat	N/A	Tomb	NO	N/A	N/A	N/A	EBA pottery.	34.98	31.98
66 P	Nahal Oren	N/A	Scatter	NO	N/A	N/A	EBA scanty evidence.	N/A	35.02	32.72
67 P	Nahal Qana (3)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.91	32.15
68 P	Nahal Saflul	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	35.08	32.56
69 P	Nahal Shiqma (121)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.52	31.60
70 P	Nahal Shiqma (198)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.54	31.58
71 P	Nahal Siyah (51)	N/A	Cave	YES	N/A	Burnt layer with EBA pottery.	N/A	EBA pottery.	34.97	32.80
72 P	Nahal Soreq (south)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery?	34.77	31.83

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
73 P	Nahalal	N/A	Cave	NO	N/A	N/A	N/A	EBA pottery.	35.20	32.70
74 P	Nizzanim	Holot Ashdod (2)	Settlemen-t	YES	Floor, pits, installations, walls. Three child burials in jars.	The site was first settled at the beginning of EBIA, it was deserted following the EBIA to be resettled again some 700 years later in the EBIII.	EBI, EBIII	Two rims of KKW, red slipped juglet, ledge-handled jars, storage jars, pithos, holemouth jars.	34.62	31.74
75 P	Oshrat 2	N/A	Cave	YES	N/A	N/A	EBI, EBII	EBA pottery.	35.16	32.97
76 P	Palmahim	N/A	Settlemen-t	YES	Several broadrooms, round storage facilities possibly silos, walls, rectilinear building.	Occupation of short duration. Burial cave used only once.	EBI	GBW, Holemouth-jars, pithoi. Two serekhs bearing Egyptian elements. A hybrid pithoi with a complete serekh incised before firing. The pithoi is of local clay. From the cave: 14 pottery vessels including bowls, amphoroski, jars with pillar spouts and a tea pot, holemouth jar and jugs (globular type with two handles).	34.69	31.91
77 P	Qannir (M)	Kannîr (S)	Settlemen-t	YES	N/A	N/A	N/A	EBA pottery.	35.03	32.53

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
78 P	Qiryat Ata (72)	Kefar Ata; Kufritta (M)	Settlemen-t	YES	Mudbrick, limestone boulders. Rooms, installations: kiln. Settlement with a courtyard.	Remains of a large settlement attributed to an early phase of the EBI, covered by sparse remains of a settlement dating to EB II–III. EBIB settlement was built with a preconceived plan.	EBIB, EBII	EBIB: bowls, kraters, Jars, holemouth jars, rope decorated fragment, stopper. Three late GBW bowls. Dominance of Metallic Ware in the EBII. Classic combed metallic ware. Main non-metallic ware are cooking pots of short-necked type. EBII Metallic Ware typical, zoomorphic figurines, copper axeheads, North Canaanite metallic ware.	35.11	32.80
79 P	Ramat Ha-Nadiv	N/A	Settlemen-t	YES	N/A	Cairn field and burial ground.	N/A	EBA pottery.	34.94	32.54
80 P	Rujm el Bahta (M)	N/A	Stone heap	NO	N/A	N/A	N/A	EBA pottery.	35.05	32.57
81 P	Saknat Muhamm-ad Mahmud (southwes-t)	Jabalīya (M) (south west)	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.52	31.63
82 P	Sheikh Baraz ed Din (S)	Esh Sheikh Buraz-ed Din (M)	Tomb	NO	N/A	N/A	N/A	EBA pottery.	34.96	32.08

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
83 P	Shoham	N/A	Settlemen-t	YES	Domestic reuse of the late Chalcolithic caves during the EBI (c.3250–3100 BC).	Caves used as food storage rather than dwellings during the EBI. Sparse remains dating to the EBIV.	N/A	GBW, Holemouth jars. Carinated and hemispherical bowls (typical EBI domestic assemblages). Red-slipped bowls, storage jars with rope decoration, short-necked jars, and red-burnished jugs. Combed jars on the upper part of the body or the based.	34.95	31.99
84 P	Taur Ikhbeineh	N/A	Settlemen-t	YES	Stratified occupation with remains of architecture and installations. Fills, floors and burials (the latter from the EBIV).	N/A	N/A	Typical Canaanite pottery including painted Ware, hole-mouth jars, burnished jars, and Egyptian types and imports (Polished Red and Rough Faces).	34.42	31.44
85 P	Tel Akko	N/A	Tell	YES	N/A	N/A	N/A	N/A	35.08	32.92
86 P	Tel Aphek	Antipa-tris (S) (M); Qal'at Ras el 'Ein (M)	Tell	YES	Remains of a city wall, and adjoining structures, dating to the late EBI.	Peacefully abandoned During the EBII.	EBI, EBII		34.93	32.11
87 P	Tel Ashdod	Esdûd (S); Isdud, Sdud (M)	Tell	YES	N/A	N/A	N/A	EBA Pottery (scanty).	34.66	31.76

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
88 P	Tel Assawir	Tell Esur 1, En Assaw-ir	Tell	YES	Cave, capacious chambers intended as repositories for bones of multiple successive burials.	Recent salvage excavations south of the Tell unearthed a sequence of Neolithic, Chalcolithic and EBI occupations. Exploration in a cemetery to the east of these settlements revealed four cave tombs ranging from a late phase of EB I into EB II. Potsherds were found indicating that a settlement existed on the site from the Late Chalcolithic or EBI.	EBI, EBII.	GBW. Jugs with high look handle, red-burnished jug.	35.02	32.48
89 P	Tel Burga	Kh. Tell el Bureij (M); El Bureij (S)	Tell	YES	Golani (2011: 70)Intermediate Bronze Age were discovered following deep plowing in the eastern portion of the site, attesting to a settlement from this period within the confines of the enclosure.	The majority of the finds were ascribed to MB II; Chalcolithic and Early Bronze artefacts were mixed with chalk material brought to the site for the construction of the rampart and apparently derive from a settlement, several kilometres to the east. EBIV material were discovered following plowing in the eastern portion of the site, attesting to a settlement from this period within the enclosure.	EBIV	EBA Pottery.	34.97	32.52

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
90 P	Tel Dalit	Kh. Ras ed Daliya (M)	Tell	YES	Whole settlement/town with fortification walls and a gate. Area A: structural remains in Tumulus (EBIII). Broadroom with floors, curvilinear building with floor (EBII). EBIA-B (stratum V) earliest occupation in Area B, artefacts on uneven bedrock .Earliest fortification built on the debris of stratum V. Substantial fortification wall (elevation 4.4m), a gate with stones rising two courses. The curvilinear house has a flagstone platform in the corner and a pillar base in the centre. Domestic houses, Tumili may indicate public spaces.	Peacefully abandoned During the EBII.	EBI, EBII, EBII. Fortified during the EBII.	Small bowls, carinated pottery. Holemouth Jars, pithos, juglets and amphorisko. The EB I-II ceramic repertoires present a picture of an intermingling of both northern and southern ceramic elements.	34.97	31.98
91 P	Tell edh-Dhahab	N/A	Tell	NO	Sections of walls and a scatter of building stones and pottery.	N/A	N/A	EBA pottery.	34.93	32.14
92 P	Tel 'Eran	Umm el Khurū-s (M); Umm el Kharu-s (S)	Tell	YES	N/A	N/A	EBI	EBA pottery.	35.03	32.51

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
93 P	Tel Erani	N/A	Tell	YES	Mudbrick walls. Massive buildings, rooms. EBI: large and complex constructed of thick brick walls, two stories high. Courtyard. Massive fortification walls.	Nine strata dated to the EBI, a significant period in the history of the site. As archaeological understanding stands, the site became the main administrative centre of the Egyptian 'colonization' of the coastal plain.	EBI, EBII-III	Holemouth jars, bowls, beakers, juglets. Egyptian and egyptianised pottery in three forms: Canaanite shapes with Egyptian finish; vessels displaying Egyptian forms sometimes having a Canaanite type of plastic ornamentation; Egyptian shapes with Canaanite type clay.	34.78	31.63
94 P	Tell es-Sakan	N/A	Tell	YES	Fortification, domestic houses and installations. Construction similar to the Egyptian style with bricks, silos and circular structures.	The site's location on the south bank of Wadi Ghazzeh (Nahal Habesor), quite near the coast, as well as its size, would have made it a likely port or at least a place to stop for coastal maritime activity. It may have served as a centre for the distribution of Egyptian and Egyptianized materials to sites further north, perhaps by sea. Phases of occupation: an Egyptian phase (strata 9 to 6) characterised by an exclusively Egyptian material culture of the Late Predynastic Period, late EBIB; and a Canaanite phase (strata 5 to 1) EBIII.	Occupation at the site dates to 3500-2350 BCE. The site seems not to have been settled in EB II.	EBI pottery greatly egyptianised (very little EBI local pottery types) Egyptian pottery is of local production. Bowls, wine jars (imported from Egypt). Pithoi Jars (EBIII). Pottery with *serekh.*	34.41	31.48

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
95 P	Tel Gerisa	Tel el Jarish-a; Tell Jerishe	Tell	yes	Structural remains and pottery were discovered in the centre of the western part and in the southern part of the mound.	N/A	EBIII	EBA pottery	34.81	32.09
96 P	Tel Gezer	Tell el-Jazari	Tell	YES	Caves, shaped for dwelling, (Field I, Cave 3A dates to the EBA), the cave was used mainly as a kitchen or pantry.	Much of the area in the site was inhabited already at the beginning of the EBA. Most of its residents lived in caves in the early phase of the period. Excavators were unable to locate the city wall from this period. In the twenty-eighth c. BC, the site was abandoned.	N/A	Ovoid storage jars, Holemouth jars, amphorae, holemouth kraters, globular bowls.	34.92	31.86
97 P	Tel Gimzo	Jimzu/ Jemus-u	Tell	NO	Fortification	N/A	EBI, EBIII	EBA pottery.	34.95	31.93
98 P	Tel Hesi	N/A	Tell	YES	The EBA III occupation is evidenced in several fields and includes several occupational phases and fortification walls. Domestic dwellings with local workshops, cooking areas and courtyards. Hearths, ash with broken pottery and charcoal fragments of bone suggest cooking areas located in the EBA courtyards of Field VI. Extensive building repair found at the site.	Tell el Hesi thrived as an agricultural grain producing centre for the southern Levant. The acropolis served for storage and redistribution for the inhabitants of the Tell. Coinciding with the collapse of the southern Levant, Tell el Hesi was abandoned throughout the Middle Bronze Age and Late Bronze Age.	N/A	N/A	34.73	31.55

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
99P	Tel Kabri	N/A	Tell	YES	Floor, fills and tombs, curvilinear buildings, curved walls and partition walls. Courtyard, crushed chalk floors. Limestone column bases, Jar burial. Technique of construction: three courses of large fieldstones, topped by several courses of medium-sized fieldstones and mudbrick superstructure varying in width 0.8-1m. Rectilinear structures. Column bases in the buildings of the EBIA-B.		EBI,EBII-III	GBW, red-slipped and burnished vessels, jugs, holemouth jars, storage jars, teapots, amphoriskoi, Metallic Ware. A cross incised beneath the handle appears mainly on holemouth jars (EBI). Incised lines on the shoulder of storage holemouth jars (EBII). Abydos jugs. KKW.	35.14	33.01
100P	Tel Kurdana	Afeq (Kurda-na)	Tell	YES	It is impossible to estimate the settlement size during the EBA since the site was massively built over in later periods.	Burial caves mainly Middle Bronze Age.	N/A	Holemouth jars. Jars, goblet fragment.	35.11	32.84
101P	Tel Lachish	Tell ed Duwei-r (S), Lachis-h (Tell ed Duwei-r) (M)	Tell	YES	Extensive settlement and fortifications. Remains of EBA city revealed.	N/A	EBI, EBII, EBIII	EBA pottery.	34.85	31.57
102P	Tel Malot	N/A	Tell	YES	EBIV tombs and cist graves.	N/A	EBIV/IB	Jar, juglets.	34.87	31.85

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
103P	Tel Megadim	Magadim Well,; Tell Sahar	Settlement	YES	Unwalled EBI settlement. Curvilinear and rectangular buildings, exterior corners. In addition, a circular towerlike structure was exposed. The EBIV architecture was feeble compared to the relatively massive walls from EBIB. From the EBIV a pottery kiln with a central pillar was discovered.	N/A	EBIA, EBIB, EBII, EBIV	GBW. Flat-based, bow-rim storage jars.	34.95	32.72
104P	Tel Poran	Tell el Farāni (M); Tellûl el Ferâni (S)	Tell	YES	A segment of a mud-brick fortification wall and a pit dating to the EB III. The fortification wall was strengthened by a leaning buttress.			Red slipped bowl, cooking pots, jar, and pithos.	34.62	31.71
105P	Tel Qana	Tell el Mukh-mar (S) (GL)	Tell	YES	N/A	N/A	N/A	EBA pottery.	34.89	32.13
106P	Tel Qashish	N/A	Tell	YES	Buildings with rounded-corners (EBI). Several dwellings arranged on both sides of an alley. Fortification wall (EBII) Potential water reservoir system (EBII). Fortification goes out of use at the end of EBIII.	The mound is strategically located on the main route that cuts across the Jezreel Valley from southeast to northwest.		Holemouth jars, storage jars, bowls, cups, ledge handle, krater, incised potter's marks (EBI domestic pottery). Red slipped metallic vessels, GBW in high percentage. Cylinder seal impression (EBII), combed metallic ware.	35.11	32.69

ID	Site	Other Names	Type	Exc.	Architecture	Description	Chronology Notes	Pottery	Grid X	Grid Y
107P	Tel Re'ala	Tell Ghalta (M); Tell Ghalta-h (S)	Tell	NO	Abundance of ashlar stones and stone wall foundations. To the north, a collapse of brick structures.	N/A	N/A	EBA pottery.	35.17	32.68
108P	Tel Yoqne'am	Tell Qamu-n (M); Kh. Kaimu-n (S);	Tell	NO	EBA tombs west of the tell.	N/A	N/A	EBA pottery.	35.11	32.66
109P	Tel Zefi	Khŭrbet Sitt Leila (S); Khirba-t es Sitt Leila (M)	Tell	YES	N/A	N/A	N/A	EBA pottery.	35.00	32.53
110P	Yad Rambam (North)	N/A	Scatter	NO	N/A	N/A	N/A	EBA pottery.	34.89	31.91

Appendix E: Direct maritime-related evidence

ID Code	*Site Name*	*Coastal rocks*	*Fish remains*	*Shell remains*	*Turtle remains*	*Hippopotamus remains*	*Anchors*	*Other*
13S	Tell Sukas	-	-	x	-	x	-	-
14S	Ugarit	-	x	x	-	-	-	-
3L	Aramoun	x	-	-	-	-	-	-
14L	Byblos	x	x	-	-	-	x	-
18L	Khalde II	x	-	-	-	-	-	-
26L	Sarjbal	-	-	-	-	-	-	-
27L	Sidon (College Site)	x	x	x	x	x	-	-
31L	Tell Fadous-Kfarabida	x	x	x	x	x	-	x
36L	Tell Koubba	-	x	-	-	-	-	-
6P	Ashqelon, Afridar (west)	x	x	x	-	-	-	-
7P	Azor	-	x	x	-	-	-	x
15P	En Besor	-	-	x	-	-	-	-
19P	Givatayim	-	-	x	-	-	-	-
25P	Holon 5	x	-	-	-	-	-	-

ID Code	Site Name	Coastal rocks	Fish remains	Shell remains	Turtle remains	Hippopotamus remains	Anchors	Other
28P	Holot Karmiyya	x	-	-	-	-	-	-
31P	Jaffa	-	-	x	-	-	-	-
43P	Kh. el Musalla (M)	x	-	-	-	-	-	-
47P	Lod	x	-	x	-	-	-	-
57P	Nahal Besor (Site H)	-	x	x	-	-	-	-
74P	Nizzanim	x	x	-	x	-	-	-
75P	Oshrat 2	-	-	-	-	-	-	-
76P	Palmahim	x	-	x	-	-	-	-
78P	Qiryat Ata (72)	-	-	x	-	-	-	-
81P	Saknat Muhammad Mahmud (southwest)	x	-	-	-	-	-	-
83P	Shoham	-	-	x	-	-	-	-
84P	Taur Ikhbeineh	-	x	x	-	-	-	-
86P	Tel Aphek	x	-	-	-	x	-	-
88P	Tel Assawir	x	-	x	-	-	-	-
90P	Tel Dalit	-	x	x	-	x	-	-
93P	Tel Erani	-	-	-	-	-	-	x
94P	Tell es-Sakan	x	x	x	-	x	-	-
96P	Tel Gezer	x	x	-	-	x	-	-

ID Code	Site Name	Coastal rocks	Fish remains	Shell remains	Turtle remains	Hippopotamus remains	Anchors	Other
98P	Tel Hesi	x	x	x	-	-	-	-
99P	Tel Kabri	-	x	x	-	-	-	-
101P	Tel Lachish	x	-	x	-	-	-	-
102P	Tel Malot	-	-	x	-	-	-	-
103P	Tel Megadim	-	-	x	-	-	-	-
104P	Tel Poran	x	-	-	-	-	-	-
106P	Tel Qashish	x	x	x	-	-	-	-
		21	***16***	***24***	***3***	***7***	***1***	***3***

Appendix F: Potential maritime-related evidence

		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
11S	Tell Sianu											Figurine	Egypt
14S	Ugarit	Pottery exchange (affiliation)	Cilicia Palestine Northern Syria										
6L	Bchem-oun			2 used blades of imported flints.	?								
14L	Byblos							Carnelian, Ivory, Silver, Cylinder seal, Stone vases	Mesopotamia for cylinder seals and Egypt for stone vases	Obsidia-n in graves	(Anatoli -a?)	Imported copper Metal artefacts (affiliation)	Cyprus? Northern Syria Egypt
22L	Nahr Ibrahim											Copper axe	Egypt
27L	Sidon (Colleg-e Site)	local juglet (pottery affiliation)	Egypt Syria									Seals impressions of spiral motif (EBIIB) affiliation	Aegean world, Lerna in the Early Helladic Period

		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
28L	Tell Arqa	Pottery imports from Phase P	Syria							23 obsidian artefact-s	11 from central Anatolia 2 from Nenezi Dag (EBIV) 4 pieces from Gollu Dag.	Copper pins (afflilations, EBIV)	northern Syria- the middle Euphrates area.
31L	Tell Fadou-s-Kfar-abida	Metallic Ware (Fabric VI) Fabric V- non local pottery	Upper Galile (100km from the site) 20 km radius from the site or more (Fabric V)					Steatite, Carnelian and cylinder seal made of Ivory	Egypt Possibly Indus Valley, Mesopotamia , central and southeast Anatolia.			Stone vessel	Egypt
41L	Tyre											Cylinder seal	Egypt (3rd-4th Dynasty).
6P	Ashqel on, Afridar (west)	Wine jar fragment	Egypt			Cedar Lates niloticus (Nile perch)	Lebanon mountain Nile River						

		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
7P	Azor					Glycymeris insubrica, Donax trunculus, Lambis truncate, Chambardia rubens	Mediterra-nean Sea Red Sea Nile River						
15 P	En Besor	Lumps of unbaked clay (impression)	Egypt			Aspatharia rubens	Egypt					Copper pins cynlinder seal	Egypt possibly Syrio-Mesopotami-an
19 P	Givatay im					Nerita sanguinolen ta Two Cypraea sp.	Red Sea Mediterra-nean Sea?						
46 P	Kh. Shefey a	Pottery (EB?)	Cyprus										
47 P	Lod	9 vessels sampled for petrographi-c analysis from Area I Egyptianise-d pottery	Nile clay Anatolia/ Amuq OR the Cypriote Troodos Mountain-s			Cahmbardia rubens conus species	Nile River Red Sea?						

		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
57 P	Nahal Besor (Site H)	Petrographi-c analysis on groups of vessels Egyptianise-d pottery	Egypt			Shells (Aspatharia rubens) Fish-Clarias gariepinus	Red Sea Nile River						
74 P	Nizzani-m	Petrographi-c analysis of EBIA pottery shows local manufacturi-ng except for a couple of samples	Material common to the hilly region Egypt									Bitumen	Vicinity of the Dead Sea
76 P	Palmah-im	Hybrid pithoi with a complete serekh incised before firing	Egypt (Dynasty 0)			Chambardia sp.	Nile River						

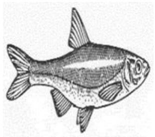
		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
78 P	Qiryat Ata (72)	Petrographic analysis of GBW. EBII Metallic Ware. Petrographic analysis of four unique vessels found outside EBIB building show they are of local origin	Western Jezreel Valley (GBW) upper Jordan Valley (Metallic Ware)	The vast majority of the artefacts were made of fine-grained Eocene flint Foreign origin of Canaanean blades and tabular scrapers.	Jezreel Valley								
83 P	Shoham			Canaanean blades	Closest source some 30 km to the southwest in the southern Shepelah								

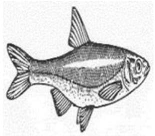
		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
84 P	Taur Ikhbein-eh	Petrographic analysis concluded that EBI ceramic are represented by 3 groups: canaanite, imported Egyptian and locally egyptianised.	Egypt			Aspatharia rubens	Nile River						
88 P	Tel Assawir	Petrographic analysis from pottery in tombs	Egypt Orontes Valley Upper Euphrates	Canaanean blade cores	Haruvim, ca. 15km to the northeast	Chambardia rubens	Nile River					Pendant shape	Egypt
90 P	Tel Dalit			Canaanean blades and tabular scrapers	South of the site Sinai and Negev							Bitumen	Dead Sea

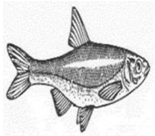
		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
93 P	Tel Erani	Most are local but there are non-local clay material (Nile clay)	Egypt	Raw material	The surface of Gath-Guvrin, ca. 2 km. north of Tel Erani								
94 P	Tel es-Sakan	90% of recovered ceramic (Egyptian and Egyptianised)	Egypt										
99 P	Tel Kabri			Cenozoic and Eocene geological strata	2-3 o 6km north and south of Tel Kabri	Chambardia rubens	Nile River	Faience beads	Egypt?				
101P	Tel Lachish					Planaxis, Nerita and Ancilla ovalis	Red Sea						

		Pottery		Flint		Fauna		Stones		Obsidian		Other	
ID	**Site**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**	**Details**	**Source**
10 3P	Tel Megadi -m	Petrographi- c analysis of pottery demonstrat- es that several regions of manufactur- e are represented	Carmel coast northern Sharon Plain			Aspatharia rubens	Nile River						
10 6P	Tel Qashis- h	Basaltic inclusions of GBW	Basalt outcrops in the western Jezreel Valley	Flint raw material	Local in the hills surroundi- ng the site	Clarias garepinus (Bile Catfish) Tonna sp .shell	Nile River or local freshwate -r sources. Red Sea						

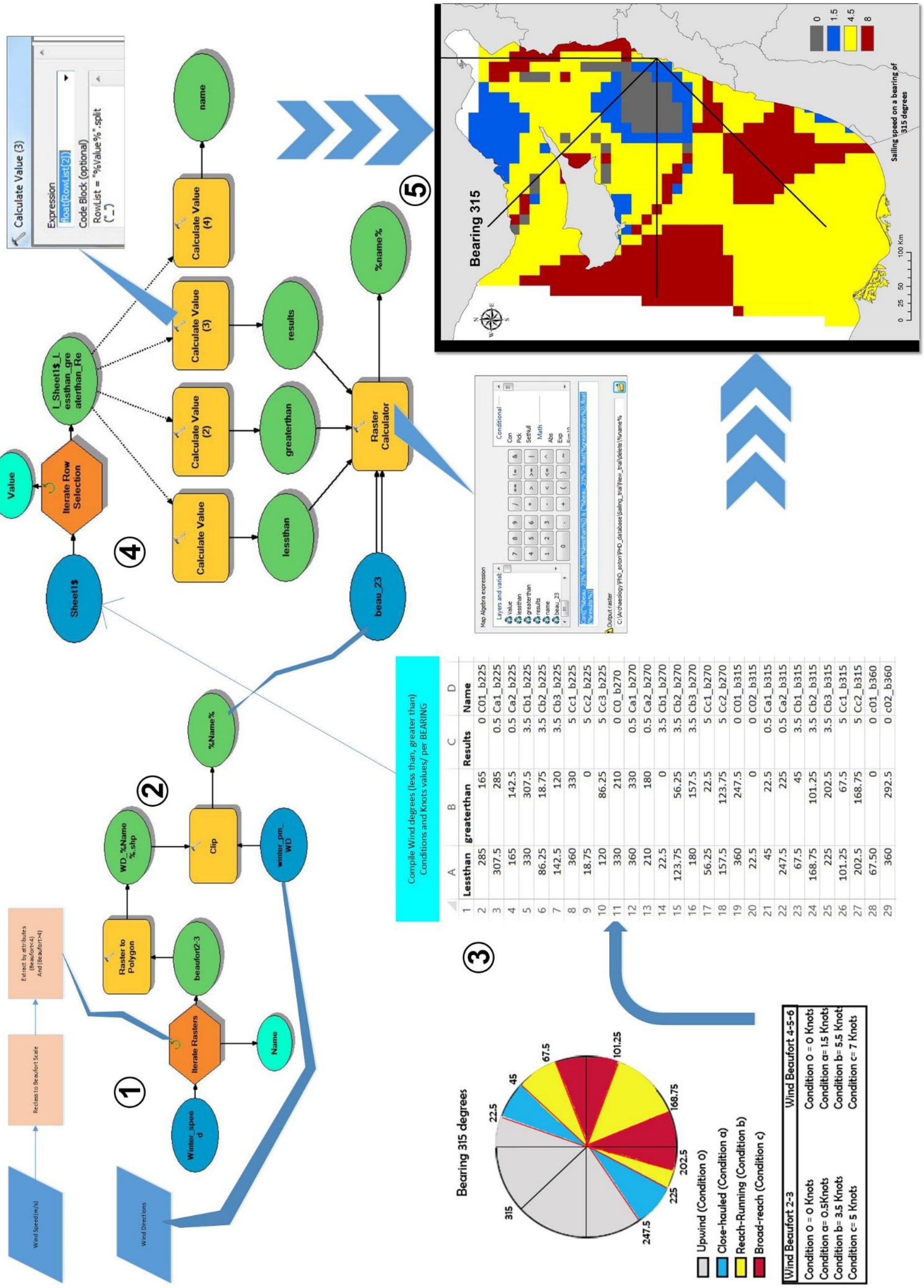
Appendix G: Direct and potential maritime evidence

ID	**Site Name**	**Coastal rocks**	**Fish remains**	**Shell remains**	**Turtle remains**	**Hippopotamus remains**	**Anchors**	**Indirect Evidence**	**Natural Anchorage**	**Other**	**Total**
											
31L	Tell Fadouos Kfarabida	✓	✓	✓	✓	✓		✓		✓	7
27L	Sidon (College Site)	✓	✓	✓	✓	✓		✓	✓		7
14L	Byblos	✓	✓				✓	✓	✓		5
6P	Ashqelon, Afridar (west)	✓	✓	✓				✓	✓		5
94P	Tell es Sakan	✓	✓	✓		✓			✓		5
7P	Azor		✓	✓				✓		✓	4
74P	Nizzanim	✓	✓		✓			✓			4
106P	Tel Qashish	✓	✓	✓				✓			4
14S	Ugarit		✓	✓				✓	✓		4
47P	Lod	✓		✓				✓			3
57P	Nahal Besor (Site H)		✓	✓				✓			3
76P	Palmahim	✓		✓				✓			3
84P	Taur Ikhbeineh		✓	✓				✓			3
88P	Tel Assawir	✓		✓				✓			3

ID	Site Name	Coastal rocks	Fish remains	Shell remains	Turtle remains	Hippopotamus remains	Anchors	Indirect Evidence	Natural Anchorage	Other	Total
											
90P	Tel Dalit		✓	✓		✓					3
96P	Tel Gezer	✓	✓			✓					3
98P	Tel Hesi	✓	✓	✓							3
99P	Tel Kabri		✓	✓				✓			3
101P	Tel Lachish	✓		✓				✓			3
13S	Tell Sukas			✓		✓			✓		3
15P	En Besor			✓				✓			2
19P	Givatayim			✓				✓			2
86P	Tel Aphek	✓				✓					2
93P	Tel Erani							✓		✓	2
31P	Jaffa			✓					✓		2
41L	Tyre							✓	✓		2
5L	Arde Ardata								✓		1
45L	Anfeh								✓		1
11S	Tell Sianu							✓			1
3L	Aramoun	✓									1
18L	Khalde II	✓									1
22L	Nahr Ibrahim							✓			1
28L	Tell Arqa							✓			1
36L	Tell Koubba		✓								1
25P	Holon 5	✓									1

ID	Site Name	Coastal rocks	Fish remains	Shell remains	Turtle remains	Hippopotamus remains	Anchors	Indirect Evidence	Natural Anchorage	Other	Total
											
28P	Holot Karmiyya	✓									1
43P	Kh. el Musalla (M)	✓									1
46P	Kh. Shefeya							✓			1
78P	Qiryat Ata (72)			✓							1
81P	Saknat Muhammad Mahmud (southwest)	✓									1
83P	Shoham			✓							1
102P	Tel Malot			✓							1
103P	Tel Megadim			✓					✓		1
104P	Tel Poran	✓									1
	Beirut (Bey 003, 013, 020, 023, VII)								✓		1

Appendix H: Steps of the model



Lessthan	greaterthan	Results	Name
285	165	0	C01_b225
307.5	285	0.5	Ca1_b225
165	142.5	0.5	Ca2_b225
330	307.5	3.5	Cb1_b225
86.25	18.75	3.5	Cb2_b225
142.5	120	3.5	Cb3_b225
360	330	5	Cc1_b225
18.75	0	5	Cc2_b225
120	86.25	5	Cc3_b225
330	210	0	C0_b270
360	330	0.5	Ca1_b270
210	180	0.5	Ca2_b270
22.5	0	3.5	Cb1_b270
123.75	56.25	3.5	Cb2_b270
180	157.5	3.5	Cb3_b270
56.25	22.5	5	Cc1_b270
157.5	123.75	5	Cc2_b270
360	247.5	0	C01_b315
22.5	0	0	C02_b315
45	22.5	0.5	Ca1_b315
247.5	225	0.5	Ca2_b315
67.5	45	3.5	Cb1_b315
168.75	101.25	3.5	Cb2_b315
225	202.5	3.5	Cb3_b315
101.25	67.5	5	Cc1_b315
202.5	168.75	5	Cc2_b315
67.50	0	0	c01_b360
360	292.5	0	c02_b360

Step 1:

- Reclassification of wind speed rasters into two categories, rasters of wind speed Beaufort less than 4 and rasters of wind speed Beaufort greater than or equal to 4.

Step 2:

- In model builder in ArcGIS 10.4, iterate the wind speed rasters generated in order to clip wind direction rasters. The result is wind direction rasters corresponding to wind speed less than and greater than to Beaufort scale 4.

Step 3:

- In an excel sheet assign the values of wind directions that correspond to set conditions as per Table 6.4 and Figure 6.23, for each bearing. Assign a resulting value in knots and a name that distinguish the conditions and bearings.

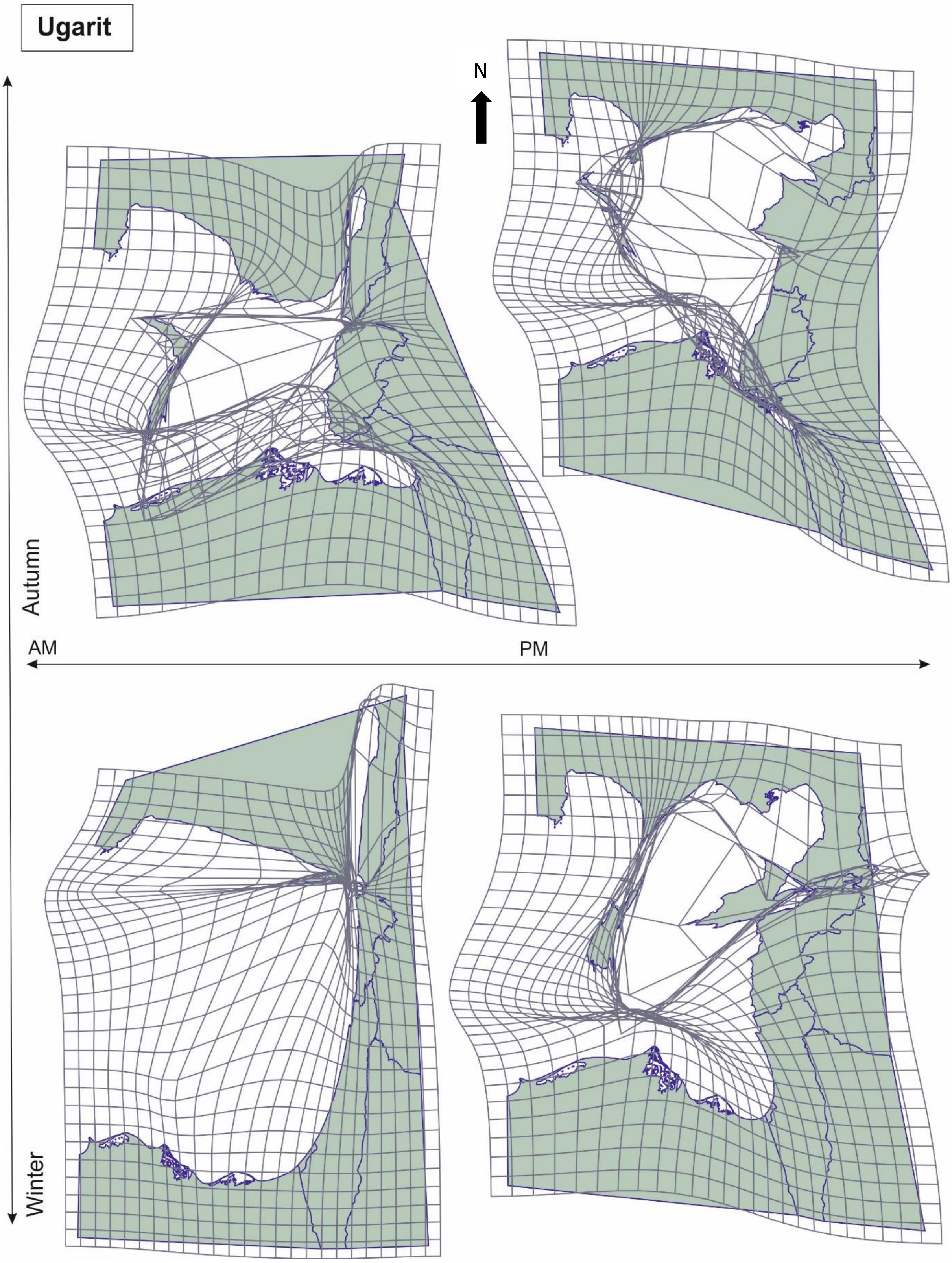
Step 4:

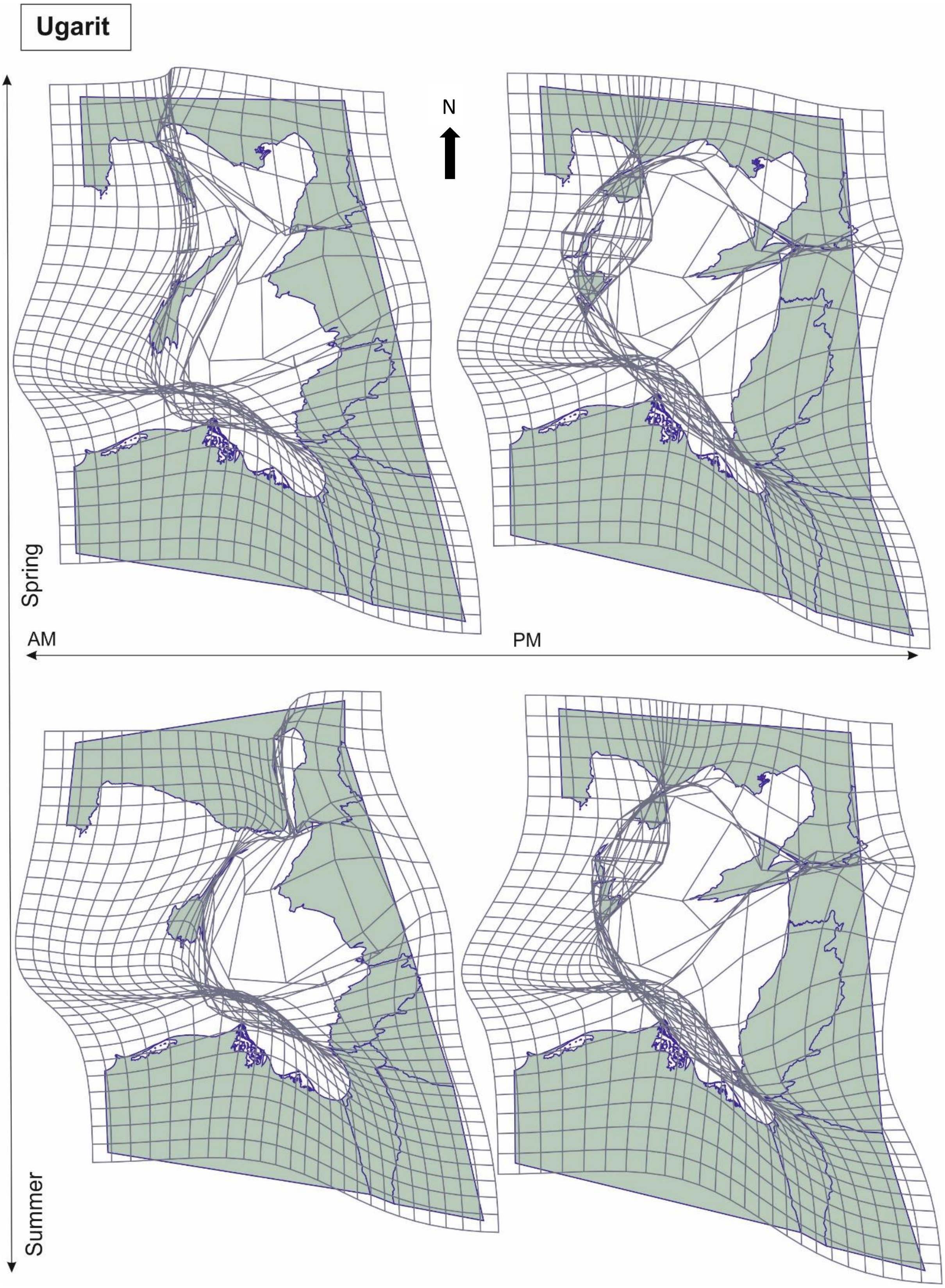
- Iterate the rows of the excel sheet in Model Builder in ArcGIS 10.4, then calculate the value of the iterations by splitting each row into the values of each of the columns.
- Use the calculated values in map algebra taking as input the wind direction rasters to generate according to a conditional statement applied on the wind direction rasters using the calculated values of the iterated rows, a raster in knots that corresponds to the wind speed.

Step 5:

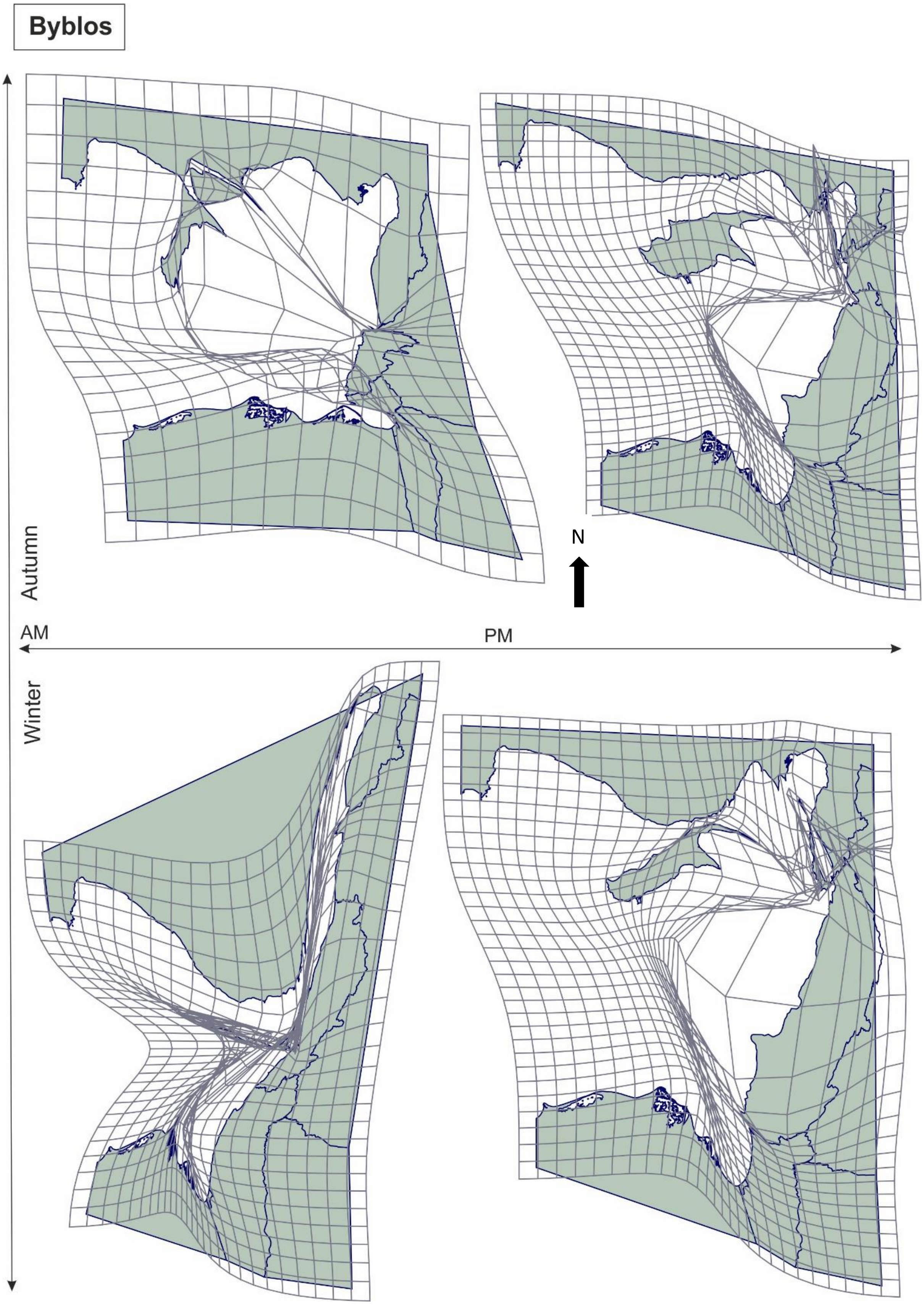
- The resulting wind speed raster in knots accounts for the wind directions and conditions of sailing for each bearing.
- According to the names of the wind speed rasters, those corresponding to the same bearing are merged together.

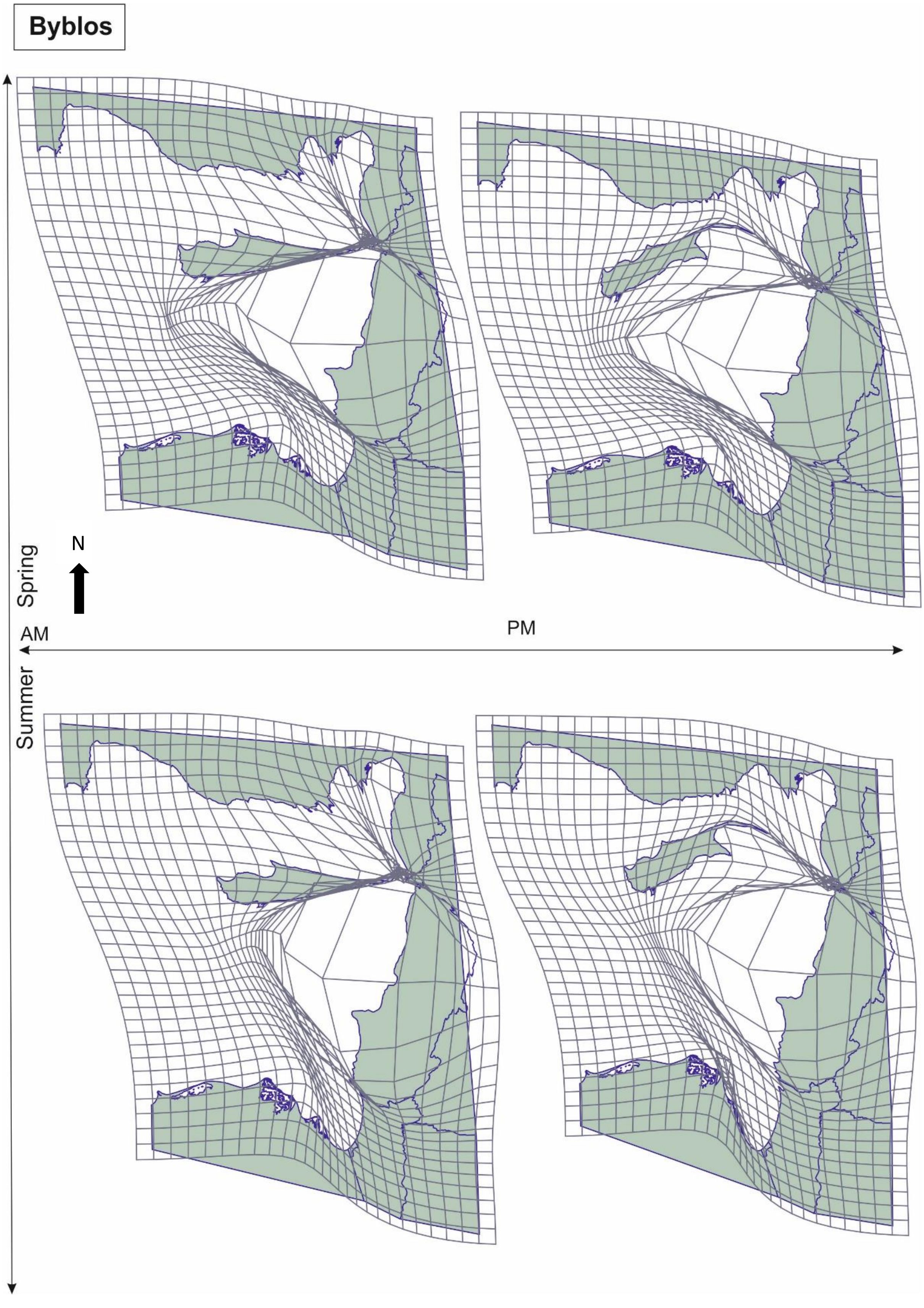
Appendix I: Ugarit



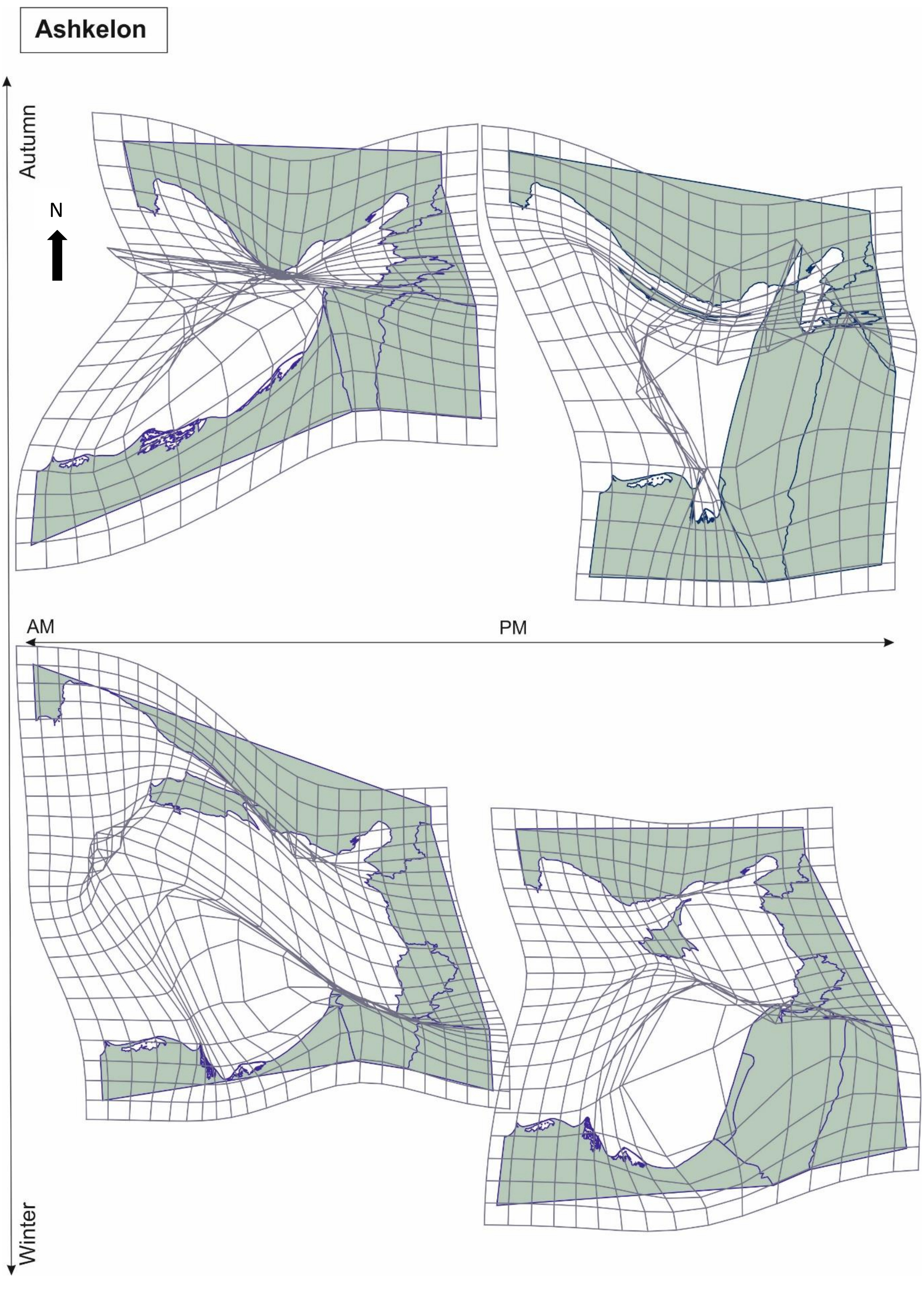

Ugarit
N
Spring
AM
PM
Summer

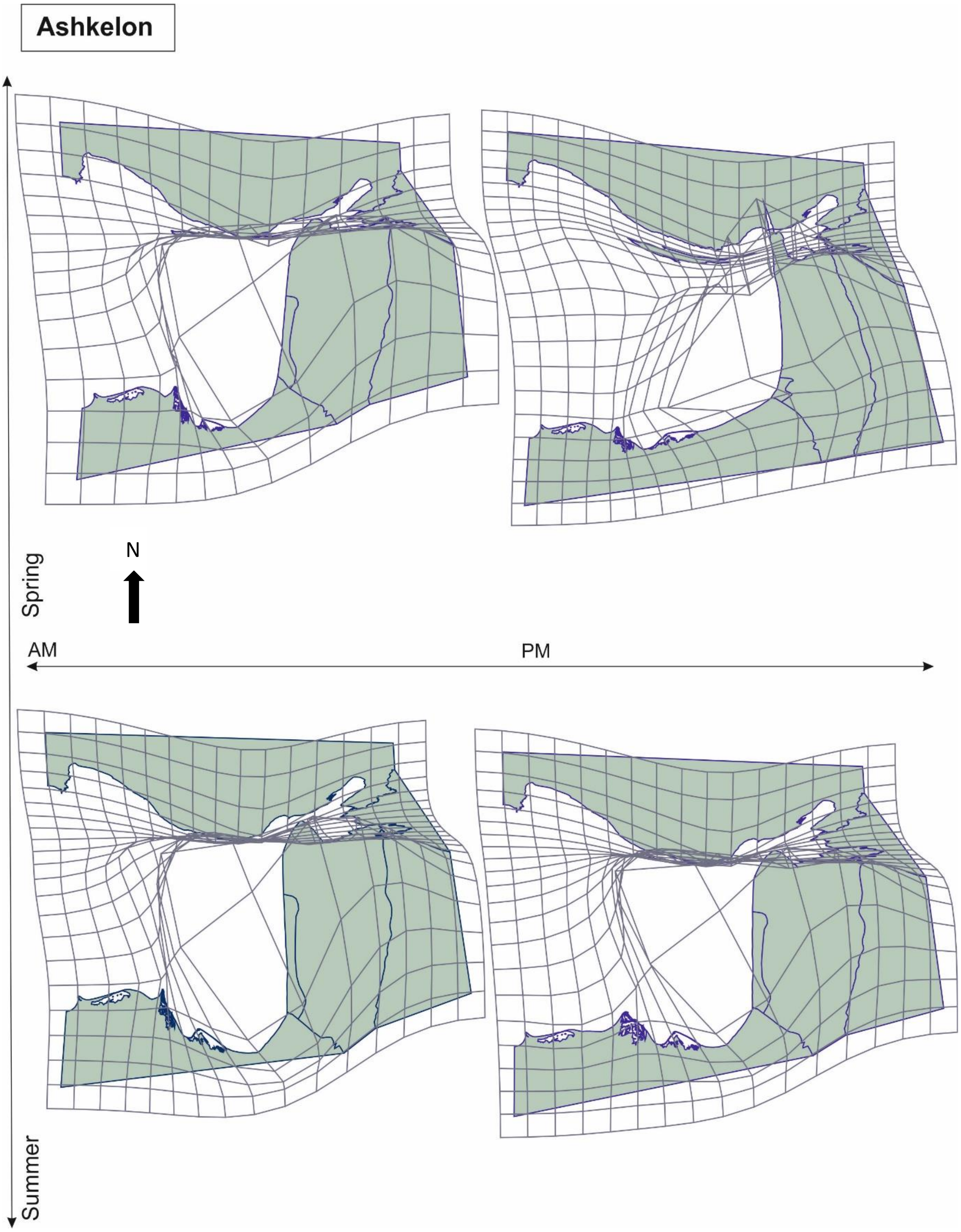
Appendix J: Byblos



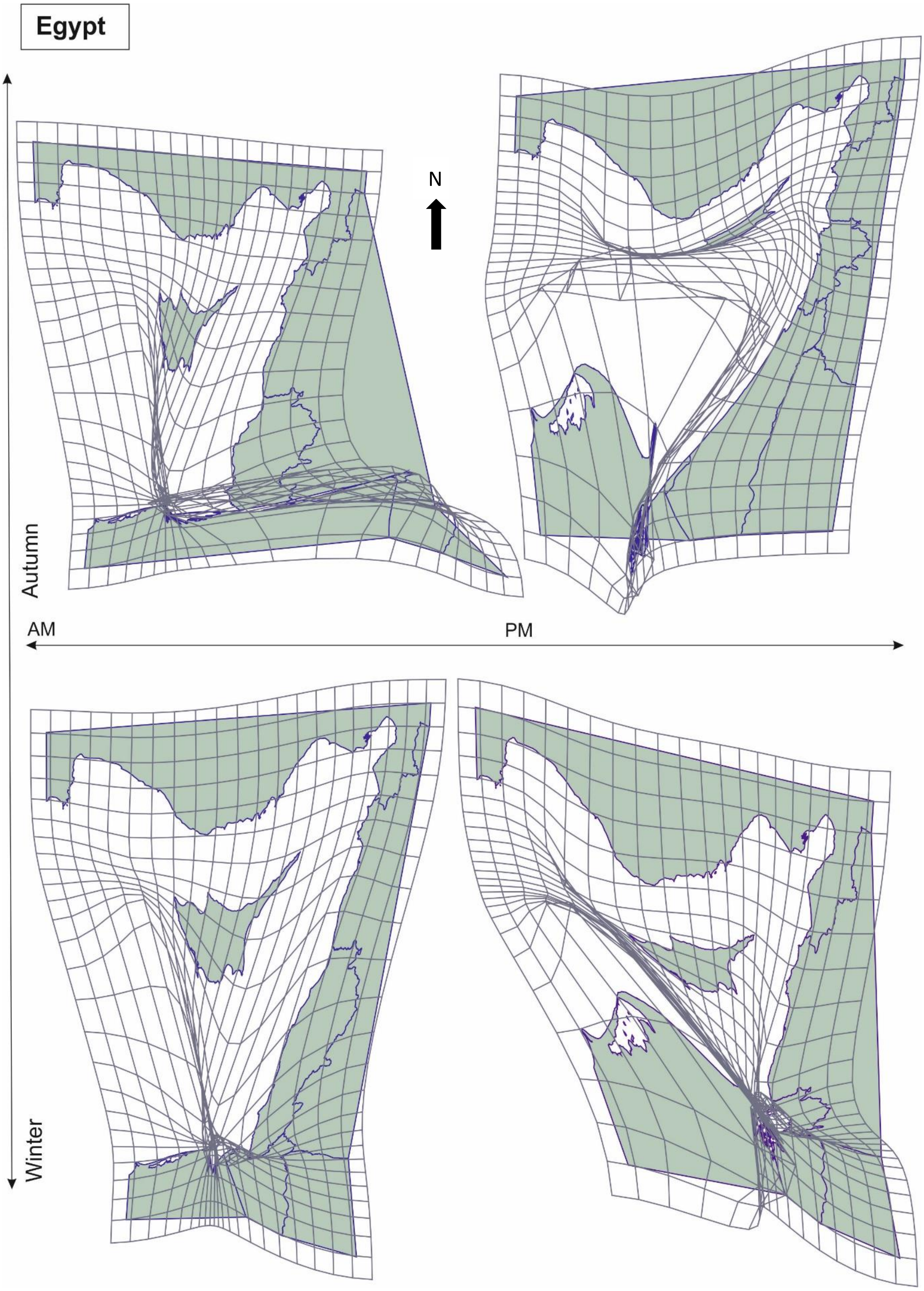

Byblos
N
Spring
AM
PM
Summer

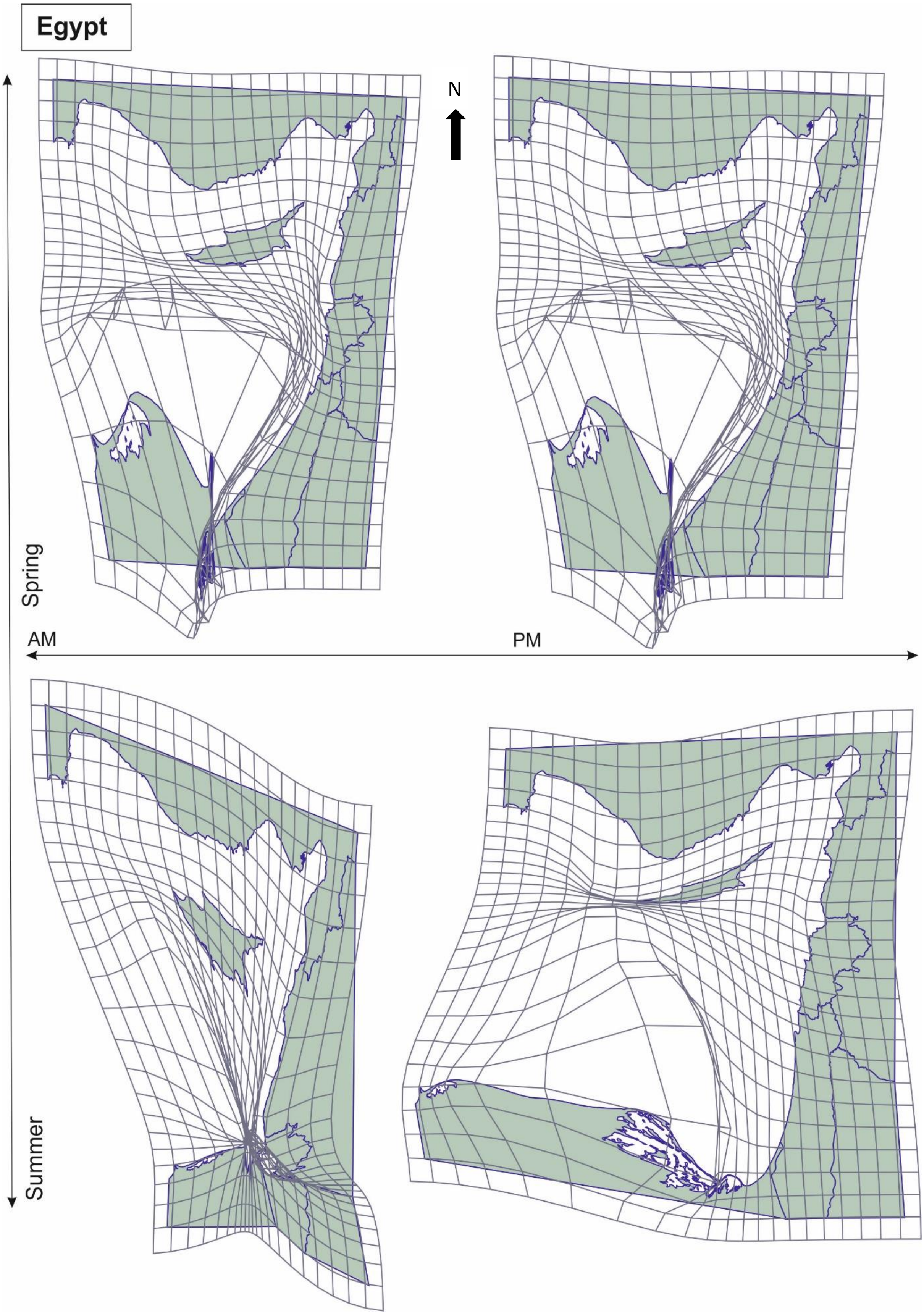
Appendix K: Ashkelon



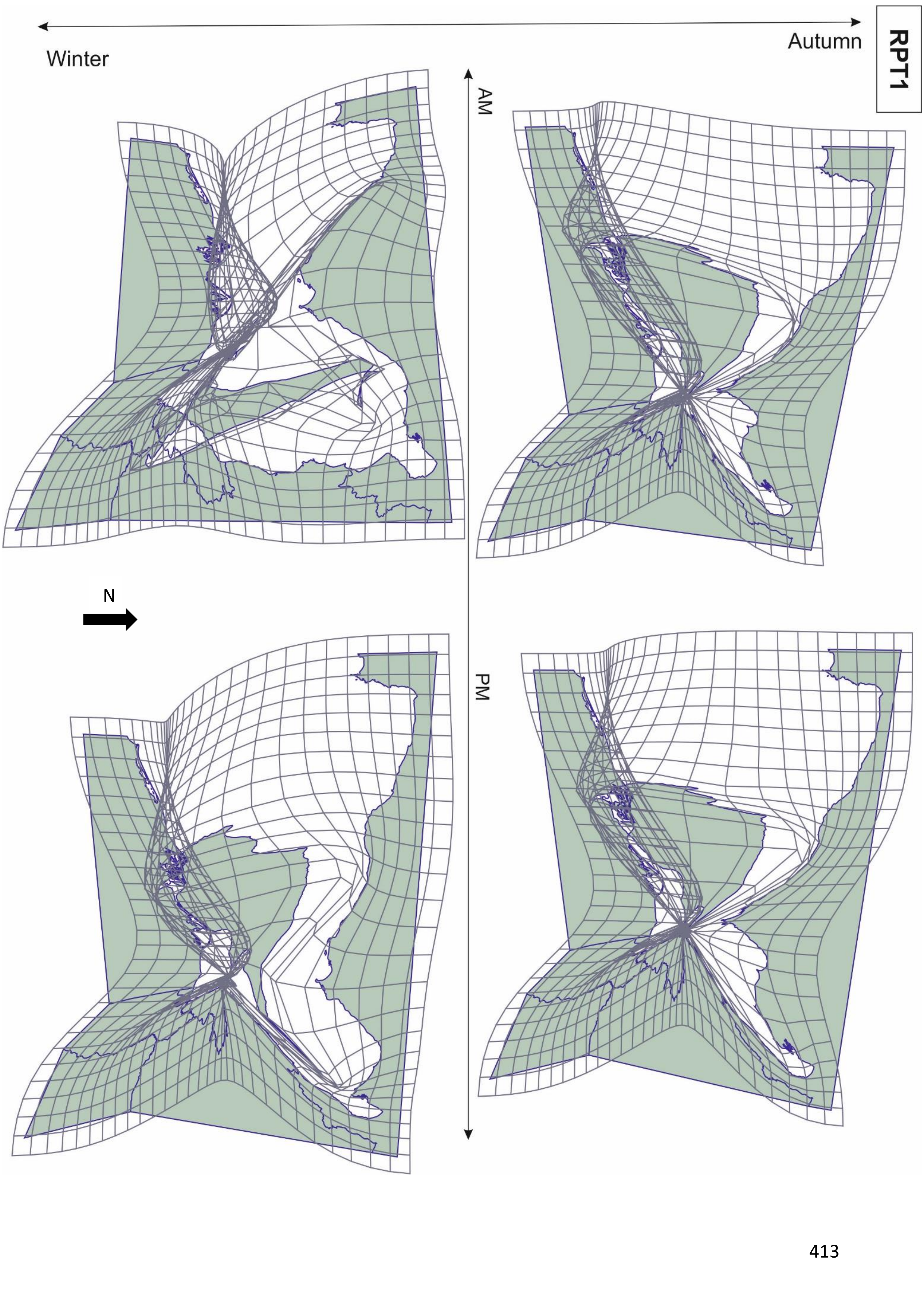

Ashkelon
N
Spring
Summer
AM
PM

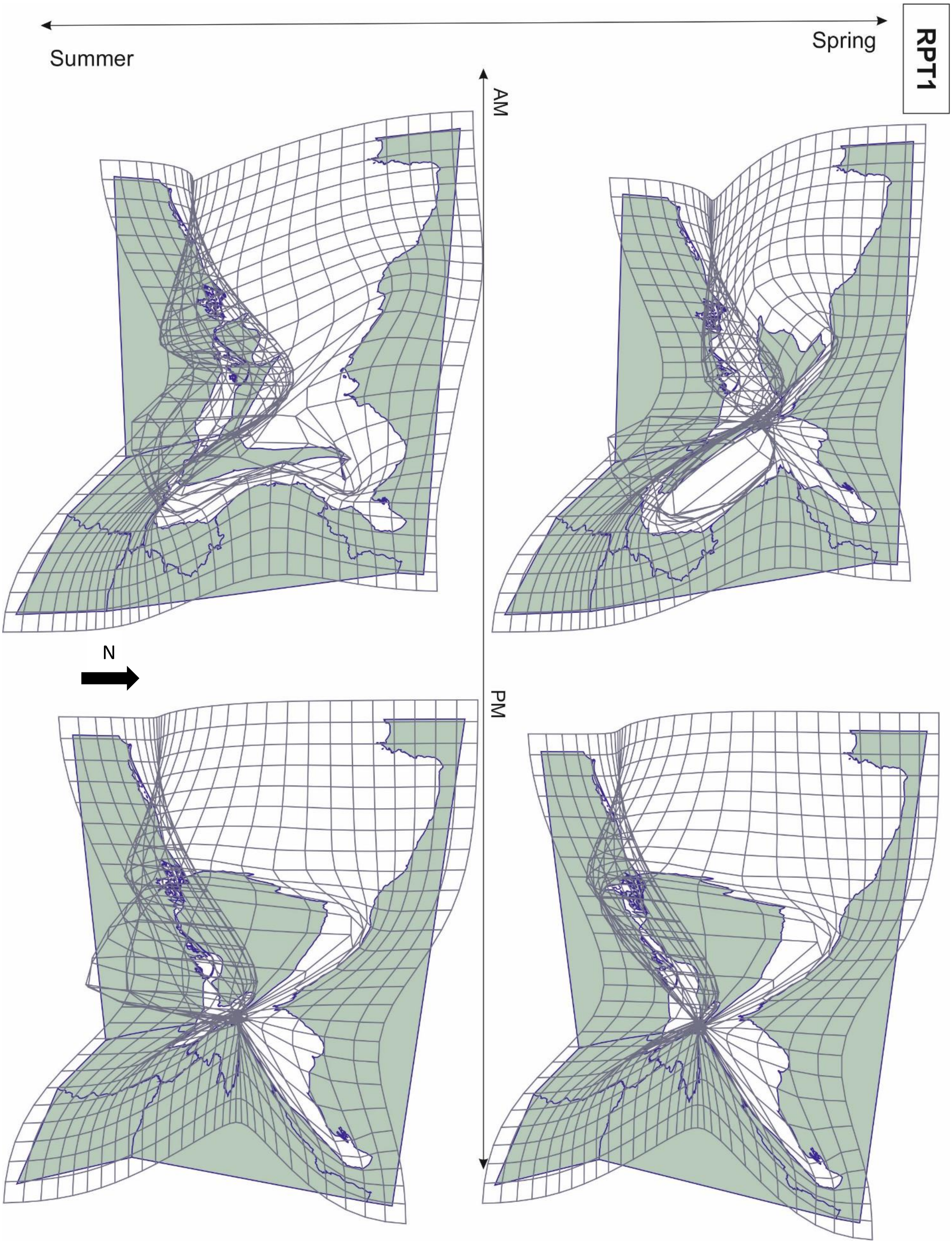
Appendix L: Egypt



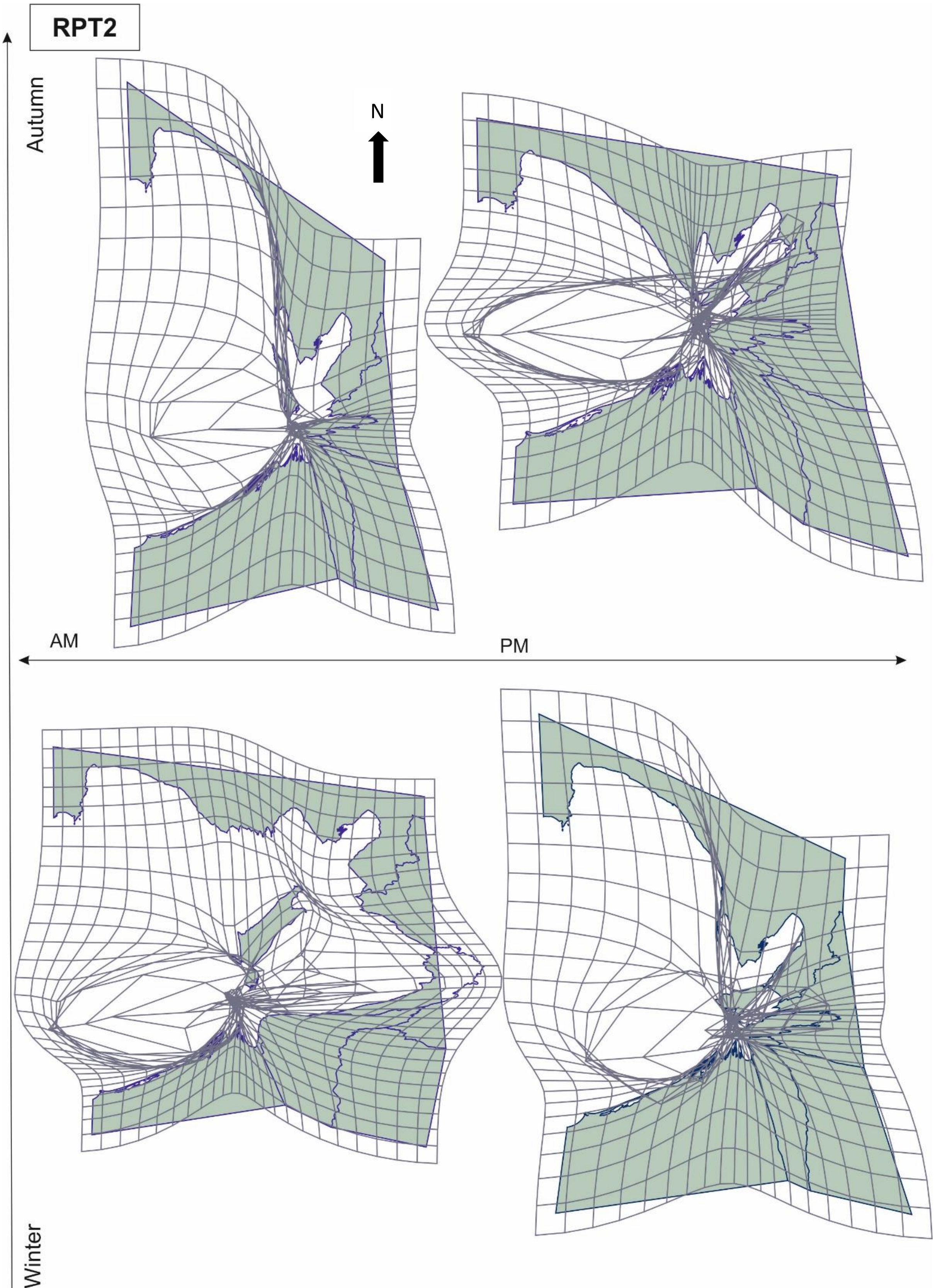

Egypt
N
Spring
AM
PM
Summer

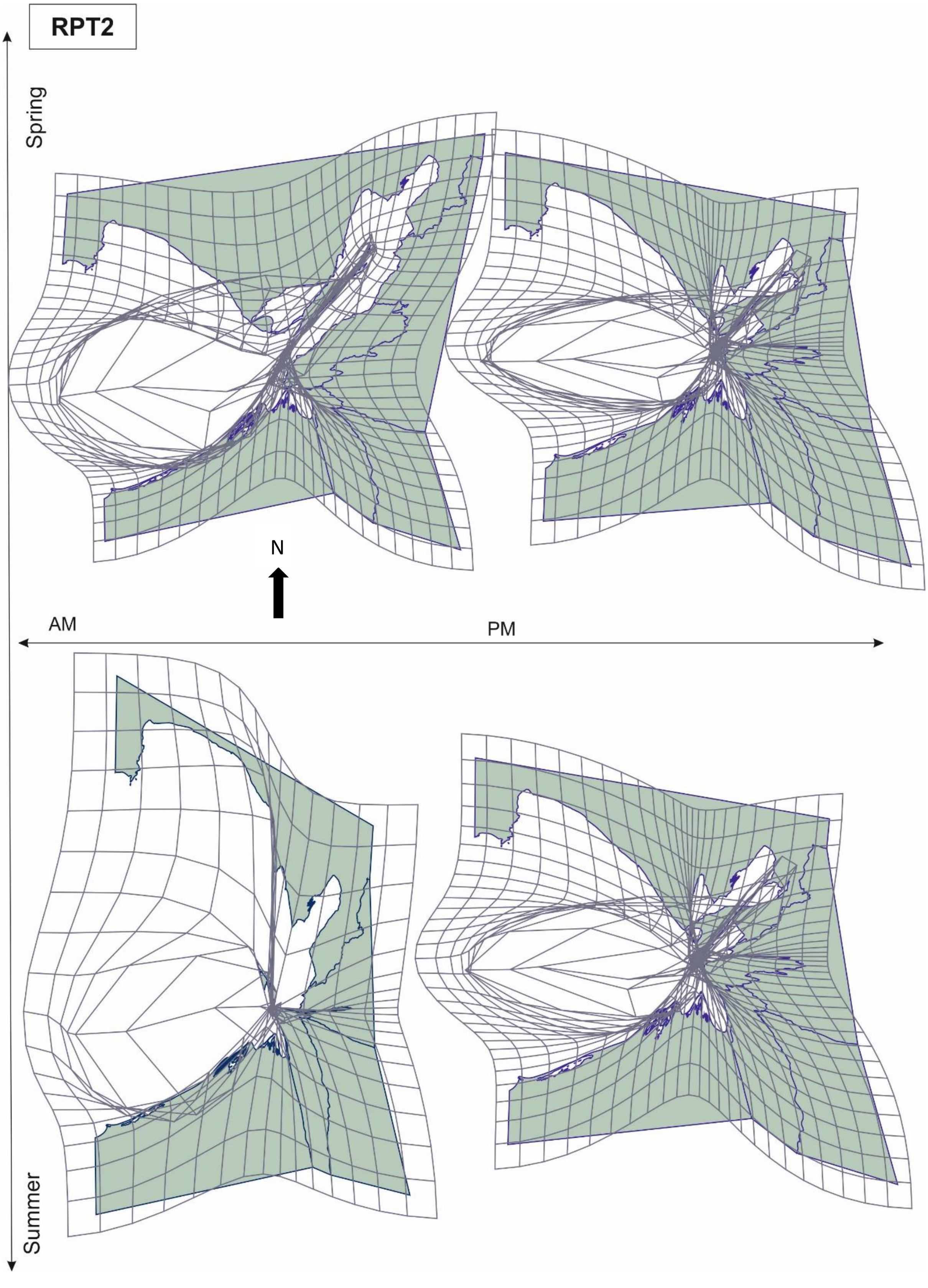
Appendix M: Random Point 1



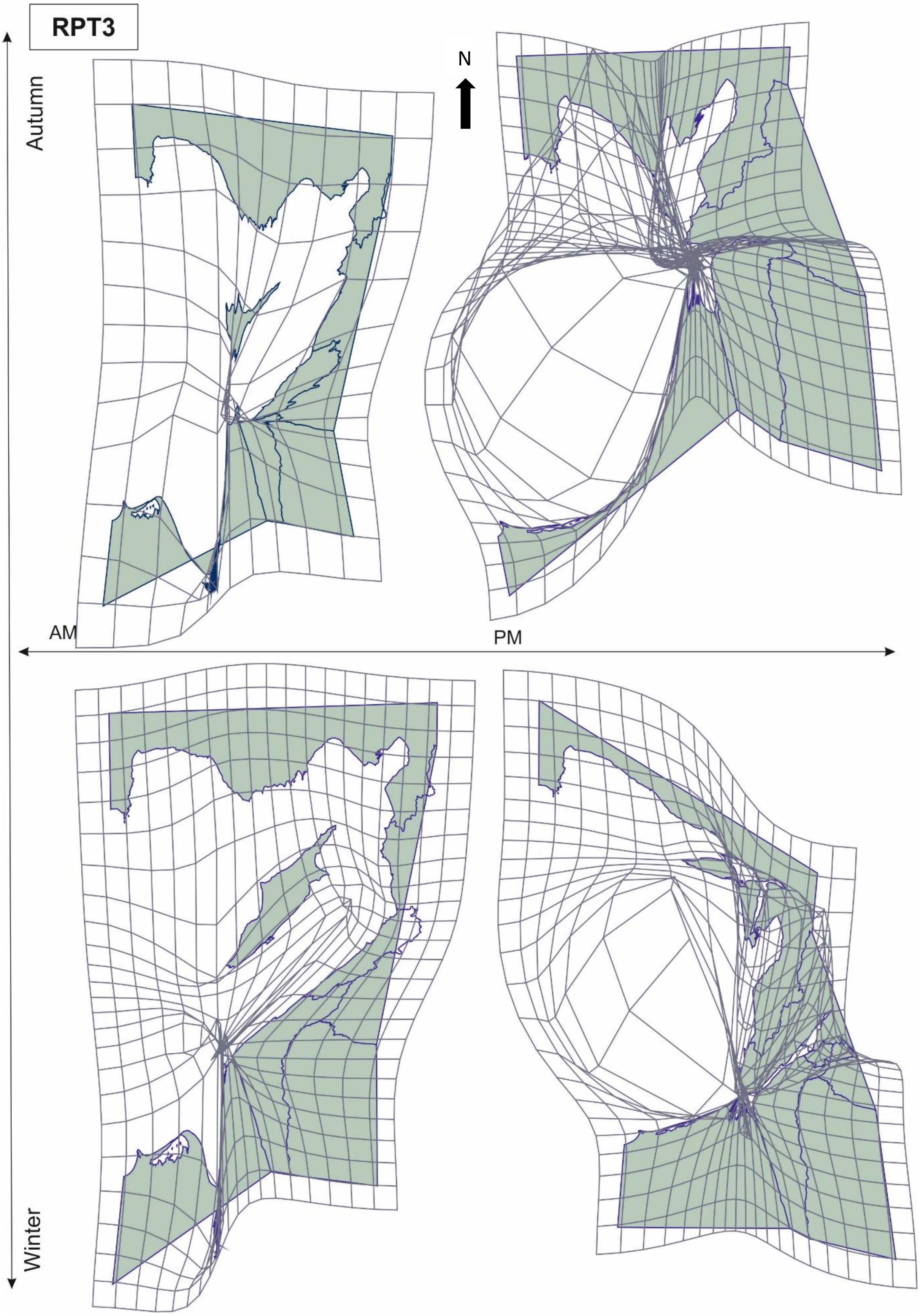

RPT1
Summer
Spring
AM
PM
N

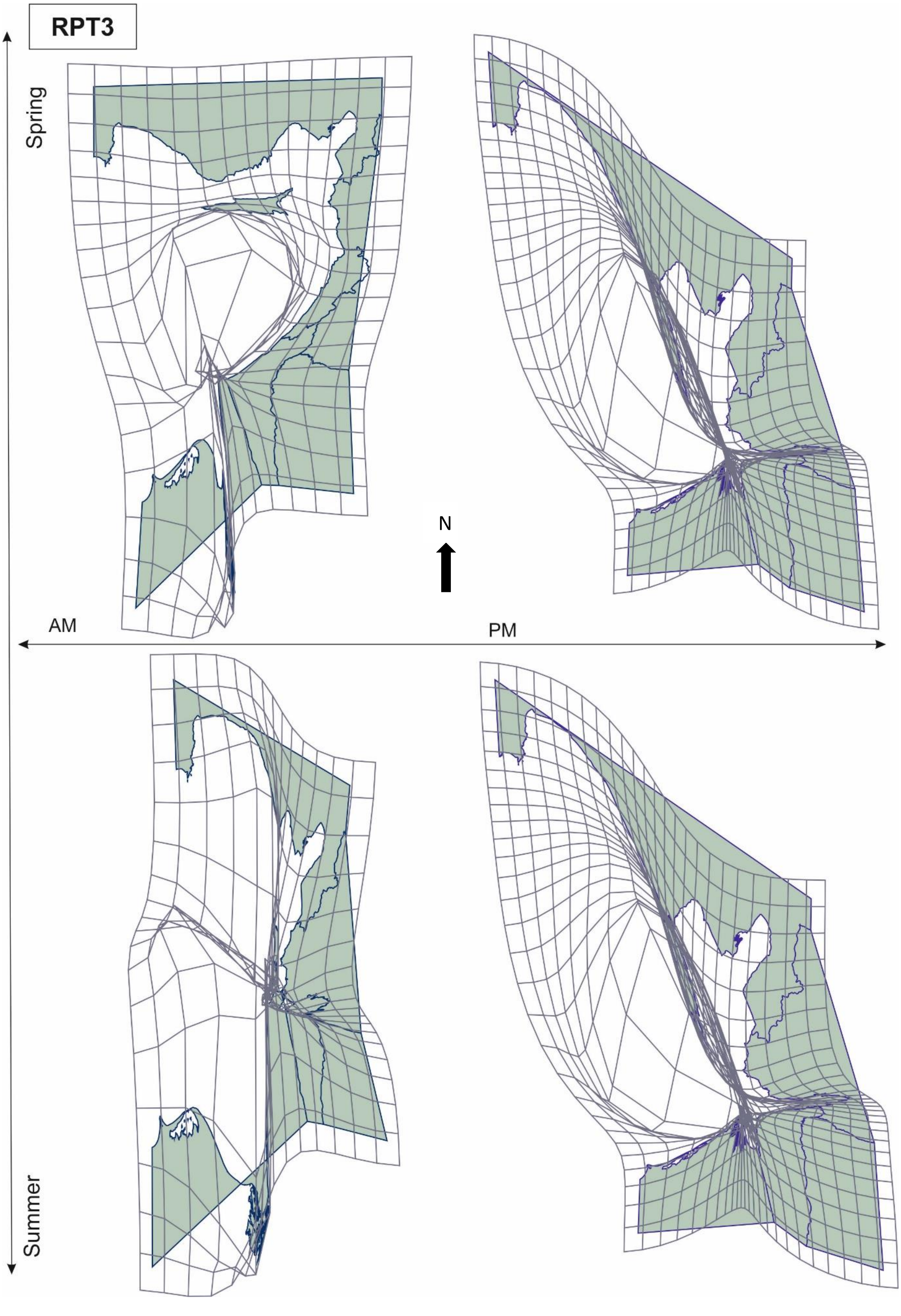
Appendix N: Random Point 2




RPT2
Spring
N
AM
PM
Summer

Appendix O: Random Point 3




RPT3
Spring
Summer
AM
PM
N

Appendix P: Cost values for sailing from and to origin and destination locations in the Levantine Basin, during winter and spring in the morning, based on the space-time deformations

Winter AM							
FROM\TO	***Ugarit***	***Byblos***	***Ashkelon***	***Egypt***	***Aegean***	***Anatolia***	***Cyprus***
Ugarit	N/A	49571	337356	537693	401480	94105	27784
Byblos	231772	N/A	234386	242327	317109	296660	57764
Ashkelon	452191	293131	N/A	358111	644875	580316	479722
Egypt	490030	200154	37422	N/A	390251	570133	365208

Spring AM							
FROM\TO	***Ugarit***	***Byblos***	***Ashkelon***	***Egypt***	***Aegean***	***Anatolia***	***Cyprus***
Ugarit	N/A	346770	519371	621902	628721	257757	333637
Byblos	120777	N/A	461191	605284	605295	241840	165621
Ashkelon	513697	378104	N/A	470907	566151	632751	495972
Egypt	704360	610605	472895	N/A	532278	769520	609481

Appendix Q: Cost values for sailing from and to origin and destination locations in the Levantine Basin, classified by percentage

Autumn AM							
FROM\TO	***Ugarit***	***Byblos***	***Ashkelon***	***Egypt***	***Aegean***	***Anatolia***	***Cyprus***
Ugarit	N/A	7%	62%	100%	82%	10%	37%
Byblos	0%	N/A	31%	69%	75%	44%	31%
Ashkelon	46%	57%	N/A	46%	59%	50%	33%
Egypt	82%	53%	31%	N/A	75%	44%	53%

Summer AM							
FROM\TO	***Ugarit***	***Byblos***	***Ashkelon***	***Egypt***	***Aegean***	***Anatolia***	***Cyprus***
Ugarit	N/A	45%	79%	100%	72%	8%	26%
Byblos	0%	N/A	75%	84%	87%	22%	6%
Ashkelon	78%	72%	N/A	65%	81%	92%	65%
Egypt	42%	17%	75%	N/A	87%	22%	36%

0-25% Rapid	25-50% Intermediate	50-75% Slow	75-100% Difficult

The percentage values are contingent on the range of values within one season. For instance, in the autumn AM, the least costly value is 57,943 (Byblos to Ugarit, see Table 7.2), whereas the highest costly value is 62,7147 (Ugarit to Egypt). Hence, the former value represents 0% and the latter 100%. The remaining cost values are classified in percentage according to these minimum and maximum values.