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POST-MEDIEVAL SEAFARING IN THE WESTERN BLACK SEA: ARCHAEOLOGICAL AND ICONOGRAPHIC EVIDENCE FOR THE RIG

Volume 1 of 2

by

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Abstract

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DOCTOR OF PHILOSOPHY

POST-MEDIEVAL SEAFARING IN THE WESTERN BLACK SEA: ARCHAEOLOGICAL AND ICONOGRAPHIC EVIDENCE FOR THE RIG

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This thesis aims to research the wide topic of post-medieval Western Black Sea seafaring, particularly focusing on the rig. Two main datasets collected in the last eight years form the core of this dissertation, and provide the nautical data of the research. The first consists of several late medieval shipwrecks with extremely well-preserved upper structures, including rigging elements, discovered on the bottom of the Bulgarian Black Sea during the three field seasons of the M.A.P. Black Sea – the first high-tech archaeological project ever undertaken in the world. However, the rigging remains are used mainly as a comparative material in supporting the follow up analysis of the second dataset – a group of post-medieval ship graffiti carved in four medieval churches in Nessebar, Bulgaria. A thorough analysis of the shipwrecks' remains is due to be published by their principal researcher – Professor Kroum Batchvarov. The corpus of nearly 340 ship graffiti was recorded non-destructively using advanced photographic methods during a three-season project which I coordinated. All of the ship graffiti are included in the catalogue which constitutes Appendix A of the current thesis. For the purposes of analysis and interpretation of the two datasets, complementary sources of information on rigging such as other regional-based iconographic examples, travellers' accounts, published historical evidence, marine art's illustrations, and ship's modellers works were used.

The research presented in the current thesis is one of the few studies of Western Black Sea seafaring which uses the maritime archaeology approach. The theoretical framework of the thesis follows traditional, processualist, and post-processualist ideas. It uses historical contextualisation to better understand the events that impacted the life of local maritime communities, and the inevitable technological changes. Three main tools were used in the analysis of the two datasets – comparison, interpretation, and reconstruction.

The analysis of the two datasets provided two different, complementary results: the archaeological remains revealed details about individual rigging elements, while the iconography illustrated overall rigging silhouettes and the variety of ship types that sailed in the region in the post-medieval period.

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Research Thesis: Declaration of Authorship

Print name: Zdravka Hristova Georgieva

Title of thesis: Post-medieval seafaring in the Western Black Sea: archaeological and iconographic evidence for the rig

I 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.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
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3. Where I have consulted the published work of others, this is always clearly attributed;
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Research Thesis: Declaration of Authorship

Signature: ....Date:............................

Dedication

I dedicate this PhD dissertation to the loving memory of Hristina Angelova

Director of the Center for Underwater Archaeology, Sozopol

(1954-2016)

Dedication

Acknowledgements

Definitions and Abbreviations

INA..Institute of Nautical Archaeology, United States

CUA ....Center for Underwater Archaeology, Sozopol, Bulgaria

RTI ....Reflectance Transformation Imaging

M.A.P. Black Sea/ BSMAP ....Black Sea Maritime Archaeology Project

NAIM-BAS.............................National Archaeological Institute with Museum at the Bulgarian Academy of Sciences

BHF ....Balkan Heritage Foundation - a Bulgarian non-profit cultural organisation in the field of cultural heritage research, preservation, communication and management, and education

Chapter 1   Introduction

During the post-medieval period, political, economic, social, and maritime life along the Black Sea coast were all changing dynamically as a result of the episodic Russian-Turkish wars for control over the straits, and the concurrent appetites of the Western countries for power over the trade in the Black Sea. This thesis combines multiple assets to better understand the response of the Western Black Sea coastal population to the changing post-medieval world, and specifically the effects of those changes on Black Sea seafaring - a principal topic of this study. One aspect of the responses will be investigated from a technological (nautical) perspective through a demonstration of the diversity of the rigging arrangements of the ships that navigated the Black Sea between the 17th-19th centuries. So far, the technological aspect of seafaring in the Western Black Sea, particularly in terms of analysis of ship rigging, has been poorly explored due to the lack of comprehensive datasets. The last eight years were favourable in the accumulation of a rich nautical database that will advance the technological aspect of the current research. First, a large group of post-medieval shipwrecks, identical in construction and extremely well preserved, were discovered during the Black Sea Maritime Archaeology Project (BSMAP) - a four-year maritime archaeological project in Bulgarian Black Sea waters - the largest project of its type ever undertaken with the specific task to apply advanced technology to answer purely archaeological questions (see Chapter 4). Second, over three years, the largest group of post-medieval ship graffiti in Bulgaria carved in medieval churches in the coastal town of Nessebar was recorded using advanced, non-destructive photographic methods (see Chapter 5). These two datasets form the main body of the thesis, and their thorough analyses form the basis of exploring the post-medieval seafaring of the western Black Sea from a technological and social perspective.

1.1   Early research on late medieval seafaring in Bulgaria

Until the end of the 20th century, post-medieval seafaring in the Western Black Sea was mainly examined from a historical perspective, with only a few archaeological studies published. Few Bulgarian scholars studied the subject in depth, extracting evidence from various historic sources such as archive documents, the Ottoman empire's archives, manuscripts, travellers' accounts, and iconographic sources (Ovcharov 1992; Tonev 1995; Shterionov 1999). Professor Velko Tonev examined the economic, demographic, political and cultural development of the Western Black Sea region during the Revival period (Tonev 1995). Tonev's student Shteliyan Shterionov authored a key work dedicated to ships, shipping, seafaring, and maritime trade along the southern shores of the

Western Black Sea during the Revival period – arguably the first reasonably structured study of these topics for the region (Shterionov 1999). He primarily used historical sources, augmented by experimental work, all within an ethnographic approach that utilised accounts by contemporary travellers to create a detailed picture of the western Black Sea harbours. However, there is a distinct lack of archaeological sources in his interpretation of shipbuilding techniques and ship types. The same is true for another seminal work on medieval seafaring in the Black Sea – Nikolay Ovcharov's thesis, which uses ship graffiti inscribed in medieval churches in the town of Nessebar as the main source of information on ships and shipping during that period (Ovcharov 1992, 1993).

These works all share the same characteristics: 1) they are key studies of post-medieval seafaring in the Western Black Sea; 2) they use the more common historical approach in their analyses of seafaring; 3) they lack maritime archaeological analyses, probably due to the lack of a nautical database of archaeological remains in the region - a crucial prerequisite in order to build a comprehensive picture of seafaring of the highest quality. It could therefore be argued that, until the end of the 20th century, our understanding of seafaring in the Western Black Sea region has been at best incomplete, and probably to some extent biased due to the interpretative nature of historical and iconographic sources. The probable reasons for these gaps might be, on one hand, the limited funding for systematic archaeological surveys, and on the other - the absence of trained nautical archaeologists in Bulgaria.

1.2   Current state of nautical archaeology in Bulgaria

Early underwater archaeological expeditions in Bulgaria, sporadically undertaken in the 1960s, did not properly apply and use the methods of underwater excavation. Their sole purpose was to search for shipwreck remains that might be linked with known historic events, without the application of the scientific methods of archaeological excavation.

A three-season underwater archaeological excavation of a post-medieval shipwreck was undertaken by the Centre for Marine History and Underwater Archaeology in Sozopol in the southern bay of Kitten in the period 1982-1986 (Porozhanov 2000). Based on the characteristics of the miscellaneous artefacts discovered during the excavations, a broader date - 16th – 19th centuries - was proposed for the ship (Porozhanov 2000). After three seasons of excavations, the shipwreck had to be reburied due to "the construction of the marina and the absence of nautical specialists", as Batchvarov (2009: 3) concluded based on Porozhanov's preliminary report (Porozhanov 2000).

The 21st century brought a significant advancement in the nautical knowledge in the region with the archaeological excavation of two shipwrecks from the post-medieval period - the only ones archaeologically studied in Bulgaria until then. The first was a renewal of the excavations of the Kitten shipwreck, which was undertaken between 2000 and 2004 as a collaboration between the Institute of Nautical Archaeology (INA) in the USA, and the Center for Underwater Archaeology (CUA) in Sozopol. The professional survey and meticulous recording of the shipwreck allowed very precise, detailed analyses of the hull, conducted in the framework of Batchvarov's doctoral thesis (Batchvarov 2009). The Kitten ship was identified as late 18th- early 19th century merchantman built within Mediterranean shipbuilding tradition, and was the first one from the Western Black Sea coast to be studied in depth. The complete graphic reconstructions of its hull and rigging system are the first significant archaeological contribution to the nautical knowledge on the Western Black Sea during the post-medieval period (Batchvarov 2009, 2014a, 2014b).

In 2015, another in-depth archaeological survey of a post-medieval shipwreck off the town of Chernomorets's harbour was conducted by the CUA (Garbov et al. 2016; Garbov 2021a). The ship was determined to be a 19th century sailing merchantman, and is the first one in Bulgaria documented using modern photographic techniques – photogrammetry and Reflectance transformation imaging (RTI). Other interdisciplinary methods such as dendromorphology and dendrochronology, petrographic analysis of charcoal, and X-ray of metal elements were also applied in the study in order to interpret the ship's origin, trade route, and artefactual assemblage (Garbov et al. 2021).

It was the largest maritime archaeological survey to date – the Black Sea Maritime Archaeology Project (BSMAP) (2015-2019) – that made significant progress towards assembling an exhaustive nautical database for the Bulgarian Black Sea. The project was funded principally to assess the impact of environmental change and associated changes in sea level on later prehistoric populations in the Western Black Sea region (see chapter 4). This depended on establishing more reliable chronologies generated from an extensive programme of marine geophysics (covering 2000 km^2) and marine geological core sampling. As the prehistoric communities concerned were coastal, maritime connectivity was a principal element of the research design, and while shipwreck research *per se* was not a principal objective, it was realised that wrecks would inevitably be discovered. Under the terms of the permit issued by the Bulgarian authorities, these wrecks were to be assessed and reported. However, the number of wrecks discovered and the level of their preservation, offered an extraordinary bounty of new knowledge and prompted a greater degree of attention than originally anticipated. Over the course of the project, the international team of specialists directed by Professor Jonathan Adams registered and recorded the remains of 65 shipwrecks in the Bulgarian Exclusive Economic Zone (Vagalinski et al. 2015, 2016, 2017). Using cutting edge methods for deep sea survey such as laser scanning and acoustic and photogrammetric

techniques, high resolution photogrammetric models of the ships were built, to be used in further analyses (Pacheco-Ruiz et al. 2019). Of these, 44 were initially dated to the 17th-19th century, and constitute an invaluable resource on post-medieval seafaring and shipping in the Western Black Sea which will be central to this thesis.

1.3   Potential for the future development of nautical archaeology in Bulgaria

Today, with the recent advances and the accumulation of more diverse artefactual sources of information, the application of the maritime archaeological approach in the study of ships and seafaring on the Western Black Sea is more relevant than ever, and offers the added advantage that misleading and vague information about seafaring in the region can be correctly identified and avoided. The BSMAP group of about 40 post-medieval shipwrecks is the largest one to date, and will undoubtedly provide numerous insights into ship construction and shipping in the region during that period, filling a critical gap in our knowledge. Fascinatingly, the parts of their hulls that are most exposed on the seabed resemble elements of the superstructure and the rigging systems. This is unusual, as the latter are perishables that rarely survive in the archaeological record: normally, it is the lower parts of the hull - keel, framing, planking – that are found. In general, wreck site deposition and post-deposition processes are very dependent on the environmental conditions - a topic thoroughly studied by Keith Muckelroy, who agreed with Frost that deep waters are necessary for the preservation of significant ancient wreck remains (Muckelroy 1978, 160). The deep waters of the Black Sea, anoxic below ~150 m depth, present ideal conditions for the *in situ* preservation of not only ancient wrecks, but also of wreck sites from medieval periods, with their masts and lines still standing (Pacheco-Ruiz et al. 2019). The newly discovered details and fittings of the rigging of the post-medieval shipwrecks will therefore probably allow the validation of the only previous hypothetical reconstruction of the Kitten shipwreck's lateen-rigging (Batchvarov 2014a), and other ongoing reconstructions of the rigging systems of post-medieval shipwrecks with a high degree of certainty. The new nautical data about Black Sea shipbuilding will further allow researchers to draw more precise parallels with ships' rigging system examples from the archaeological record in the Mediterranean and other basins.

The analyses of the wrecks' remains will also help answer important questions related to the tonnage and displacement of the ships that sailed on the Black Sea. Defining these two parameters precisely would facilitate further analysis and hypothetical reconstruction of the proportions of elements of the rigging system on some of the BSMAP post-medieval shipwrecks. As stated above, before the first archaeological shipwreck excavations in the country, Bulgarian scholars extracted

evidence about ships' capacity in the post-medieval period mainly from the Ottoman empire's archives, marine art, iconographic sources, travellers' notes, and wreck examples from other regions. In his study on shipping in the western Black Sea, Ovcharov (1992) points out that due to the control of the Ottoman Empire over navigation in the Black Sea, and the basin's closed character, the technological progress in shipbuilding at the time was limited and did not stimulate the building of large-tonnage ships of solid construction. He concludes that the predominant vessels were probably small and mid-tonnage coasters (Ovcharov 1992, 58). However, since ship graffiti were his primary evidence in determining the ships' technical characteristics, these conclusions seem most likely controversial. Basing himself on historical narratives, ethnographic questionnaires, and travellers' notes, Shterionov (1999, 82–84) considers the topic about merchantmen size as unclear. His analysis of data on the trade circulation in the harbour of Burgas between 1842 and 1869 shows that the merchantmen's tonnage, which in this context refers to capacity, varied between 190 and 551 tons, with the average approximately estimated to 317 tons (Shterionov 1999, 83). His various sources indicated that the capacity of the local small and mid-tonnage sailing ships varied between 10 and 100 tons, but the determination of the tonnage of larger ships was disputable (Shterionov 1999, 84). The best way to obtain corroborative data on post-medieval Black Sea ship tonnage is from archaeological remains. So far, the only such vessels excavated in Bulgaria are the shipwrecks from Kitten and Chernomorets. The Kitten shipwreck offers priceless multi-aspect information (Batchvarov 2009). With its calculated capacity of 160 tons (Batchvarov 2009, 60), this late 18th - early 19th century Black Sea merchantman could fall into the group of the mid-tonnage sailing ships, if we take into account the vague categorisation from the previous studies. The shipwreck from Chernomorets (St. Nicholas Bay shipwreck), which thorough archaeological and archival examination revealed to be a sailing merchantman with Mediterranean European provenance, and which sailed in the Black Sea during the second half of the 19th century, is classified as a vessel with a tonnage between 400 and 500 tons (Garbov 2021, 20). According to Shterionov's scheme (Shterionov 1999, 83), the Saint Nicholas Bay shipwreck must fall into the group of the large-tonnage sailing ships.

1.4   Ship graffiti as a source of information on Black Sea seafaring

Despite the effectiveness of a maritime archaeological approach in the analysis of Western Black Sea seafaring, supporting sources of information should also be assimilated into the study in order to better understand the maritime history in the region. Researchers studying ship construction and rig arrangement often refer to iconography, especially when there is a substantial lack of archaeological data. Along the Black Sea coast, the abundance of iconographic sources such as ship

graffiti, mainly inscribed on the walls of sanctuaries from Eastern Bulgaria, unequivocally suggests a type of maritime response by a maritime-oriented society to the historic events of the time. However, the trustworthiness of ship graffiti as a source of information about the maritime knowledge of the people is unclear, as is their adequacy for the reconstruction of ship types, and these are topics that deserve further examination.

Several studies on ship graffiti from Bulgaria appeared in the second half of the 20th century (Ovcharov 1979, 1982, 1987, 1992; Villain-Gandossi 1981), but only Professor Nikolay Ovcharov published a complete collection of depicted ships in his works on shipping along the Bulgarian Black Sea coast in the 14th- 19th centuries (Ovcharov 1992, 1993). His methods are similar to those commonly used by ship graffiti researchers examining these epigraphic monuments as a source of technical information about shipbuilding (Michail 2015), and sometimes can be biased. Namely, he compared visible elements from ship graffiti with such from marine paintings, and proposed particular ship types based on this resemblance - a somewhat tenuous approach in the absence of archaeological comparative material. Batchvarov came to the same conclusion (2009, 111), seeing the iconography (particularly the paintings) as an overrated source of constructional knowledge for the identification of archaeological remains, and criticising the attempts to reconstruct ships from art depicting the upper part of the hull, when usually only the bottom parts have survived (Batchvarov 2009, 111).

1.5   Research aims and objectives

Based on the brief literature review above, it becomes clear that only a few studies on post-medieval seafaring in the Western Black Sea apply a maritime archaeological approach, simply due to the lack of material evidence and sufficient nautical knowledge until the end of the 20th century. Until the discoveries of more recent times the majority of the research inevitably focused on historical and iconographic sources.

Identifying these knowledge gaps in the broad topic of western Black Sea post-medieval seafaring, and taking advantage of recent discoveries and the accumulation of a more comprehensive nautical database in the Bulgarian Black Sea, this thesis' primary question is: To what extent the political, social, and economic changes between the 17th and 19th centuries affected the development of Western Black Sea seafaring, particularly in the arrangement of the rigging?

The examination of the post-medieval ships' rigging system takes a central place and provides the nautical insight in the thesis research. The focus is on the comparative approach between two

different datasets. Dataset 1, or the BSMAP post-medieval shipwrecks, stresses the nautical archaeology perspective in setting up a reasonable analysis of Black Sea rig arrangements. Dataset 2, or the post-medieval ship graffiti from Nessebar, focuses on the interpretative approach for the analysis of ship rigging.

The comparison between the two datasets could be challenging, since the data derived from the second could be considered subjective and only auxiliary. Iconography is almost always seen as an auxiliary source in the reconstruction of the technical aspects of ships' remains, when a large portion of the latter are absent from the archaeological record. Since most rigging elements of the shipwrecks on the bottom of the western Black Sea are well preserved, I would like to mitigate the auxiliary character of the iconography through formulating the following overall aim of the thesis:

1) To combine and draw parallels between the two datasets in order to study the rigging of the post-medieval ships, and to use the insights thus gained to shed more light on the diversification of rigging arrangements along the western shores of the Black Sea.

To achieve this aim, I set out the following objectives for each of the datasets:

Dataset 1: BSMAP post-medieval shipwreck remains:

a) Extract from the BSMAP database the post-medieval shipwrecks with the best preserved and visible rigging elements on their hulls, and categorise these based on structural similarities;

b) Describe the relevant features of the selected shipwrecks as a basis for a hypothetical reconstruction of rigging;

c) Explore relevant additional sources of information on rigging as comparative material for a hypothetical reconstruction: travellers' accounts, published historical evidence, marine art, iconography, contemporary plans;

d) Make a hypothetical reconstruction of rigging elements or a complete rig arrangement of a Black Sea post-medieval ship based on the analysed multiple datasets aiming to trace specifics in the rigging and add dimensional perspective, in order to: 1) narrow down the proposed chronological boundaries (17th-19th centuries); 2) determine the shipbuilding tradition within which the rig was set; 3) if possible, find out the historical setting in which the ship sailed.

Dataset 2: post-medieval ship graffiti:

a) Record the largest post-medieval group of ship graffiti in Bulgaria through advanced photographic methods;

b) Preserve the ship graffiti in the long term in a digital catalogue accompanied by graphic drawings and photographs;

c) Categorise the ship graffiti according to different characteristics: incision style, spatial position, and technological performance;

d) Interpret the rigging of the most elaborately incised ship graffiti, and build a solid base for further comparisons with the archaeological remains, marine art, and other iconographic sources.

The above-mentioned questions about the trustworthiness of ship graffiti as a source of information on the maritime knowledge of the people, and their adequacy for the reconstruction of ship types, are thoroughly examined within the scope of the second dataset. The analysis of the ship graffiti in Nessebar also poses other important questions related to their origin: what group of people inscribed them, within what historical setting, and why.

1.6   Structure of the thesis

The structure of the thesis is defined by the importance and function of the empirical evidence in relation to its adequacy for critically filling a gap in the knowledge of western Black Sea seafaring.

In the introductory **chapter 1**, I reviewed the previous research on the topic, and traced the aims and objectives of this thesis.

Chapter 2 sets out the historical background of the research, and goes through several main events that affected the seafaring of the region during the post-medieval period. The coastal population and its role in the processes of change is also examined. This context helps to establish the historical setting in which the local people used to carve the ship graffiti in the harbour town of Nessebar.

Chapter 3 outlines the theoretical and methodological framework of the thesis. The main analytical approaches used in the earliest studies on Black Sea seafaring, and the errors they can lead to, are presented here. Relevant hypotheses are formulated, and the drawbacks of the main analytical approaches of the thesis are discussed. All datasets to be used in the thesis are also described in detail here, along with some potential issues that could arise during their analyses.

The analysis of the BSMAP shipwreck remains is covered in **chapter 4**. The analysis focuses on the rigging elements of the upper structures of the best preserved post-medieval shipwrecks, and results in technical reports. These reports, as well as the comparative material (graphic plans of ships, marine art, other iconographic sources) brought in to better understand the remains, form a

solid basis for further hypothetical reconstruction of a Black Sea post-medieval shipwreck's rigging arrangement **(chapter 6)**.

The ship graffiti analysis and interpretation are detailed in **chapter 5**. The classification of the graffiti aims to facilitate the next stage of interpretation and hypothetical reconstruction of some of the rigging elements available in the record. Similar to the previous chapter, comparative material is also used here. The chapter also attempts to determine the probable origin and tradition of inscribing ship graffiti.

The results generated in the previous two chapters are applied in practice in **chapter 6**, in a full hypothetical reconstruction of the rigging setting of one of the BSMAP post-medieval shipwrecks. In this final stage of the thesis, the assembled ship's rigging is used to narrow down its chronological boundaries (17th-19th century), and an attempt is made to find out the shipbuilding tradition within which the rig was set, and the historical setting within which the ship navigated the Black Sea.

All of the aspects discussed in the previous chapters that culminate in the single reconstruction of a post-medieval rigging arrangement come together in the final chapter (**chapter 7**), where I attempt to go further and draw conclusions on western Black Sea seafaring and the maritime-oriented society that once navigated the post-medieval Black Sea and left the invaluable cluster of ship graffiti in Nessebar.

Chapter 2   Historical overview

2.1   Introduction

The Black Sea has always been culturally, politically, and economically connected to the rest of the world. Throughout history, however, periods of accessibility and restriction of navigation in the basin alternated depending on which empire succeeded in taking control of the Bosphorus and the Dardanelles - the sea's only connection to the World Ocean - either directly or through vassal states (Ghervas 2017, 240). In 1453, Sultan Mehmed II laid siege to Constantinople with a fleet built in Aegean shipyards, with which he succeeded in capturing Constantinople (Kinross 2003, 89–90; 97). This event marked the end of the Byzantine Empire and led to the inclusion of the Black Sea, along with the Straits, within the boundaries of the Sublime Porte. After the 15th century, the Black Sea, along with a significant part of the Mediterranean world, was controlled by the Ottoman Empire.

Based on their technological characteristics, the recently discovered shipwrecks on the bottom of the western Black Sea and the ship graffiti from Nessebar which this dissertation examines were broadly dated between the 17th and the 19th centuries. Therefore, a necessary first step of the study is a historical overview of these three centuries in the region.

2.1.1   Three centuries of dynamic changes

The thorough outlining of three centuries of history in the Black Sea region is an ambitious and complex task that could scarcely be contained in a single overview chapter. Nevertheless, the analysis of the events concerning the Black Sea region, and even more so those that affected the development of shipping along the western shores, would not be adequate outside the context of the political, socio-economic, and cultural processes that took place on the world stage. This is a necessary prerequisite for the in-depth study of the changes in the technology of Black Sea ships, and in particular their rigging, on both merchantmen and warships.

The gradual displacement of oar-sail-powered galleys by fully wind-driven European ships, military conflicts, and piracy in the Mediterranean determined to a large extent the nature of maritime trade in the Ottoman Empire as early as the 17th century. The protection of trade routes was of paramount importance in asserting the supremacy of each country, and any attempted intervention by competitors became an occasion for military conflicts. The 17th century was also marked by large-scale wars and geo-political upheavals, which led to military reforms in the technology and tactics of warfare, including the naval fleets of the empires. For example, in the middle of the 17th century, the Köprülü viziers of the Ottoman Empire instituted a key reform

investing in the construction of a new type of square-rigged warships influenced by the European square-rigged galleons (Stoyanov 2018, 130).

Shipping in the Black Sea in the 17th century was mainly related to the transport of local production to the capital Istanbul, and was carried out mainly by Ottoman-flagged ships. The maritime trade of the European empires was limited to Istanbul and, with exceptions, beyond the Bosphorus to the interior of the Black Sea. Attempts to open a trade route across the Black Sea to the Persian Gulf for the silk trade were made as early as the early 17th century by members of the Levant Company (Wood 1964, 49). The turbulent 17th century for Europe ended with the beginning of the Enlightenment period, a period of changes in culture, military, and politics, and saw the growth of the power of the rulers and their armies.

The following 18th century was a century of reform, economic progress, alternating centralisation and decentralisation of power. Beginning with the struggle for control of the Baltic, namely the Great Northern War (1700-1721) (Stoyanov 2015, 9–11), the eighteenth century was a period of revolution, of evolution, of armies, of military strategies and elements, including changes in the design of warships. The second half of the century also marked the first official penetration of Western European merchants into the Black Sea. With this began the diplomatic and military struggles of the Western European powers to assert their influence over the economically, socially, and militarily weakening Ottoman Empire - a process later termed the "Eastern Question".

The nineteenth century was the most dynamic century for shipping along the Black Sea shores, which became the main export centre for grain and cereals to Western Europe. For the Ottoman Empire, it was also a time of crises in its military power, after it was monopolised by the Kapu Kulu or the elite Janissaries until at least the beginning of the 19th century. As a result, the Ottoman economy also experienced another crisis, and was later rather marginalised by the industrialising Western European powers (Stoyanov 2018, 127, 130).

2.1.2 Black Sea - trade route and arena of 300 years of wars between the Ottoman Empire and Russia

The Black Sea region was one of the arenas of numerous conflicts and large-scale wars between the Ottoman Empire and Russia for over 300 years between the 16th and 19th centuries. Davies (2012) frames the territorial extent of these wars between the lands along the Danube - from Croatia and Bosnia through Transylvania, the lands along the Northern Black Sea - from Wallachia and Moldovia through Ukraine, the Bucak Horde and the Crimean Khanate, the Zaporozhian and Don Cossacks Hosts, and southern Russia and the North Caucasus (below the Kuban River), summarising it with the term "The Danubian-Pontic theater of war" (Davies 2012, 5). The first conflicts between the

Ottomans and Moscow occurred in the northern Pontic region, and were related to subduing the local societies (Tatars and Cossacks), or more precisely, to controlling them and limiting their military-political intentions (Stoyanov 2018, 12). In fact, their first conflict began as early as the middle of the 16th century, in 1569, in the northeast of the Black Sea basin. The Ottomans aimed at strengthening their defence facilities in the Tatars' area of Astrakhan and push the Muscovites away; creating a navigable canal connecting the Don with the Volga, not only to control the goods coming from Asia to the Ottoman western territories, but also to deploy a river fleet to dispel Cossack raids; and building a fleet in the Caspian Sea to aid in their struggle against the Safavids in Iran (Stoyanov 2018, 58–59).

Thus, the Ottomans built a network of defensive fortresses, mainly along the mouths of the large rivers flowing into the Black Sea - starting from the mouth of the River Danube at Kilia, Ackerman, and Kinburn, through Perekop to Azov (Stoyanov 2018, 49). More than once, these fortifications prevented the Muscovite offensives. The Russian territories and defensive lines gradually expanded to the south from around the middle of the 17th century onwards (at first with the main purpose of preventing Tatar invasions), through eastern Ukraine, with Kiev as its centre, to the old lands of the Golden Horde spanning the shores of the Caspian Sea to the Dnieper River, and later approaching the northern shores of the Black Sea - from Odessa in the west, through Sevastopol in the Crimea, to Novorossiysk in the east (King 2004, 143). However, one of the last obstacles to the Black Sea invasion by the Muscovites was the Ottoman Azov fortress, which would not be overcome until the end of the 17th century during the reign of Peter I (Stoyanov 2018, 43). The external policy of the Muscovite Principality was based on expanding its territories to dominate the Baltic in the west, and the Black Sea in the south, and was tied to its appetite for opening trade routes across the Mediterranean and Black Seas to Persia and the consequent profits to the Principality of Muscovy from the export of their own production and through commercial treaties with the Western European empires. However, until the reign and reforms of Peter I, and even after Catherine II's first war with the Ottomans, Russia still did not possess the necessary naval power to oppose the naval forces of the Porte, and to challenge its territories in the Black Sea (Stoyanov 2018, 158–159).

Navigation and maritime practices through the Black Sea (and other basins) can conditionally be determined by two categories of factors – natural features and/or obstacles, and the human factor. Each of the Black Sea's shores is distinguished by its unique landscape, with different features - either accessible or restrictive to navigation. Delis (2020: 1) describes such obstacles to passage in the northern Black Sea region, notably the "shallowness of the waters in the Sea of Azov, the inhospitable coasts of Crimea, the rough and stormy prevailing north winds and the frozen ports of the northern shores during the winter" (Delis 2020, 1). On his Black Sea voyage to the southern Russian territories, William Eton (1805) described the changing landscape and navigational

landmarks along the Black Sea coast by outlining two main trade routes used in the late 18th and early 19th centuries: from Istanbul in an eastern direction to Kuban; and from Istanbul to the north, towards the southern Russian territories - Odessa, Dnieper, Kafa, Kerch (Eton 1805, 5–9). According to his description, the route from Odessa to Istanbul is characterised by extremely high shores (with the exception of the western ones), with the mountain ranges forming an excellent navigational landmark visible from 20 to 60 miles out to the open sea (Eton 1805, 5). For its part, the Istanbul route eastwards to Poti provides sufficient depth near the shore, and is clear of rocks and sandy bays, except at Sinop; nevertheless, that part of shore is clearly visible from a distance thanks to the sheer mountain banks surrounding it, and the rocky shores of Kefkani provide a good navigational landmark. The route from Istanbul to the Dnepr River features a gradual deepening of the shore, for instance at the sandy shores of Domuzdere, near Istanbul (Eton 1805, 5–6). But were the geographical conditions along the western Black Sea coast sufficiently favourable for the intensity of its use as part of the trade route from Istanbul north to Odessa and Kerch in the 17th-19th centuries? From Dearborn (1819, 21), we learn that on the route from Kherson to Istanbul, the Black Sea coast of Rumelia is dangerous to anchor at (but not impossible with good navigational skill) when there are strong north-east or east winds, and the more accessible Anatolian coast is to be preferred (Dearborn 1819, 21).

The second category determining maritime practices in the Black Sea - the human factor - includes for example the level of qualification or experience of the sailors, and the stability of the vessel in accordance with the possible short or long distance of the voyage. There is little historical data on that. Eton (1805, 9) writes about the use of the small wharf of Sozopol on the Odessa-Istanbul route in the early 19th century as a temporary shelter from winds from any direction. Black Sea navigation witnessed by Eton (1805) in the late 18th and early 19th centuries was no more or less dangerous than in other basins as long as the necessary skills, good navigational charts, and suitable vessels were available (Eton 1805, 6). However, he states that in Black Sea shipping, the Ottomans used mostly poorly constructed ships with large and heavy sails, manned by an unskilled crew consisting mainly of Greek sailors with relatively outdated navigational skills acquired by experience rather than formal training. Upon a sudden change of wind, they sought the nearest port, which was also the reason for the great number of merchant ships washed ashore (Eton 1799, 84, 223). In addition, their navigational charts were practically unusable by Europeans, as there were inconsistencies in the scale, and ports were represented rather schematically (Eton 1805, 10). Data from Eton's voyage (1809) were also used by Clarke and Anthon (1816: 387-388) to support his observation

during his Black Sea voyage in 1800[1], that in fact the navigation of the Black Sea was no more dangerous than that of the ocean, thus disproving the claim of the Turks that the Black Sea was exceptionally dangerous to navigate, hence its name ("black") (Clarke and Anthon 1816, 388).

In person, however, Clarke (1816: 388–389) became an observer of several marine disasters due to sudden storms from which even the most experienced sailors would find it difficult to escape:

„dreadful storms take place so suddenly, and with such fury, that every mast is carried overboard almost as soon as the first symptom of a change of weather is noticed. Perhaps more skilful sailors might guard against danger from the winds: it has more than once happened, when the Russian fleet put to sea, that the ships commanded by Admirals Priestman and Wilson were the only vessels that escaped being dismasted: yet even those experienced officers described the Black Sea being sometimes agitated by tempests more fearful than anything they had encountered in the Ocean. Many vessels were lost during the year when we visited Odessa, by the storms preceding and following the Equinox. The hulk of a vessel driven on shore at Varna was all the intelligence received of the fate of a merchant ship that sailed out of Odessa when we were there: not a soul on board escaped." (Clarke and Anthon 1816: 388-389).

In addition to the evidence of Eton (1805) and Clarke and Anthon (1816) about the dangers of navigating the Black Sea arising from both natural and human factors, even more reliable evidence in the form of numerical data on the high insurance premiums on merchandises from the port of Trieste in 1845 suggests that sailing in the Black Sea was high-risk. There are examples of carriers from Trieste to the Black Sea, the Baltic Sea, the North Sea, the Mediterranean and the South Atlantic, with the Black Sea, even during the sailing season, rated as one of the most perilous areas with the highest risk after the Central and North America, the Baltic Sea, and Scandinavia (Chatziioannou and Delis 2020, 24–25).

2.2 Three centuries of trade relations of the Ottoman Empire

The growth of trade in Europe and the search for new, more direct trade routes and partners to the East inevitably led the great empires to try to provide good conditions for the passage of their already technologically advanced ocean-going ships through the Ottoman Eastern Mediterranean and the Black Sea. The trade relations of the Ottoman Empire with Western European countries

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[1] From Dearborn's Memoirs (1819, vol.1, xvii-xxi), we learn that the traveller Edward D. Clarke, who subsequently published his voyages in 6 volumes (1799-1804), sailed in the Black Sea in 1800, when he was invited aboard the American frigate *George Washington* by Captain Bainbridge. This was also the first American ship to raise its national flag in the Black Sea (Dearborn 1819, vol. 1, xxi; Güleryüz 2014, 231).

were intensive, and until the second half of the 18th century, a large part of the import and export of 'foreign' goods was carried out through the Eastern Mediterranean to the Persian Gulf and back, with the capital Istanbul as the main trading centre. The importance of Istanbul as a commercial centre for the internal and external trade of the Ottoman Empire is attested by many who visited the empire, one of whom was the French military officer François Baron de Tott, who notes during his voyage to Istanbul in 1755 that merchant ships daily transported goods to the capital from the Black Sea and the Greek archipelago, and that it received luxury goods and textiles from every corner of the world from active foreign trade (Tott 1785, 40–41). In the 17th to the first half of the 18th century, however, trade in the Black Sea had a rather local character, catering to the needs of Istanbul. North of the Bosphorus, the entire Black Sea was virtually monopolised by the Ottomans, with strict control over maritime trade (İnalcık 1994, 273), and severely restricted access to foreign merchants and goods carried out by means of ships under Ottoman flag (Çizakça 1995, 213).

2.2.1 Maritime trade relations in the 17th century

By turning the Black Sea into an "Ottoman lake", the Ottoman Empire achieved its goal of diverting the world's trade flow through Istanbul. An example of this is the rerouting of the ancient Silk Road, which until the end of the 14th century reached Trabzon before crossing the Black Sea and continuing through the Crimea in a western direction; after the diversion, it crossed Anatolia, through the main centres of Istanbul, Bursa, and Smyrna (Çizakça 1995, 214). In the 17th century, the route connecting Anatolia with the Danube basin was also diverted to Istanbul (Çizakça 1995, 214). All trade flows from the Black Sea ports went to Istanbul, with wheat as the main article of trade, at least until the second half of the 18th century; the largest share of it was exported from the lands of present day Bulgaria (Panzac 1992, 195).

In addition to internal trade in the areas around the Black, Red, and Eastern Mediterranean Seas, the economy of the vast Ottoman Empire was also driven by external trade with the Indian Ocean through two main sea routes: one through the Persian Gulf and the other through the Red Sea; and with Western Europe across the Mediterranean (Panzac 1992, 189). Its main trading centres in the Eastern Mediterranean were Aleppo and Damascus in the east, and Alexandria in the south, which was also an important internal trading point connecting Egypt with Anatolia via Smyrna (Çizakça 1995, 214). Smyrna was also an important trade centre that connected the western Mediterranean and Europe with Anatolia and Istanbul, and from there – with the Black Sea and the land routes between central Asia and the west (Çizakça 1995, 214).

It was trade across the Mediterranean that pushed the first signs of Western influence into the Ottoman Empire through the establishment of trade ties with Western European merchants. First,

trade relations were established with the Venetians (1540), followed by the conclusion of agreements first with French (1569), then the British (1581) in the second half of the 16th century. Thus, the French and British empires began to compete to dominate the Eastern Mediterranean, Ottoman market, and to maintain decent trade relations. Later the Dutch (1612) also entered the competitive market, at first (1600-1612) sailing under the British flag (Wood 1964, 29, 46). The expanding Ottoman economy, at the expense of an ever-increasing political dependence on the Westerners, also required the permanent placement of Western diplomatic missions, directly subordinate to their own governments, in the empire (İnalcık 1994, 190). The largest number of foreign consulates, apart from those in Istanbul, are attested in Smyrna, with the most numerous after the end of the 16th century being the British, followed by the French, and finally the Dutch, and a very modest number of Venetians (İnalcık 1994, 191). In Aleppo, the French missions were more numerous, as well as in Cairo, where British consulates were also established at a later stage (İnalcık 1994, 191).

The route from Western Europe to the East through the Eastern Mediterranean, Istanbul, Aleppo, and Smyrna began to be exploited, besides the long-standing French trading partners of the Porte, also by English merchants from the Levant Company established in 1581 (Wood 1964, 42). Cloth was a major export merchandise, which was highly valued and sought on the Ottoman market. In the 1620s, the export of English cloth to the Ottoman Empire increased by 1/3, half of which was transported to Istanbul, and the other half - to Smyrna and Aleppo (Wood 1964, 42). With the increase in imports of English and Dutch goods to the Ottoman market, in the first decades of the 17th century, imports of French goods, mainly cloth, decreased dramatically (Wood 1964, 45). Part of the reason for that was the drastic fall in the French cloth trade in the Mediterranean as a result of the struggling textile industry in Normandy, Languedoc, and Provence due to the 16th-century religious wars in France. The raids by British and Barbary privateers and pirates on French goods and merchants further aggravated their position in trade with the Ottoman Empire. This continued until the 1660s (Wood 1964, 45), and even later, until the middle of the next century, when French textile exports to the Ottoman Empire in turn supplanted British ones, and reached some of their highest levels (İnalcık 1994, 724).

2.2.2   Maritime trade relations in the 18th century

While during the 17th century the Great Empires competed to dominate the Ottoman market in the Mediterranean, as well as the trade flows to Persia and the Indian Ocean, the 18th century, especially in its second half, was characterised by the reorganisation of trade flows, and the emergence of new players holding major stakes in trade within the Ottoman Empire. The importance of the Black Sea as a trade route for Western European merchants also increased during

this century. The main trade flow was directed to the newly opened northern Black Sea Russian ports, with an interest in grain exports to Western Europe. Seriously worried about the competitive export of this commodity to Europe and the reduced supplies to Istanbul, the Ottoman Empire tried to impose certain protective measures to overcome this process. One of these measures was the restriction on entering the Black Sea through the issuance of *izn-i sefine*, which entitled the carrier to one course, and a return course within no more than three months. The issuance of one such document became a cumbersome process: if in 1802 it took about a week, by 1830 it required more than two weeks (Çizakça 1995, 216). The Ottoman authorities also imposed control over private grain merchants united in sailors' guilds (kapan merchants), requiring them to export grain only to the capital Istanbul, with certain advantages in loading and unloading activities as an incentive (Çizakça 1995, 216).

Unlike the external trade of the Ottoman Empire, which remained significantly stable until the first decades of the 19th century, in the 18th century, the internal, and in particular the Levant trade, experienced a change related to the transport of goods from the empire. In the early years, the trade relied mainly on the re-export of luxury goods of relatively fixed value, mainly silk through the Arab provinces. Over the course of the century, however, the main export shifted towards large quantities of lower-value local products - a trend imposed by competing trade flows of luxury goods via the alternative African route to the Indian Ocean that developed over the three centuries after its discovery by the Portuguese (İnalcık 1994, 727). With the increasing demand for cotton in Europe between 1725 and 1789 (Panzac 1992, 203), the Ottoman Empire began to grow the raw material in several provinces, and export it to European markets. However, after the Napoleonic Wars, its exports decreased due to Europe's shift to importing cotton mainly from America (İnalcık 1994, 727). In this period, European imports of cotton products, mainly fabrics, to the internal market of the Ottoman Empire increased significantly (Panzac 1992, 203). The growth of European trade in the 18th century, and the import of more and more European merchandise to the Ottoman market, at the expense of lower exports, began to excessively overburden the Ottoman economy (Panzac 1992, 203). Ultimately, the Ottoman provinces became passive participants in the developing world trade system, where the main flows of European colonial products and processed European goods such as woollen cloth, ironwork, glass and porcelain ware, gunpowder, medicines, etc., poured (Panzac 1992, 727). Even Istanbul began to lose its importance as the main trading centre of the empire, with its share of exports also significantly reduced at the expense of imports, as a result of the intensive use of foreign factories opened in the 17th century in the Levant (İnalcık 1994, 727). Thus, as the importance of locally grown produce in the Ottoman provinces increased, harbour centres there began to flourish. Istanbul was thus displaced by Smyrna, for example, where Dutch merchants predominated; by Salonica, frequented by French merchants; and, after the French

Revolution, mainly by Austrian merchants from Trieste (İnalcık 1994, 727, 736). Trieste and Fiume were declared free ports after the Treaty of Passarowitz (1718), and gradually Austria-Hungary entered permanently into the increasing trade flow in the Adriatic, taking away Venice's first positions there (İnalcık 1994, 737; Delis 2014a, 45). The birth of the modern Greek merchant fleet in the first half of the 18th century in western Greece and the Ionian Islands is also connected with the increasing shipping in the Adriatic and the main harbour centres there - Venice, Ancona, and Trieste (Delis 2014a, 45). They mainly used typically Mediterranean-type ships, with the main distinguishing feature for most types being the use of fore-and-aft rigging arrangement; after the second half of the century, under the influence of trade relations with northern and western Europe, they gradually began to adopt the use of square rigging (Delis 2014a, 46).

In contrast to the first decades of the 17th century, after the 1720s to the 1760s, the share of the English cloth trade in the Ottoman market fell by half at the expense of the increase of the French, carried out almost entirely by French merchantmen enjoying the lowest duties compared to other foreign merchants (İnalcık 1994, 728). The greater percentage of French merchant ships compared to those of other European countries in the Levant trade in the second half of the 18th century is evidenced by Panzac (1992, 196), who shows that of the 776 ships that anchored at Rhodes from 1776 to 1779, 174 were Ottoman, and 602 European, of which 411 were French. In conclusion, he estimates that of the ships that passed through Rhodes in those years, those flying the Ottoman flag constituted less than a quarter in the eastern Mediterranean, and were almost absent from the western, where French-flagged ships predominated, followed by those of other European countries (Panzac 1992, 196). By 1782, major sea routes within the Ottoman Empire such as Tunis, Salonika, Smyrna, and Istanbul were dominated by Europeans (Panzac 1992, 196–197).

After the 1780s, French maritime trade with the Ottoman Empire in the eastern Mediterranean, with a share higher than those of the English and Dutch combined, was displaced by German trade. The events that led to this are associated with the opening of the Black Sea to trade in 1783, as well as the French Revolution from 1789 (İnalcık 1994, 729). After these events, as well as the subsequent defeat of Venice in 1797 by the French, Venetian and French merchant fleets operating in the Mediterranean almost completely disappeared, which benefited the Greeks living within the Ottoman Empire whose merchant ships began to grow significantly in number (Panzac 1992, 204). The Greek became a main carrier in the Ottoman waters of the eastern Mediterranean and the Black Seas, sailing under the flags of various countries (İnalcık 1994, 729).

2.2.3   Maritime trade relations in the 19th century

After the signing of the Treaty of Küçük Kaynardzha in 1774, the presence of Western European countries into the Black Sea trade gradually began to expand. In the 19th century, the Black Sea became an international water space, and the main flow of trade in the basin was from western Europe to the newly conquered Russian ports in Ukraine, with Kherson and Odessa becoming some of the most intensively used port centres in the region. Shortly after the signing of the treaty between the Ottoman Empire and Russia in 1784, Austria demanded from the Porte the same commercial rights and privileges granted to Russia; thus, the Austrians became the first of the Western European countries to enter the Black Sea (Dearborn 1819, 113). They established close trade relations with the autonomous Ottoman Danubian provinces of Wallachia and Moldavia, with their main exports being livestock and animal products, processed cloth, raw and worked hides, salt, etc.; in return, they imported into the provinces cloth, fruit, and luxury goods (Ardeleanu and Lyberatos 2016, vi).

With the signing of trade agreements with Austria, Russian maritime trade in the Black Sea began to occupy even more advantageous positions, and ships sailing under Russian and Austrian flags began to predominate in the basin. Merchants in the Black Sea came from Genoa, Leghorn, Trieste, as well as France, which, after signing a commercial treaty with Russia in 1787, sailed for 16 years under the Russian and Austrian flags with a main trade line between Kherson and Marseille (King 2004, 156). In 1802, the French first raised their own flag (for commercial purposes) in the Black Sea, a condition demanded by Russia under the peace treaty between Russia and the Ottoman Empire signed in March 1802 (Dearborn 1819, 113, 115, 125, 126). In the same year, England was also allowed to trade in the Black Sea (Dearborn 1819, 125; Wood 1964, 181; King 2004, 156), with the principal articles of English trade there being corn, tallow, and timber for naval supplies (Wood 1964, 181).

The early period of the development of the southern Russian port centres, around the 1790s, is also associated with the establishment in Kherson of a Venetian consulate. Consul Pietro Locatelli pushed the first commercial interests of Venice in the Black and Azov seas, and his consular reports attest to the intensive involvement of Greek merchants and shipowners under Ottoman or Venetian patronage in the international grain trade through port centres in the Crimea, the mouth of the Danube, and the Sea of Azov. Their trading companies rapidly expanded in the late 18th century, and laid the foundations of the future development of the Black Sea in the 19th century as a major centre for the export of grain (Ardeleanu and Lyberatos 2016, v–vi; Luca 2016, 3).

With the change in the political situation in the Ottoman Empire, and with the increasing trade between Russia and Western Europe, the complete dominance of the Ottoman Empire in the Black

Sea grain trade ended, giving way to the free formation of production prices, and in turn stimulating the flow of private investment from the rapidly industrialising West. These processes began to benefit the minorities of agricultural producers and merchants living within the borders of the Porte - Bulgarians, Armenians, Greeks - and the lands in the western Black Sea, so far little known to Western Europeans, began to gain more and more importance (Wood 1964, 243). After the Treaty of Adrianople (1829), more and more harbour centres on the west coast of the Black Sea began an intensive development (Ardeleanu and Lyberatos 2016, vi). Unlike the sea's northwestern shores, which opened to European markets at an earlier stage due to the development of the Danube trade route to Western Europe, the southwestern part of the Black Sea began its entry into the trade flow of Western European countries a little later, with the signing of the Anglo-Ottoman Treaty of Balta Liman (1838). This treaty abolished compulsory state supplies of grain, and lifted the ban on grain exports from the Ottoman Empire in 1840, while also establishing more favourable tariffs (Ardeleanu and Lyberatos 2016, pp. xi–xii). In this period, Kyustendzha, Mangalia, Kavarna, Balchik, and Varna were identified as important port centres for the province of Bulgaria, and Misivri, Anhialo, and Burgas - for the province of Rumelia (Rusev and Pletnyov 2012, 551). After the 1830s, Burgas became a rapidly developing port city and the main grain export centre in the province of Rumelia, even surpassing in economic importance the neighbouring port settlements such as Anhialo, Mesemvria (Misivri), and Apollonia. The main trade flow there was carried out by regional agents under Ottoman, Greek, Ionian, and Wallachian flags (Ardeleanu and Luca 2016, xii-xiv). In the largest port centre of the Western Black Sea - Varna, in the period before the Crimean War, the highest number of consulates were built - from France, Austria, Belgium, Greece, Sardinia, Russia, and England (Rusev and Pletnyov 2012, 549; Roussev 2024, 104). After the 1840s, the development of the local economy, although accompanied by difficulties related to an uncertain investment environment due to a number of abuses, poor infrastructure, etc. (Roussev 2024), rapidly progressed as a result of the increase in prices and demand for goods from the lands of today's Bulgaria by Western European merchants. This expansion was even more accelerated after the Crimean War, with the influx of foreign capital that contributed to the enrichment of individual local commercial entrepreneurs (Roussev 2019, 63).

2.3   Wars, warships, economic and social consequences for the Ottoman Empire and the Black Sea region

Before presenting and analysing the after effects of each key war and the terms of trade agreed between the countries, and their impact on the economy of the Black Sea region, I will first try to describe, based on the available data, the naval fleets of the main countries fighting for the Black Sea sea - the Ottoman and Russian empires; tracing the main stages of large-scale reforms between

the 17th and 19th centuries, because they are crucial in understanding and studying navigation in the Black Sea during this period.

Parallel to the development of trade and merchant fleets, the navies also began to develop and modernise, as a natural result of their pivotal role in the control and protection of trade and the territories from which the precious resources are obtained (Ciarlo 2023, 387). The naval power of the great Western European empires was mainly supported by the ship of the line, a term relating to the mode of naval warfare involving large ships fighting 'in line of battle'. Its origins are disputed but it was increasingly adopted in the 17th and 18th centuries, the 74-gun ship eventually regarded as the optimal combination of speed, manoeuvrability and power. Naval power was however, inextricably linked to mercantile enterprise with the Dutch becoming a prominent sea power in Europe in the first half of the 17th century, before being supplanted in the early 18th century by Great Britain after the War of Spanish Succession (1700-1714) (Stoyanov 2015, 24). The Ottoman and Russian Empires began to modernise their naval power at a later stage, bringing it technically and administratively to European standards, and taking advantage of the technological advancements and specialised personnel of Western European countries.

Before the establishment of the Russian Imperial Navy in 1696 by Peter I, the navy of the Muscovites in the 17th century was practically non-existent; at that time, they only had sea passage to the White Sea through the city of Arkhangelsk in the north (Anderson 1952, 237; Sozaev and Tredrea 2010, 49). Before the establishment of their first Azov fleet, the expansion of the Muscovite Principality into the northern Black Sea Ottoman strongholds was severely repulsed by Ottoman forces. As mentioned earlier, it was the northern Black Sea region that was the starting arena of the first conflicts between the Ottomans and the Muscovites in the middle of the 17th century. In these conflicts, the two also allied themselves with their vassals and mutually hostile Tatars and Zaporozhian Cossacks, respectively (Stoyanov 2018, 12). For the purpose of his offensive in the south, Peter I built the first organised river fleet on the Don River near Voronezh, consisting of shallow-draft rowing frigates, rowing galleys, and fire ships (Sozaev and Tredrea 2010, 77). In his description of the Ottoman and Russian naval forces at the Battle of Azov, Anderson (1952) gives detailed accounts of the number and type of vessels of both countries. The ships of the first Russian fleet lacked the necessary structural qualities to reach the Sea of Azov, which is why the Russian command led by Peter I had to use allied Cossack vessels adapted to sea conditions, as well as a Turkish galley they captured (Anderson 1952, 239). From the same source, we learn that one of the successful battles during this campaign, the defeat of a Turkish supply fleet off the waters of Azov, was actually won thanks to an attack by Cossack ships (Anderson 1952, 239). Even before that, in the last years of the 16th century and in the 17th century, Cossack fleets had gained experience in independent sporadic raids against Ottoman fortresses and fleets; at the time, the Black Sea was

Ottoman and guarded against entry by foreign warships and merchant ships, and only Zaporozhian Cossack vessels managed to break through the Ottoman defenses and carry out raids mostly on the northern coasts, but there is evidence that their fleets attacked the western coast and even reached the Bosphorus (Ostapchuk 2001, 39).

Before the arrival of Russia in the Black Sea, the Ottoman Empire had a flotilla of rowing galleys, mainly operating in the Mediterranean Sea. Only after 1650, after the reforms of the viziers Köprülü - Merzifonlu Kara Mustafa Pasha and Kaptan-i Derya Gazi Hasan Pasha, did the construction of a new type of ship begin, along with a reorganisation, training of crews, and also strengthening of ties with the vassal North African corsairs (Stoyanov 2018, 130). About three decades after these reforms, the more systematic construction of Atlantic-style heavily armed sailing ships began (Zorlu 2011, 18). Nevertheless, from the Mediterranean actions of the Cretan wars in the 1650s and 60s (see below) until near the end of the 18th century, there was simultaneous use of rowing galleys and large sailing ships, although by the end of the period galleys were mainly used for auxiliary purposes (Zorlu 2011, 18).

The 18th-century development became even more tangible with the construction of not only larger sailing ships with heavy artillery for long-distance voyages, but also the change in the administration and financial dimensions of the imperial arsenals. These changes included an increased allocation of funds for building infrastructure, organisation, gun manufacture, training personnel (Ciarlo 2023, 387). However, due to a number of factors, the navies of the Ottoman Empire and Russia still continued to rely on rowing galleys well into the 18th century, and even shortly after the second half of the century in the case of the Ottoman navy, albeit with greatly reduced numbers (Zorlu 2011, 18). Zorlu (2011) points out several main reasons for the slower replacement of the rowing galley as the backbone of the Ottoman Navy: 1) the long-standing rivalry with Venice in the Eastern Mediterranean, which inevitably led to trade and technological exchange, and a general tradition of adapting the rowing galley to be suitable for use in that area; 2) the practicality and adaptability of the Ottomans to using oar-powered ships in battle due to the effective use of artillery on foredecks, which in turn did not require significant changes in the design of their hulls that would impose a new order of organisation and allocation larger financial investments; 3) economic and psychological, expressed in increasing unemployment after the release of a large number of oarsmen, sailors, and soldiers employed from the Ottoman provinces as crew of the galleys, and the expense of hiring foreign specialists to build the new types of sailing ships (Zorlu 2011, 20–23).

With the development of scientific and technical means and innovations in shipbuilding in European naval dockyards, the race for their adoption by Western European and later Eastern European navies necessitated the use of heterogeneous methods. Copying ship designs from those of other

empires during these centuries was a common practice, especially between opposing countries. Itinerant labour, head-hunting of master shipwrights, study tours and on occasion outright espionage were some of the methods used to acquire knowledge in the race to build more capable ships. Another was the close inspection of a vessel during its repair in a foreign port or, in the case of naval ships, after their capture. For example, the French 74-gun ship *L'Invincible,* built in 1744, was captured by the British navy in 1747 and her lines became the basis of subsequent English 74s, including Thomas Slade's *Valiant* Class (Lavery 1984, 9–10). Conversely much of the advances in French naval construction had benefitted from knowledge acquired from their competitors earlier in the century (Ciarlo 2023, 386). In addition, the empires applied similar designs and constructions of their warships due to the employment of foreign specialists (engineers, mathematicians, shipbuilders). And thus, in the 18th century, warships of both the Ottoman and the Russian Empires began to be designed more and more under Western influences (Davies 2012, 8). At the end of the 18th century, the second main reforms for the Ottoman Navy - those of Sultans Abdul Hamid I and Selim III, initiated as a result of the loss in the Battle of Cheshme in 1770 against the Russian Navy of Catherine II - modernised the Ottoman Navy, allowing it to reach the modern standards of the Western European fleets (Zorlu and Özbay 2012, 472).

One of the reforms was an improvement in the construction of the ships, and in particular a complete change in the rigging, credited to one of the hired specialists from England, who rearranged the rigging after the English model (Eton 1799, 88). These reforms also included the construction of the first Ottoman Naval Training Institution "Kalyoncu kişlasi" in 1770, and the first Technical Navy Academy "Mühendishane-I Bahri" in 1776 (Güleryüz 2014, 231). In fact, the need for these institutions was even more urgent in order to provide quality technical training of the necessary personnel (sailors and naval officers), whose lack was evident in the Battle of Cheshme, and is even considered the main reason for the Ottomans' loss (Zorlu 2011, 28).

The engagement of Western naval specialists also helped to create the Russian Navy, following Tsar Peter the Great's sojourn in Amsterdam (1697) and London (1698) during which was able to study shipbuilding among other sciences. This led directly to the creation of Black Sea and Baltic fleets in contrast to the earlier more sporadic and ad hoc building or acquisition of ships noted below. The process of development continued during the reign of Catherine II throughout the 18th century. In the early years of its development, there was a Dutch influence in the design of the ships, as early as 1667 when the first Russian flotilla was built in Dedinovo by Russian craftsmen under the instructions of Dutch ship specialists (Sozaev and Tredrea 2010, 49). Dutch specialists were employed to build ships for the Azov fleet, and some of the galleys from this fleet were the work of Venetian shipbuilders (Cross 1996, 159; Sozaev and Tredrea 2010, 29). However, in the following years Peter I began to hire English shipbuilders, preferring them to the Dutch because they used

mathematical methods in the process of ship designs. Having spent time in Holland and England it is not surprising his scientific interests made him favour the English approach in which the craft of shipbuilding had moved further towards the science of naval architecture (Adams 2013: 148). In this he was following the example of the Swedish Crown who had attracted three English Master shipwrights, Francis Sheldon, Robert Turner and Thomas Day in 1659. Peter personally brought from England the master shipwrights John Deane (son of Sir Anthony Deane) and Joseph Noy [Nye] (Cross 1996, 160). In addition, in 1698, Peter also employed other specialists needed in the making of masts, such as Henry Wright; for making blocks - Nicholas Baggs; Henry Atherley the caulker; and Samuel Hopkins the painter (Cross 1996, 163). Thus, the hiring of English naval specialists continued for a century, and helped to build warships of English design for the Russian Baltic Fleet and Black Sea Fleet. During the two wars for the Black Sea and the Mediterranean in the second half of the 18th century, well-trained and disciplined English naval officers were recruited into the ranks of the Russian Navy (Cross 1996, chap. 5). Russian developments therefore inevitably affected subsequent maritime competition with the Ottoman Empire in the Black Sea.

The main line of analysis in the following pages will focus on how the trade in the Black Sea basin was affected by the wars that broke out within the boundaries of the Ottoman Empire between the 17th and 19th centuries, and their economic and social consequences.

2.3.1 Key wars in the 17th century, diplomatic moves, and economic and social consequences of the signed peace treaties

2.3.1.1 Ottoman-Persian wars in the first quarter of 17th century

Before the deepening of Russian-Ottoman confrontation at the end of the 17th century, the lands around the Black Sea were an area serving entirely the internal trade of the Ottomans, with Istanbul as the main commercial center. In this sense, until the infringement upon the northern Black Sea territories by Russia, the situation in the Black Sea could be defined as relatively calm. During the early years of the 17th century, the naval forces of the Ottoman Empire were torn between several fronts. In the Mediterranean, there was the struggle with Venice for influence over the Western European trade flow. In Southeast Europe, the war with the Habsburg Empire lasted nearly 300 years - from the beginning of the 16th century to the end of the 18th century. The Great Turkish War against the Holy League (1683-1699) unfolded on several battlefields along the Danube river valley, Moldova, the Northern Black Sea, as well as in the Peloponnese and the Aegean Sea. Finally, until 1640, the Ottoman Empire also struggled against the Safavids in Iran.

Aside from diverting the Ottomans from pursuing active politics in Europe, the prolonged struggle of the Ottoman Empire with Persia under the leadership of Shah Abbas in the first quarter of the

17th century also led to significant trade losses through Aleppo, which was an important trading centre for importing Persian goods to Europe, and exporting European goods to the East. These events also impacted negatively the trade relations of the Ottomans with the Levant Company, which was the main exporter of English cloth to the east via Aleppo. As Wood (1964) points out, in order to make new trade contact with Europe, the Shah of Persia began negotiations with the Cossacks of the Northern Black Sea and with Russia, with the idea of establishing an alternative trade route through Astrakhan, the Volga River, and Arkhangelsk, or across the Black Sea and Poland (Wood 1964, 48). Ultimately, the trade with Persia via the Persian Gulf benefited the rival of the Levant Company – the British East India Company by establishing a route through the Cape of Good Hope, Africa in 1611, which was another blow to English trade in Aleppo (Wood 1964, 42). The East India Company established factories in Ispahan, and Levant Company merchants were never granted the right to cross the Black Sea due to strained relations between the Ottomans and Persia (Wood 1964, 49). Although indirectly related to the development of the economy in the Black Sea region, the negative effects on the external trade of the Ottomans from the war between Persia and the Ottoman Empire were still felt in the region.

2.3.1.2   Cretan War (1645-1669)

Before one of the Ottomans' most significant losses in the war against the Holy League and the signing of the Treaty of Karlowitz in 1699, which Peter I used to push his expansionist policy towards the Black Sea, the Ottoman Empire fought successful naval battles in the Mediterranean against Venice in the first Cretan War (1645-1653) and the second Cretan War (1654-1669). One of the greatest advantages of these wars for the Empire was the increase and reformation of its naval forces, as well as the expansion of its influence in the Eastern Mediterranean trade. A key reform was instituted in shipbuilding, explicitly dealing with the technology of ship propulsion – by command of the grand vizier Merzifonlu Kara Mustafa Pasha and Kaptan-i Derya Gazi Hasan Pasha, galleons began to be built more systematically (Zorlu 2011, 18). From Anderson (1952) we also learn that even when the Ottomans laid siege to the northern coast of Crete in 1645, they were already using sailing ships: their fleet, apart from a large number of galleys (80), also included over 20 sailing ships (Anderson 1952, 121–122). Anderson (1952, 125) also notes the presence of 12 ships in the Ottoman fleet employed by the Netherlands in the siege of Candia. According to Wood (1964), in this war, the fleets of both hostile empires (Venice and the Ottoman Empire) included English ships, which aggravated the relationship between the Ottomans and England in terms of their trade relations in the Levant (Wood 1964, 51).

2.3.1.3   Great Turkish War against the Holy League (1683-1699)

After consolidating its positions in the Eastern Mediterranean, and attracting North African (Barbary) pirates to its Navy, mainly to guard the waters of the Mediterranean Sea, and to exercise control over the Western European merchant fleets trading with the Ottomans, under the rule of Vizier Kara Mustafa Köprülü Pasha (1676-1683), the Ottoman Empire turned its army back to Europe. After his refusal to extend the Peace of Vasvár with Vienna in 1664, and having opened his way with the victory over Poland at Żurawno in 1676 and the annexation of the Podolia to his lands (Stoyanov 2018, 77; 2022, 346), in 1683, he made his last march against Vienna, which marked the beginning of the Great Turkish War against the Habsburgs and the Holy League (Austria, Poland-Lithuania, Venice, Russia). Overall, the resumption of the Holy League's war against the Ottoman Empire presented a good opportunity for Peter I to make a southward advance towards the northern Black Sea region, after his previous unsuccessful campaigns against the Crimea in 1687 and 1689. This time, his ambition was to assault Azov (Anderson 1952, 237). Allied to the Holy League in the Great Turkish War, for this campaign, Russia began building the Voronezh flotilla to block the Don River and thus prevent the Ottomans from crossing by sea. Soldiers, villeins, engineers, and carpenters supervised by Dutch and English mariners were mobilised for the flotilla's construction. After 14 years of combat on several fronts, by both land and sea, the Ottoman Empire suffered two of its heaviest defeats during the Great Turkish War, at Mohács (1687) and Zenta (1697), where primary strongholds of the Empire in Hungary and Transylvania were captured. With the subsequent Peace Treaty of Karlowitz in 1699, the lands north of the Sava River, with the exception of Timișoara, passed to the Habsburgs; the Peloponnese passed into the hands of Venice; Podolia was given back to Poland. Further territorial losses followed with the Treaty of Constantinople with Russia a year later: Azov was handed over to Moscow; however, the fortresses along the Dnieper were returned to the Ottoman Empire (Stoyanov 2018, 158). However, even after Russia's advance to Azov, and the establishment of its first Azov fleet there, its fleet was still too insignificant in size, lacking the necessary naval bases, and not modernised enough to be able to overcome the greater naval power of the Ottomans in the Black Sea (Stoyanov 2018, 158–159). For the next 20 years, Moscow's advance to the Black Sea remained in the background due to another ambition of Peter I - the overcoming of the Baltic and the exit of the Russian fleet to the Atlantic Ocean in the Great Northern War (1700-1721) (Stoyanov 2018, 159).

As for the Ottoman Empire's trade in the Eastern Mediterranean shortly before and during the Great Turkish War against the Holy League, it began to decline. Trade relations between the Porte and the Levant Company deteriorated rapidly, and exports and imports through the Levant began to suffer due to the need to allocate additional funds to cover the losses resulting from the repressive policy of Vizier Kara Mustafa. This necessitated an increase in consulage for the export

of English goods to Turkish ports (Wood 1964, 105). The losses of the Ottoman Empire from sea trade with England, represented by the Levant Company, continued during the Great Turkish War, and were further exacerbated during the Nine Years' War, when England joined the Habsburg coalition (1688-1697) against France. Now her merchant ships sailing to the Levant were attacked not only by pirates, but also by ships of the French navy, and also by French privateers. Thus, the Company's English merchant fleet became dependent on the ability of the English Royal Navy to provide the necessary convoy of warships for protection; however, the latter were often engaged in military operations against France (Wood 1964, 108). Therefore, at the end of the 17th century, the challenging trade traffic through the Levant to the Persian Gulf had a negative effect on the economy of the Ottoman Empire and on the profits of the English Levant Company. Another reason for the decline in the Levant Company's trade share was the increased sea trade of their rival East India Company through the then safer route through Africa to Bombay, and the more favourable conditions for importing Persian goods such as silk and wool, and selling them in Europe at lower prices (Wood 1964, 116). The Holy League's war against the Ottoman Empire restructured trade in the Levant in such a way that France took advantage and came to the forefront, occupying the niches of English, Dutch, and Venetian trade in the area (Wood 1964, 107–108).

2.3.2 Key wars in the 18th century, diplomatic moves, and economic and social consequences of the signed peace treaties

2.3.2.1 The Northern War (1700-1721) and the reordering of Europe and European maritime trade

After several key battles and losses, the decisive battle that turned the tide of the war for the Russian Empire was at Poltava in 1709, won by Peter I following a mistake by the Swedish King Charles XII. During the Northern War, the Baltic Russian Fleet was established. Unlike Sweden's technologically advanced and well-organised navy, in the early years of the war, the Russian fleet was in its infancy, with little experience in naval combat, and consisted of ships purchased from foreign shipyards and untested ones built in Russian shipyards with the help of English shipbuilders (Sozaev and Tredrea 2010, 54). After 1713, the importance of the Russian fleet grew and began to occupy a central place in the amphibious war in the Baltic Sea against Sweden (Stoyanov 2015, 44). The introduction of a number of naval reforms and the construction of a competitive naval fleet by Peter I, as well as the experience gained during the Northern War, gave Russia enough self-confidence to continue its expansionist policy in Eastern Europe and in the northern border territories of the Ottoman Empire. However, with the death of Peter I in 1725, plans to expand the naval fleet were extinguished until the accession of Catherine II (Sozaev and Tredrea 2010, 57).

Meanwhile, after a ten-year period without wars, the Ottoman Empire had managed to consolidate its finances and economy after the losses suffered with the Peace of Karlowitz. In late 1710, when the Swedish king Karl XII took refuge with the Ottomans in Bender after his defeat at Poltava, the Porte saw an opportunity to challenge Peter I by refusing to hand him over to the Russians, and thereby managed to divert Peter I's attention from the Baltic War (Stoyanov 2018, 160–161). This led Peter I, under the excuse of, or really in addition to, capturing the Swedish king, to further his foreign policy objectives in the Balkans by imposing his influence on the Danubian principalities - Wallachia and Moldavia, specifically by attempting to sever the Romanian princes' dependence on the Ottoman Empire (Stoyanov 2018, 161–162). This move was unsuccessful, and he turned his attention again entirely to the war against Sweden, which Russia won in 1721. This win saw Russia with access to the Baltic Sea, and a Baltic fleet deployed, which enabled it to have good trade relations with Europe and the Atlantic, respectively through Denmark, and the Netherlands and Great Britain (Stoyanov 2018, 173). However, the maintenance of good trade relations only held until the Western European partners began to see more of a threat to their positions in the expansion of the Russian fleet in Petersburg, and Russia's turn to a hostile foreign policy. Russia desired to be competitive, and break out of trade dependence on the Western Europeans. Seeing that most of his country's capital came in the form of money and exotic goods via the Indian Ocean, Peter I began to seek alternative land routes to the Indian Ocean, which was possible only through expansion in the East towards Central Asia (Stoyanov 2018, 173). An additional reason for pushing Russian foreign policy to the east was the deterrence of the Ottoman influence on the territories between the Azov and Caspian seas, after the Empire regained Azov in 1711 at the Prut River battle (Stoyanov 2018, 173).

2.3.2.2 Russo-Turkish war (1736-1739)

After the end of the Northern War, the 1720s were a decade of military campaigns for Russia and the Ottoman Empire in the race to push their foreign policies into Persia. After occupying strategic territories in Western Persia, and imposing their influence among the peoples there, in 1724, the Ottoman Empire and Russia came to an agreement with the mediation of Great Britain and France. The Ottomans were left with all the lands around the Caucasus except the coast of the Caspian Sea, and Russia – with all the western and southern shores of the Caspian Sea (Stoyanov 2018, 180–181). However, their possession of these territories did not last long. After the restoration of the Safavid dynasty in the War of the Persian Succession, in a series of successful campaigns, the tribal leader Nadir Afshar managed to repel the Ottoman forces, thus regaining all the lands occupied by them after 1722 (Stoyanov 2018, 181). The Persian leader also managed to negotiate the return of the lands occupied by Russia through a diplomatic move, offering an alliance against the Ottoman Empire to the newly ascended ruler of the Russian throne - Empress Anna (Anderson 1952, 272;

Stoyanov 2018, 181). Ultimately, the ensuing peace between Persia and the Ottomans rendered Persian support in Empress Anna's upcoming campaign against the Tatars in Ukraine meaningless (Anderson 1952, 272). The military campaigns of Russia and the Ottoman Empire in Persia were more than unsuccessful, and led to economic and social losses. After a Janissary rebellion due to the prolonged military campaigns, Sultan Ahmed III and Vizier Damat Ibrahim Pasha were deposed and killed, and Russia lost tens of thousands of soldiers and financially strained the treasury (Stoyanov 2018, 182).

After Russia's victory in the War of the Polish Succession (1733-1738), in 1736, Empress Anna renews military operations against the Ottomans in alliance with Austria, with the goal to renew Peter I's policy of establishing permanent control over the lands in the Northern Black Sea region and settling in Ukraine (Stoyanov 2018, 183). In the 1736 campaign, one of Russia's aims was to recapture Azov, thereby gaining access to the Sea of Azov. The land troops were led by Field-Marshal Lacy, and a river fleet commanded by Rear-Admiral Bredal advanced along the Don River to Azov. This fleet's construction began under Peter I, and was completed in 1734 (Anderson 1952, 273). Anderson (1952, 273) describes it as consisting of 9 44-gun prams, 6 8-gun prams, 35 galleys, and 29 kaiks (small rowing vessels), while Sozaev and Tredrea (2010, 79) rather do not justify the use of the term "fleet" for this group of shallow-draft vessels lacking the characteristics of sea transport, but rather purpose-built for the purpose of attacking a fortification. Another division under led by the German military commander Field-Marshal Münnich advanced towards the Crimean Khanate (Anderson 1952, 272). For this campaign, more than 500 small vessels equipped with 2 3-pound guns were built in the Don, and in Bryansk on the river Dnieper - 400 double sloops with 6/ 2-pounder guns each, 2 prams, and 30 galleys (Anderson 1952, 273). The Russian campaigns put the Ottoman Empire in a critical position, as its army was in crisis after the military clashes in Persia, and it was financially exhausted (Stoyanov 2018, 184). However, the Ottoman navy demonstrated greater technical superiority, consisting as described by Sozaev and Tredrea (2010, 79) of a combination of galleys and sailing ships for the neutralisation of the Russian inshore fleet, both in Azov and in the Ochakov fortress.

Afterwards, the hostilities intensified on multiple battlegrounds, in which Russia managed to win all battles thanks to the Western European commanders in its employ, despite weak logistics and military administration. In the end, the outcome of the war was diplomatic rather than military, with the Ottoman Empire emerging as the winner in spite of the weaknesses in its command structure and the lack of discipline in the Janissary infantry (Stoyanov 2018, 204). After Austria's internal exit from the war with a secret peace with the Ottomans after their defeat at Grocka, in breach of the Russo-Austrian agreements, the unsuspecting Russia was forced by France to find a peaceful way out of the war, and on September 29, 1739, the Peace Treaty of Belgrade was signed

(Stoyanov 2018, 203). With it, Austria returned the lands south of the Sava River, the fortresses of Belgrade, Orshova, and Adakale to the Ottoman Empire, and Russia retained the fortress of Azov, but without the right to retain its fortifications. It also returned to the Ottomans all previously occupied Moldavian territories, and recognised the authority of the Ottoman Empire over the Danube principalities. With regard to the maritime aspect of the peace treaty, Russia was prohibited from building naval fleets in the Sea of Azov and the Black Sea. The only concession the Porte gave it was the right to trade in the Black Sea, but only by means of Ottoman vessels (Stoyanov 2018, 203–204).

Despite the restrictions imposed after this war, in the long term, Russia had managed to gain access to the northern Black Sea territories, first by sufficiently undermining the economy in Crimea after the incursions of Von Lacy's army, and second by establishing its influence over the Cuban Tatars and Kalmyks in the territory between the Volga and the Don Rivers (Stoyanov 2018, 205). But the final annexation of these territories would happen under Catherine II, and before that, the policy of Peter I's heiress Elizabeth was aimed more at Western Europe. Under her rule, Russia intervened in two of the largest wars in Europe in the 18th century - The War of the Austrian Succession and the Seven Years' War (1756-1763), after which it later undertook some of its largest naval reforms (Stoyanov 2018, 205). At the end of the Seven Years' War, Tsar Peter III of Russia was ousted by his wife Catherine II. France was on the losing end of this war, and its interest in lands in Southeastern Europe and the Black Sea region grew in search of new markets (Gutmeyr and Kaser 2018, 184). The political interests of Western European countries in Southeast Europe and the territories ruled by the Ottoman Empire grew and culminated in the 1860s in the course of the Crimean War (1853-1856) (Gutmeyr and Kaser 2018, 184). Before that, however, one of the largest wars between Russia and the Ottoman Empire broke out, with a fundamental impact on the development of the Black Sea region.

2.3.2.3 Russo-Turkish war (1768-1774)

Before the beginning of the Russo-Turkish War of 1768-1774, Russia, although financially unstable after the Seven Years' War, became a serious political factor in Europe, with a Baltic fleet and an experienced army subordinated directly to Empress Catherine II (Stoyanov 2018, 207–208). On the other hand, the Ottoman Empire, having enjoyed peace during the first two decades of the 18th century, was able to recover economically with a surplus in the treasury, but at the expense of economic restructuring expressed in the restriction of central power, the expansion of private economic initiative, and the rise of the provincial elites – ayans (Stoyanov 2018, 207). This led to the formation of separate political factions which destabilised the main units of the army - the

Timariots and the Janissaries. The Timariots disappeared by the 1760s, and the Janissary corps became more of a social unit (Stoyanov 2018, 207–208).

The reasons for the outbreak of another Russo-Turkish war were rooted in internal political conflicts in Poland, which became a Russian satellite state after the end of the War of the Austrian Succession (1740-1748) and the Seven Years' War (1756-1763) (Stoyanov 2018, 211–212). The confrontation between the newly elected pro-Russian king Stanislaus Poniatovski, militarily supported by Russia, and the aristocratic circles protecting their own political, social, and religious interests, in turn deepened and eventually led to an open war - the War of the Confederation of Bar in 1768 (Anderson 1952, 278; Stoyanov 2018, 212). The placement of Russian troops in Poland and the strengthening of Russian influence there, on the other hand, was seen as a serious threat by the Ottoman Empire. But the Empire was even more worried about the growing Russian influence in Ukraine, and the loss of political support in the Northern Black Sea region - the Crimean Khanate (Stoyanov 2018, 212). In October 1768, the Ottomans declared war on Russia (Stoyanov 2018, 214).

The Russian offensive in 1769 was planned in two directions. One campaign targeted Ukraine, with the land forces divided into three: to Kiev and from there to Moldova; entering Podolia; and in defence of Ukraine. The Voronezh fleet was also assigned to this front, aiming to enter the Sea of Azov through Azov and Taganrog (Stoyanov 2018, 215). The other campaign was entirely entrusted to the naval forces of the Baltic Fleet, which, through the mediation of Great Britain and the use of her ports as bases, was transferred to the Mediterranean (Anderson 1952, 279; Stoyanov 2018, 215). Catherine II's aim for this naval campaign was to divert all naval forces of the Ottoman Empire from the Black Sea to the Mediterranean by attacking the Ottoman coast from Montenegro to southern Asia Minor (Sozaev and Tredrea 2010, 81; Stoyanov 2018, 216). In addition to Britain's cooperation for the purposes of its hostilities in the Mediterranean, Russia also sought support from Montenegrins and Greeks, and from other Slavic peoples in the Balkans. To incite local rebellions, it used the rhetoric of the injustices of the Ottoman Empire towards the Christian nations. This became Russia's main concept in its occupation policy in the subsequent wars with the Ottomans (Stoyanov 2018, 214, 216).

The 1769 campaign of the Russian landed troops was successful. First, they managed to capture Khotyn after the retreat of the Ottoman forces caused by a breakdown in the ranks of the army due to many losses, a lack of provisions, and a rising rebellion (Stoyanov 2018, 222–223). This was followed by the capture of Jassy, Bucharest, Focşani. Rumyantsev's army thus conquered parts of Wallachia and Moldova, imposing its power through the creation of wartime governments – a frequent methodology used by Russia in the Balkans over the course of the next century (Stoyanov 2018, 223–224).

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Russia's naval campaign of 1769 was delayed from the original plan. Undertaking such a long voyage constituted a significant risk, exacerbated by the fact that the Baltic fleet ships were not technically suited to sailing in the Mediterranean. In addition, this left Russia's territories around the Baltic Sea with minimal naval protection. Nevertheless, Catherine II divided the fleet into two squadrons. One was commanded by Admiral Grigorii Spiridov, and the second - by Rear-Admiral John Elphinston. The squadron commanded by Spiridov was scheduled to sail in July from Kronstadt for Port Mahon in the Mediterranean, where it would wait for Elphinstone's second squadron. It consisted of ships of the line: 1 with 80-gun and 6 with 66-guns; one frigate *"Nadezhda Blagopolutchia 32"*; 6 smaller ships, and the bomb vessel *Grom 12* (Anderson 1952, 279; Sozaev and Tredrea 2010, 81). The second squadron commanded by Elphinstone consisted of 3 battleships and 2 frigates, and 3 smaller storeships (Anderson 1952, 281). Some ships of the fleet remaining for defence in the Baltic (Sozaev and Tredrea 2010, 81). Due to extreme weather conditions, the need to service some of the vessels, as well as the sinking of some, the rejoining of the two squadrons in the Mediterranean was delayed until early June 1770 (Anderson 1952, 280-281; Sozaev and Tredrea 2010, 81-83). Meanwhile, the Russian Count Aleksei Orlov, who would be commander-in-chief of the combined squadrons, had captured the port of Navarino in April 1770, and had turned it into a Russian base for a month (Sozaev and Tredrea 2010, 82–83). The Ottoman naval fleet managed to drive the Russian lines and their Greek allies out of the area, but Elphinstone's squadron overwhelmed the Ottoman fleet off the Eastern Peloponnese (Stoyanov 2018, 231). The subsequent three-day battles at Chios and the Gulf of Cheshme in the Aegean Sea ended disastrously for the Ottomans and their Aegean Fleet Commander-in-Chief, Capudan Pasha Husameddin Ibrahim Pasha; thus, the Russian Navy's objective of blocking the Dardanelles was accomplished (Stoyanov 2018, 231–232). Sozaev and Tredrea (2010, 85) attribute the victory of the Russian fleet primarily to the successful use of a combination of a new type of weapon, the ironclad monitor, firing explosive shells, fireships, and a disciplined and prepared crew, as well as the passivity and incompetence of the Ottoman commanders. With this loss at Cheshme, the Ottomans realised that general reforms were needed in their naval sector. As described above, this marked the start of the construction of a completely new fleet, with the employment of Western European specialists, and the establishment of the necessary infrastructure, arsenal, and training schools for qualified personnel, so that the Ottoman Navy could reach the standards of the Western European fleets.

On the other battleground, the armies of Rumyantsev and Panin were operating, one advancing towards Moldavia, and the other towards Eastern Wallachia. After a series of clashes with the Ottoman infantry and its mercenaries, the Russians managed to impose their rule there (Stoyanov 2018, 240–241). As a result of this Russian campaign of 1769 and 1770, a crisis began in the Balkans, expressed in the large number of miserable Ottoman soldiers who began pillaging in the regions of

Mysia, Thrace, and Greece; this in turn severely destabilised the Ottoman Empire (Stoyanov 2018, 241). After the end of the war in 1774, mercenary soldiers left without pay and deserters from the ranks of the army began to plunder the Balkan provinces. In historiography, this dark period for the Balkans is known as the Kirdzhalis times (Stoyanov 2018, 269).

After the losses suffered by the Ottoman Empire, its position on the European stage was increasingly unstable. Already in 1770, the war was transferred to the sphere of diplomacy. Austria, with its interests in the Balkans, offered to mediate any negotiations between Petersburg and Istanbul. Prussia also intervened, trying to stand between Russia and Austria, and hoping to resolve the dispute over Silesia and ally with Austria. Eventually, the Ottoman Empire and Austria signed a secret treaty in July 1771, according to which the Ottomans would have to hand over Belgrade, Vidin, and Western Wallachia to the Austrians, as well as pay reparations covering the transfer of Austrian soldiers from Italy to Transylvania (Stoyanov 2018, 242). At the same time, Russia seriously pressed the Porte with its demands on several points: to recognise Russia's right to rule Kabardia in the Caucasus; to give independence to the Crimean Khanate; to let Wallachia and Moldavia be occupied by Russia for 24 years, until reparations were fully paid by the Ottomans; to give the right to Russia to establish a naval fleet in the Black Sea, and to conduct free maritime trade through the Bosphorus without the mediation of Ottoman merchants (Stoyanov 2018, 243). Knowing about the agreements between the Ottoman Empire and Austria, Catherine II made a number of political arrangements with Prussia and Austria in order to maintain her relations with them. Poland became the victim of a plan to divide its territories, with a secret convention signed for this purpose in February 1772, and the Austrians were given the right to mediate in peace negotiations with the Ottoman Empire (Stoyanov 2018, 243).

After these diplomatic struggles, the campaigns of 1771 were mainly concentrated on the Danube in the Balkans, and in Ukraine for the Crimean Khanate (Stoyanov 2018, 243, 253). During this campaign, the Russian infantry was supported by the Azov fleet built the previous year in Taganrog under the command of Vice-Admiral Senyavin, consisting of 1 16-gun battleship, 6 14-gun and 2 howitzers battleships, 1 12-gun, and 2 bomb vessels with a big mortar, 2 howitzers, and 8 small guns (Anderson 1952, 305). In the following year, the Russian fleet was reinforced with 2 32-gun frigates, and 2 58-gun ships were prepared for a campaign in the Black Sea (Anderson 1952, 305). During the campaign of 1771, the entire Crimean peninsula was captured by Russian forces, and a pro-Russian Crimean ruler was installed, with whom a treaty was concluded that made the Crimean state allegedly independent, and placed it under Russian protection (Stoyanov 2018, 252–253). Until the end of the war, the Russians used the captured Kerch fortress as a base for the Azov fleet (Stoyanov 2018, 253).

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The following 1772 passed almost entirely in peace negotiations between the Porte and Russia. The latter, insisting that her demands be met, did not receive a signature from the Ottomans, which again led to the decision to take military action. For this purpose, the Russians spent the year building a Danube River fleet, from where they intended to transfer the war to the territory of Mysia (Stoyanov 2018, 255). The purpose of hostilities in 1773 was a Russian advance south of the river Danube, which proved successful; however, at the end of the year they had to withdraw again to the north due to the lack of adequate convoy (Stoyanov 2018, 256–262). The Ottoman army led by Vizier Muhsinzade Mehmed Pasha lost many battles, partially due to the demotivation and low discipline of the soldiers, which led to a lack of coordination between the separate corps led by pashas from different political circles (Stoyanov 2018, 261).

In 1774, after the death of Sultan Mustafa III, his brother Abdul Hamid I came to power and undertook a revision of the imperial treasury, which turned out to be depleted as a result of the prolonged 4-year wars. The Sultan clearly realised that a subsequent military season was practically beyond the Empire's means, after which in March the Porte and Russia came to the negotiating table (Stoyanov 2018, 263). However, Russia did not accept the vizier's proposal to sign the agreements that had been on the table since 1772, but wanted complete victory on the political stage as well (Stoyanov 2018, 264). The goal of the subsequent military campaign of the Russians from 1774 was again to advance south of the Danube River, and to seize territories in Dobrudzha (Stoyanov 2018, 264). In repeated attempts to resist, the Ottoman corps were defeated at Kozludzha, Tutrakan, Ruse, Silistra, and Shumen (Stoyanov 2018, 266).

On July 10, 1774, a treaty was signed in Küçük Kaynardzha, in which the Ottoman Empire accepted Russia's demands. The fortresses Kinburn, Yenikale, and Kerch, Azov and Taganrog, where they could maintain a naval base, were already Russian (Sozaev and Tredrea 2010, 86; Stoyanov 2018, 267). Russia was granted the right to maintain a naval fleet in the Black Sea, and for her merchant ships to pass through the Bosphorus. Also, the Crimean Khanate became a Russian protectorate. At a later stage, in violation of the peace treaty, in 1783, Russia would also annex Crimea (Sozaev and Tredrea 2010, 86; Stoyanov 2018, 271). The Ottoman Empire retained all the fortresses west of the Dnieper River, including Bender and Ochakov, as well as lands in Wallachia and Moldavia in exchange for Russia patronising the Christian communities there (Rusev and Pletnyov 2012, 527; Stoyanov 2018, 267).

The war of 1768-1774 had serious socio-economic consequences for both the Ottoman and the Russian Empires. The finances of both were seriously hit, the Ottoman Empire's even drastically so. This difficult situation for the Ottoman Empire necessitated radical financial and economic measures. The Ottomans began to spend funds from the fiscal reserve, but even then it was

necessary to mint coins with a reduced silver content (Aksan 2007, 261; Stoyanov 2018, 267–268). Nevertheless, these measures for reforming the economy and the establishment of transitional forms in the development of the agrarian sector and the urban economy rather aggravated the taxation system in the Porte in the second half of the 18th century. The situation was exacerbated by the growing need for cash, the exhausting wars, a decline in the efficiency of the timar system, as well as the changing financial conditions in Europe, the decentralisation of the Sultan's power, and the settled new political status quo (Mutafova 2024, 68–69).

The consequences of this war, as well as those of the next one from 1787-1791, are accepted as laying the foundations for the development of a new, prolonged stage of the Eastern Question. At its centre were the Russo-Turkish contradictions, which for the first time directly involved the Bulgarian lands, and had terrifying consequences for the population and the internal political picture of the Balkans, the Black Sea region, and the Caucasus. Some of these were mass migrations, including the emigration of Orthodox Christians from the Ottoman Empire to the lands newly conquered by Russia, of Ottoman Serbs to Austro-Hungary, and millions of Muslims living in those lands to the capital (Rusev and Pletnyov 2012, 527; Frary and Kozelsky 2014, 7, 8; Stoyanov 2018, 267).

2.3.2.4   Russo-Turkish war (1787-1791)

Apart from all the territorial, social, and economic negative consequences for the Ottoman Empire after the end of the first war with Catherine II, the internal political ones were perhaps the most detrimental, contributing to the cracking of the Porte from the inside out. This rift began to deepen even more with the outside pressure during the next war against Catherine II. By annexing Crimea in 1783, the Russians unequivocally declared their future intentions of permanently entering the Black Sea; the Porte responded by declaring war on August 16, 1787 (Anderson 1952, 318; Rusev and Pletnyov 2012, 529; Stoyanov 2018, 268).

The first phase of this war in 1787 was marked by the Ottomans heading from Istanbul to the Russian fortress of Kinburn, located opposite Ottoman-controlled Ochakov, with a fleet led by Capudan Pasha Cezayirli Gazi Hasan Pasha (Sozaev and Tredrea 2010, 87; Stoyanov 2018, 272). The latter was built during the reign of Abdul Hamid I, as a result of his "piecemeal" program of military reforms (İnalcık 1994, 645). The term piecemeal might refer to the Sultan's inability to continue his reforms due to two main reasons: the aggravated financial and internal political condition of the Porte; and the recall of all French experts from Istanbul by King Louis XVI as a result of his negotiation of advantageous trade relations with Petersburg (Stoyanov 2018, 274). However, the modernisation of the Ottoman fleet after the 1780s with the active participation of French missions had already started. Between 1784 and 1788, under the direction of Jean-Jacques Sebastien Le Roy

and Du Rest, the total number of ships built according to Le Roy's models and plans reached 112 (Zorlu 2011, 120). These ships included the galleon Mukaddeme-i Nusret of 74 guns; two frigates of 12 guns; four corvettes of 14 guns; a galliot of 10 guns; a preme of 10 guns; 12 bomb vessels of 36 guns; 41 bomb vessels of 24 guns; 16 gunships of 24 guns (Zorlu 2011: 120).

Thus, the naval forces of the Ottomans at the battle in 1787 at Kinburn, although difficult to trace, according to Anderson (1952, 323) amounted to 22 battleships and 8 frigates with some 1700 guns (Anderson 1952, 319), and Sozaev and Tredrea (2010: 87) specify "15 serviceable ships of the line (battleships) and 8 frigates in the Black Sea and additional 7 ships of the line in the Mediterranean". Anderson (1952, 323), supporting his reasoning with data from Paul Jones and William Eton, concluded that the "battleships" were nothing more than merchant ships or caravels (corvettes), equipped with 40 guns, and measuring 141 feet by 44 1/2 feet. The Russian Navy was not as numerous, but had nevertheless also significantly improved its efficiency, with bases in Kherson and Sevastopol already established (Sozaev and Tredrea 2010, 87). In its first attack of the campaign in 1787, the Ottoman fleet deployed 3 battleships, 1 frigate, and supporting amphibious and rowing vessels; the Russian fleet had 2 battleships and 2 frigates with auxiliary vessels at Kherson, from where they managed to send minimal reinforcements to Kinburn in the course of the battle (Anderson 1952, 319; Sozaev and Tredrea 2010, 87). The Ottoman amphibious fleet withdrew on September 27 and 30, and October 1, the Ottoman army was repulsed by a garrison under Alexander Suvorov while attempting to capture Kinburn. At the same time, an Ottoman fleet of 3 battleships, 5 frigates, 7 shebeks, 4 bomb vessels, 12 gunboats, and 30 other small craft simultaneously blocked the way to the Black Sea for Rear-Admiral Mordvinov's fleet, which had reached the mouth of the Dnieper River on October 14. On October 17, the Ottoman fleet withdrew to Istanbul after a battle at the mouth of the Liman on October 15, where the Russian fleet of smaller vessels pushed them back to Ochakov (Anderson 1952, 320–321; Sozaev and Tredrea 2010, 87). A month earlier, on September 11, the Sevastopol fleet of Admiral Count Voinovich attempted to attack a naval base in Varna, but failed due to a sudden storm; this underlined –both the unpredictability of weather conditions in the northern part of the Black Sea, and the shortcomings in the design of Black Sea warships as well as the ineptitude of command and crew on both sides. Caught in the storm that occurred on September 19 around Cape Kaliakra, the *Krym* 44-gun frigate met its end, and the other battleship – the 66-gun *Maria Magdalina* was captured by the Ottomans after a suffering a heavy drift and losing all her masts, anchors, and rudder (Anderson 1952, 321; Sozaev and Tredrea 2010, 88). Russia achieved greater success at the diplomatic table that year by signing an alliance with Austria, under the terms of which Austria agreed to support the Russians against the Ottomans in the next campaign in 1788. Thus, the Ottomans were faced with a difficult

military campaign on two battlefields - against the Russians in the region of Ochakov, Khotyn, and Bender, and against Austria - along the Sava and Danube Rivers (Stoyanov 2018, 274).

The campaign of 1788 was marked by the capture of Ochakov by the Russians, whose forces were divided into two active infantry armies - one commanded by Prince Potemkin besieging Ochakov, and the other under the command of Count Rumyantsev and supported by the Austrian army led by General Coburg moving towards Khotyn (Stoyanov 2018, 275). At the same time, the Azov fleet was tasked with blocking the Ottoman fleet in its reciprocal attempts to attack Crimea and Kinburn. The Dnieper fleet of gunboats was commanded by Rear-Admiral Prince Charles of Nassau-Siegen, and the other Liman fleet of sea-going sailing vessels - by Rear-Admiral John Paul Jones (Anderson 1952, 322; Sozaev and Tredrea 2010, 88). During the naval campaigns of June 1788, the Russian and Ottoman fleets clashed at Liman, at the mouth of the Dnieper, where, the Russian fleet, equipped with more heavily armed frigates modeled after Samuel Bentham, managed to push back the more numerous, but lighter-armed Ottoman naval forces that consisted almost entirely of merchant ships converted into 40-gun battleships (Anderson 1952, 327; Sozaev and Tredrea 2010, 89–90). In July 1788, around the island of Fidonisi, east of the Danube Delta, the Ottoman fleet threw in for the defense of Ochakov 15 battleships, 8 frigates, 3 bomb vessels, and 21 shebeks, along with 5 of their newest and most capable ships, with heavy armament of 74- and 80-guns. The opposing Sevastopol squadron of Rear-Admiral Voinovich consisted of 2 66-gun battleships, 2 50-gun heavy frigates armed with 24 pounders, and 8 40-gun frigates armed with 12 pounders (Anderson 1952, 328; Sozaev and Tredrea 2010, 90). Although the Ottoman naval forces dominated the Russians in numbers and firepower, they were unable to defend the fortress, and in early December, Suvorov's infantry army supported by Russian warships managed to capture Ochakov (Stoyanov 2018, 280).

In 1789, naval battles in the Black Sea were limited to a single unsuccessful attempt by the Ottomans to retake Ochakov in June, when they were repulsed by the Russian army, and also lost Odessa (Sozaev and Tredrea 2010, 91). In fact, the main battles during that year were fought in Moldavia and Wallachia by the combined Russian-Austrian army, which managed to conquer territories at Rimnik, Bucharest, Akerman, and Bender (Stoyanov 2018, 287). On the Ottoman throne at that time sat the nephew of Abdul Hamid I - Selim III.

In 1790, the Ottomans assembled their naval forces for attack around two fortresses in Crimea – Kerch and Tendra. Their fleet was already under the command of Capudan Pasha Hussein Pasha, and consisted of 10 battleships – 4 72/74-gun ships, and 8 frigates with 36 small supporting vessels (Anderson 1952, 336; Sozaev and Tredrea 2010, 91). They were opposed by the Black Sea Russian fleet commanded by officer Fyodor Ushakov, which included the 84-gun *Rozhdestvo Khristovo*, 4

66s battleships, 5 battle frigates, and 6 frigates and supporting vessels of small craft and privateers (Anderson 1952, 336; Sozaev and Tredrea 2010, 91). The move by the Ottomans to advance by sea, given the extreme financial and consequent military crisis they found themselves in, as well as their inability to maintain an infantry army on the Danube frontier, is rather questionable. Stoyanov (2018, 289) assesses this as a distraction for the Russians, aiming to make them withdraw their army from the territories from Moldavia to Ochakov. At the Battle of Kerch, the Russian fleet, benefiting from a favorable NNE wind and the confusion in the Ottoman ranks, succeeded in pushing Hussein Pasha's fleet south. The next battle at Tendra was again won by the Russian fleet, and hindered the Ottomans' plans to prevent the Russian Dnieper fleet from moving along the Danube. Thus, the next battles were concentrated along the border line of the Danube. The Russian infantry, supported by the river fleet, defeated the Ottoman forces along the line, first in Tulcha, then Isakcha, and later captured Izmail (Stoyanov 2018, 292–295).

The Ottoman Black Sea Fleet's losses during the previous year adversely affected its integrity, organisation, and effectiveness in its 1791 campaigns. To strengthen his ranks, Hussein Pasha turned to his naval forces operating in the Mediterranean, including the Albanian and those of the vassal Ottoman North African provinces of Algeria, Tunis, and Tripoli (Anderson 1952, 344; Sozaev and Tredrea 2010, 93; Stoyanov 2018, 292). With these more numerous and heavily armed forces (Anderson 1952, 344), defined by Sozaev and Tredrea (2010: 93) as "a heterogenous collection of ships lacking any sort of cohesiveness and bereft of morale after the unbroken series of defeat suffered by the Turks in the previous years of combat", the Ottomans opposed the Russian Black Sea fleet in the battle in front of Cape Kaliakra. Commanded by Ushakov, the latter was at "the height of its power" in 1791 (Sozaev and Tredrea, 2010: 93). On April 11, the Russian Dnieper fleet attacked the Ottomans, and captured Braila (Anderson 1952, 343). On July 11, the Sevastopol fleet headed for Kaliakra, where the final key naval battle of this war took place against Hussein Pasha's Ottoman fleet and the Algerine Admiral Said Ali's North African squadron (Anderson 1952, 343–344). Ushakov's fleet consisted of 18 ships of the line, 2 bomb vessels, 1 repeater, 1 fireship, and 17 privateers, with a total firepower of 990 guns. The Ottoman fleet was formally dominant, both in numbers and in firepower, with 18 battleships, 10 large frigates, 7 smaller frigates, and 43 small craft, with a total firepower of about 1500 guns (Anderson 1952, 344; Sozaev and Tredrea 2010, 93). At the end of the battle in front of Cape Kaliakra, Ushakov managed to overcome the Ottoman lines tactically, and on August 12 the latter withdrew to the Bosphorus. Neither side lost any ships, although some of the Ottoman ships were badly damaged (Anderson 1952, 346; Sozaev and Tredrea 2010, 94). Meanwhile, peace negotiations were already underway in Jassy. Still unaware of this, however, the Russian Black Sea fleet anchored around Cape Emine, and on August 12-13

destroyed several Ottoman transporter and burned a shebek with a part of its privateers and a 36-gun frigate (Anderson 1952, 346).

The international geo-political situation at that time was changing. Austria sought to end its participation in this war through negotiations with the Ottoman Empire, and the raging French Revolution accelerated the actions of the European powers in relation to the Russo-Turkish contradictions. In an effort to limit Russia's expansion towards the Danube, Great Britain and Prussia persuaded Russia to sign peace with the Porte (Stoyanov 2018, 295). After long negotiations, both pressed by financial exhaustion, Russia and the Ottoman Empire signed a peace treaty on January 9, 1792 in Jassy, according to which Russia received territories between the Dniester and Bug Rivers, but gave up much of the conquered territories; the Porte regained Anapa, and in return gave up claims to Crimea and Georgia (Anderson 1952, 346; Stoyanov 2018, 298). The Ottoman Empire, which came out of the war as the defeated state, was in an extremely difficult socio-economic situation. The subsequent inflation and sharp devaluation of the akçe, and the need for salaries for the disintegrating army necessitated additional fiscal measures to rapidly cover the increasing costs; one such measure was the expansion of the system *malikâne* (funding the Ottoman army) (Stoyanov 2018, 299–300; Mutafova 2024, 72). This, however, turned out to be detrimental to the imperial treasury and economic life in the empire, but benefited the provincial elites (ayanas) by transferring tax collection to second-thirds, etc., leading to a tax burden on the economy, and a flow of income from the productive sector to the increasingly numerous rentier groups (Mutafova 2024, 73, 75). At the end of the 18th century, Selim III again tried to reorganise the imperial budget by regaining control over the state *mukatâas*, as large and profitable ones were excluded from the *malikâne* sector, and were controlled by the newly created treasury division (Mutafova 2024, 75). One budget line was intended to finance the newly created military corps (Nizam-i cedid), another - the newly organised grain extraction system, and a third, introduced in 1805, - the expansion of the Navy Arsenal (İnalcık 1994, 717). Despite these reforms, Selim III failed to deal with the disintegrated troops, which began to restructure into bandits in the Balkan provinces, and the Ayans used some of them for their own political and financial schemes (İnalcık 1994, 658; Stoyanov 2018, 300). Before being deposed by the revolting Janissaries in 1808, Selim III managed to introduce some partial reforms in the naval sector. During his reign, cooperation with European naval experts was resumed, and thus French, Swedish, and British missions were once again engaged to revive and modernise the Ottoman fleet and Arsenal (Sozaev and Tredrea 2010, 94–95; Zorlu 2011, 122–137). The Ulema and the Janissary corps tried their best to reject the introduction of new technologies and ideas that would threaten their positions, and the sultan's attempts at reform were met with complete opposition. The navy's definitive change would only come after 1826, when the self-serving Janissary Corps that had taken over the empire and was

draining the finances of the imperial treasury was eradicated by Selim III's successor, Sultan Murad II (İnalcık 1994, 645; Stoyanov 2018, 312–313).

The Russo-Turkish wars of the last quarter of the 18th century caused significant changes to the trade and economy in the Black Sea region. Until 1774, the economy of the Ottoman Empire was relatively stable, benefiting from its vast trade relations with France, Great Britain, the Netherlands, and Venice. Until then, the bulk of the empire's maritime trade was carried out by Ottoman Muslims (Panzac 1992, 204). After 1783, with the increasing accessibility of the Black Sea to European merchants heading for the newly opened Russian ports of Crimea, the Ottoman Empire's economy began to gradually lose its integrity, and the Ottoman Muslim share of internal trade was considered to be declining at the expense of European and minority groups within the empire (Panzac 1992, 204). Çizakça (1995, 216–217) provides data from a census list (*sened-I bahri*) of private ships sailing in the Mediterranean and Black Sea issued on March 5, 1823: out of a total of 142 shipowners, Muslims predominate, and only 12% are Christians, probably Greeks. Even so, in 1783, after the loss of Crimea - the main production centre and exporter to Istanbul, - the Ottoman Empire began to gradually lose its position in the Black Sea grain trade (İnalcık 1994, 721). After the 1792 peace treaty, the main share of grain exports came from Russia with the newly opened Crimean ports; by 1800, the number of ships carrying grain to Istanbul increased, this flow now held mainly by Ottoman Greeks sailing under Russian flag (İnalcık 1994, 721). Despite Çizakça's example (1995, 216–217), after the last two Russo-Turkish wars of the late 18th century, the number of Greek ships carrying merchandise under flags of different nationalities tended to increase in the Levant trade as well (İnalcık 1994, 737).

2.3.2.5   The Ottoman Empire on the eve of the French Revolution and the 1793 Anglo-French War for Egypt

The role of the Ottoman Empire's Greek subjects in the maritime trade in the eastern Mediterranean grew even more after the French Revolution, after 1792, and later after the restriction of the Republic of Venice in 1797, which resulted in the decline of French and Venetian trade in the eastern Mediterranean (Panzac 1992, 204). The internal political situation in the decentralised Ottoman Empire, strained by the raging rebellions of the Ayans in the Balkan and Asia Minor provinces, and the governance of the more distant African provinces such as Egypt, long subordinated to local dynastic families, increasingly directed Bonaparte to conquer Egypt, with the goal to cut off the competing English merchants' route to the Red Sea, and from there to India (Stoyanov 2023, 201–202). Thus, the Anglo-French War for Egypt in 1793 also saw a decline in the share of the English Levant Company in the Eastern Mediterranean trade with the Ottoman Empire (Wood 1964, 179). Conditions for England improved after 1798, when they defeated the French

contingent at the Battle of the Nile on August 3, and English goods were needed to supply the Ottoman army against France (Wood 1964, 180). This also dictated the subsequent agreement of January 1799 between Britain and the Ottoman Empire, uniting them against the French invasion of Egypt (Wood 1964, 180). This agreement, along with Catherine II's decree of 1784 for favourable trading conditions for all foreign merchants in the newly opened Russian Black Sea ports, motivated the Levant Company's merchants to demand again (after an initial unsuccessful attempt immediately after the Peace Treaty of 1774) from Sultan Selim III the right of access to the Black Sea; this was subsequently granted in 1802 (Wood 1964, 181).

2.3.3   Key wars in the 19th century, diplomatic moves, and economic and social consequences of the signed peace treaties

2.3.3.1   Wars in the Mediterranean and the Russo-Turkish coalition against the French flotilla in the Mediterranean to liberate the Greek Ionian Islands from French control (1798-1807)

After France's loss to Nelson's British fleet at the Battle of the Nile on August 3, 1798, a new anti-French coalition was formed between Great Britain, Portugal, Naples, Austria, Russia, and the Ottoman Empire, with the objective to end French control in the Ionian Islands and Corfu (Stoyanov 2023, 216). For the first time, Russia and the Ottoman Empire were together in a coalition as a result of British and Austrian diplomacy (Stoyanov 2023, 221). The impetus for Russia's involvement was the French occupation of Malta, which hindered Russian ambitions and its policy of controlling the Straits. As for the Ottoman Empire, it was motivated by the French invasion of Egypt, which destroyed its already fragile territorial integrity, and severed this strategic commercial centre from the empire. Egypt connected the Ottomans' trade between the Red Sea and Europe, and was also the main base for the export of cereals and rice to Istanbul and other main Ottoman ports (Stoyanov 2023, 212, 222). The common fear of the possible expansion of France in the central and eastern Mediterranean prompted the Ottoman Empire to grant the Sevastopol Russian fleet commanded by Vice-Admiral Ushakov the right to pass through the Straits, and it joined Horatio Nelson's fleet together with the Ottoman fleet (Anderson 1952, 367; Sozaev and Tredrea 2010, 95). The Russian fleet consisted of 6 ships of the line and 8 frigates, and the Ottoman fleet, commanded of Admiral Kadir Bey, entered with almost the same strength of 4 ships of the line, 6 frigates, 4 sloops or corvettes, and 14 gunboats (Anderson 1952, 367; Sozaev and Tredrea 2010, 95). While the British fleet operated west of the Italian peninsula, the joint Russo-Turkish fleet succeeded in freeing a number of Ionian islands from French control, as well as in cutting off France's trade links in the Adriatic Sea (Sozaev and Tredrea 2010, 97). A four-month occupation of the island of Corfu by the Russians followed, and in the next phase of the campaign, when the Ottoman fleet withdrew, the

Russians moved in and occupied Malta as well (Sozaev and Tredrea 2010, 97). While this campaign successfully freed the Greek Ionian Islands from France, in fact, they remained under Russian occupation (Sozaev and Tredrea 2010, 97). As a coalition partner in the Third Coalition Campaign against France, and the guarantor of the Greek autonomous Ionian Republic, created from the remnants of the Venetian state conquered by France in 1800, Russia placed its fleet commanded by Senyavin around the island of Corfu in 1805 (Stoyanov 2018, 338).

The end of the 18th and the beginning of the 19th century was a period marked by intermittent coalition wars against France in the Mediterranean, during which the situation for the Ottoman Empire worsened even more. One of its most valuable allies - the Barbary pirates, were defeated by the United States in the First Barbary War (1801-1805) while defending the Empire's maritime space in the eastern Mediterranean. This was followed by a period of even greater fragmentation in the Ottoman Empire's provinces (Stoyanov 2018, 332). Dissatisfaction with the aggravated tax policy and repression by provincial leaders and Janissaries provoked the population of Serbia to stage an uprising. After a subsequent battle with Ottoman troops in 1805, the Serbs took Smederevo and Belgrade in 1806, thereby attracting the support of the Christian population in Bosnia, Montenegro, and Bulgaria (Stoyanov 2018, 332–334).

In addition to the failure to control the Serbian uprising in the Balkans, the Ottoman Empire entered a new phase in its foreign policy relations with European countries. After France had changed its position in Europe in the framework of the War of the Third Coalition, following the French victory over the Austro-Russian army at Austerlitz in late 1805, and the signing of the Treaty of Pressburg in 1806 with Austria, the Russian army withdrew to the island of Corfu (Stoyanov 2018, 334, 2023, 356–357). In order to pressure Russia, France exerted its influence on the Porte, demanding from the Sultan to close the Bosphorus to Russian ships (Wood 1964, 189). For his part, Selim III, supported by France, removed the rulers of Wallachia and Moldavia, violating one of the clauses of the Treaty of Jassy. Russia saw this as a move by France to advance towards the Balkans (Stoyanov 2018, 334). The Russians sent their army to the Danubian principalities under the excuse of restoring the order imposed by the Jassy Peace Treaty of 1791, but they were met with resistance from the local ayans Pehlivan Pasha and Mustafa Bayraktar, who did not believe the "decent" Russian intentions. These two ayans came to power in the struggles between the ayans in Rumelia in 1800-1806, and oppressed the rest of the ayans on the territory of today's eastern Bulgaria (Stoyanov 2018, 336). Eventually, despite their resistance, the Russians successively captured Khotyn, Bender, and other Ottoman fortresses in Bessarabia, including Akerman (Stoyanov 2018, 337). Their next advance towards Izmail led the Ottomans to declare war on Russia, encouraged even more by a French offer of support (Stoyanov 2018, 337). This started the first Russo-Turkish war of the 19th century (1806-1812).

2.3.3.2   The long Russo-Turkish war (1806-1812) and the military reforms of Mahmud II

As the war began, Russia advanced towards the Mediterranean Sea with the aim of attacking the Ottoman positions in the Aegean Islands. At the beginning of 1807, the Russian fleet, commanded by Vice-Admiral Dmitry Senyavin, joined Admiral Sir John Duckworth's British fleet, which was sent under the terms of a Russian-British agreement signed in early 1807, with which Great Britain declared war on the Ottoman Empire (Stoyanov 2018, 338–339). The Russian fleet captured the island of Tenedos, from where they subsequently managed to block the Dardanelles, thereby cutting off the flow of basic goods and foodstuffs to Istanbul (Stoyanov 2018, 339). As tensions in the Ottoman Empire grew, and so did the discontent of the Janissary Corps and the Ulema against Selim III, the Sultan sent his fleet to the Dardanelles against Senyavin's Russian fleet in order to consolidate his position. However, after the Russians' victory, the Janissaries rebelled against the central government, and swept away the regular army (Nizam-i cedid) of Selim III; Selim III himself was later killed (Stoyanov 2018, 339). In the same year, the Ottoman army, consisting mainly of irregular units and volunteers, was defeated at Obileshti, Wallachia by Russian forces, and on June 19, Senyavin's naval forces defeated the Ottoman fleet under the command of Capudan Pasha Said Ali between Thassos Island and the Athos Peninsula (Stoyanov 2018, 341–342). After these Russo-Turkish battles, Napoleon defeated the Russian troops at Friedland; with the subsequent Tilsit Peace Treaty, Alexander I was forced to make peace with the Ottoman Empire, with France mediating the negotiations (Stoyanov 2018, 342–343). Under the terms of this treaty, Russia was forced to withdraw from the Aegean Sea, Wallachia, and Moldavia, as well as to return the island of Tenedos to the Ottomans, and Corfu and the rest of the Ionian Islands - to France (Sozaev and Tredrea 2010, 102; Stoyanov 2018, 343). For its part, the Ottoman Empire was forced to stop fighting against the Serbian rebels, and was prevented from installing its own rulers in the Danube principalities (Stoyanov 2018, 343).

During the period of apparent truce in the Balkans in 1807-1809, the internal political struggles in the Ottoman Empire reached their peak. After Selim III's fall from power, the new power subordinated to the Ulema, the Kapu Kulu, and the Janissaries tried to dominate political and social life in the Porte. Opposing them were the provincial ayans, headed by the Ruse warlord Mustafa Bayraktar. In the end, as a result of the attack of the Ruse warlord on Istanbul, the Janissaries rebelled and killed Sultan Selim III and Mustafa IV, and a new Sultan, Mahmud II, ascended the throne. Mustafa Bayraktar was appointed Grand Vizier. In their attempt to create a new regular army similar to the Nizam-i-cedid, Mahmud II and Mustafa Pasha were met with the resistance of the Kapu Kulu, the Janissary Corps, and the Ulema, who allied themselves with the Ayans of Rumelia (Stoyanov 2018, 343–344).

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In 1809, war between Russia and the Ottoman Empire was again rekindled after the Porte's refusal to accept the clauses of the Russo-French Convention of Erfurt in 1808, which allowed Russia to annex Bessarabia, Wallachia, and Moldavia in exchange for recognising Ottoman territorial integrity, including the Serbian Pashalik (Stoyanov 2018, 345). In this situation, the Ottomans were supported by Great Britain, feeling threatened by the rapprochement between Russia and France after the Tilsit Peace (Stoyanov 2018, 345–346). In January 1809, the Ottoman Empire concluded the Dardanelles Peace Treaty with Great Britain (Wood 1964, 191). In this period, the Levant Company also entered the final phase of its existence, enjoying a monopoly of the Ottoman market (Wood 1964, 192). At the end of the long war of 1812, British exports by the Levant Company to the Ottoman Empire saw their greatest growth since the 17th century (Wood 1964, 192). This success resulted from the industrialisation of productions, with the development of cotton manufactures having a particularly strong impact for Great Britain (Wood 1964, 192).

The campaign of 1809 was fought mainly in Wallachia and Moldavia, with the Russian army stretched out on a wide front from Craiova to the Danube Delta (Stoyanov 2018, 346). Their targets were Izmail, Silistra, and Braila. In September, Izmail was captured, and later Braila (Stoyanov 2018, 353). The local pashas, who recruited soldiers for the Ottoman garrison, and who, by inflating the number of wars on paper, managed to drain serious sums from the capital's coffers, benefited from the hostilities with the Russians (Stoyanov 2018, 351). Ultimately, the Russians conquered the last Ottoman fortress of Anapa during this campaign, and pushed the Ottomans out of the northern Black Sea (Stoyanov 2018, 354).

During the next campaign in 1810, the military crisis in the Ottoman Empire began to worsen. It became more and more difficult to gather an army, many of the regular soldiers deserted, and the recruitment of soldiers for the irregular army from the local ayans was more uncertain than ever when they were disbanded and left without support in the winter (Stoyanov 2018, 360). Such was the army with which the Ottomans were left to face the Russians, whose plan during this campaign called for the capture of Silistra and Varna in order to force the Porte to accept their plan for a peace treaty (Rusev and Pletnyov 2012, 537). According to this draft peace treaty, Russia demanded the establishment of a border along the Danube River, a guarantee of autonomy for Serbia under Russian protection, a transfer of the Georgian states under Russian protection, and the payment of a large amount of reparations (Stoyanov 2018, 354). This plan ultimately failed. Although at the end of the campaign the Ottomans managed to keep Vidin, Shumen, and Varna, they gradually lost Tutrakan, Dobrich, Silistra, Razgrad, Balchik, Batin, Svishtov, Nikopol, Turnu Magurele, and Pleven (Stoyanov 2018, 356–359). Intensive fighting in the area had an extremely heavy impact on the local population. Rusev and Pletnyov (2012, 538–539) cite an excerpt from a letter from the Swedish consul in Istanbul, Nils Gustaf Palin, to the Swedish government, which describes the emigration of

the population from Varna to Istanbul due to rising prices and the lack of basic goods as a result of the military actions in Shumen and Varna. The preservation of Varna was extremely important to the Porte from an economic standpoint. As an important commercial and military strategic point, Varna was the first settlement on the western Black Sea coast to host foreign consular offices already in the first decade of the 19th century. During the 1806-1812 Russo-Turkish war, Varna managed to maintain its position as an important trading spot on the Levant trade route from and to Istanbul and Smyrna (Rusev and Pletnyov 2012, 539).

In the next two years, with the advance of the Russian land forces towards Wallachia and Mysia, the Ottoman army was pushed south from Stara Planina mountain, and further weakened (Stoyanov 2018, 368). Even the promises of support from France failed to change Sultan Mahmud II's decision to conclude a truce with Alexander I, and on May 16, 1812, the Bucharest Peace Treaty was signed (Stoyanov 2018, 369). Among the 16 articles of the treaty, articles four and five carried the highest burden of socio-economic consequences in the region. Eastern Moldavia and Bessarabia became under Russian protectorate, and in terms of shipping in the Black Sea, it became free for both empires (Stoyanov 2018, 369). Wallachia and Moldavia were returned to the Porte, which was obliged to offer the population there the choice to emigrate freely. Thus, Russia opened up the possibility of transferring the Christian population to its newly occupied territories in Bessarabia (Stoyanov 2018, 369).

After the end of the war, the Ottoman military-political system was in crisis. The army was disintegrating, and more and more Janissaries refused to be involved in hostilities against Russia (Stoyanov 2018, 373). A reform of this system was on Sultan Mahmud II's agenda, as well as dealing with the ayans in the Balkans and Asia Minor. In addition to these confrontations, the ever-increasing process of national awareness of the local population in the Ottoman Empire provoked internal rebellions of Serbs, Greeks, and Bulgarians, who fought for an autonomous status (Stoyanov 2018, 374). Perhaps around ¼ of the inhabitants of the Ottoman Empire in this period were Greek Orthodox Christians, mainly concentrated in four areas – the Peloponnese, the Greek islands of the Adriatic and the Aegean Seas, Wallachia and Moldavia, Bessarabia, Odessa, and Istanbul (Aksan 2007, 269). A large part of this population held positions in the central administration of the Porte, in both the commercial and the diplomatic spheres (Aksan 2007, 269). The Ottoman Empire's military was too weak to counter the emerging rebellions in the Balkans, as well as the Greek revolts in the Peloponnese, which became more intense after 1825 (Stoyanov 2018, 374–375). One of the suppression methods applied by Mahmud II in the course of the Greek Revolt that broke out after 1821 was the removal of all personnel of Greek descent from the administration; this included senior diplomats and the chief dragoman (Aksan 2007, 269). He also

dismissed all captains and sailors of Greek origin who had manned a large portion of the Ottoman vessels, and replaced them with Muslims from Trabzon, Crete, and Rhodes (Aksan 2007, 269).

The rebellions that broke out on the borders of the Ottoman Empire attracted the attention of France, Great Britain, and Russia. The latter began to play a strong role in the Balkans after the defeat of Napoleonic France and the Congress of Vienna in 1815. Russia aimed to be seen as counterpoise in the confrontation between the Ottoman Empire and the Greek rebels (Stoyanov 2018, 376). In order to strengthen the weakened Ottoman army in the fight against the Greek revolutionaries, and to avoid intervention by the Great Powers, Mahmud II engaged the army of the Egyptian pasha Mehmed Ali, giving him the island of Crete in exchange for his support (Stoyanov 2018, 376). This combined army successfully imposed its power over the Greeks in the western and central Peloponnese, which caused concern on the part of France and Great Britain. This concern further intensified when Alexander I's successor, Emperor Nicholas I, began to act independently, pressuring the Ottoman Empire through the Greek question to fulfill all articles of the Bucharest Peace Treaty, with an emphasis on the withdrawal of the Ottoman army from Wallachia and Moldavia (Stoyanov 2018, 376). Threatened by a new war with Russia, the Ottoman Empire decided to sign the Akerman Convention in 1826, in which the Empire agreed to the Russian conditions, and which included the additional condition of free trade and movement of Russian merchants within the Ottoman Empire (Stoyanov 2018, 377). In the same year, Mahmud II managed to complete his military reform and to eliminate the Janissary corps, replacing it with a regular army on a regimental basis similar to Western European ones (Aksan 2007, 261; Stoyanov 2018, 377). Seeing Russia's growing position in the Balkans, France and Great Britain forced Russia to sign the London Convention in 1827 (Stoyanov 2018, 377). They united around a plan to force the Ottoman Empire to end hostilities with the Greeks, and to allow them to establish an autonomous state under Ottoman supremacy. Russia, in turn, ceased its territorial expansion and gave up its trade privileges within the Ottoman Empire (Sozaev and Tredrea 2010, 104; Stoyanov 2018, 377). A naval battle followed in Navarino, where the combined fleets of the three powers destroyed the Ottoman-Egyptian fleet (Stoyanov 2018, 377). This defeat of the Ottoman fleet only gave Britain reasons to suspect the subsequent strengthening of Russian positions in the region (Stoyanov 2018, 378). All these events provoked Mahmud II to declare jihad on the European countries publicly to the subjects of the empire, and to terminate the Akerman Convention, as well as to stop all foreign ships not sailing under the Ottoman flag from entering through the Bosphorus (Aksan 2007, 261; Stoyanov 2018, 378).

2.3.3.3   Russo-Turkish war (1828-1829)

In view of the preceding events and the Ottomans' withdrawal from the Akerman Convention, Russia began a full-scale war against the Porte on April 14, 1828 (Stoyanov 2018, 378–379, 382). The Russians aimed to conquer Silistra, Shumen, and Varna, and subsequently to advance to the south towards the mountain ridges of Stara planina (Stoyanov 2018, 379). Unlike the previous war, in this one, a significantly larger Ottoman army faced the Russians, showing that Mahmud II was able to mobilise the necessary resources in wartime, with a predominance of the regular units over the mercenaries of the provincial troops (Stoyanov 2018, 381-382). The campaign of 1828 did not bring definitive success for the Russians. After capturing the Black Sea fortress of Anapa, the Russian fleet of Vice-Admiral Grieg managed to proceed to Varna, and there to support the land forces of Prince Menshikov, Major-General Perovsky, and Field-Marshal Mikhail Semyonovich Vorontsov (Stoyanov 2018, 384). After anchoring in St. Dimitar Bay on July 22, 1828, the Russian fleet bombarded the Varna fortress intensively, and after an 89-day siege, Varna was captured on September 29 (Rusev and Pletnyov 2012, 543; Stoyanov 2018, 385). In this campaign, Grieg's fleet, in almost the same configuration as at the capture of Anapa, consisted of 2 110-gun battleships, 1 84-gun, 1 80-gun, and 3 74-gun battleships, 5 44-gun frigates, 3 bomb vessels, a few smaller vessels, and a fleet of rowing gunboats. After the defeat in the previous war, the Ottoman fleet was practically ineffective against the stronger Russian Black Sea fleet (Anderson 1952, 546; Sozaev and Tredrea 2010, 104).

Russia's increasingly aggressive policy towards the Ottoman Empire was in breach of its obligations under the London Convention for non-assertion of territorial claims to the Porte. This began to increasingly worry France and especially Great Britain after its change of government in 1828, which opposed Russia's expansionist policy in the Balkans (Stoyanov 2018, 386). The Western Powers negotiated with Mehmed Ali Pasha the withdrawal of the Egyptians from the Peloponnese, thereby removing this threat to the Greeks there. Thus, it became clear to the two Great Powers that for Russia, the suppression of the Greek rebellions within the Ottoman Empire, and the establishment of an autonomous Greek state were never on the agenda, but only served as an excuse for an offensive (Stoyanov 2018, 386). In the end, in 1831, Greece received the status of an independent kingdom with the signing of a protocol in London, guaranteed by France, Great Britain, and Russia (Stoyanov 2018, 395).

Increasingly assertive in their policy, the Russians, now with a new commander of the land forces - General Dibich, decided to attack Silistra directly, and enter Thrace through Stara Planina mountain. There, Dibich's plan was to break the main connections of the Ottoman forces in Mysia and Istanbul by entering Aytos, then Burgas (Stoyanov 2018, 387). Therefore, the campaign of 1829 began with

the sending of an army by sea to Sozopol, from where they could support Dibich's land forces after their transfer through Stara Planina mountain (Stoyanov 2018, 388). With the help of Bulgarian squadrons and a sea attack by Vice-Admiral Kumani's fleet, Sozopol was captured at the end of February (Anderson 1952, 546; Stoyanov 2018, 388). In May, the entire Sevastopol Russian fleet anchored off Sozopol, from where it attacked several Ottoman ships (Anderson 1952, 547). In the same campaign, the well-known battle between two Ottoman presumably heavily armed flagships – a 110-gun and a 74-gun, and the Russian 20-gun brig *Merkurii* occurred south of the Bosphorus; after suffering numerous defeats, the Russian brig managed to escape (Anderson 1952, 547; Sozaev and Tredrea 2010, 104). Anderson (1952, 547) attributes this speculative information about the ability of a 20-gun ship to escape from heavily armed flagships to the poor quality of the Ottoman artillery (Anderson 1952, 547; Sozaev and Tredrea 2010, 104). The next offensives by sea, supporting the Russain land forces, were aimed towards Mesemvria (present-day Nessebar), Anchialo (present-day Pomorie), Vasiliko (present-day Tsarevo), and Agatopol (present-day Ahtopol) (Anderson 1952, 548; Stoyanov 2018, 390). With the capture of the Ottoman fortifications at Ineada, and later at Kıyıköy, the Russian naval attacks ended (Anderson 1952, 548). The last Ottoman fortress of Edirne fell without resistance on August 7, 1829, after which the Ottomans signed the Peace Treaty of Adrianople on September 2, 1829 (Stoyanov 2018, 391–392). All of Russia's interests were covered by the 16 clauses of the Peace of Adrianople, after which its influence over the Balkans strengthened even more. For the Ottoman Empire, the social, political, and economic consequences were extremely serious. Article thirteen of the Treaty had a direct impact on migration processes along the Black Sea. According to it, the Ottoman subjects who supported the Russian army (including a large number of Bulgarians) were given the right to settle north of the Danube River (Stoyanov 2018, 394). This led to the emigration of several hundred to one million robust Bulgarians to Wallachia, Moldavia, and Bessarabia; at a later stage, they returned, pressed by the serfdom policy imposed on them by Russia (Stoyanov 2018, 394). According to the third article, the Ottoman Empire retained the right to trade on all canals of the Danube River, but could only maintain a naval fleet along its southern canal (Stoyanov 2018, 393). With this treaty, another goal of Russia - to open a way across the Black Sea to Istanbul - was achieved. This was covered by articles five, six, and seven, according to which Russia assumed the suzerainty of Wallachia and Moldavia, gave autonomy to Serbia, which would later be used as an ally and a buffer between itself and Austro-Hungary, and gave Russians subjects free trading rights by sea and land within the boundaries of the Ottoman Empire. For its part, the Porte had to ensure complete freedom of navigation (with the exception of heavily armed ships) through the Straits, and could not confiscate merchandise transported by Russian merchants (Stoyanov 2018, 393).

By postponing the fulfilment of his promises to Pasha Mehmed Ali of Egypt, Mahmud II entangles the country in the face of a threat from rising Egyptian power, and opened the door to the Russians, who later benefited by supporting the Porte in the fight against the Egyptian Pasha under the 1833 Hunkyar Iskelesi Treaty (Stoyanov 2018, 396). According to the treaty, the Ottoman Empire agreed not to admit the military fleets of any country except for Russia; Russia itself was bound to declare war on anyone who dared to attack the Porte (Stoyanov 2018, 396). The contradictions between the Ottoman Empire and Mehmed Ali Pasha in Egypt caused the Western powers to fear a destabilisation in Europe as a result of a possible collapse of the Ottoman Empire. In order to preserve the territorial integrity of the Ottoman Empire, in 1840, the London Convention was signed between the Empire on one hand, and Great Britain, Austria, Prussia, and Russia on the other. It stated that in peacetime, the Straits were closed to warships of all countries, with the exception of the Ottoman and light-armed ships of its allied countries under a Sultanate decree (Stoyanov 2018, 396, 399). A free trade regime was also established in all Ottoman territories, and Egypt was given the status of an autonomous Ottoman province (Aksan 2007, 260). Ultimately, the strengthening of Russian positions in the region began to seriously worry Great Britain and Austria (Stoyanov 2018, 396). As a result of all these diplomatic and foreign policy agreements, all the wars of the Ottoman Empire after 1841 gained global geopolitical importance requiring international intervention both military and financial; the first such war was the Crimean War of 1853-1856 (Aksan 2007, 260). In summary, the war of 1828-1829 was the first of a series of wars after which the Ottoman Empire entered a regime of capitulations, driving it to an economic crisis, and eventually to bankruptcy in 1874. As part of these capitulations and as a result of the fall of the Porte's monopoly on the export of grain products, more and more Western European merchants and trading companies were attracted to the Black Sea region, and more foreign consulates began to open on the western Black Sea coast. For instance, before the Crimean War, consulates of seven countries were opened in Varna - France, Austria, England, Greece, Sardinia, Belgium, and Russia (Rusev and Pletnyov 2012, 549; Roussev 2024, 104). Cereals were one of the most in-demand goods on the Western European market, and their export from the Balkan provinces flourished after the 1840s and peaked by the end of the 1860s, despite only beginning in the second quarter of the 18th century (Roussev 2024, 104).

2.3.3.4   Crimean War (1853-1856)

The Russian and the Ottoman Empires benefited from the period of peaceful relations that began with the Treaty of Hünkyar Iskelesi, and ended with the outbreak of the Crimean War. While Russia was increasingly active in its policy of exerting influence among the Christian communities of the Balkans by opening consulates and trade missions, the Ottoman Empire entered a period of administrative, economic, and military reforms known as the Tanzimat period (Stoyanov 2018,

399). The reforms of the beginning of the 19th century to the 1840s, the flawed financial policy of tax collection, as well as an imbalance in exports and imports led the Ottoman Empire to a period of devaluation of the grush (kuruş), whose silver content was reduced to 83%, in turn contributing to subsequent indebtedness (Aksan 2007, 262). The Ottoman Empire became even more heavily indebted as a result of the withdrawal of enduring credits for military expenses from France and England as a result of the Peace Treaty of Paris that ended the Crimean War (Stoyanov 2018, 433).

The involvement of the Great Western Powers - France and England - in the Crimean War, which started extremely passively on both the Russian and the Ottoman sides, began in the summer of 1854. The reason for their intervention on the side of the Ottomans was the naval battle around Sinop in the Black Sea. The Crimean War was also the last Russo-Turkish war in which sailing ships were used. In this battle, the Russian fleet defeated the Ottoman ships carrying supplies from Istanbul to the battlefield in the Caucasus (Stoyanov 2018, 413). This episode of the beginning of the Russo-Turkish war was reported in Western newspapers as an unprovoked attack by the Russians, which the pro-war parties in France and England used to convince both sides of the need for intervention (Stoyanov 2018, 414). The real reason for England's intervention was actually the threatened integrity of the Ottoman Empire, which was an obstacle to the preservation and expansion of British economic interests in the region (Stoyanov 2018, 403). In 1854, Austria, desiring to remove the Russian protectorate over Serbia and the Danube principalities, joined France and England against the Russian policy in the Balkans (Stoyanov 2018, 417). Emperor Nicholas I refused their demands, leading the two Western powers to declare war on Russia, and thus the actual war began (Stoyanov 2018, 417–418). In April, a Franco-British fleet was in position in the Black Sea, and began a series of bombardments against Russian Black Sea ports (Stoyanov 2018, 418). In the end, after a series of battles on different battlegrounds, the Western Powers managed to overcome Russia, although at the cost of heavy casualties from all sides. Already economically pressed and facing an open civil rebellion, the government in Russia agreed to sit at the negotiation table (Stoyanov 2018, 431). In February, the Treaty of Paris was signed, ending the Crimean war. The treaty effectively turned the Ottoman Empire into a marginal state, hostage to the diplomatic relations of the Great Powers. Within its framework, the London Convention of 1841 was reaffirmed for the Straits, and an additional clause declared the Black Sea a neutral water area. Both Russia and the Porte were prohibited from maintaining naval arsenals in the Black Sea region (Stoyanov 2018, 432).

As a result of the diplomatic moves of the Great Powers during and after the Crimean War, the Ottoman Empire became their economic and political hostage, and an excellent environment for investments by British and French merchants (Stoyanov 2018, 435). It was the financial injections from the West and the social equality imposed during the Tanzimat that contributed to the

economic development of the Western Black Sea coast through the accumulation of capital by enterprising merchants (Roussev 2019, 62–63). Very often, this development was stopped by the conservative Ottoman society, which hardly accepted the equality between Muslims and Christians, and their entry into state management. This subsequently led to social upheavals, and later to ecclesiastical and political struggles for independence from Ottoman power (Stoyanov 2018, 435–436). Despite the opposition of the Muslim population to foreign investments in the field of grain trade, all these processes initiated during and after the Crimean War had a stimulating effect on the Bulgarian economy and the processes of modernisation of society (Roussev 2019, 52, 2024, 103, 108–109). The increased demand for Bulgarian and Wallachian grain from Western merchants caused the price of other basic food products to rise. This process started at the beginning of the Crimean War due to a number of factors: the blocking of Black Sea ports due to the war, the transport difficulties caused by the agreed freight rates for the hire of a ship or part of it for the transportation of goods, a poor harvest especially in the provinces of Rumelia and Bulgaria, as well as the fluctuating prices in the Ottoman Empire, affected strongly by the foreign market (Roussev 2019, 57–60). For example, large quantities of cheaper flour were imported from Trieste and Marseille, not because of the lack of raw material in the Porte, but because of the lack of funds and technological means for its processing (Roussev 2019, 52). To these reasons for the transformation of the Ottoman Empire into a vassal to the Western European countries, Stoyanov (2018, 301–302) also adds the lack of competitiveness of the low-tech Ottoman economy, and rejects the outdated interpretation that the capitulation regime was entirely behind it. To summarise, the economic crisis in the Ottoman Empire in the 19th century was the result of both external pressure and internal weakness, causing it to fail to realise competitive modern production. As Inalcik (1994: 695) points out, "the Ottoman craft association faced conditions that changed rapidly after 1750, and lead to stiff competition with Western manufacturers in the early 19th century,". Cheaper Western goods flooded the Ottoman Empire at the expense of increased exports of local raw materials to the West, while local crafts still continued to rely on traditional methods of production in contrast to the already industrialising Western societies (İnalcık 1994, 695).

2.4 The Western Black Sea Coast - communities and the evolution of maritime transport (conclusion)

This historical overview provided the necessary context, outlined the complex chain of events that influenced Black Sea shipping, and summarised the stages of its development. The development of Black Sea shipping was primarily influenced by the political and economic interests of the Great Powers, and the ever-changing circumstances had a profound impact on the lives of the local population and their livelihoods, and hence on the development of maritime technology in the

region. Undoubtedly, a turning point in the development of Western Black Sea shipping was the gradual opening of the Black Sea after 1774. The wider entry of Western European merchants, and the increasing intensity of maritime traffic, in turn inevitably led to the transfer of new shipbuilding ideas and techniques. This transfer began to make its way to the region even earlier - already in the 17th century with the maritime contacts of the Ottoman Empire with the Western and Northern European countries in the Eastern Mediterranean. In the last quarter of the 17th century, the Greek and Armenian communities established a network of trade contacts between the Balkans (Danube principalities), Central Europe, the Adriatic, and Venice, and became one of the most active participants in the overland trade flow of the Ottoman Empire (Luca 2010, 313). Already during the Ottoman-Venetian Wars (1645-1669), Greeks and Armenians successfully occupied the niche for transporting raw materials and food products from Eastern Europe Ottoman territories to the Venetian Market as a result of the war's negative impacts on the Venetian economy and merchant class (Luca 2010, 314). These communities continued to be a factor in the maritime trade of the Ottoman Empire, with the Greek subjects of the Porte having a significant share in it after the first half of the 18th century with the emergence of the modern Greek merchant fleet in Western Greece and the Ionian Islands, and the resulting increase in trade in the Adriatic (Delis 2014a, 46). Greek merchants also became a significant carrier in the Ottoman Eastern Mediterranean and the Black Sea, with increasing numbers of Greek merchant ships sailing under the flags of various states, particularly after the Napoleonic Wars (Panzac 1992, 204; İnalcık 1994, 729). The Aegean and Ionian merchants and their ships expanded further in the Black Sea after the 1790s, occupying the trade niche between Venice and the newly conquered Russian ports in the northern Black Sea region (Luca 2016). The penetration of Western European merchantmen and warships in the Black Sea after 1774, and the participation of Eastern Mediterranean merchants in the trade flow of the Ottoman Empire with Europe led to the gradual transfer of Western European influences in shipbuilding technology, including the adoption of the square-rigged arrangement into the Mediterranean shipping tradition, of which the Black Sea region is also a part.

Chapter 3   Methodology and theory

The historical narrative from the previous chapter puts together all the diverse materials to be analysed here, and underpins the theoretical framework of the current study in an attempt to narrow down the broad topic of western Black Sea seafaring through tracing technological developments in post-medieval rigging as a response to the dynamic changes in the life of the coastal communities.

In any integration of different source materials there are evident benefits of correlation, verification or correction. The methodological challenge this thesis addresses is how this can be done in ways that sustains subsequent interpretation. For as Adams (2013: 48) has pointed out, there are dangers as well as opportunities. In particular, where a synthesis of archaeological and historical data is concerned it is often assumed that the latter has primacy. In such a case it is the historical sources that might guide the research and, to a certain extent, "control or even predetermine" the archaeological interpretation (Adams 2013, 48). Depending on the relative quality and nature of the two sources this may be justified but in other cases such an assumption ignores the value of the material remains. As Adams (2013, 48) further points out, in the maritime research context it is typical for convenient information from a wreck to be used for its identification in the historical source. Satisfying though this is, it is often impossible, especially for earlier periods but this does not degrade the value of archaeological data, which in well preserved wreck sites hold extraordinary explanatory power. This study is a case in point. Although it relies on maritime archaeological data, these are not used for the purpose of historical identification of a single vessel or group of vessels, but for building a set of instruments to observe and interpret changes in Black Sea seafaring seen through the lens of rigging arrangements in the context of the society that built and used them. Adams' (2013: 2) definition for maritime archaeology – an upgraded version of Muckelroy's, namely "the study of the remains of past human activities on the seas, interconnected waterways and adjacent locales" - is adopted as pivotal in this thesis, as it includes some of the prerequisites for the study to supplement the necessary maritime archaeological asset. The thesis covers archaeological remains in the western Black Sea (rigging elements from post-medieval shipwrecks) and maritime monuments in adjacent locales (ship graffiti in Nessebar). Since the current research involves analysis of technological data, i.e. rigging, inevitably, this study falls within the domain of nautical archaeology as defined by Muckelroy (1978, 4) albeit falling within the wider field of maritime archaeology, because studying technology also involves the social factor, i.e. the analysis and interpretation of past human activities not only on the sea, but also related objects on the shore, and coastal communities (Adams 2013, 2). The iconography contains not only technological information, but it also offers a better perspective on people's ideas, motives, knowledge, and

perception of the sea – aspects that were traditionally considered undiscoverable by archaeology (Muckelroy 1978, 216; Adams 2013, 2). In this respect, this thesis adopts a post-processual hermeneutic approach by analysing multiple sources, but it also includes, to a certain extent traditional historical explanation to better understand the social, political, and economic changes in the western Black Sea that impacted the coastal communities. Also, in attempting to determine people's ideas and perception of maritime life through a comparison between physical remains and iconographic examples, the study adopts a post-processual cognitive archaeological approach.

Hence, three interconnected instruments - comparison, interpretation, and reconstruction, - are applied together in this study in order to examine the data, and answer the complex, multilayered research question that encompasses technological changes. The comparative approach supports the interpretation of the materials derived from the two main datasets. To complement the analyses of both types of data, other auxiliary sources of information are used, e.g. travellers' accounts, marine art, plans of ships, published reconstructions of post-medieval shipwrecks, and other iconographic material. Drawing on such an array of comparative material aims to mitigate two underlying problems:

1) the auxiliary character of ship graffiti. Once this drawback is overcome, these could potentially serve as a trustworthy source of not only technological information, but also of aspects of societal developments and people's perception of the environment. Often seen as rather loaded with symbolism and subjectivism, this 'low-art' would predispose more particularistic and interpretative approaches. But there would be nothing wrong with using it, as Bintliff (2015: 25) notes that "there can be no such thing as objectivity in archaeology since the archaeologist brings to his/her research unavoidable preconceptions from their own cultural background". In the context of this study, the ship graffiti from Nessebar in particular have great potential to become a reliable source of information, since they are analysed and interpreted within the context of shipwrecks with well-preserved upper structures – a first for Bulgaria. Conversely, the ship graffiti can themselves help mitigate certain issues in the analysis of rigging remains. The recording of the massive corpus of ship graffiti from Nessebar might be considered "an orgy of particularistic data collection", but it is in fact a stage of data collection through which "every archaeological field project must pass" (Adams 2013: 8). Besides, extensive recording, according to McGrail's notion of the 'floating hypothesis', is needed for reconstruction, testing, and analysis of watercraft (McGrail 1992), and I would argue that the same applies to ship graffiti;

2) in the archaeological record, some small elements from the wrecks crucial for precise reconstruction (mainly from the standing and running rigging) are still obscured below the

sediments due to the impossibility of conducting underwater archaeological excavation, which was outside the scope of the M.A.P. Black Sea. While answering Westerdahl's question whether it is possible to scientifically reconstruct a ship type from the available documentary, iconographic, and comparative material in the absence of physical remains, McGrail agrees that this can be a significant problem (McGrail 1992, 353).

From the literature review presented in the introduction, it became clear that earlier studies faced a comparable problem when trying to build their narratives on western Black Sea seafaring only from one-sided sources – either historic or iconographic, or a combination of both, but in the complete absence of archaeological remains. Examples of such studies are Ovcharov's (1992) and Shterionov's (1999) works, which seem to mainly discuss the technological aspects in general, when actual technology (excavated shipwrecks from the region) was missing from the record at the time. Although Ovcharov criticises earlier researchers for only aiming to differentiate various ship types without predefined typologies when studying the development of the shipbuilding traditions along the Bulgarian Black Sea during the Ottoman period, he falls into a similar trap by building such a typology only from iconographic examples and historical sources from different regions (Ovcharov 1992). These earlier studies all lack a rigid maritime archaeological approach, which is nevertheless considered a prerequisite in studying seafaring. Instead, all of them rely mostly on the traditional historical explanation, seen as the oldest approach in studying seafaring by Muckelroy (1978: 4), "in which the primary concern is with the uncovering and interpretation of surviving documentary evidence for the past events, and by which the researcher seeks to understand not only the precise course of events but also the reasons, causes, or motives behind them."

Returning to Westerdahl's question about the scientific reconstruction of a ship type, the earlier studies mentioned above demonstrated that it is possible to reconstruct a ship type in the absence of physical remains, but it is unclear whether such a reconstruction should be considered accurate enough from a scientific perspective. Luckily, the current research has all the materials needed to accomplish a scientific reconstruction of a ship type. However, the final product is not the ultimate goal of this study; rather, it focuses on the specifics of the Black Sea rigging and its adaptation to the environment, and therefore on drawing more general conclusions regarding the development of technology in accordance with changing geo-political and economic circumstances.

In summary, it seems that the earliest researchers of western Black Sea seafaring were not familiar with maritime archaeology – a discipline closely tied to seafaring. This is reasonable, since this discipline has significantly changed and evolved with the accumulation of more material in recent decades, and the simultaneous advancement of the analytical methods to study it. Therefore, we see the maritime archaeology methods, well combined with the historical approach, implemented

in the most recent studies on the shipwrecks excavated from the western Black Sea - in Kitten and St. Nicholas Bay (Batchvarov 2009, 2014b; Garbov et al. 2016; Garbov 2021a). Using convenient pieces of information from the wrecks this was a case where their identification in the historical source was possible, and in contrast to the current thesis' focus, these two studies arguably link their respective shipwrecks to a precise moment in the history of shipping in the Black Sea and the Mediterranean. Moreover, the St. Nicholas Bay shipwreck study relies quite strongly on the maritime archaeological approach, by which the researcher compiles evidence to relate the wreck site to a particular historical ship (Garbov 2021a, 2022). Such a link between a historically documented ship and an archaeological find is also suggested by McGrail, who argues that it should be demonstrated through an argument rather than assumed.

Since this thesis relies strongly on a predominantly maritime archaeology approach, it combines diverse technologically oriented material in an attempt to reasonably study western Black Sea seafaring through the application of state-of-the-art recording and analytical methods. Such methods are applied to the post-medieval group of shipwrecks on the western Black Sea seabed, which were registered and recorded during the three-year fieldwork for the BSMAP (Vagalinski et al. 2015, 2016, 2017). The project is discussed in detail in chapter 4. A rich database of over 250,000 high-resolution photographs and hundreds of hours of high-definition video for all 65 shipwrecks was generated during the BSMAP survey of the Black Sea waters between 2015-2017 using the most advanced techniques in maritime archaeology – deep sea acoustic and optical systems launched on work-class remotely operated vehicles. This database was used to create detailed 3D and pseudo 4D photogrammetric models of the shipwrecks (Pacheco-Ruiz et al. 2019). In this thesis, the photogrammetric models, raw images and video files of some of the most completely preserved BSMAP post-medieval shipwrecks (dataset 1) are used in the analysis of the ships' technical characteristics. The dataset is accessed through the BSMAP server at the University of Southampton for the purposes of this thesis with the exceptional permission of Professor Jonathan Adams - the main data holder and project director. A two-dimensional digital graphic reconstruction of the ships' rigging system is performed with specialised software for two- and three-dimensional graphical operations and modelling (Adobe Photoshop and Illustrator, Agisoft Metashape Professional).

Advanced photographic methods such as RTI, photogrammetry, and 360-degree gigapixel photography are applied in the recording of the other primary source of information for the thesis – the post-medieval group of ship graffiti located in Nessebar (dataset 2). This dataset was obtained during a three-year (2018-2020) study I directed, which recorded ship graffiti in the medieval churches in Nessebar non-destructively. The project is discussed in detail in chapter 5.

Chapter 4   Analysis of rigging arrangements in BSMAP post-medieval shipwreck remains

Archaeological evidence is essential for understanding maritime technology in its finest detail. It provides physical information about the material and the society that produced it, while placing them in a broader social context (Whitewright 2008, 26). Whitewright also points out that archaeological remains "show what actually existed, rather than what was thought to have been there or should have been there." (Whitewright 2008: 26). Now, for the first time in the western Black Sea, the archaeological record has the potential to reveal what the post-medieval rigging of the region actually might have looked like, rather than what it was thought to have been based on comparative sources such as travellers' accounts or iconography, where small details are usually omitted. This is due to the discovery of the largest group of post-medieval shipwrecks within the framework of the BSMAP.

Prior to this project's discovery of post-medieval shipwrecks with extensively preserved rigging elements, archaeological evidence for rigging from this period in the Black Sea record was scarce. As mentioned in the introduction, only two shipwrecks from the Western Black Sea have been excavated and thoroughly studied so far. Excavation of a third (Kitten 2) started in 2022, while the current thesis was being written, and its thorough examination is still underway by the principal researchers Professor Kroum Batchvarov and Dr. Dragomir Garbov. The hulls of the other two post-medieval wreck sites (Kitten 1 and St. Nicholas Bay shipwreck) have been mostly reconstructed; however, their upper structures have not survived except for only a few elements of the rigging such as blocks and toggles (Batchvarov 2014a; Garbov 2022). Extensive expert analysis of the BSMAP group of post-medieval shipwrecks, focused on a thorough examination and reconstruction of their hulls and rigging, is expected to be published soon by the principal investigator of Ottoman-period shipbuilding traditions along the Western Black Sea coast - Professor Kroum Batchvarov.

One of the reasons for the lack of rigging evidence could be the shallow water where the ships were wrecked, i.e. within the surf zone where the wave activity is higher, and most of their upper structures would have disintegrated first. Other reasons can include legitimate salvage activity in which rigging elements are the easiest things to recover, or illegal looting wreck sites by local groups, as documented in a telegram from the Lloyds List from 25 November 1875 about the unfortunate wrecking of the English barque *'Helpmeet'* in the shallow waters off the Bulgarian Black Sea, whose tackle and copper still visible from the surface were probably looted by a group of Circassians living on the coast (Garbov 2021b, 127).

In contrast to the ships wrecked in shallow waters, the shipwrecks sunk in the deep waters of the Western Black Sea are better preserved, and most of their upper structures and rigging elements still exist either *in situ* or collapsed in and around the site. Despite this advantage, the great depth at which they are located is also one of the main barriers to thorough research, and until recently made archaeological excavations impossible. This in turn renders adequate measurements, crucial for extensive analyses and reconstruction, scarcely possible. While techniques to record positional and dimensional data accurately now exist, as noted in chapter 1, wreck research was not the prime focus for which the BSMAP was funded and so time spent on the investigation of most of the wreck discovered was necessarily limited. While detailed photogrammetric recording was carried out on all the wreck sites considered here, detailed measurement of specific constructional elements was not possible and constitutes one of the main constraints in the following analysis.

Another proviso needs to be made explicit at this stage: As noted, examination of the wreck data in the form of imagery including photogrammetric models shows a considerable amount of detail of the masting and rigging, some of which is recognisable in the imagery of the period and/or described in various sources. Some however, at least at first sight, are far more cryptic and indeterminate. So, a series of tentative reconstructions were attempted to assist in correlating the material remains of these ships and the ship graffiti recorded and analysed in the next chapter, and to assist in identifying any change over time prompted by the social, economic and technological developments summarised in chapter 2. It must be emphasised therefore that these reconstructions are research tools and should not be regarded as final.

4.1   Background of the M.A.P. Black Sea Archaeological Project

The post-medieval group of shipwrecks, along with shipwrecks from a range of other historical periods, was discovered during the fieldwork for the M.A.P. Black Sea. The project aimed to survey the Western Black Sea waters in the Bulgarian Exclusive Economic Zone during three-season fieldwork in 2015, 2016, and 2017, with two further seasons of excavation on coastal sites (2017-2019). Funded by the Julia and Hans Rausing Trust through the UK Expedition and Education Foundation and acting in strict compliance with the UNESCO Convention for the Protection of Underwater Cultural Heritage, the project was the first high-tech scientific endeavour of its kind surveying the Bulgarian Black Sea waters. The academic lead institution was the Centre for Maritime Archaeology of the University of Southampton (CMA), and the principal partners of the consortium were the Centre for Underwater Archaeology – Sozopol (CUA), the Centre for Maritime Archaeology of the University of Southampton (CMA), and the National Archaeological Institute with Museum

of the Bulgarian Academy of Sciences (NAIM-BAS), along with several other partner institutions which made research on such a large scale possible – the University of Connecticut, USA, the Maritime Archaeological Research Institute, Södertörn University, Sweden (MARIS), the Hellenic Centre for Marine Research, Greece (HCMR), and MMT, a Swedish company specialising in high-resolution marine surveys. The initial objectives of the M.A.P. Black Sea included a reconstruction of the Quaternary palaeolandscape of the shelf zone along the Western Black Sea; the study of the human response to sea level change during the Pleistocene and Holocene, and the establishment of a precise curve of Black Sea level change; the location, mapping and registration of evidence of human activities during the prehistoric and historic past of the region; the location, registration and interpretation of evidence of ancient maritime interconnections such as shipwrecks and seafaring infrastructure (CMA 2017; CUA 2017).

During the first phase of the project in 2015, a geophysical survey covering an area of 1000 m^2 was completed onboard the HMCR vessel *Agaeo* and the small research vessel *Nomad*. Based on bathymetric and seismic data derived from diverse types of sub-bottom profilers, a high-resolution 3D model of the seafloor was built. The model served as the baseline for the analysis of the palaeolandscape and sea-level changes of the Black Sea in the last 15000 years, and for obtaining a detailed geological map of the shelf zone through a programme of geological core sampling. It would also be used to explore and test two contradicting hypotheses: one about a rapid sea-level increase ("the flood hypothesis"), and the other about a gradual increase of the sea-level. Several shipwrecks were registered during that season at depths between 40 and 300 metres (Vagalinski et al. 2015, 893–896). Another field survey was conducted in September 2016 aboard the MMT offshore survey vessel *Stril Explorer*. The vessel carried some of the most advanced underwater survey systems – the remotely operated vehicles (ROV) *Surveyor Interceptor* equipped with a full range of geophysical instruments, as well as lights, high-definition cameras, and a laser scanner; and the ROV *Supporter* carrying high-resolution 3D photogrammetry and video systems (CMA 2017). Seventy-three geological sediment samples were collected with a vibro-corer in order to study the Quaternary palaeolandscape changes of the Bulgarian shelf. Geophysical surveys and remotely operated inspections of shipwrecks were conducted in order to look for evidence of ancient maritime interconnections and seafaring infrastructure. The geophysical surveys during the season covered 150 km^2 and were performed by the ROV *Surveyor Interceptor*. Seven new shipwrecks at depths between 57 and 104 metres were registered. These were inspected by the ROV *Supporter*. All 15 shipwrecks discovered during 2015 and 2016 were inspected and recorded by this vehicle. Another group of 23 shipwrecks, initially registered during the surveys for the *Southstream pipeline* in 2014 (Angelova et al. 2014, 881), was also thoroughly recorded using the ROV *Supporter* (Vagalinski et al. 2016, 720–723).

In 2017 the fieldwork continued onboard the research vessels *Pelagia* and the MMT offshore survey vessel *Havila Subsea*. During this field season, the sediment coring program was concluded. The work focused on the collection of samples from coastal areas with a high potential for prehistoric occupation in the bays of Sozopol and cape Urdoviza, as well as near the paleochannels of the rivers Ropotamo and Veleka (CUA 2017). For the whole period of the expedition, 94 sediment cores were collected, and approximately 2000 km² were mapped with geophysical instruments. During this year, 23 shipwrecks located in two different zones – northern and southern - were inspected. In the northern zone, 9 new shipwrecks were registered, and another 4, initially registered in 2016, were re-inspected. In the southern zone, only shipwrecks that were discovered during the BSMAP project were documented. During this field season, samples from some of the shipwrecks were taken with the ROV *Supporter* for typological and absolute dating. Some small-scale remotely operated excavation of some important diagnostic elements from some of the hulls was also performed (CUA 2017).

During all three seasons of the project, 65 shipwrecks in total from different historic periods were discovered and recorded (Vagalinski et al. 2017, 713–716). Depending on the circumstances of their loss, the wrecking process and the depth that they came to lie, some of these ships' wooden hulls were more or less disarticulated. However, the majority were relatively intact and well preserved, allowing for more extensive analysis.

4.2   State of preservation of the BSMAP wreck sites

Unfortunately, of the hulls that are well preserved, many are deeply buried under the sediments and so constructional detail and rig are partially obscured. In other cases, much structure can be visible on the seabed but disarticulated and thus difficult to identify. In both cases the lower hull, its construction and form are impossible to record. These wreck sites are therefore not included in the current analysis. Despite that, a few of the BSMAP wrecks' outlines are traceable from the tops of frames projecting above the sediment. However, key structural elements from the hulls have lost their original position as a consequence of wrecking and environmental disintegration processes, which has particularly affected the original proportions of the hulls. This will be considered during the analysis in order to minimise possible errors in dimensions. Luckily, on some of the shipwrecks, elements of the rigging are well preserved and even, on some hulls, still standing. Nevertheless, most of the rigging that is visible on the decks - masts, spars, and other round tapering timbers - is broken off and often not in its original position. This would be an issue for structural analysis and further references on rigging. Many elements from both standing and running rigging lie obscured

under the sediment, which, due to the terms of the grant and the environmental focus of the research design, could not be excavated. This is therefore a limitation to the current analysis. This would definitely hinder the determination of key dimensions; moreover, crucial elements for building up a more precise hypothetical reconstruction would possibly be lacking.

4.3   Categorisation of the BSMAP post-medieval shipwrecks

The BSMAP group of about 40 post-medieval shipwrecks are dispersed unevenly along the shelf and continental slope of the Western Black Sea. Two main groups can be differentiated according to their technological appearance: oar-sail-powered vessels, and sailing ships (merchantmen or warships). Further extensive analyses of this rich dataset would allow for more accurate and detailed definition of their types.

The adjacent location and the pattern in the hulls' appearance of the group of oar-sail-powered vessels suggest that these ships were probably subjected to a common maritime catastrophic event. At first glance, vessels with similar hull construction are seen in illustrations by Admiral Paris in his Souvenir de Marine from 1882 (Pâris 1882). Similar ships were also illustrated in 1709 by the French artist Guerlout du Pas in his album, where these types are described as galley's boats (Pas 1709). Although these wreck sites have the potential to provide valuable technological information, especially on rigging structure, they are not the focus of the current thesis as they are currently being analysed as a distinct group (Batchvarov and Kobalia forthcoming).

The second group of BSMAP shipwreck remains is mainly dispersed in the southern sector of the Bulgarian shelf zone, and some are also found among the cluster of the oar-sail-powered vessels. This is the group of sailing merchantmen or warships, some of which on initial observation seem to find precise parallels to the Turkish coaster illustrated in 1879 in Souvenir de Marine by Admiral Pâris (Pâris 1882, vol. 2). At first glance, the remains of some of the BSMAP post-medieval shipwrecks also seem to have identical features and hulls to the previously archaeologically studied shipwreck from Kitten, Bulgaria (Batchvarov 2009, 2011, 2014a, 2014b).

In order to build up a solid knowledge foundation about post-medieval rigging in the Western Black Sea, to be used in one of the final stages of the thesis (a tentative reconstruction of a BSMAP wreck site's rig arrangement), first, a preliminary description of visible rigging elements scattered on the decks of seven selected well-preserved shipwrecks, in the state as they were discovered, is necessary. This will allow us to establish closer parallels with previously studied post-medieval shipwrecks from adjacent regions. Then, the details of rigging and related rigging elements from

their upper structures will be discussed and compared to the studied ship graffiti, and also to various historical sources and contemporary engravings left by travellers. More details about rigging arrangements of Black Sea vessels from the 19th century are obtained from the rich collection of drawing plans, engravings and notes of Admiral François-Edmond Pâris.

4.4   Description of the BSMAP post-medieval wreck sites

Because the current thesis aims to analyse Black Sea post-medieval rigging, the wreck sites' description will be focused on the rig. The wreck sites with the most extensively preserved rigging elements, which could provide further information on their rigging arrangement, are described.

The combination of highly advanced methods such as photogrammetric surveys, swath bathymetry, and laser scanning that were applied during the recording phase of the BSMAP shipwrecks allowed for obtaining precisely scaled three-dimensional models to a millimetre accuracy (Pacheco-Ruiz et al. 2019, 9–10). Nevertheless, in the course of my analysis, adequate measurements were only possible for one of the 3D models (BSMAP_2017_Wreck_005) that was scaled during the post-processing work of the BSMAP team. Most of the shipwrecks' models from the late medieval period are not scaled and direct measurements cannot be obtained. Therefore, the overall descriptions of these wreck sites will provide the dimensions of their hulls, based on data derived from the multibeam record. The following descriptions correspond to the shipwrecks from the group of the sailing ships dispersed along the southern and northern area of the Bulgarian Black Sea (Figure 1). The descriptions are in order of the wrecks' location – south to north.
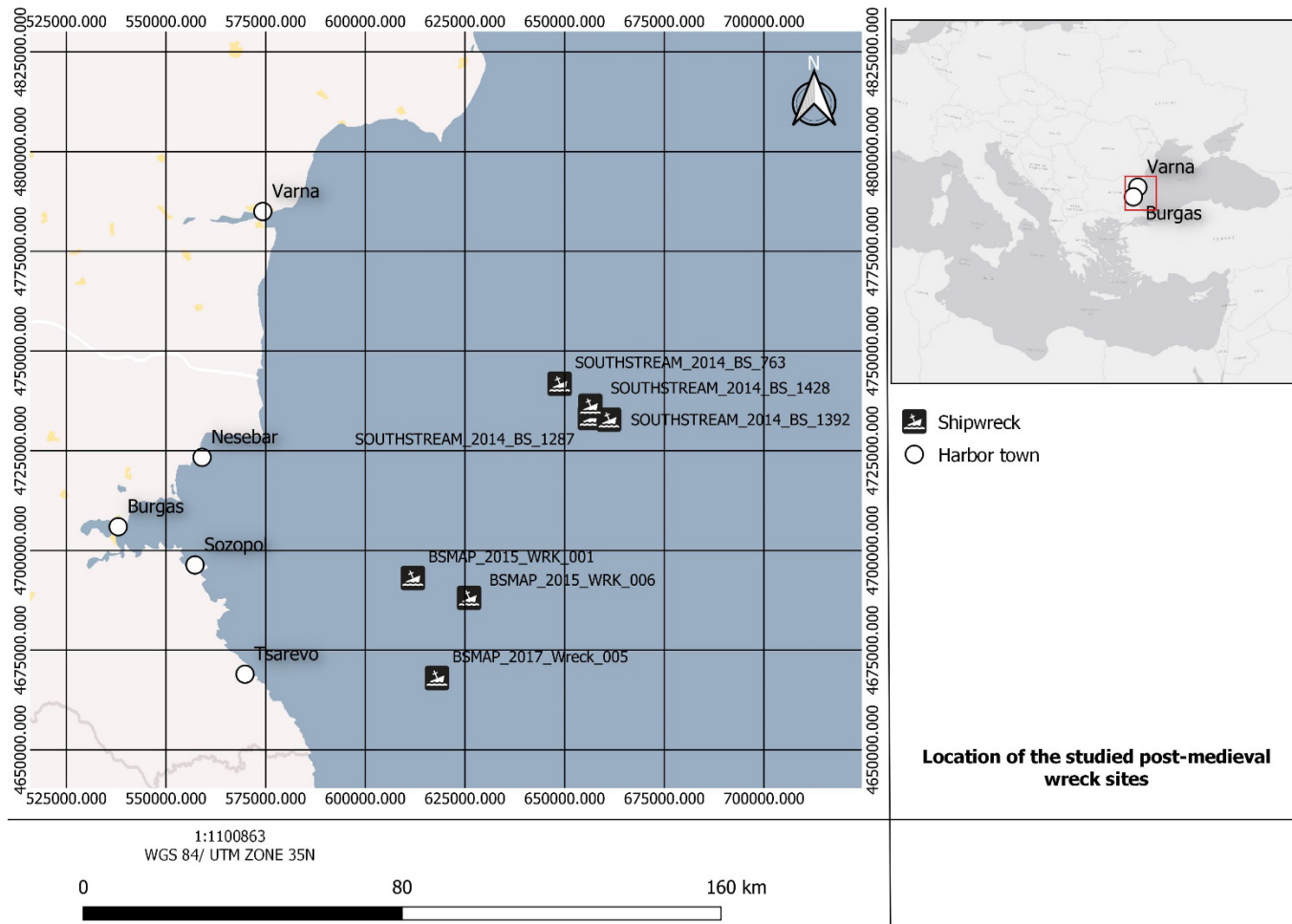
Figure 1　　　Map of the distribution of the post-medieval shipwrecks discovered in the Western Black Sea that are analysed in the current thesis ©Zdravka Georgieva

4.4.1   Wreck site BSMAP_2015_WRK_001

The wreck site is preserved considerably well from bow to stern, and is lying on an even keel at a depth of about 120 m. The shipwreck is oriented NW-SE, with the bow pointing to SE. The hull is well outlined from bow to stern, and has a length of about 25 metres as measured from the multibeam model (Figure 2). However, exact measurements of the elements of the shipwreck are not possible at this stage because a scaled photogrammetric model is not available. The sternpost has kept its original position, but the stempost is not visible and most likely buried below sediments. Parts of the planking are better preserved on the starboard side and partially on the portside up to the bulwark. Compared to the nearly intact transom shaped stern, the bow is less well preserved; however, the preservation is sufficient to trace the presence of an anchor-deck. Hints for the existence of an anchor-deck are several *in situ* deck planks which seem to cover the bowsprit's lower part, and above them - some discernible fittings such as a capstan and one of the bower's arms with only its fluke visible, both slightly displaced from their original positions. The fore bitts are preserved *in situ* slightly forward of the capstan; they are crossed by a rail with several pins still *in situ* (Figure 3).

Other fittings visible on deck aft of the fore bitts are a windlass and two cast-iron pump-barrels. The wooden windlass is preserved in its entirety with its carrick-bitts, pawl-bitt, pawl- and purchase-rims, strong-back, and whelps on which the anchor chain coming from the foredeck hatchway is still wrapped. The lever pump brakes that are visible above the pawl-bitt suggest a single pump-brake lever similar to the one patented by William George Henry Taunton of Liverpool in 1814 (Harland 2015, 46–47) (Figure 4). A coherently preserved boat is recorded on deck along the port side bulwark.

The vessel seems to have two masts. One of the masts, with preserved height up to deck level, is positioned before a companion way in the midship area. The other portion of the mast has fallen over to the starboard bow. It is proposed as a fore mast, deduced by its position before the main companion way. The collapsed mast is crossed by two yards at its middle, probably for foresail and fore topsail. The upper yard's parrel is still attached to the mast.

The bowsprit is at its original position with the jibboom still attached to it through woolding as indicated by the presence of lines *in situ*. There is also a hoop close to the woolding. Along the whole length of both the bowsprit and the jibboom, some preserved bowsprit shrouds can be seen. The proposed fore mast was probably fidded with a topgallant mast, identifiable by two trestle trees with part of the wire shrouds still looped around the mast head. Eight deadeyes for the fore

mast shrouds are secured inboard on the starboard side, probably on a bulwark rail. This method began to be used after the second half of the 19th c., as pointed out by Batchvarov (Annual Report for the NAIM-BAS and the Bulgarian Ministry of Culture 2016, Appendix D, 189-190). A part of the other mast is positioned further aft of the companion way in the midship area. Its preserved *in situ* height reaches slightly above deck. The other part of this mast is broken off, but not visible from the record. The presence of a gaff leaning on deck in the starboard quarter near the preserved part of the mast is a clue that it might have been rigged with a spanker. Abaft the preserved part of what was probably the main mast, a companion way to the stern cabin is visible. The position of the masts within the hull and the presence of a gaff near the aft one suggests a full-rigged brig.
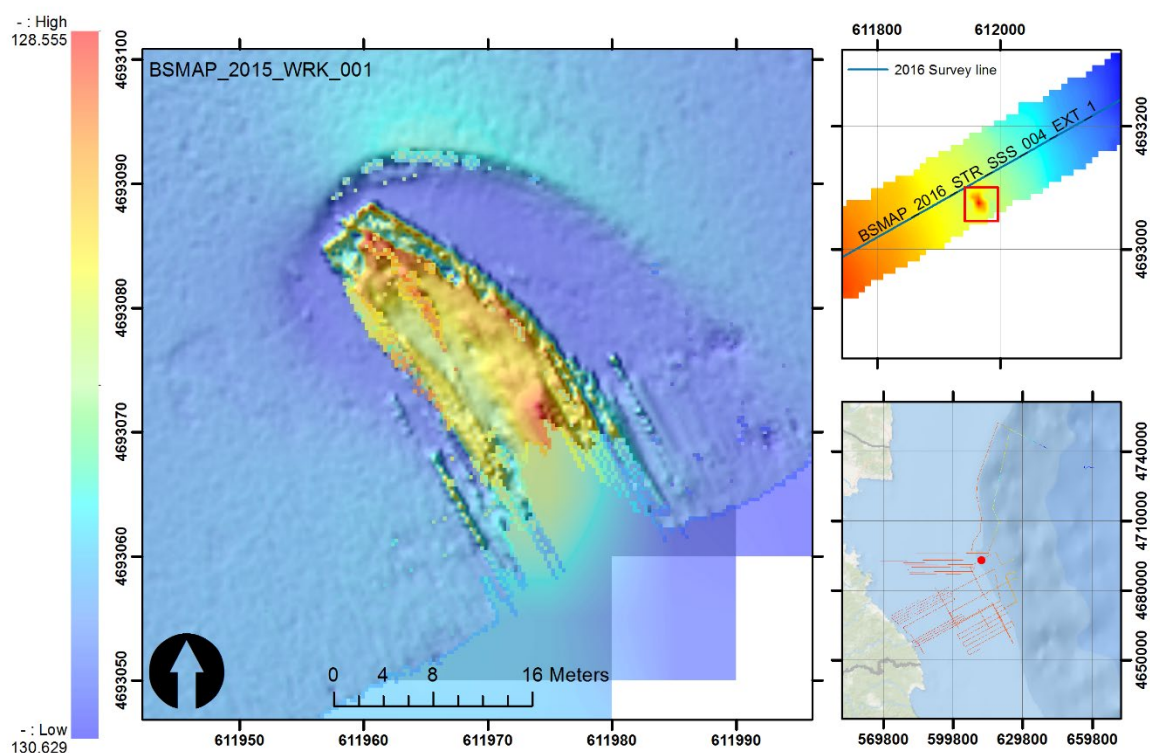
Figure 2   Multibeam image of BSMAP_2015_WRK_001, ©BSMAP database
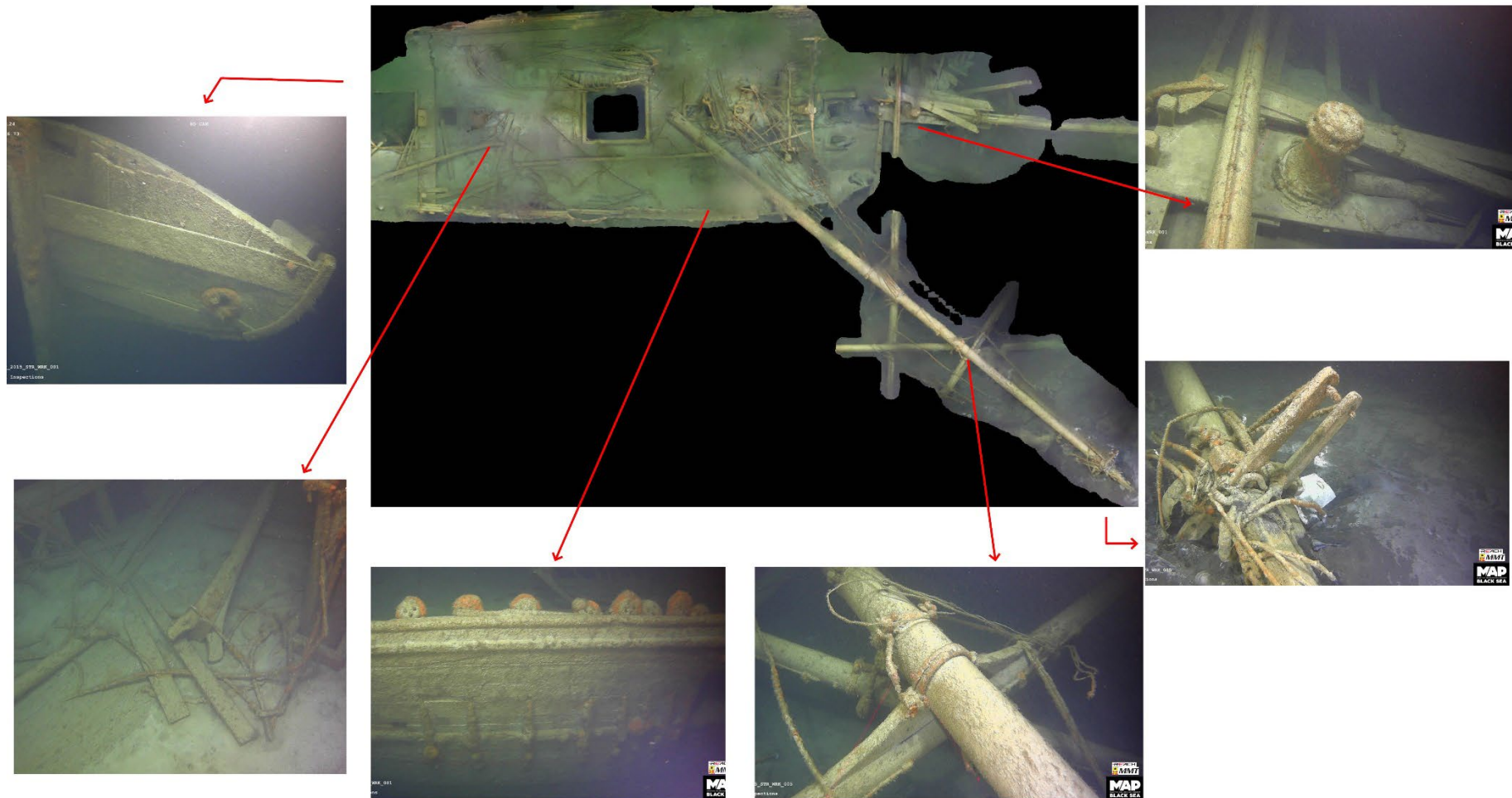
Figure 3   Top view of BSMAP_2015_WRK_001 with positions of the fittings, ©BSMAP database
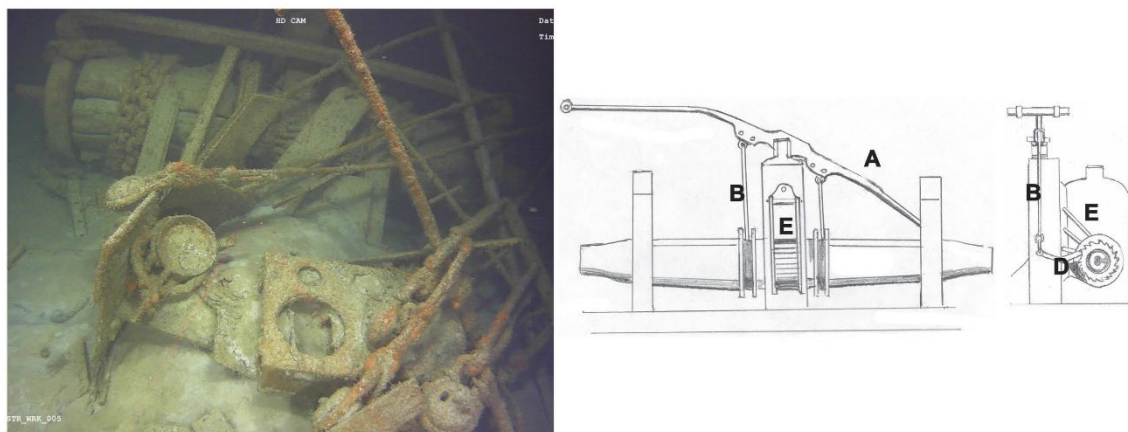
Figure 4   Comparison between a windlass preserved in situ with chain still wrapped around the barrel, ©BSMAP

database, and a windlass construction with a pump-brake lever patented by W.G.H. Taunton in 1814,

illustration after Harland 2015, 46-47

4.4.2   Wreck site BSMAP_2015_WRK_006 ("the Black Sea rose")

The wreck site lies at a depth between 318 and 313 m. The ship is oriented E-W, with the bow

pointing east. The vessel is extremely well preserved from bow to stern, and its shape is outlined

by the tops of frames exposed above the sediment. The bottom of the hull is buried under the

sediments as well as under a considerable number of elements from the superstructure and rigging,

some of which at their original positions. The planking along the whole hull has fallen apart and is

buried under sediment deposits. The vessel has a length of about 22 m, and a breadth of about 6

m (Figure 5). The bow is less well preserved than the stern; nonetheless, the stempost is preserved

and is leaning over the deck at bow. The stempost (along with other features of the ship) is richly

decorated with carved floral ornaments (Figure 6). The deck at bow ends with a deck beam which

separates it from the hold of the vessel. The bowsprit is broken off and is leaning over the deck at

bow. A jibboom is visible lying diagonally over the deck at bow.

Abaft the deck beam at bow, two bitts whose heads are ornamented with wooden carved flowers

remain at their original position. A feature reminiscent of a narrow cargo hold surrounded by

coamings is located along the centreline of the midship area of the vessel, extending from the fore

bitts to the aft bulkhead. Some beams visible inside the hold might have served as supporters to

some of the deck planks. More deck planks are preserved abeam port and starboard sides off the

coamings. Inside the forward half of the hold, there are pieces of timber and beams that might

resemble elements of the support system of the mast to deck. In the aft half of the hold, in front of

the bulkhead at stern, a crutch richly ornamented with floral motives is still standing *in situ*. Its function as a belaying point and supporter for rigging may be deduced by a spar and a part of a mast leaning over it.

Further aft, a well-preserved raised deck still covered with deck planks is visible. Another raised platform is recorded abaft it. The sternpost with stern rudder fastened to it can be seen preserved *in situ*. The tiller, also decorated with wood carving, has fallen over the aftermost platform along the port side (Figure 7).

The vessel is fore-and-aft rigged. It seems single-masted, with a main mast most likely positioned slightly forward from the vessel's centreline, considering the position of a vertical timber leaning abaft the bitts' crossbeam, which might be part of the mast's supporting system. The main mast is leaning on the starboard bow. A spar, possibly a topmast, has fallen over along the starboard side. It is a tall pole mast almost as long as the vessel's hull. Two other spars reminiscent of topsail yards cross the pole mast. This was very likely a rig with a sprit sail to be raised, suggested by the presence of another long spar, one end of which is leaning over the crutch, and the other broad on the port bow. A different interpretation of the vessel's sail plan is proposed in Chapter 6.
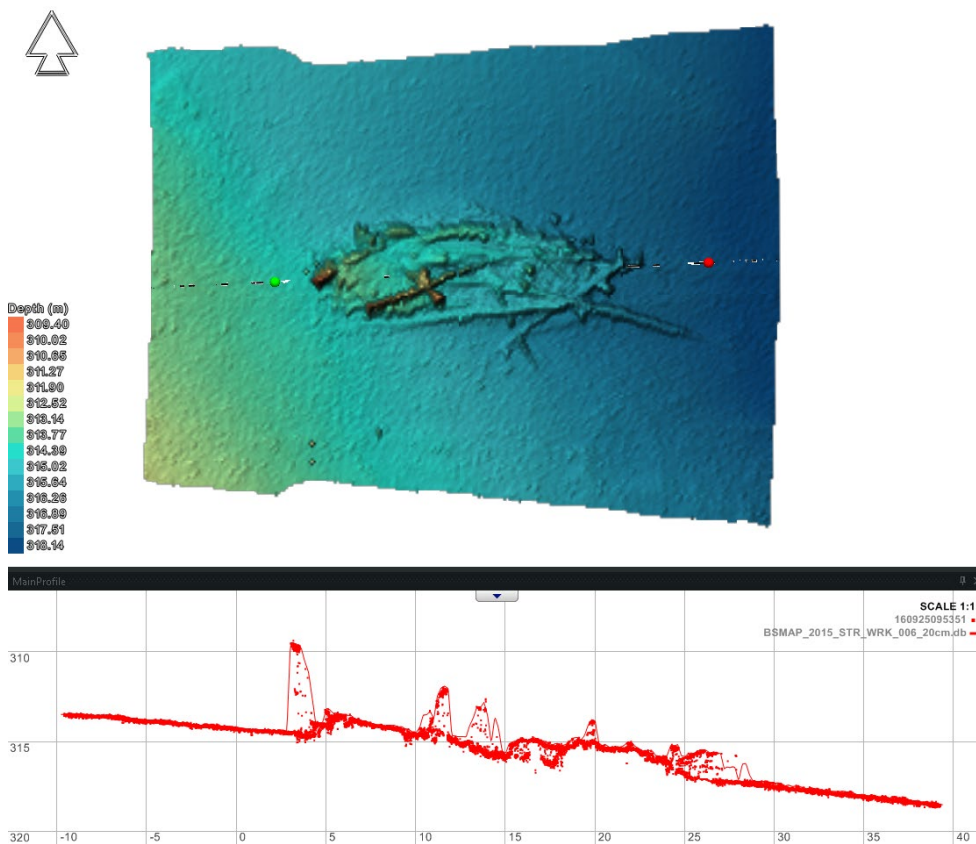
Figure 5   Multibeam image with a record of wreck site BSMAP_2015_WRK_006's size and position ©BSMAP database

The floral ornamentation of the fittings and the nearly straight sternpost are more likely to find parallels with the hulls of 18th century – Izmir and Aegean shallow draft barges which the Ottoman Navy deployed as auxiliary vessels in campaigns on the Danube, in the Sea of Azov, and along the Crimea. Nonetheless, there is also evidence of their use as commercial ships, and later the *Barça* evolved in the *Mavna*, *Çektirme*, *Pereme* class of vessels (Güleryüz 2014, 50–51). The proposed rigging of a main sprit sail for the wreck site, however, may find parallels with a later, 19th century example – the Marmara Caique built in the yards of Izmit and Iznik Bays, drawings of which are presented by Captain Mannarino of the *Messageries ships* in 1870, and by Admiral Edmond Pâris in his *Souvenirs des marines conservees* from 1876 (Güleryüz 2014, 92–97) (Figure 6). Earlier dates for the wreck site, placing it in the first decade of the 19th century, can be inferred from examples of ships rigged with main sprit sail, but with an additional foremast (not recorded in the wreck site, but whose existence cannot be definitively excluded) painted on two icons from 1804 and 1809, located in Nessebar (see Chapter 5). Because of its floral decorations, the wreck site is called "*The Black Sea rose*" by the BSMAP research team. The extensive preservation of the rigging elements makes this wreck site one of the most potentially useful for further hypothetical reconstruction of the rig arrangements (see Chapter 6).
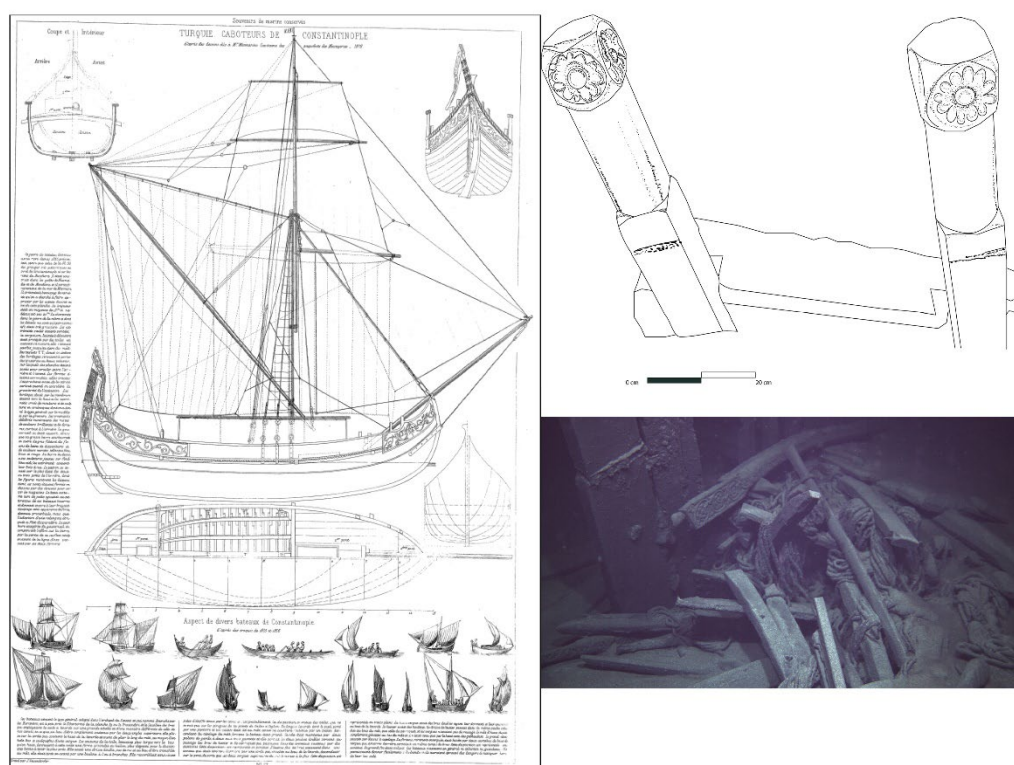
Figure 6   Decorated elements of wreck site BSMAP_2015_WRK_006 reminiscent of decorated elements in drawing by Pâris (Pâris 1882); drawing of the fore bitts ©Zdravka Georgieva
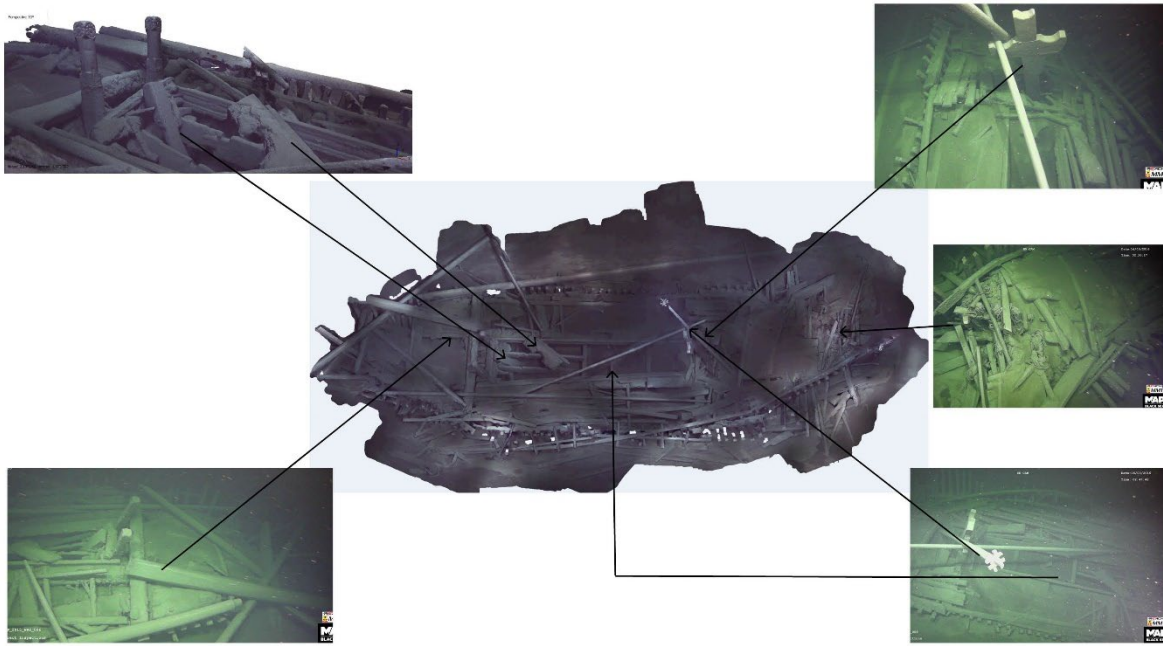
Figure 7   Top view of BSMAP_2015_WRK_006 with positions of the fittings, ©BSMAP database

4.4.3   Wreck site BSMAP_2017_Wreck_005

The wreck site BSMAP_2017_Wreck_005 has a hull that is considerably well preserved from bow to stern. It is oriented N-S, with a slight deviation of the bow to NE. The visible small, densely spaced tops of frames reveal to some extent the overall shape of the vessel. The vessel has an overall length of approximately 19 meters, and a breadth of about 6 meters. The hull bottom is buried under sediments and collapsed planks and timbers from the deck's fittings and rigging spars. A deck beam with a length of more than 6 meters separates the bow from the hold of the vessel (Figure 8). It is apparent that the deck beam projects outside the hull. A similar method of construction for seat planks, which also served as transverse stays, is used in smaller craft such as the Inebolu caiques. These seat planks are "straight and project through slits on the sides outside of the hull and are kept in place with nails" (Güleryüz 2014: 93). Abaft the deck beam, the bitts are preserved but slightly dislodged from their original position.
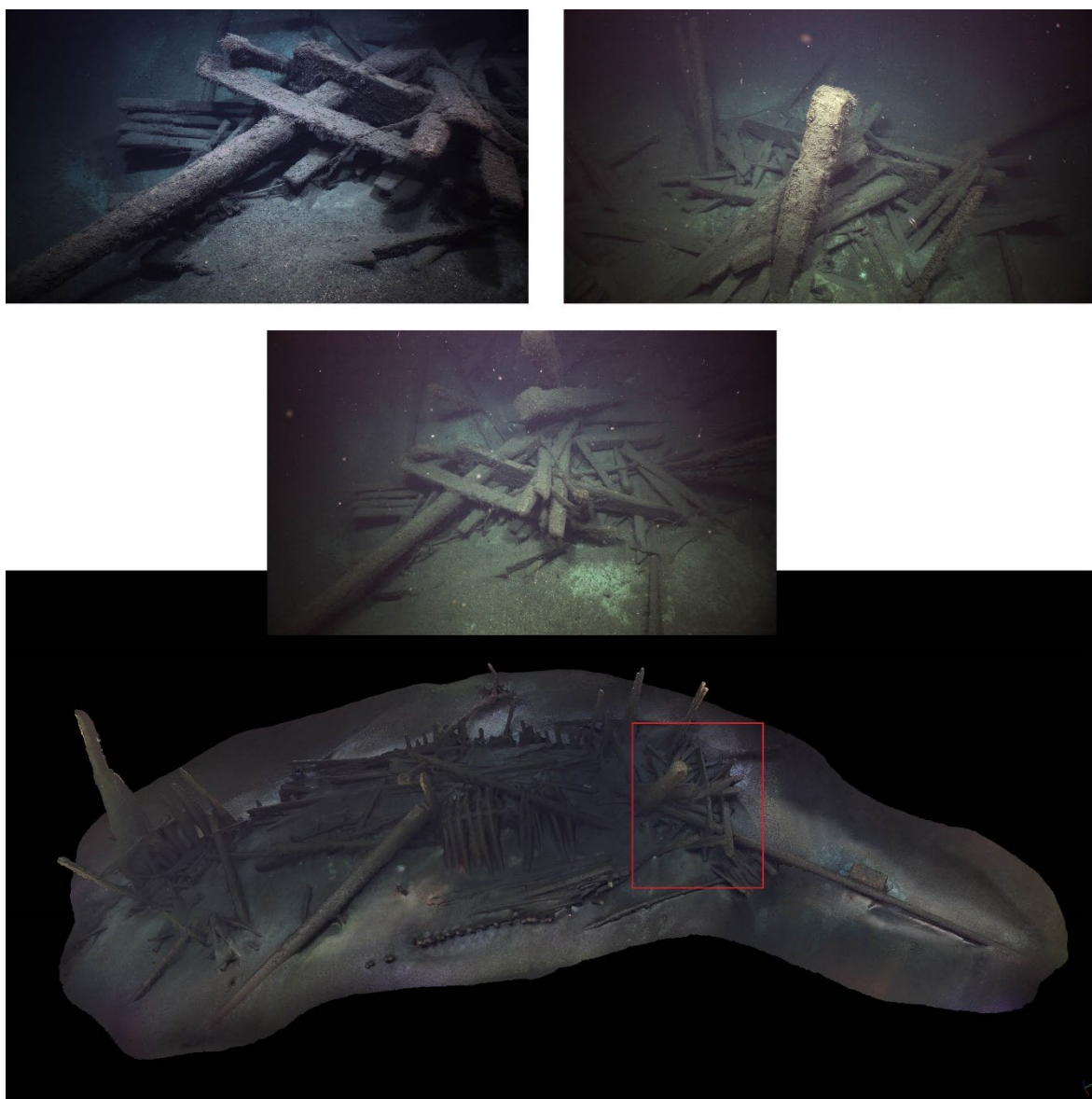
Figure 8   Photogrammetry model of wreck site BSMAP_2017_Wreck_005 with some of the preserved features from the area of the foredeck ©BSMAP database

Further aft of the bitts, amidships arc-shaped frames enclosed a cargo hold, which extends to a deck beam located at stern. It was usually covered with canvas and tarpaulins under which the cargo was once transported. Such a fitting is also recorded in another BSMAP shipwreck, BSMAP_2015_WRK_007.

Two grapnels are recorded on the port side – one leaning over the port side, and the second - outwards over the debris forward of the port beam. The sternpost is preserved in a vertical position, but slightly inclined towards the port quarter. The fore and aft deck beams, as well as the recorded height of the sternpost (approx. 4.50 m) are indicative of the existence of raised platforms at bow and stern. Such raising is evident in most of the BSMAP shipwrecks (BSMAP_2015_WRK_006,

SS_2014_BS_1428, etc.). A similar raised deck at stern is proposed for the Kitten shipwreck (Batchvarov 2009, 126). Batchvarov points out that one of the purposes of the poop decks is to facilitate the handling respectively of the sails and of the tiller (Batchvarov 2009, 127).

The vessel is proposed to be a single-masted fore-and-aft rigger. A bowsprit with a preserved length of about 10 meters is recorded, leaning over on the starboard bow with its head buried under the sediments (Figure 9a). The main mast with a preserved length of about 8 meters is recorded fallen over broad on the starboard quarter; its upper portion is covered by silt (Figure 9b). The position of the mast amidships is identifiable by a vertically positioned lower portion of the mast, preserved *in situ* at a height slightly exceeding the tops of frames. Other elements of the standing and running rigging such as spars or blocks, etc. are not visible on the images. One spar with a length of 10 meters that appears to be either a sprit or a lateen yard is visible along the port side (Figure 9c).

Although this is the only shipwreck from the studied group with a scaled model providing approximate dimensions, its rigging is not well enough preserved to precisely ascertain the rigging type. Nonetheless, the bowsprit, the main mast, and the potential sprit or lateen yard hint at the vessel being single-masted, rigged with a sprit or lateen sail.
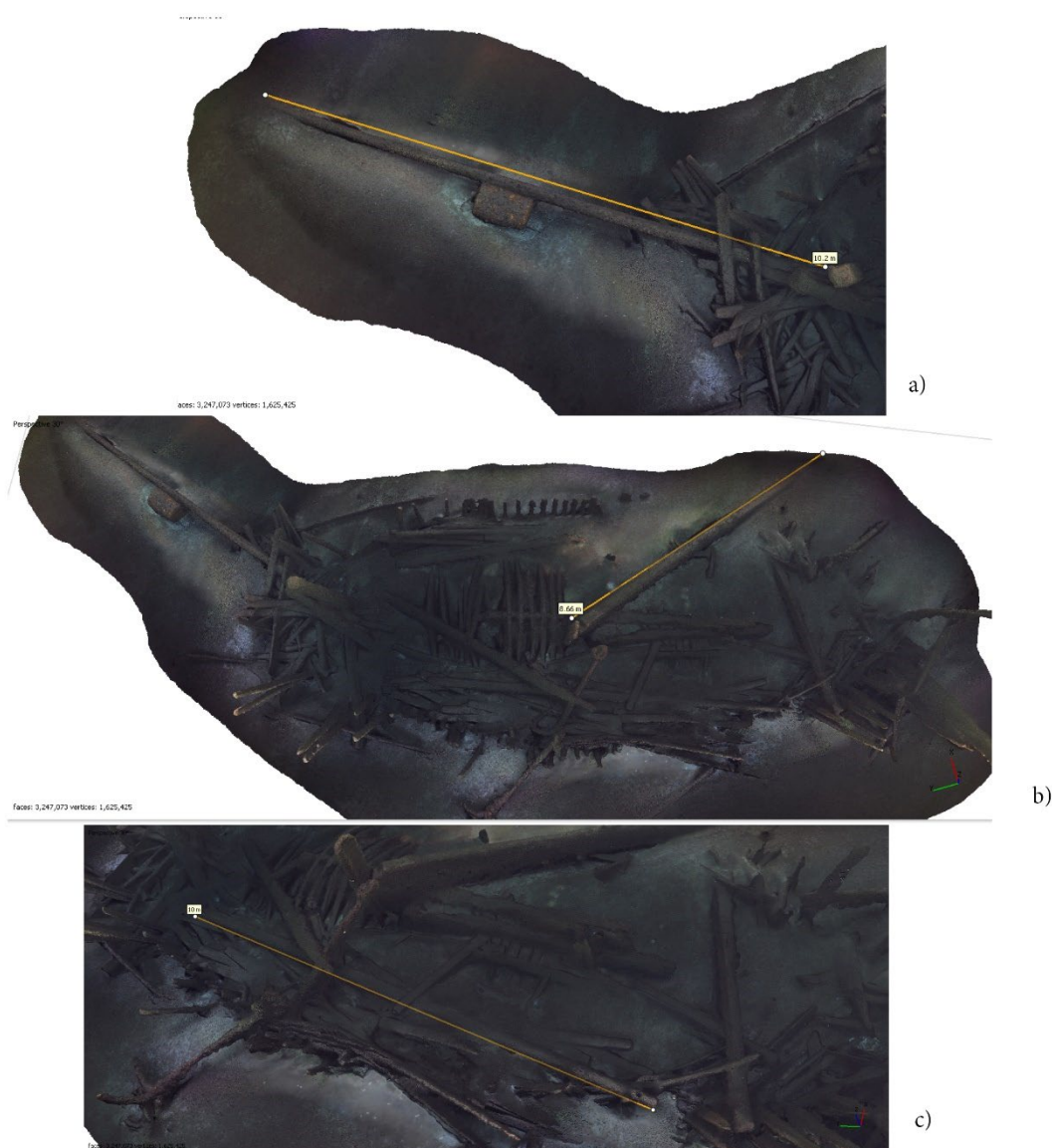
Figure 9   Rigging of BSMAP_2017_Wreck_005 with dimensions: a) bowsprit; b) main mast; c) yard, photogrammetry models ©BSMAP database

4.4.4   Wreck site SS_2014_BS_1287

The shipwreck lies at a depth between 1673 m and 1668 m, and is oriented W-E with the bow pointing west. The wreck site is considerably well preserved from bow to stern. The somewhat distorted but still well-preserved tops of frames of port and starboard sides outline the overall shape of the hull, which at first glance looks similar to the hull of wreck site BSMAP_2015_WRK_006. The length of the shipwreck is about 20 m, and its breadth is hard to estimate (Figure 10). Bulkheads at bow and stern indicate the presence of raised platforms with

some of the planking well-preserved at some places. Deck planks in the vessel's hold are also recorded.

The sternpost is recorded tilted towards the starboard side. The fore bitts and one of the bitts in the rear are also preserved, but are slightly inclined towards the starboard side. The rake of most of the hull elements from port side towards starboard suggests that the ship hit the bottom starboard side first. Two grapnels on the port and starboard bow are recorded in their original positions.

The vessel seems to be single-masted and is suggested to be rigged with a sprit or a lateen sail. The main mast seems to have been positioned amidships, and is recorded broken off at the level of the deck, from where it is leaning abeam the starboard side and extends further outwards over the silt. Although its length is unknown, it is a tall pole mast with a fidded topmast (Figure 11). The bowsprit is preserved *in situ*, and passes through a stempost on the stem that ends with two bitts perhaps used for belaying the forestays. A long spar (Figure 11, point 1), most likely a lateen yard, leans over transversely forward of the mast, with one end on port bow, and the other towards the starboard side, reaching the main mast. In proximity, two other spars with less clear purpose are recorded (Figure 11, point 2 and 3).
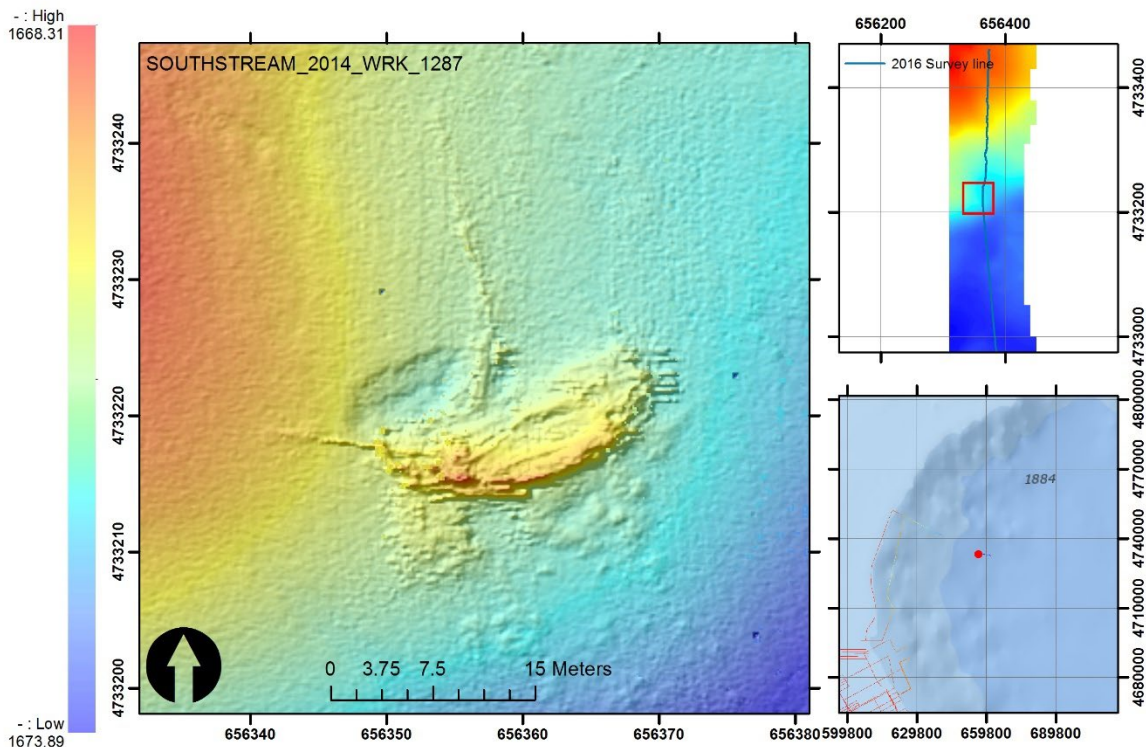
Figure 10   Multibeam image with a record of wreck site SS_2014_BS_1287, ©BSMAP database

Figure 11   Top view of wreck site SS_2014_BS_1287 with positions of rigging elements, ©BSMAP database

4.4.5   Wreck site SS_2014_BS_1392

The wreck site lies on its port side at depths between 1772 m and 1769 m, and is oriented S-N, with the bow pointing south. The shipwreck is preserved from bow to stern, with densely spaced frames at starboard and port side exposing the overall hull shape. Although most of the frames are dislodged from their original position, an impression of overall hull shape can still be obtained. Hence, its length and breadth from stempost to sternpost (which are preserved at their original positions) are measured approximately to 22 m and 6 m, respectively (Figure 12). The raised deck at bow ends with a deck beam. Aft of this beam, the bitts are recorded, with a great rake towards the starboard side. Abaft the bow, in the hold of the vessel, an abundance of dispersed planks and elements of the hull's framing is recorded, as well as various fittings – all leaning over the port side. A handspike-operated capstan is recorded still standing on deck farther abaft the midships, closer to the port side (Figure 13). Batchvarov notes that this design is old-fashioned and disappears in the Western European records in the third quarter of the 17th century, but in this case a later date cannot be excluded since the vessel sailed in Ottoman waters (Batchvarov 2016, Annual Report for

the NAIM-BAS and the Bulgarian Ministry of Culture 2016, Appendix D). The next distinguishable feature abaft the capstan and before the deck beam at stern is another pair of bitts, slightly tilted towards the port side. Aft of the bitts is the deck beam of a raised deck, with the deck planks still preserved. Abaft the deck, another raised platform - a poop deck - is distinguishable by another pair of bitts supporting the deck beam. The tiller still hanging on the *in situ* preserved stern rudder is also recorded.

All of the features' inclination towards the portside is indicative of the process of wreckage and disintegration, with the port side hitting the bottom first. During the disintegration, most of the frames and planks from the starboard side slid towards the port side.
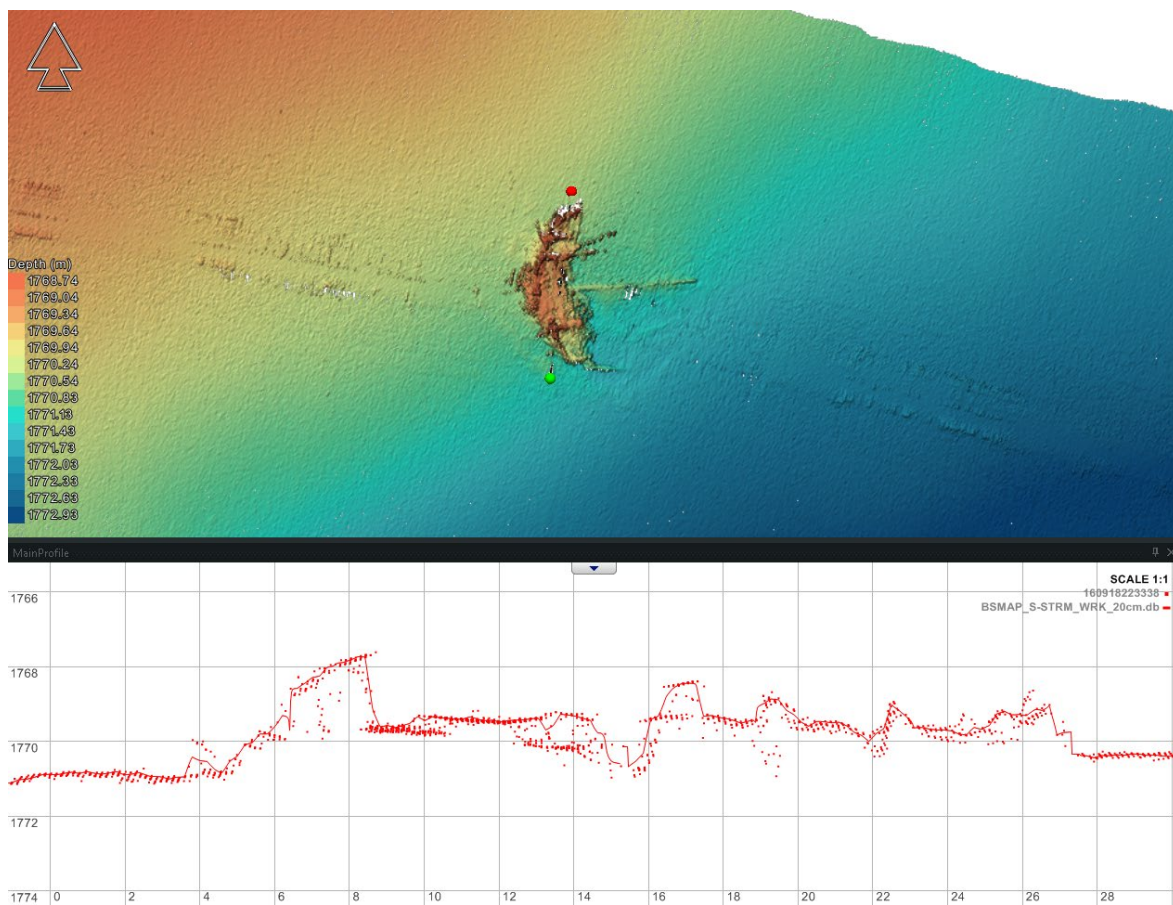
Figure 12   Multibeam image of wreck site SS_2014_BS_1392 showing its dimensions and position ©BSMAP database

The vessel seems single-masted and appears to be fore-and-aft rigged with a type of spritsail or lateen sail, and at least a square topsail. A bowsprit and one tall mast with fidded topgallant mast

are recorded. The mast is broken off at deck level, and is leaning over the debris abeam the port side. Its position originally seemed to be amidships. A spar (most likely a sprit considering its length) is recorded crossing the mast diagonally, with its lower end buried under the sediments and its peak approaching the upper part of the mast (Figure 13a). The topgallant mast is fidded to the pole mast through three caps, the middle one of which has three holes on its end that served for reeving the tackles for the yard (Figure 13b). The topgallant mast is broken off at the level of the pole mast head, which appeared to be hook-shaped – likely inherited from an archaic Mediterranean rigging tradition. In his argument for the Mediterranean origin of lateen-settee sails Whitewright (2012, 6, fig. 4) shows an example of a hook-shaped mast head in a graffito from Corinth dated to the 5th – 6th c. AD, which was associated with the use of a lateen-settee rig, which seems to support this hypothesis. The mast head appears to have three mast tackle sheaves: one sheave on top of the mast head, and the other two below, positioned side by side (Figure 13c, d). A spar that could potentially be considered as either a topsail or a topgallant yard is leaning over deck on the starboard quarter. The bowsprit projects through the prow by means of an opening on the stempost. The latter's forward portion is broken off, and it is impossible to ascertain whether there was a jibboom. The stempost's head ended with four bits, most likely serving to belay a forestay and potentially jibstays (Figure 13e). The fittings from the standing and running rigging are key finds in the archaeological record, opening new avenues of research on ships that sailed in the Ottoman Black Sea, and potentially useful in a further tentative rigging reconstruction.
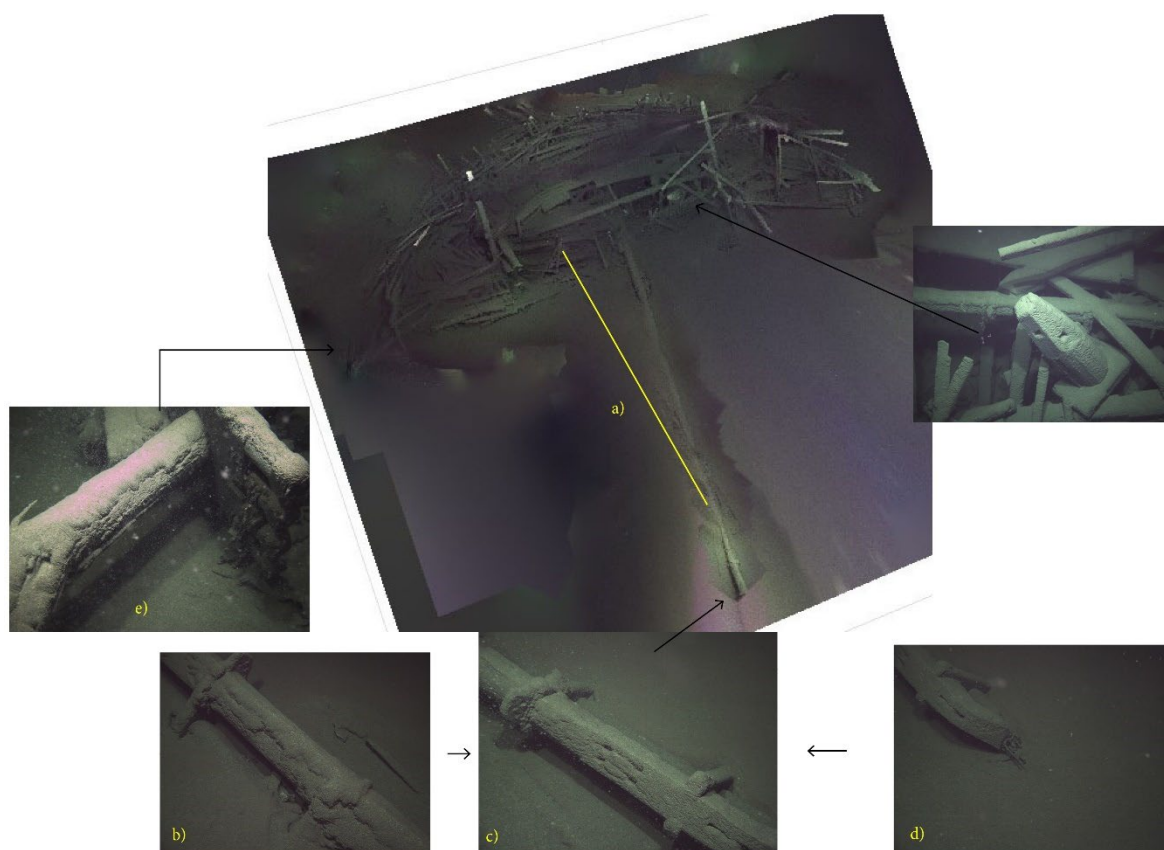
Figure 13   Top view of SS_2014_BS_1392 with positions of the fittings, ©BSMAP database

4.4.6   Wreck site SS_2014_BS_1428

This wreck site is the best-preserved example of the group of shipwrecks included in the current analysis. The vessel is preserved from bow to stern with the stern rudder and tiller *in situ*, with all tops of frames visible without serious distortion up to deck. The deck planking is well-preserved on the raised decks at bow and stern, as well as in the vessel's hold. The vessel lies on an even keel, which makes the overall hull shape clearly visible. Unfortunately, there is no data on the hull's overall dimensions.
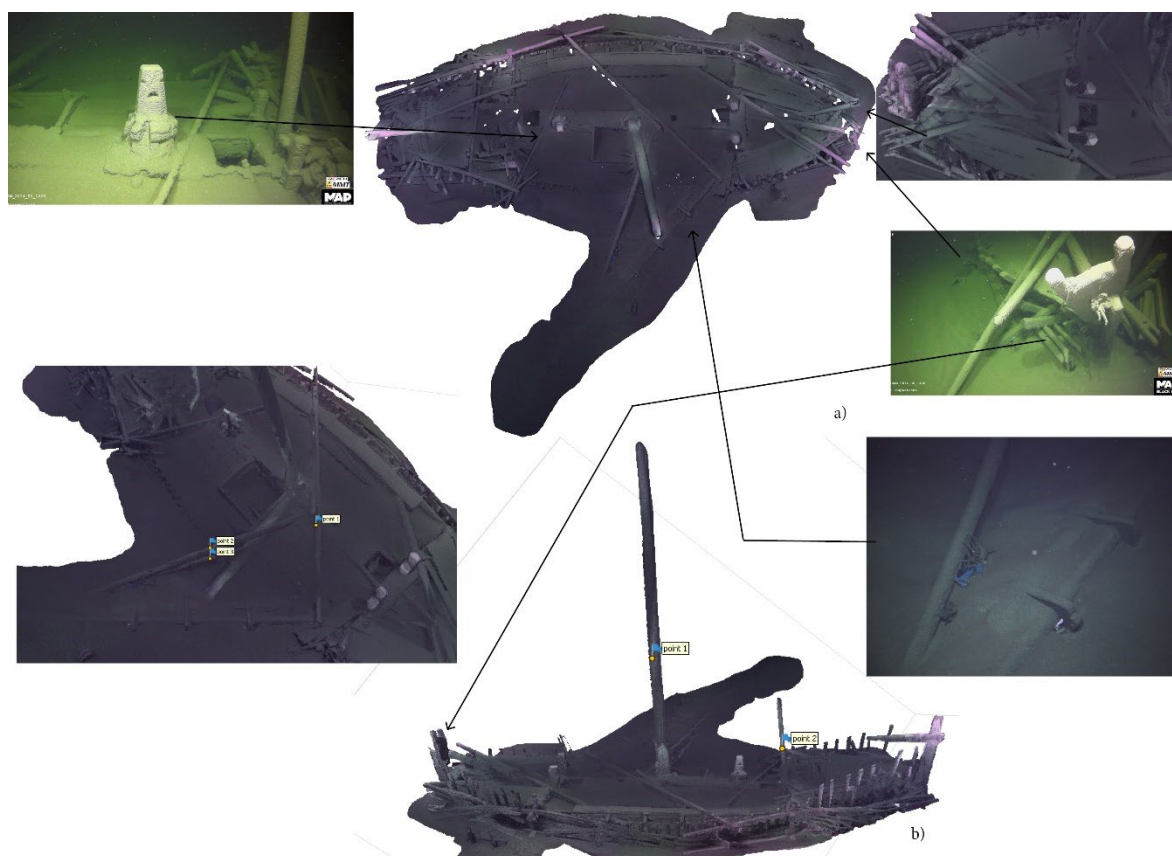
Figure 14   Wreck site SS_2014_BS_1428 with positions of fittings and spars: a) top view; b) port side with main and mizzen masts, ©BSMAP database

The stempost is recorded *in situ*; the bowsprit projected through it and is broken off at its level. The stempost ends with two bitts for belaying lines. A spar leaning diagonally over the bow may have been the other half of the broken-off bowsprit. Two catheads are leaning on the port bow. The deck at bow ends with a bulkhead supported by a pair of bitts. Abaft them, a small hatchway is visible. Along the centreline of the hold, the deck seems prominent. It is reminiscent of the narrow cargo hold recorded in wreck site BSMAP_2015_WRK_006, but this one is closed. A larger double-edged companion way is recorded on the starboard side abaft the mast. In the midship area further abaft, a handspike-operated capstan, similar to the one recorded in wreck site SS_2014_BS_1392, is located. Abaft it, the aft bitts are recorded where the deck at stern was raised. Another deck beam separates the lower platform at stern from the raised space (poop) covered with deck planks (Figure 14a).

The vessel likely has two masts: a main mast with fidded topmast and a mizzen, probably rigged with lateen sails (Figure 14b). A main mast is recorded amidships with its partially preserved lower portion standing *in situ* and supported in front by support timbers fore and aft. The other portion of the lower main mast is broken off and has collapsed near the mast, leaning over abaft the starboard beam. The fidded topmast has also fallen down in proximity to the main mast and is leaning over the starboard side. Three caps used to fasten the topmast to the lower mast, identical

to the ones recorded from wreck sites SS_2014_BS_1392 and SS_2014_BS_1287, are also visible. Two spars located next to each other, which seem to compose a single lateen yard, are leaning diagonally over the deck forward of the main mast. A vertical timber located abaft the aft bitts appears to be a mizzen mast. In front of the proposed mizzen, a long spar with the characteristics of a lateen yard is leaning diagonally over the deck (Figure 14).

A main mast with topmast fidded through three caps seems to be used in the Ottoman *saïques*, as evidenced in a late 17th century depiction from the Album du Levant of 1679 by Jean Jove (Gardiner 1995, 78) (Figure 15). However, the proposed rigging for this ship consists of two lateen sails.
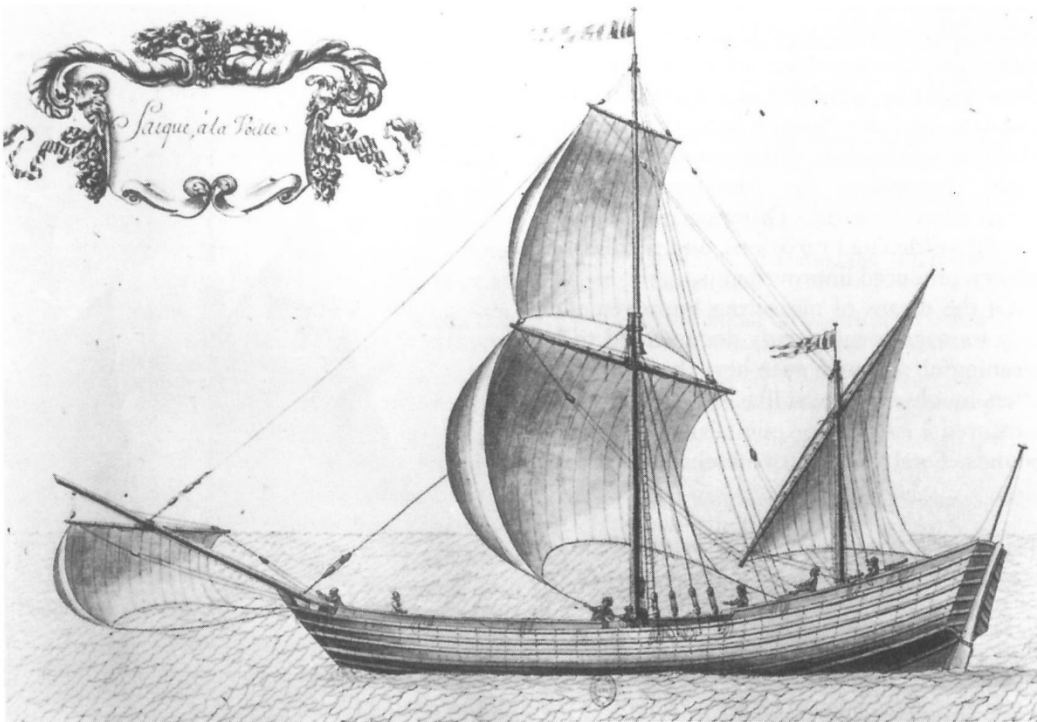
Figure 15   A method of fastening of lower mainmast and topmast illustrated in an example of a Turkish saïque, a late 17th-century example from the Album du Levant of 1679 by Jean Jouve, after Gardiner 1995, 78

4.4.7   Wreck site SS_2014_BS_763

The shipwreck is preserved well from bow to stern, with all frames along its length preserved *in situ*, without any considerable distortion. The wreck lies at a depth of 1320 m; however, its

orientation cannot be determined, as no multibeam data for it exists. At first glance, its construction and overall hull shape seem similar to wreck site SS_2014_BS_1428.

The deck amidships is covered by sediments, and many of the fittings are obscured. However, some key elements of the rigging are visible, which allows further observations and hypotheses for the sails to be made. A deck beam that separates the deck at bow from the hold of the vessel is recorded *in situ*. The stempost is preserved, but dislodged from its original location, and is inclined towards the port bow. Abaft it, there is another frame with an opening leaning over the port side, through which the bowsprit passes, but the bowsprit itself is not preserved in its entirety. Abaft the deck beam, a larger single bitt is recorded.

The vessel has two masts, and seems to be rigged more likely with lateen sail on the main mast, and a lateen on the short mizzen. The main mast is located amidships, as indicated by mast support timber inclined forward. This is very likely the original rake of the timber; if so, it might find parallels with the forward-inclined masts in *sacolevas*. The main mast, which is not preserved in its entirety, has collapsed and is leaning forward of the port beam. There are no recorded stepped topmasts, but only a long spar, seemingly broken off in the middle, with a preserved loop of rope in the middle leaning diagonally over deck ahead of the mast support timber.

Two other spars (possibly a lateen yard and a bumpkin) are visible, extending diagonally from the centreline astern on the port quarter. Abaft the deck beam at stern, a standing *in situ* mizzen mast is recorded. On the mizzen itself, a feature reminiscent of a mizzen lateen yard purchase is preserved *in situ*. Hawser laid ropes and lines can be seen still belayed on the bitts near the mizzen. Abaft the mizzen, a lead of a hawser is belayed in a sort of *figure-of-eight* knot on one of the frames on the starboard quarter. There are quite a few hawsers and lines further astern on the starboard and port quarters. In all probability, all elements recorded around the mizzen were used to tack the mizzen lateen rig, either to bring the yard round the front of the mast and to lower/hoist the sail, or to move the stays supporting the mast across to the new windward side (Figure 16).
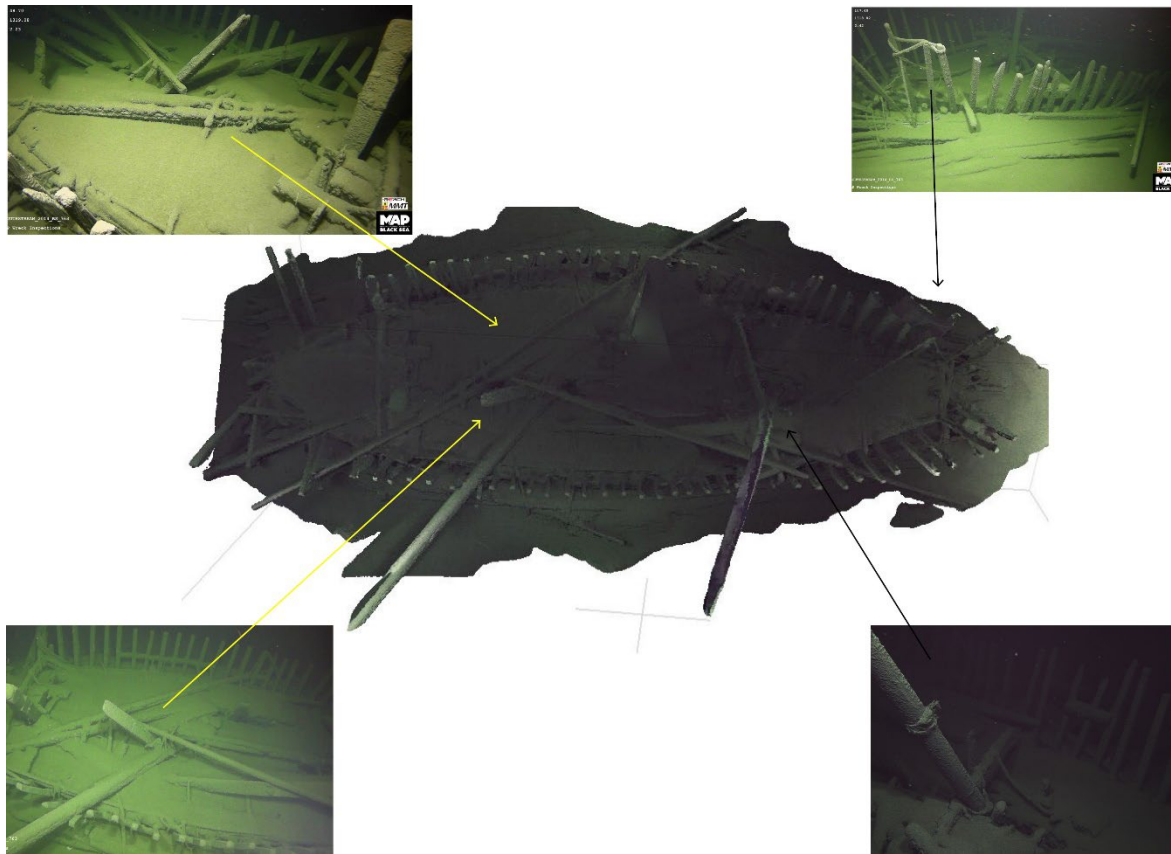
Figure 16   Top view of SS_2014_BS_763 with positions of the fittings and rigging elements, ©BSMAP database

4.5   Discussion

Detailed research on post-medieval rigging in the Western Black Sea is sparse. On one hand, the preservation of only hulls in the archaeological record, and the limited evidence of rigging, led scholars to direct their research towards the better understanding of hull design and construction. On the other hand, contemporary treatises of rigging from the region are also scarce, limiting the plausible sources on rigging to drawings of contemporary Western travellers visiting the region, which most likely did not represent the rigging in the finest detail. Batchvarov (2009, 170) expressed similar concerns, stating that research on Eastern Mediterranean and Black Sea post-medieval ships was limited, and especially that almost nothing is known about local rigging from that period. The latter was generally considered archaic, and only variations of the lateen rig were supposed to predominate in the region until the beginning of the 19th century.

Basing his analysis on the preliminary results from a few ship licenses (*sened-i-bahris*) from the Ottoman archives which contain information on commercial shipping, Mahmuzlu (2019, 121–122)

described the hull and the rig of the predominant group of Ottoman-flagged merchantmen from the early – middle 19th century that navigated the Sea of Marmara and the Black Sea. During the period of isolation of the Black Sea, and specifically the 18th century, *perama*, *sayka* (*saique*), and *volik* were the most common types of merchantmen in these seas. With the increase of shipping in the second half of the 18th century, new ship technology reached the region. The old 18th-century ships became coastal ships, while the Ottoman Empire started to build new ship types with designs whose origin can be traced to the Atlantic and the Indian Oceans (Mahmuzlu 2019, 121).

This chapter's description of the post-medieval Western Black Sea wreck sites, focused on the rig, allowed an evidence-based examination of rigging in the region during that period. Moreover, it attempted to accumulate new technical information about the Black Sea rig. This synthesis could contribute to the validation of the information derived from the variety of other sources on ship rigging in the Black Sea – iconography, marine art, and Western travellers' accounts. It would further serve to determine whether the rigging at the time should indeed be considered archaic, and whether the lateen rig predominated in the region until the 19th century.

To answer these questions, first, the initial observations on the BSMAP wreck sites' rigging are summarised; then, their possible sail plan and setting tradition/s are discussed; and finally, an attempt is made to further narrow down their initial chronological boundaries (Table 1). Five of the shipwrecks (SS_2014_BS_1287, SS_2014_BS_1392, SS_2014_BS_1428, SS_2014_BS_763, and BSMAP_2015_WRK_006) share somewhat similar technological characteristics – from identical hull shape and dimensions to elements of the rigging. Four of them belong to the group discovered in the northern waters of the Bulgarian EEZ. These wreck sites are located close enough to each other to form a single cluster, and could have belonged to a common fleet. The group of oar-sail-powered boats were recorded in proximity. BSMAP_2015_WRK_006, on the other hand, was discovered in the southern part of the Bulgarian Black Sea. All these wreck sites appear to have similar hull outlines with approximate dimensions of about 20 metres in length and no more than 6 metres in breadth. Pronounced raising of decks at bow and stern and additional raised platforms above are clearly discernible at all four shipwrecks, and less evidently in SS_2014_BS_763. The bowsprits of the four "northern" wreck sites follow the same pattern of adjustment – the bowsprit projects through an opening in the stempost, whose upper part ends with two and four bitts. Their bows and sterns seem to be bluff. Two of the shipwrecks (SS_2014_BS_1428, SS_2014_BS_1392) have handspike-operated capstans at their holds, but with different constructions: SS_2014_BS_1428's capstan appears to be more elaborate. The presence of such fittings within their hulls suggests earlier dates for these vessels compared to the rest of the cluster. As pointed out above, handspike-operated capstans disappeared from the Western European record in the third quarter of the 17th century (Batchvarov 2016, Annual Report for the NAIM-BAS and the Bulgarian Ministry of Culture

2016, Appendix D); nonetheless, this is not necessarily the case for the Ottoman Black Sea, as the Empire's strict control over the Bosphorus for three centuries might have led to the preservation of older shipbuilding traditions for longer periods of time. Batchvarov (2012, 181) expresses the same opinion in his study of the implementation of the whole-moulding Mediterranean tradition of hull design in the late 18th – 19th century merchantman *Kitten 1*, where he concludes that already during the period before the defeat of Constantinople by the Ottomans and the subsequent closure of the Black Sea, this shipbuilding practice had already developed on the western Black Sea coast, and had been preserved for longer than in any other Mediterranean regions. Similarly, handspike-operated capstans could have been used for a longer period on the western shores of the Ottoman Black Sea. This is also supported by iconographic examples: handspike-operated capstans are illustrated in ship graffiti on the exterior wall of the church of St. Stephen in Nessebar, formerly part of an additional space attached to the southwestern corner of the church in the beginning of the 18th century, with a second phase of restoration between 1780 and 1791 (Gerov 2014, 710) (see Chapter 5; ship graffiti ST_156, ST_160).

Three of the five wreck sites (SS_2014_BS_1287, SS_2014_BS_1392, BSMAP_2015_WRK_006) clearly have one tall pole mast stepped nearly amidships with fidded topmasts or topgallant masts. Foremasts are not evident among the archaeological remains of these shipwrecks, but this conclusion derives only from initial observations, and does not exclude further recognition of such (so far only BSMAP_2015_WRK_006 has shown indications for the probable existence of foremast). SS_2014_BS_1428 and SS_2014_BS_763 have two masts – pole main mast and mizzen, but only SS_2014_BS_1428 is recorded with fidded topmast on the main mast. SS_2014_BS_763 is interpreted as a version of *Sacoleva* rigged, as evidenced by the forward inclined main mast that may have carried lateen sails. SS_2014_BS_1428 more likely shows characteristics (e.g., a straight stern and possibly lateen sails) of a *Çektirme* type. Parallels of the proposed ship types for these wreck sites can be seen in the work of Güleryüz (2014) on the craft with Turkish and Greek origin with versions of *Çektirme /Sacoleva* rig (2014, 60–69).

Based on these analyses of the rigging arrangements of the five wreck sites, they can be regarded as a product of Mediterranean shipbuilding, especially considering the tall pole main masts carrying mostly lateen and spritsails. Raising of square topsails on the pole masts of some of the larger wreck sites, rather than on stepped masts and tops characteristic for the northern Europe, also suggests their Mediterranean origin. The proposed lateen sail arrangement on the mizzen is a version of rigging arrangement which Delis (2014, 49) relates to a transitional period that happened with the expansion of trade after 1789, when Aeagean captains from Spetses started using square sails on pole main masts, and kept the mizzen lateen. Delis also points out that some *sacolevas* - mainly from Psara, northeastern Aeagean Sea - sailed also to the Black Sea up to 1790s (Delis 2014, 49).

Therefore, the ships from the discussed group very likely sailed in the Black Sea in the period after the 1790s to the early years of the 19th c. This period also corresponds to the expansion of Greek shipping as neutral carriers in the eastern Mediterranean, and from the Black Sea to the western Mediterranean, in 1794-1815 during the French Revolutionary and Napoleonic Wars (Delis 2014, 49–50).

This summary of the four wreck sites in the northern cluster, with their close proximity and common technological characteristics and rigging arrangements, convincingly suggests that they belonged to a common merchant fleet. BSMAP_2015_WRK_006, on the other hand, may be referred to as another example of the similar shipbuilding and rigging tradition as the other four. This ship may have also been the most expensive, considering the abundance of carved ornaments of some fittings within the hull. The high financial status of its shipowner/s suggest that the late 18th – early 19th century was likely a profitable period of trade in the Black Sea region.

Shipwreck BSMAP_2017_Wreck _005, discovered in the south-western Black Sea, exhibits different technological characteristics than the five discussed above: specifically, an arc-shaped cargo hold in the midship area of the vessel. Its state of preservation does not provide enough information on the rigging type, except for the fact that the ship is most likely single-masted, with the mast positioned amidships. A 10-metre long spar leaning over deck close to the mast further suggests a possible spritsail or lateen rig arrangement.

Wreck site BSMAP_2015_WRK_001, also discovered in the southern Bulgarian Black Sea, is the only example to which a Mediterranean shipbuilding tradition cannot be ascribed, but a Mediterranean origin is nevertheless not excluded. It has two full-rigged masts – a lower fore mast, and a partially preserved main mast, suggesting that the ship could have been a brig. Some of the fittings such as a mid-19th century windlass date the ship to this period.

Six of the shipwrecks on the bottom of the Bulgarian Black Sea show somewhat archaic forms of rigging and fittings still in use in the late 18th – first half of the 19th c, which correlates with iconography, marine art, and archaeological records. However, the use of lateen sail carried on a main mast is suggested but could not be definitively proven via these archaeological remains. So far, the *Kitten 1* shipwreck presents the only archaeologically tested use of lateen sail in late 18th - early 19th Black Sea merchantmen (Batchvarov 2014a, 193). The archaic hulls and rigs of the Turkish ships from the Bosphorus and Salonika in 1918 are also evidenced by the impressions of Sir Alan Hilary Moore, sub-lieutenant and surgeon in the Royal Navy during the First World War:

"There are some contrivances that by their appearance particularly arouse a sense of the past. … born before 1890. So the old deep single topsail brings back the sailing days of the

Navy and the merchantmen of the first half of the nineteenth century; or, with no topgallant sail above it in a small vessel, the Dutch Wars" (Moore 1925: 40–42).

On one hand, political, economic, and socio-cultural factors led to the preservation of old-fashioned forms of watercraft along the shores of the Black Sea for a longer period than in any other region in the Ottoman Mediterranean. The Porte's shipping restrictions imposed on foreign merchants in the basin for three centuries are a manifestation of these factors. On the other hand, political-economic reasons certainly also caused the main changes in the Ottoman merchant fleet, and its shrinkage that most likely started in the late 18th century and the first years of the 19th century due the outflow of Ottoman subjects to the newly established Russian ports, as per article 17 of the treaty of Küçük Kaynara (1774). The increase of ships flying Russian flags and flags of other states in the Black Sea threatened the financial income of the Ottoman Empire. To prevent the worst consequences of these political changes, Sultan Selim III offered privileges for Ottoman subjects who wished to recall to Ottoman ports, and in 1806, with the establishment of a Ministry of the Navy (as part of the reforms), and a series of measures for the Ottomanisation of the merchant marine, he tried to improve "the international competitiveness of his subjects in Mediterranean trade and shipping" (Harlaftis et al. 2008: 24). Among these privileges (e.g. an exemption from the payment of customary dues, or capitation tax) given to the *reaya* shipowners and captains, the most beneficial was the establishment of a growing network of local notables such as Greek captains (shipowners), warrantors (often merchantmen) in close relation with local notables or with Muslim officials, Greek artisans working in the Imperial naval yard, etc. (Harlaftis et al. 2008, 23–24).

Table 1   List of the studied wreck sites with tentative dates initially proposed in the course of the BSMAP project
          ©BSMAP database

Wreck site	Tentative date
BSMAP_2015_001	Mid/Late 19th c.
BSMAP_2015_WRK_006	18th c.
BSMAP_2017_Wreck_005	N/A
SS_2014_BS_1287	Late 18th/ Early 19th c.
SS_2014_BS_1392	Late 17th-early 19th c.
SS_2014_BS_1428	Late 17th-early 19th c.
SS_2014_BS_763	18th-19th c.

The lack of archaeological excavation on the wreck sites is a significant impediment to studying their fine technological details, providing more accurate dimensions, dating them with more confidence, and discovering additional datable archaeological finds. A future archaeological excavation on some of these shipwrecks would be needed to complete and refine these analyses.

Prior to discovering the BSMAP archaeological evidence for the post-medieval Black Sea rigging, the interpretation of ship graffiti from the region relied largely on a researcher's knowledge and vision, and thus could sometimes become exaggerated. Today, the archaeological record offers a solid base for better recognising some elements of the ship graffiti, and vice versa. The following analysis of the ship graffiti from Nessebar attempts to provide an effective comparand of the archaeological remains.

Chapter 5   Post-medieval ship graffiti from Nessebar

The chapter is divided into six parts: 1) terminology and symbology of graffiti; 2) problems encountered in the use of iconography to reveal key elements of archaeological remains; 3) distribution and chronological framework of ship graffiti; 4) background of the project for non-destructive recording of ship graffiti in Nessebar; 5) analysis of the ship graffiti by three main criteria – incision style, space, and typology; and 6) interpretation and hypothetical reconstruction of some of the most detailed ones.

First, studying the ship graffiti in detail aims to demonstrate the diversity of ship types that navigated the western Black Sea during the post-medieval period, and to put these in narrower chronological boundaries. It contributes to our knowledge of the historical setting within which the graffiti were inscribed, and by whom. Second, but just as important, the detailed interpretation and hypothetical reconstruction of the graffiti contributes to the next part of the thesis - the process of hypothetical reconstruction of a BSMAP shipwreck's rigging.

5.1   Terminology and symbolism

In the contemporary world, *graffiti* are seen as street art or an act of vandalism, since the drawings are placed on public buildings or private properties, and almost always disturb their original appearance. In the context of archaeology, history or iconography, the term *graffiti* is widely used by researchers to refer to various types of depictions incised with a sharp tool on a soft enough surface: plaster, mortar, limestone, wood, pottery (Michail 2015, 41). Walsh (2008: 2) looks at the graffito as "a depiction (more random, less professional, unofficial and often uncommissioned, on a surface not really designed for it in the first place)". Regarding maritime graffiti, Westerdahl (2013: 345) doubts that all carvings of ships should be called ship graffiti, and instead adopts the term "carvings" or "ship images carved in churches", as he ascribes to this term a more votive meaning than that usually implied by the term graffiti. The latter according to Walsh are seen more as a low-art for entertainment (Walsh 2008, 1). In the current study, I adopt the widely used term ship graffiti to refer to images of both ships and boats incised in either the plaster or the stones of churches' walls.

The origin and the meaning of these monuments are still not conclusively known (Georgieva et al. 2022, 25). The most plausible and most widely accepted hypothesis considers them 'ex-votos' representations, especially when located in sanctuaries (Artzy 1999; Michail 2015; Demesticha et

al. 2017). Still, it remains unclear whether ship graffiti have a meaning, or represent "the idle doodling of a largely maritime-based society" (Champion 2015: 344). Champion suggests that these carvings were left by highly religious medieval mariners inside the nave of the holy temples, which he connects with the Latin word for a ship – navis (Champion 2015, 345). He also compares the purpose of the ship graffiti tradition with the English one known as 'church ships', in which wooden ship models are left hanging from the churches' roofs as votive offerings for safe return from a voyage (Champion 2015, 345). Ovcharov (1992: 8–9) interprets ship graffiti as "snapshots or photographic pictures of the things that had excited the people's minds", as well as a representation of objects (i.e. ships) that were "worshipped by seamen and fishermen". The idea for their votive meaning is further supported by other iconographic examples of ships illustrated on icons. The tradition of painting ships on icons has a deeply religious meaning. For the purpose of protection during sailing, these icons often depict the ships of their owners, who in many cases according to Shterionov (1999: 97) are also donors to a church. In the course of the current research, three icons from the western Black Sea were explored. The icons were devoted to local donors, contain illustrations of important elements of ships' rigging from the beginning of the 19th c., and are used as supporting material in chapters 5 and 6.

Nevertheless, we should not consider all graffiti of ships as having a religious meaning. Similar to Ovcharov's (1992: 8–9) suggestion that ship graffiti might have functioned as images of the things that impressed people the most, Artzy (1999: 21) proposes the latter as "footprints of sailors' willingness to eternalize their own ships during the voyage". Another group of ship graffiti discovered in cisterns might provoke researchers to propose a quite different hypothesis for their symbolic meaning. Georgieva and Nikolov (2022) see medieval ship graffiti recently discovered in a cistern in the medieval city of Rusocastro, Bulgaria, as inscriptions with narrative meaning. Nakas (2021, 52) interprets the cistern as a place closely tied with water, and thus with the sea and ships, to which only a restricted number of people (e.g. soldiers, travellers, mariners) had access to draw images, when the cistern was already empty of water. So far, it seems unwise to judge the symbolic meaning of ship graffiti based on the place in which they were carved. Taking this into an account, then, should we look at all post-medieval ship graffiti from the churches in Nessebar as images loaded with a Christian Orthodox religious meaning?

The question about the symbolic meaning of ship graffiti might not be categorically answered, but their relatively high number is a quantitative prerequisite for further in-depth analysis of the depicted nautical elements.

5.2 Problems encountered in the application of the iconographic approach in unravelling key elements from the archaeological remains

The application of iconography in studying technological features from the archaeological record is often approached cautiously by maritime researchers, especially when it comes to reconstruction of upper structures of ships, which are often missing from the wreck sites. Such an issue was encountered by Batchvarov (2009, 111) in the course of his doctoral research. He views iconography as an overrated source of information about nautical technology (especially the rigging system), since the upper structure from the wreck site he studied was not preserved. First, he sees the ship graffiti as roughly depicted images, and limits their use as a comparative material in his study. Second, the only sources that he cautiously uses for his reconstruction of the Kitten shipwreck's rig type are contemporary illustrations by European travellers.

Similar to Batchvarov's view, Adams (2013) stresses the problematic nature of iconographic material when used to build up the concept for the medieval ship's hull. First, he states that these images are an overused source, and archaeologists are attempting to extract from it more information than it can give. As a second issue, he sees that iconography has a complex, multilayered meaning, coloured by diverse facets such as the intended purpose of the image, the author's ideology, knowledge, conventions that they followed in producing an image, as well as the specific knowledge that the reader would apply in its interpretation (Adams 2013, 104). Therefore, he concludes that "these issues do not seem to have been taken into account in the rather overenthusiastic interpretations of what these images showed." (Adams 2013: 104). Dhoop (2016: 154) reaches a similar conclusion, suggesting that the interpretation of some technological characteristics of ship graffiti would only be achievable by people closely tied with nautical-oriented disciplines. However, the reader, no matter how well educated, cannot always escape from the subjective nature of the graffiti. Still, we can assume that these were carved by people with their own insight and knowledge about a certain craft, as Dhoop (2016: 297) wrote: "it is the work of people who drew what they knew and what they could see."

All of these issues should always be taken into account until the iconographic material has quantitative archaeological comparands. Whitewright (2017: 221) points out that use of "physical remains" should be crucial in the development of certain methods of using the iconographic evidence in the study of ancient maritime technology. He also adds that the archaeological examples would be better suited for analyses of crucial rigging elements. However, their limited existence in the archaeological record, especially for the ancient Mediterranean watercraft, imposes the necessity to search for different types of evidence. The abundant iconographic

examples of both ships and boats would be one such source of information, useful in particular in assisting the establishment of a more general movement of technological development or continuity, rather than revealing individual elements from the rigging, which are difficult to discern on such small-scale schematic representations (Whitewright 2017, 223).

The cautious use of iconographic evidence in previous studies was indeed reasonable. This was especially valid in the case of the Kitten shipwreck - at the time the only one in the archaeological record for the western Black Sea, - where the only preserved elements of the rigging were sheave blocks and toggles (Batchvarov 2009, 2014a). In iconography, these are almost always either omitted, schematic, or too small. Nowadays, the archaeological record for the western Black Sea has increased, especially in terms of well-preserved rigging elements, and this gives us a more reasonable ground for the use of iconographic material.

5.3 Distribution and chronological framework of ship graffiti

The tradition of inscribing maritime graffiti is a widespread phenomenon which dates back to the 3rd millennium BC (Artzy 1999, 21; Demesticha et al. 2017, 347), probably as far back as the first watercraft. Such a dating is assigned to graffiti of boats from a prehistoric megalithic temple in Malta (Artzy 1999, 22). Muscat describes the graffiti from the Tarxien temples as the oldest in the Mediterranean (Muscat 1997, 180). Another early cluster of boat graffiti from the eastern Mediterranean (near the coast of Israel and from Cyprus) is relatively dated to the end of the 13th c. BC and the beginning of the 12th c. BC (Basch 1987; Artzy 1999, 22; Demesticha et al. 2017, 347). A relatively large group of about 200 ancient ship graffiti dated to the 6th c. BC is registered in southern Attica, Greece (Van De Moortel and Langdon 2017). The most widely distributed graffiti of ships are those dated from the Middle Ages and incised on murals and façades of temples, churches, mosques, rock monasteries, wall fortifications, public buildings, etc. Examples of medieval graffiti of ships are known from Northern and Central Europe (Champion 2015; Dhoop et al. 2016; Demesticha et al. 2017), the Mediterranean (Meinardus 1972; Walsh 2008b; Trentin 2010; Michail 2015; Demesticha et al. 2017), the Black Sea area (Bryer 1966; Meinardus 1972; Ovcharov 1977, 1982, 1992; Villain-Gandossi 1981; Klenina and Biernacki 2006; Nakas 2008). In his study of medieval ship graffiti across Britain, Champion (2015, 58) finds that most ship graffiti (65 %) are found in churches located in the coastal zones and near harbours. This percentage seems quite logical since the coastal zones have been the first doorstep of maritime trade throughout history.

The distribution of ship graffiti along the shores of the Black Sea is similar to that in Britain and the eastern Mediterranean. The presence of medieval ship graffiti in Istanbul, the capital of the

Byzantine, then Ottoman empire – the largest trading centre in eastern Europe – is not a coincidence. A large and diverse epigraphic collection is preserved in the interior of Hagia Sophia. In the period between 2007 and 2014, Thomov recorded 200 graffiti inside the basilica (today a mosque), the most numerous of which he estimated to be the ship graffiti (Thomov 2021, 114). In Trebizond's churches, there are ship graffiti that illustrate small single-masted Black Sea merchantmen that navigated during the Byzantine period (Meinardus 1972, 30). Nakas (2008) also noted that ship graffiti from the 14th c. are incised in Trebizond's church St. Sofia, which he relates with galleys from the imperial fleet of Alexius III Komnenos (Nakas 2008, 79). Another graffito of a medieval ship along the Black Sea shores is evidenced from the medieval village of Basarab (Murfatlar) in the region of Constanta, Romania (Ovcharov 1977, 60; Agrigoroaei 2006).

In Bulgaria, ship graffiti are distributed both along the coastal areas and inland; however, it is still unknown which predominate. Inland graffiti of ships are evidenced from the first Bulgarian kingdoms – Pliska, Preslav and Nikopol, and are dated to the 10th c. AD (Ovcharov 1977, 1979, 1982). The church of St. George in Kyustendil exhibits a diverse collection of various graffiti, among which graffiti of medieval ships. These are dated after the 12th c. AD, but the period cannot be defined with certainty, as there were murals from three different periods – the 15th, 16th, and 19th centuries (Mitov 2018, 676), and the ship graffiti could fall in any of these periods. In the narthex of the Holy 40 Martyrs church in Veliko Turnovo there is also evidence of a ship graffito, which is recognised as a naval galley dated to the 16th-17th c. (Dermendzhiev and Koseva 2000). The largest group of medieval ship graffiti inland is known from the Imaret Mosque in Plovdiv. Part of those illustrate oar-sail-powered ships dated to the second half of the 15th and the beginning of the 16th c., or as proposed by Ovcharov (1987), naval galleys from the Ottoman fleet (Ovcharov 1987, 30–32). Another group he defines as sailing ships (cogs, caracks and caravels), predominantly single masted, which he dates to the second half of the 15th c. (Ovcharov 1987, 46). A recent archaeologically excavated cistern in the medieval fortified city of Rusocastro revealed a wall with a diverse collection of graffiti, among which two medieval ship graffiti, which add to the inland collection. The ship graffiti were defined as naval galleys dated to the end of the 13th- beginning of the 14th century (Georgieva and Nikolov 2022). Medieval ship graffiti found in the same unique context are evidenced from Kherson, Ukraine (Klenina and Biernacki 2006). Along the Bulgarian Black Sea coast, medieval ship graffiti are evidenced from the chapel of the cave monastery Aladzha Manastir near Varna that is dated to the 14th-15th century (Atanasov and Cheshmedzhiev 1990), and from four medieval churches in the town of Nessebar, which form the largest group of medieval and post-medieval graffiti of ships (Georgieva et al. 2018, 2019, 2022; Georgieva and Prahov 2020). Most of the latter are dated to the 17th-19th century; however, a few, found in St John Alitourgetos church, date from the 14th, 16th centuries (Villain-Gandossi 1981; Ovcharov 1992). The large number of post-

medieval ship graffiti makes a case for these to be considered a reliable enough source for further extensive analyses. The current research focuses only on the post-medieval ship graffiti, since they are numerous and represent an important historical source of information for seafaring, shipbuilding traditions, and the worldview of the population in Nessebar and that of the Western Black Sea coast in the post-medieval period (Georgieva et al. 2022, 24).

Today, the technological advances in the methods for cultural heritage documentation give wider and more objective perspectives for the presentation, communication, study, and interpretation of graffiti. Such methods were used during the three-year fieldwork for recording the post-medieval ship graffiti from Nessebar (Georgieva et al. 2018, 2019; Georgieva and Prahov 2020), which constitute dataset 2 of this thesis.

5.4 Background of the project for non-destructive recording of ship graffiti in medieval churches in Nessebar

The three-year fieldwork for recording ship graffiti in Nessebar was conducted in 2018-2020 within the framework of an archaeological project of the National Archaeological Institute with Museum at the Bulgarian Academy of Sciences (NAIM-BAS) financed by the Bulgarian Ministry of Culture, which I directed. The requisite annual reports of activities and results were published in the journal of NAIM-BAS 'Archaeological Discoveries and Excavation' (Georgieva et al. 2018, 2019; Georgieva and Prahov 2020) (Appendix B).

The use of modern photographic methods and the results obtained during the project were also published as a separate article *'Advanced photographic methods in studying ship graffiti from medieval churches in Nessebar'* (Georgieva et al. 2022) in the journal *Interdisciplinary Studies* of NAIM-BAS (Appendix B).

Parts of these works are used in this chapter.

Nessebar is a UNESCO World Heritage town on the Bulgarian Black Sea coast. There is an abundant collection of graffiti incised in the interiors and exteriors of four of its medieval churches – St. Spas, St. Stephen, St. John Alitourgetos, and St. Todor. The graffiti from the first three churches have been previously recorded by hand, thoroughly studied, and published in a catalogue with 174 graffiti of ships (Ovcharov 1992). The ship graffiti from the church of St. Todor were first registered and recorded in the framework of my project (Georgieva et al. 2018). The non-destructive recording of all graffiti (ships, animals, letters, years, humans) involved a team of specialists from the CUA,

the Museum Ancient Nessebar, NAIM – BAS, and the Balkan Heritage Foundation (BHF). The project was funded by the Bulgarian Ministry of Culture and technically supported by the BHF and the CUA. Its main objectives were: 1) to create a thorough graffiti database through advanced methods for scientific documentation; 2) to assess their state of preservation; 3) to produce graffiti presentation for disseminating to the public through publications, exhibitions, and a freely accessible database; 4) to give a broader and more objective perspective in studying the relatively unexplored topic of post-medieval seafaring in the western Black Sea (Georgieva et al. 2022, 22). All of these objectives were identified as prerequisites for the protection of this vulnerable cultural heritage, and were highly recommended by the Joint Mission to the underwater cultural heritage of the ancient city of Nessebar (Bulgaria) of UNESCO world heritage centre – ICOMOS and UNESCO scientific and technical advisory body (STAB), held in Nessebar in 2017 (Advisory Mission Report, 2017, Section 5.4, 14-15).

Different documentation methods were applied in order to test and compare the advantages of each, and to determine the most suitable method for the specific research objectives. Reflectance Transformation Imaging (RTI) was used as the principal method for documentation during all three years. In 2018, 3D scanning with an Artec Eva scanner was tested as an alternative recording method. However, when the obtained models were compared with the RTI ones, it became clear that 1) the size of the scanned dataset was too large for manipulation and storage, and 2) the processed scans did not provide images of the fine details of the graffiti (Georgieva et al. 2018, 683– 684). In 2020, two other methods – Close range photogrammetry and Gigapixel photography - were added to the recording techniques. Based on the results of all four methods, the most advantageous one with minimal limitations turned out to be the RTI (Georgieva et al. 2022).

RTI is a non-destructive and widely accessible low-cost digital photographic method for recording, visualisation and exploration of various objects in fine detail, which are otherwise invisible to the naked eye (Mudge et al. 2006; Palma et al. 2010). It uses a series of shots of an object taken with a stationary camera and an external light source pointing from different angles, but from a constant distance, aiming, as described by Gabov and Bevan (2011: 4), "to calculate the surface normal for each pixel in the image". The integrated software RTI Builder is used in the postprocessing workflow to combine the shots through two underlying algorithms - Polynomial Texture Mapping (PTM) and Hemispherical Harmonics (HSH). During the postprocessing phase of the project, only the HSH fitting algorithm was applied. The output is a single RTI file that presents the detailed surface morphology of the object in an interactive manner, which can then be virtually manipulated and viewed from different angles of illumination in another key software, RTI Viewer (Gabov and Bevan 2011, 4). An image with a clear enough visualisation of all details in the frame is then further processed for graphical illustration (Georgieva et al. 2022, 26).

RTI, developed as an open-source technique by Cultural Heritage Imaging (CHI, NG, USA) along with manuals and instructions for use (http://culturalheritageimaging.org/Technologies/RTI/), makes it possible to study the ship graffiti in detail, and visualise even subtle relief elements that were invisible to the naked eye, potentially revealing previously unknown graffiti or parts thereof. The equipment required for the recording phase included a camera, a lens, a tripod, an external flash with a remote transmitter, a computer, and a black sphere with a polished surface. The sphere has to be placed next to the object within the image frame. The reflection of the flash on the sphere, recorded on any shot, provides RTI Builder with the necessary information about the location of the flash, which is then used in the construction of the model (Georgieva et al. 2022, 29).

In 2018, the graffiti in two of the medieval churches in Nessebar – St. Spas and St. Todor – were recorded (Georgieva et al. 2018). The focus was the documentation of all ship graffiti, which are located on the murals of the lower levels of the south and the north walls in the nave of St. Spas church, as well as on the side walls of the south entrance of the church. The process of RTI recording followed the spatial distribution of the ship graffiti, which are incised mostly in groups and form scenes in the decorative panel. Following this pattern, during this fieldwork season we managed to capture 11 panels from the north wall and 9 from the south (Figure 17). After the models were generated, the ship graffiti recorded in this church numbered 178 in total. Several previously unrecorded graffiti of ships and a couple of unseen elements were registered after a comparison with the graffiti in Ovcharov's published catalogue (Ovcharov 1992). Several ship graffiti were also found to be either completely or partially erased by erosion of the plaster and previous conservation procedures (Georgieva et al. 2018, 684). In addition, during this season, some newly registered graffiti of ships were recorded in the church of St. Todor through traditional digital high-resolution photography. There were five graffiti of ships in total, each of them incised in individual limestone blocks used in the church's façades. Three of the ship graffiti (two on the southern and one on the eastern façade) appeared to be turned upside down, with their keels on top, which suggests that the stones are not at their original position and might have been reused during rebuilding of the walls (Georgieva et al. 2018, 684). The stones in which the ship graffiti are incised are highly eroded, and this affected negatively their overall state of preservation and appearance. Thus, these graffiti of ships will not be included in further interpretations, but only in the digital archive (Appendix A).
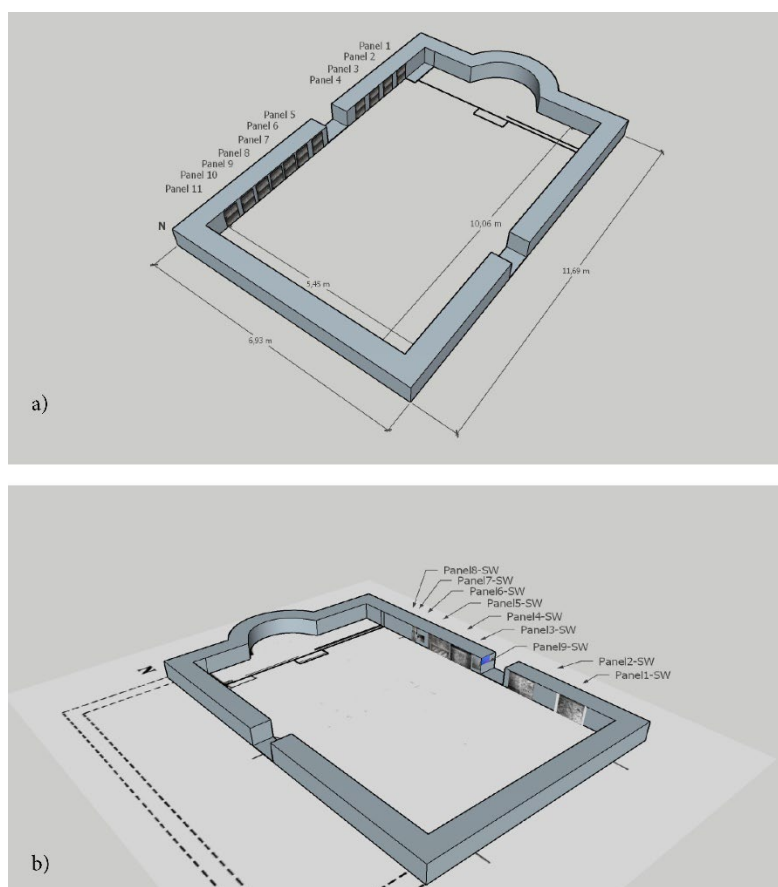
Figure 17   Plan of the church of St. Spas showing the location of the captured RTI panels: a) panels distributed along the northern wall of the nave; b) panels distributed along the southern wall ©Zdravka Georgieva

In 2019, RTI recording of graffiti was performed in the altar and the nave of the church of St. Stephen. A DSLR Nikon D810 camera with a 60 mm macro NIKKOR lens positioned on a tripod was used. The camera was remotely manipulated through a smart phone wirelessly connected with a Cam Ranger controller in order to improve stability during the capturing process. External NIKON Speedlight SB-800 and Godox flashes were used as a light source. The positioning of the camera was tailored to the area of the graffiti compositions, and the distance to the object's surface varied between 1 and 2 meters. The individual graffiti were combined into panels, which were numbered according to the sequence of their capture. A total of 36 panels were documented, with 124 graffiti overall, 114 of which are graffiti of ships and boats (Georgieva et al. 2019, 141-142) (Figure 18).
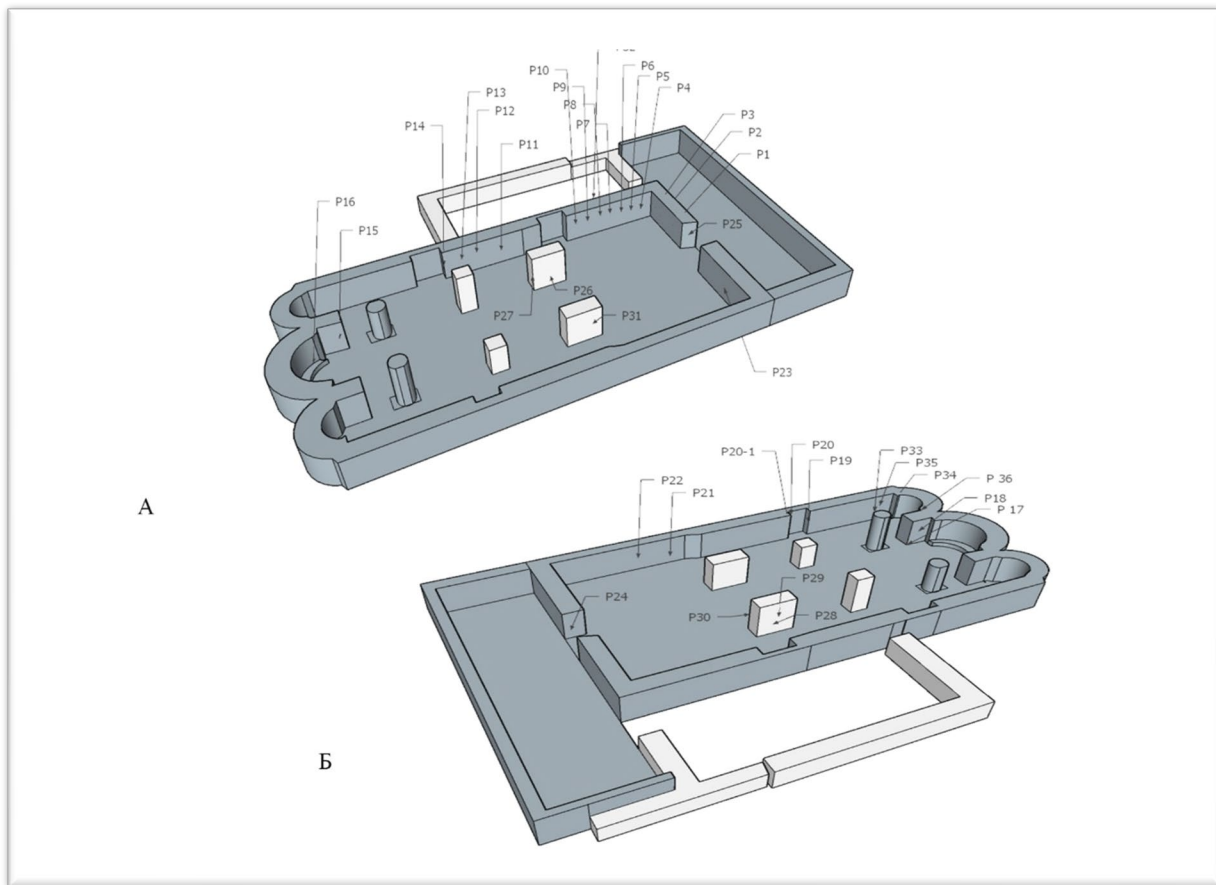
Figure 18   Plan of the church of St. Stephen showing the captured RTI panels: A represents the location of panels on the south, west, east walls, and SW and NW pillars; Б represents the panels on the north, north facing walls of the altar, and SW pillar ©Zdravka Georgieva

In 2020, we aimed to record the graffiti in the narthex and the exterior area of the church of St. Stephen (Figure 19) and the graffiti on the façades of the church of St. John Alitourgetos. The exterior wall of the church of St. Stephen, on which the graffiti are currently located, belonged in the 18-19th c. to a closed space with a second floor attached to the southern façade (Rashenov and Karayotov 2006, 17). The external graffiti were recorded through RTI and photogrammetry, while the graffiti in the narthex were captured only with RTI. The same equipment as the previous year was used for recording, with the exception that scaffolding was used for capturing the graffiti on the exterior wall in the church of St. Stephen and some graffiti from the façades of the church of St. John Alitourgetos, located at heights between 2 and 4 meters. For the purpose of the study, individual graffiti were again combined into panels, and some more detailed ones were independently documented through either RTI or photogrammetry. Precise 3D models from multiple overlapping frames were generated to allow further detailed analysis and long-term use. The composition of individual panels or frames was difficult in the narthex of the church of St. Stephen due to the presence of a large number of graffiti (mainly inscriptions and individual letters

and numbers), which, in addition to overlapping considerably, are also almost erased and barely discernible due to conservation interventions and erosion. The overall number of composed panels in the narthex is 46 (Figure 20). A panoramic 360-degree photography of the eastern wall of the narthex was taken for the purpose of referencing the graffiti's location. In the church of St. Stephen, 24 ship graffiti were recorded in the narthex, and 15 – on the exterior wall. Two of the graffiti there are drawn with black paint, unusual and in complete contrast with the other 'standard' graffiti carved with a sharp object. One possible explanation is that these were once part of a mural. Because of this, these two graffiti are not included in the current catalogue as individual graffiti. Together with the graffiti captured from the nave and the altar of the church of St. Stephen in 2019, the total number of ship graffiti in this church thus increased to 153 (Georgieva and Prahov 2020, 82-83).
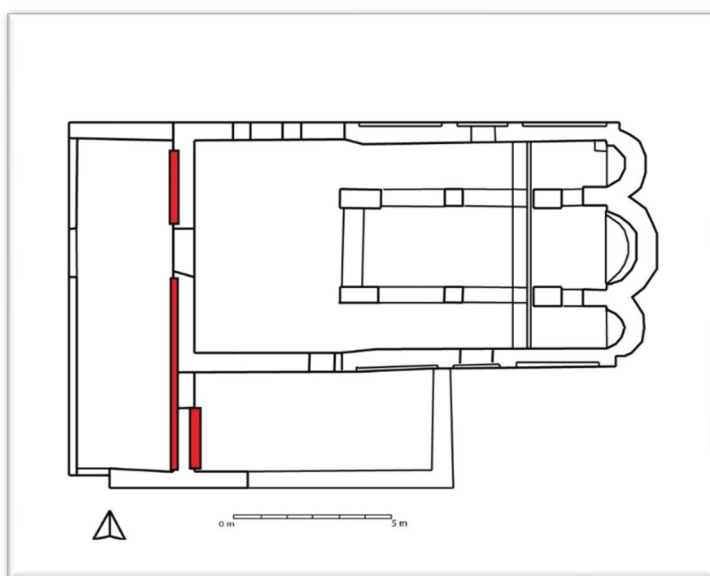
Figure 19   Plan of the church of St. Stephen showing the location of the recorded ship graffiti in the narthex and the south facing wall, at present on the exterior of the church ©Zdravka Georgieva
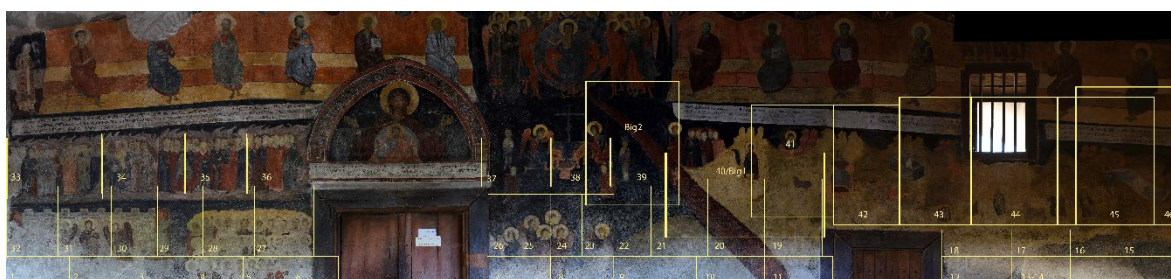
Figure 20   Reference of the RTI panels captured in the narthex of the church of St. Stephen, image by Miglena Raykovska

The graffiti on the façade of the church of St. John Alitourgetos were recorded through photogrammetry. A full-frame 24-megapixel DSLR Nikon camera with D750 and a 100 mm NIkkor FX lens was used. The recording was taken on the eastern, western, and northern walls of the

church (Figure 21). Today, there are no graffiti to be registered in the nave of the church. The graffiti are incised on separate stones, like the ones from the façades of the church of St. Todor (Georgieva et al. 2018). The highest graffito is the only one on the northern façade of the church, and was previously dated to the 14th c. based on its technological characteristics (Ovcharov 1992). On the eastern façade, three barely visible graffiti were also recorded. Thanks to the advanced software program Cloud Compare, it was possible to better delineate barely discernible lines from the hull of one of the worst-preserved graffiti on the eastern façade (Figure 22). Overall, 4 graffiti of ships were recorded in this church (Georgieva and Prahov 2020, 83).
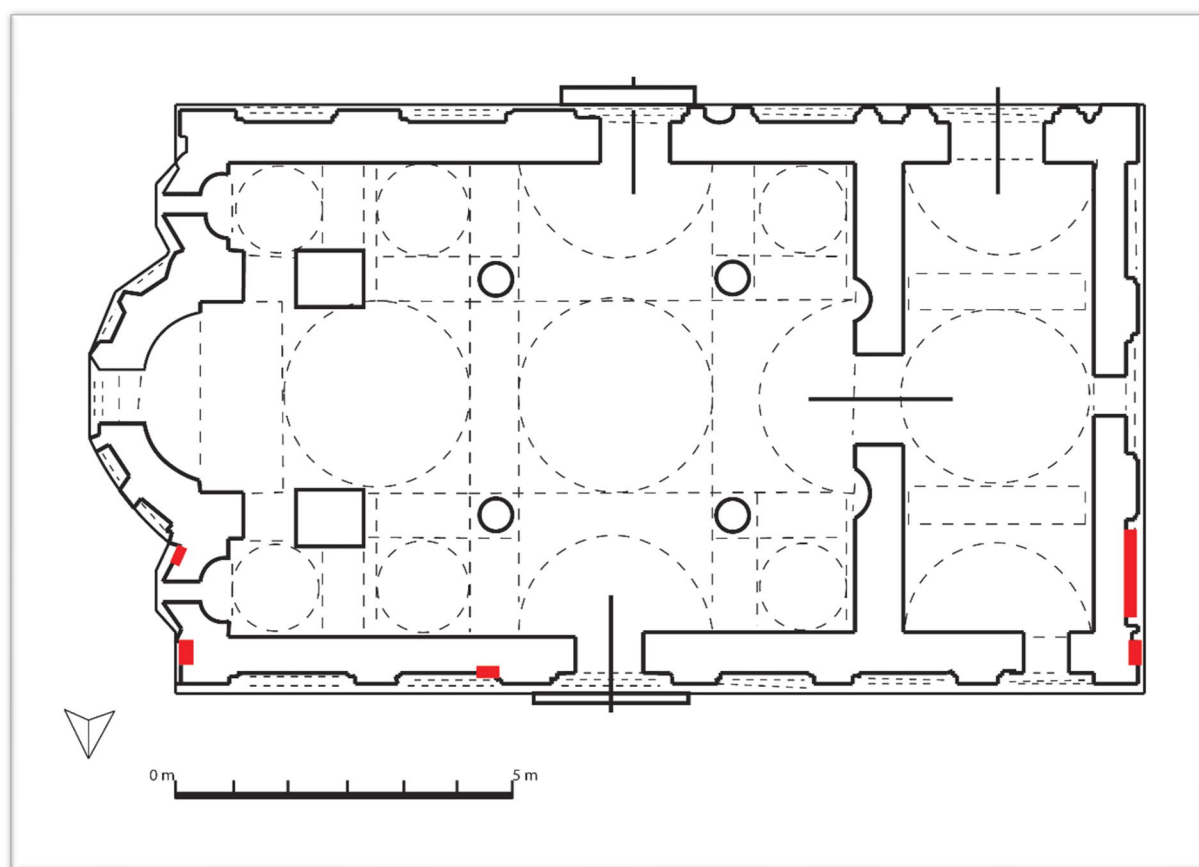
Figure 21   Reference of the recorded graffiti on the façades of the church of St. John Alitourgetos ©Zdravka
               Georgieva
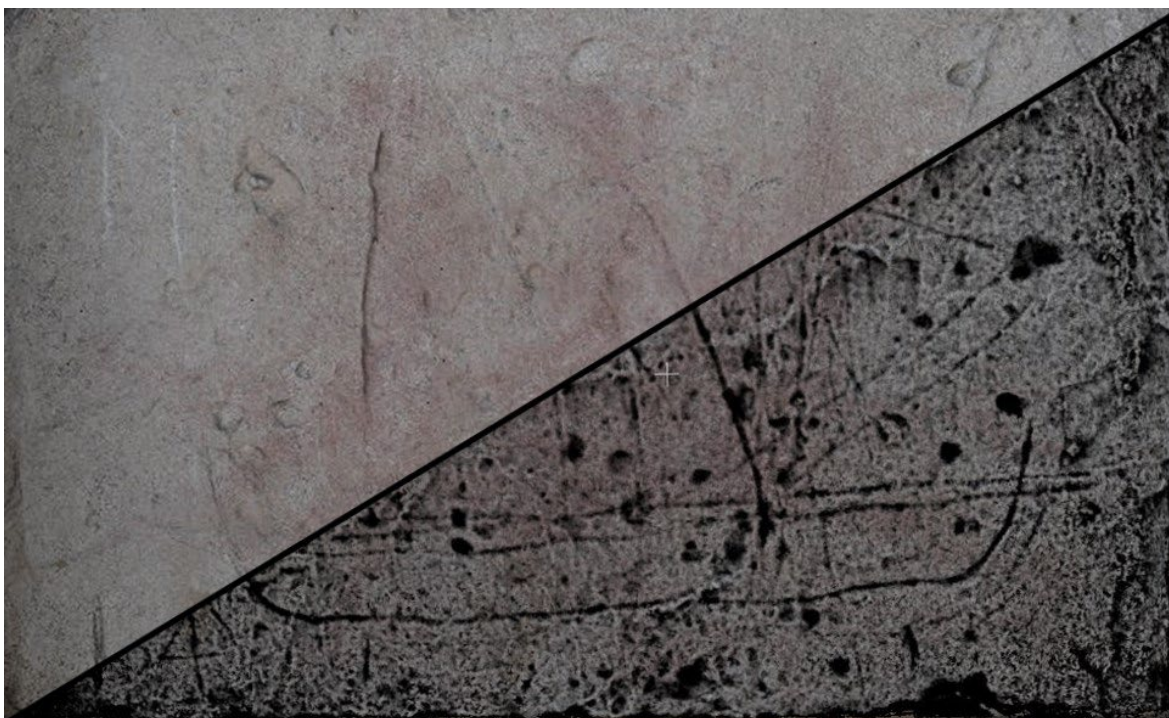
Figure 22   An attempt to reveal barely visible lines of a ship graffito from the eastern wall of the church of St. John
Alitourgetos aided by photogrammetry and Cloud Compare software, image by Kristen Jones

The application of modern photographic methods for documentation, especially RTI, on the largest group of post-medieval ship graffiti in Nessebar's churches made it possible to capture them in very fine detail, otherwise invisible to the unaided eye, and to reveal previously unregistered graffiti or elements thereof.

5.5   Analysis of the ship graffiti from Nessebar

The current analysis of the ship graffiti in Nessebar aims to answer questions such as when exactly the ship graffiti were inscribed and by whom, what events were underlined, what their meaning was for their creator, and whether it is possible, based on the ship graffiti appearance, to trace any changes in the development of rigging arrangements in the region during the post-medieval period.

To reveal as much information as possible about the technological and symbolic aspects of the ship graffiti, I chose to follow Walsh's (2008: 2) approach to study ship graffiti without excluding them within their geographical and historical context. Moreover, I also follow his advice to "start among the spars and rigging of the ship image; retreating to encapsulate the wall on which it is situated; observing the relationship with other images on the wall; considering the church itself and the image's location within it; appreciating the nature of the city; then situating all the above within the historical, economic and cultural context…".

As previously stated, the overall number of recorded ship graffiti in Nessebar is about 340, and they are all distributed in the same context - on the plaster and murals of four medieval churches: St. Spas (Church of the Holy.Christ Saviour / The Holy Ascension of the Lord, 17th century), St. Stephen (built in the 11th century and reconstructed in the 13th, 16th, 18th centuries), St. Todor (built in the 13th, and reconstructed in the 18th century), and St. John Alitourgetos (13th – 14th century) (Figure 23; Figure 24). Such an abundant cluster of ship graffiti in the quite small area of 27.1 ha of the peninsula of the ancient city of Nessebar is quite rare, and is significant for the maritime history of the Black Sea region. It compiles historical and anthropological information about shipbuilding, seafaring, and the life and worldview of the marine communities along the western Black Sea coast. It is still unclear if the graffiti in Nessebar were inscribed in the period when the churches were still functioning, or after their abandonment, but the number of graffiti, seriously damaging the wall paintings, suggests the latter. The tradition of notching objects or names in churches contradicts Church canons and would not have been tolerated by the clergy (Georgieva et al. 2022, 25).

a) St. Stephen (11th century, reconstructed in 13th, 16th, 18th centuries)   b) St. Spas (17th century)

c) St. John Alitourgetos (13th-14th century)   d) St. Todor (13th century, reconstructed in 18th century)

Figure 23   The medieval churches in Nessebar in which the ship graffiti are depicted ©Zdravka Georgieva
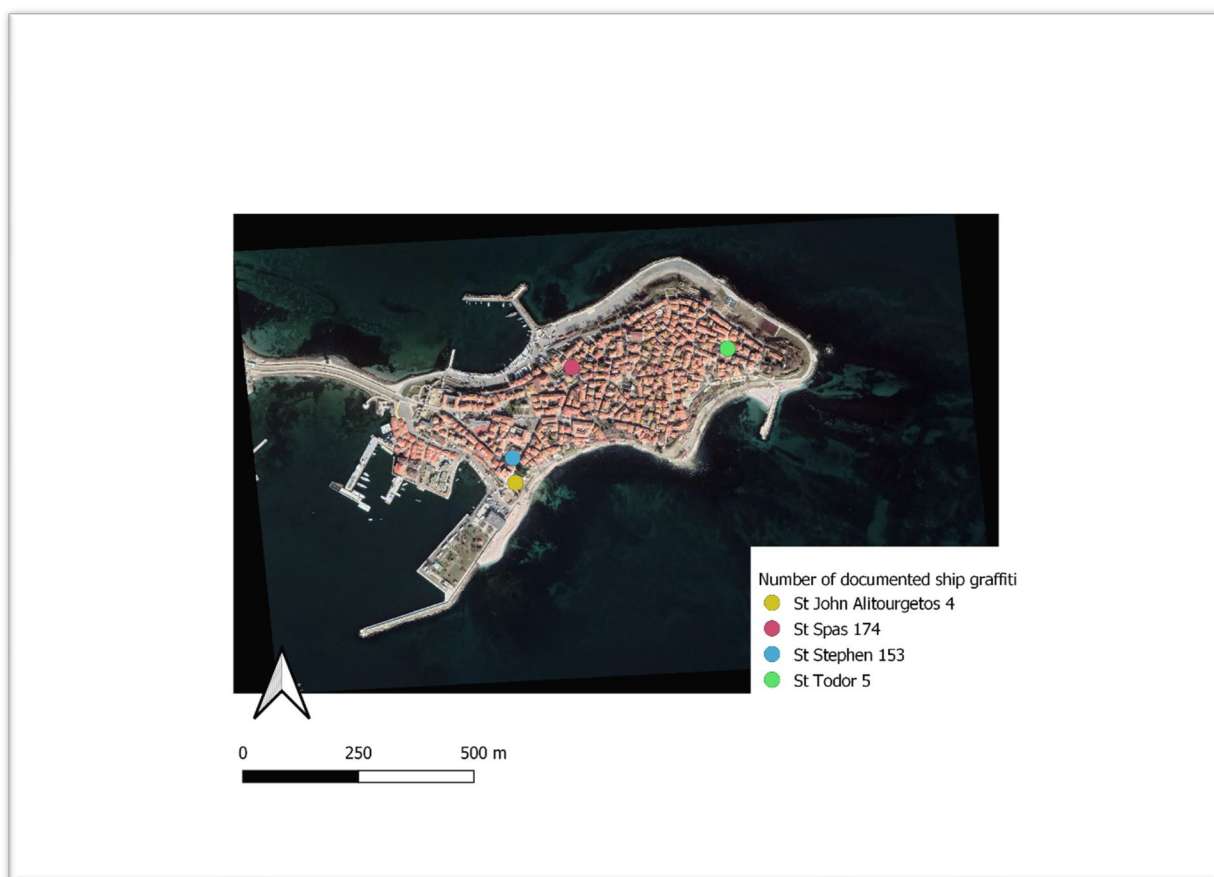
Figure 24   Map of Nessebar with the location of the four medieval churches and the number of the ship graffiti
                recorded in the framework of the project ©Zdravka Georgieva

The contextual relationships between ship graffiti and other graffiti of years, names, animals, humans, as well as between the graffiti and the churches' space and erection date, merit closer examination in order to reveal more information about the character of these monuments. In relation to this, I set out three main parts of the analysis of the ship graffiti : 1) styles of ship graffiti, or the different approach used in the depictions which is reflected in the graffito appearance itself – i.e. simple, schematic, elaborate or incomplete; 2) spatial analysis, or the relationship between the graffito and space, and whether it is a factor in defining chronological boundaries; 3) typological analysis, or searching for common technological elements of the graffiti, and from there - their examination and a search for parallels of ship types known from the historical and archaeological record from the Black Sea region. For the purpose of the analysis and their long-term preservation, the ship graffiti were entered in a catalogue with unique personal identification numbers (PINs) formed by an abbreviation of the first two letters of the church's name and the number of the graffito. For instance, ST_077 is graffito #77 in the church of St Stephen (Appendix A).

5.5.1   Styles of ship graffiti: schematic, simple, elaborate, and incomplete

The ship depictions in Nessebar are often schematic; few are elaborate with accurate and correct representations of a ship's or a boat's hull and its rigging system. However, the details and the shapes of the hulls, masts, sails, riggings, anchors, their position and specifics, show that they were notched by people whose life was closely connected to the sea, and who knew the seafarer's craft.

As already mentioned, the overall number of ship graffiti in the church of St. Stephen is 153; however, most of them are schematic representations of vessels, which provide only limited information about specific hull features. I define here 'schematic' as a graffito whose lines were unclearly carved and appear somewhat random, only rarely form a clear element of the hull, and are not enough to recognise the exact type of ship or define chronological boundaries. One example of a schematic ship graffito from the church of St. Stephen is ST_079 from the south wall in the nave (Table 2). The graffito's size is about 8 cm, and the only visible elements are the flat-bottomed hull with high bow and stern, a main mast, and two lines that resemble shrouds from the standing rigging.

Next, I differentiate another group of depictions carved in a more simplistic way. These are ship graffiti similar to, for example, ST_054 (Table 2), again located on the south wall of the nave of the church of St. Stephen. It represents clearly the shape of a rounded hull with two masts and spread lateen sails. More valuable information about the ship type, and therefore its chronology, can be extracted from these depictions. However, the simple-style ship graffiti cannot give absolute information, as some of the elements still seem to be carved unclearly. For instance, in graffito ST_080 (Table 2), at one end there is a vertical line, slightly curved below, that seems to resemble a rudder, but is quite schematic. Almost all of the ship graffiti from the south wall of the nave in the church of St. Stephen were carved in either schematic or simple style. A distinctive element of the simple-style graffiti are the sails – schematic representations of square-rigged ships with mainsails, topsails and some with topgallant sails filled in with oblique lines. Such a style is not represented among the ship graffiti from the other churches in Nessebar.
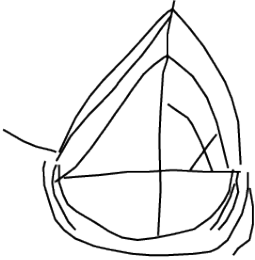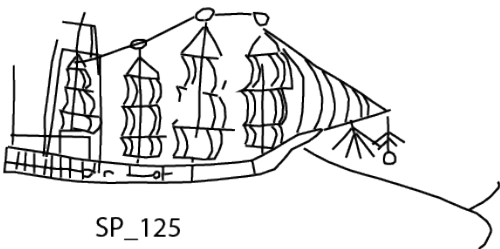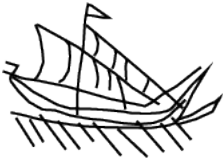
The third style observed in the ship graffiti from Nessebar is termed 'elaborate', where most elements of the vessels are presented clearly, in enough detail from which valuable information about the ship type can be deduced. Examples of such graffiti are observed in the south wall in the nave of the church of St. Spas, e.g. SP_123, SP_125, SP_144 (Table 2). The shape of the hull, with a flat bottom and high bow and stern, and each element of either fore-and-aft rigging or square rigging, are incised very precisely and most likely by a person deeply familiar with the technological features of the ship. A large number of elaborate ship graffiti are carved mostly in the church of St.

Spas, and only a few - in the narthex and the current exterior south-facing wall of the church of St. Stephen.

The last group that I observe are the ship graffiti whose appearance seems 'incomplete' – either they were not completed by their creator, or parts of the graffito have been erased with time by environmental conditions or during conservation procedures of the walls' murals. This type of graffiti form one of the largest groups, and are distributed evenly in all four churches. An example of an incomplete ship graffito abandoned in the process of carving is ST_117 from the altar in the church of St. Stephen (Table 2), where only the hull was carved. 'Incomplete' ship graffiti due to environmental conditions, predominantly humidity, are observed in all churches, and examples of such are found on the south wall in the nave of the church of St. Spas, e.g. SP_166, SP_169, SP_170, SP_174, SP_175 (Table 2). Another example from the north wall in the nave of the church of St. Spas, SP_073 (Table 2), shows a graffito partially erased by conservation procedures of the murals. Other examples of ship graffiti 'incomplete' due to environmental conditions can be found on the outer façade of the church of St. Todor. All five graffiti of ships there are barely visible, as the stones' surface is highly eroded (T_01, T_02, T_03, T_04, T_21). Three of the ship graffiti – one on the eastern façade and two on the southern – are turned upside down, which supports the hypothesis that these walls were rebuilt again in a later period and the stones have been reused (Table 2).

Table 2   Illustrated examples of ship graffiti according to incision style

Incision style	PIN	Ship graffito's drawing
Schematic	ST_079	ST_079
Simple	ST_054	ST_054

	ST_080	
		ST_080
Elaborate	SP_123	
		SP_123
	SP_125	
		SP_125
	SP_144	
		SP_144
Incomplete	ST_117	
		ST_117
	SP_170	
		SP_170
	SP_073	
		SP_073

T_01-
T_03
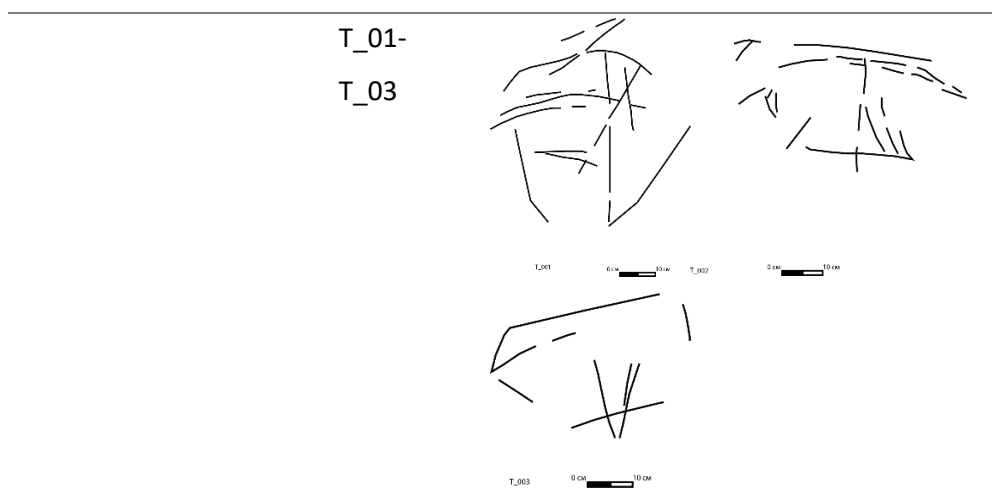
The analysis of the styles of the ship graffiti in Nessebar raised further questions about the relationships between a particular graffito's style and the identity of the people who created it, a style and a concrete period of a graffito's creation, a style and a level of a person's knowledge about the hull of the ship or the available time the individual had for carving. Usually, the most schematic and simple representations are almost always the earliest, and are simplified images of ships which stress only the most characteristic features (Michail 2015, 46). Applying this hypothesis to the ship graffiti in Nessebar's churches, I could revise the date of the earliest dated graffito in Nessebar - JA_03, which is inscribed in elaborate style, - to the 14th c. AD (Figure 25). The graffito is recognised as a cog connected to the march of Amadeus VI, Count of Savoy, in 1366-1367, according to well-illustrated details of the hull with sterncastle higher than the forecastle, a mainmast filled in with short horizontal lines (ratlines), a semi-rounded figure on the topmast (the crow's nest), and stays and shrouds from the standing rigging (Ovcharov 1992, 17–18). This example shows that looking only at one asset could lead to incorrect interpretation. The interpretation of these relationships is complicated and should be done in combination with the other analytical assets: e.g. spatial and typological analysis of the ship graffiti.

Figure 25   Ship graffito JA_03, recognised as a cog and dated to the 14th c. A.D. by N. Ovcharov, Cloud Compare image by Miglena Raykovska

5.5.2   Spatial analysis

In order to answer the above questions, the space and places where the ship graffiti were depicted should also be examined. To acknowledge their post-terminus dates, first, the available information about the churches will be presented, after which the distribution of the graffiti on their murals will be analysed.

St. Stephen church is a three-nave basilica built in a rectangular space, with a length of 12.10 m and a width of 9.50 m. It consists of an altar, a central nave that is separated from the lateral by four pilasters, and two marble columns, whose bases of trapezoid Corinthian capitals are turned upside down (Kiyashkina 2007, 28). The altar is divided into three parts, which end to the east with semi-cylindrical apses (Rashenov and Karayotov 2006, 14, 15). It is considered that the oldest part of the church was built in the 10th-11th centuries with stone, bricks, mortar, and pieces of broken bricks (Kiyashkina 2007, 28). There was an expansion of the basilica's nave to the west which happened during the 16th c. (Gerov 2014, 708). The eastern wall of the narthex was built later with stone and mud (Kiyashkina 2007, 29). These additional spaces of the church were erected in the 16th c. (Gerov 2014, 710). An inscription in Greek above the south entrance of the church from 1599 suggests that the later reconstruction of the church was accomplished at the time of Nessebar's bishop

Christopher, known as the "exarch of the Black Sea coast". The murals in the interior, all related to the Virgin Mary, are also dated from this period (Kiyashkina 2007, 29). The south wall was reconstructed later, and a separated space westwards formed a gallery that was approached by stairs (Rashenov and Karayotov 2006, 17). There is evidence that the latter spaces were built in two phases – the first happened between 1712 and 1718, when the gallery and the narthex were built, and the second phase of restorations occurred between 1780 and 1791 (Gerov 2014, 710).

St. John Alitourgetos (Non-consecrated) church is located in the southern part of the town, near St. Stephen church, on a steep slope descending to the south harbour. It was built in the 14th century, a period that was marked by a flourishing of the picturesque architectural style seen in the abundance of forms in the church facades (Galabov 1961, 76; Kiyashkina 2007, 30). Based on its architecture, the church is classified as a Constantinople architectural type – a cross dome supported by two pairs of marble columns with Corinthian capitals, and a square nave separated into three parts. The church is 18.22 m long and 10.34 m wide. In its central part, the narthex is roofed by a bling dome, and the main entrance is located on its north wall. The facades were richly decorated with stylistic forms and multi-coloured ornaments made of small stone blocks and mortar. The interior of the church was once covered by murals (Galabov 1961, 80; Kiyashkina 2007, 31).

St. Todor church was built in the 13th century and is the earliest of the group of churches built in the picturesque architectural style. The north and west facades are the only ones preserved from the original church, and the rest of the walls and the roof were erected later. The church was built with rows of sandstone and bricks. The arches were also built in mixed masonry decorated with small zig-zag and chess-board motifs made of tiny bricks and blocks (Kiyashkina 2007, 40).

St. Spas (Church of the Holy Christ Saviour) has a simple construction of one nave and a wooden roof. The outer length of the church is estimated at 11.69 m (without the apse), the width at 6.93 m and the height between 4-4.50 m. The inner length is 10.06 m, and the inner width - 5.45 m. The church was completed in the 17th century. The walls were built with stones and mortar, into which wooden timbers were inserted. Along the whole length of the north wall, a narthex was once attached. In the interior of the church, well-preserved mural frescoes which depict episodes from the life of Christ and the Holy Virgin survive, and are dated from the time when the church was built in 1609. This is evident from a donor's inscription commemorating the person who funded the erection and the painting of the murals of the church (Kiyashkina 2007, 34; Penkova and Kuneva 2012, 28). This person is attested to be the archon Teotokis Kappaducas, who was a member of a prosperous Cappadocian family. There is also evidence that the fresco painters of several other

churches in Nessebar including St. Stephen, and later St. Spas, originated from the area of Crete and Patmos (Moutafov 2022, 52).

The graffiti are incised either ordered or at random on the interiors and the exteriors of the buildings, on the murals (churches of St. Spas and St. Stephen) or on individual stones forming the churches' façades (churches of St. Todor and St. John Alitourgetos). The graffiti of ships, in particular, are carved on the decorative rectangular frames (panels) of the low level's murals that seem like an imitation of the semi-precious stone plates decorating the luxurious late antique churches (in the naves of the churches of St. Spas and St. Stephen), and on the next upper level covered with floral ornaments which are at human height (1.6 – 2 meters) and are quite suitable for carving (Figure 26). Almost every panel in the churches of St. Spas and St. Stephen is covered with several graffiti of ships, which seem to form a logical composition or a scene that mostly consists of ship graffiti with similar technological features (Georgieva et al. 2022, 23). These clusters of ship graffiti often make one think that the authors' purpose was to display an entire scene of a fleet. Historical narratives keep information about events related to a gathering of local merchant fleets back at their home harbours after long-distance voyages not only in the Black Sea, but also beyond (Shterionov 1999, 83).

Numerous ship graffiti are also depicted on the upper levels of churches' murals with the figural images of Orthodox saints and scenes from the New Testament. Many of these ship graffiti are carved among other graffiti resembling years, Greek inscriptions or individual letters or random lines, and often overlap one another, for instance on the eastern wall of the church of St. Stephen's narthex. The general distribution of the ship graffiti on the walls is at heights between 1 and 3 meters, most of them between 1 and 1.8 m. The exception is the group of the most representative and large-sized graffiti of ships, which is located at a height between 3 and 4 meters on the exterior – the southeast-facing wall of the church of St. Stephen (Georgieva et al. 2022, 23–24).
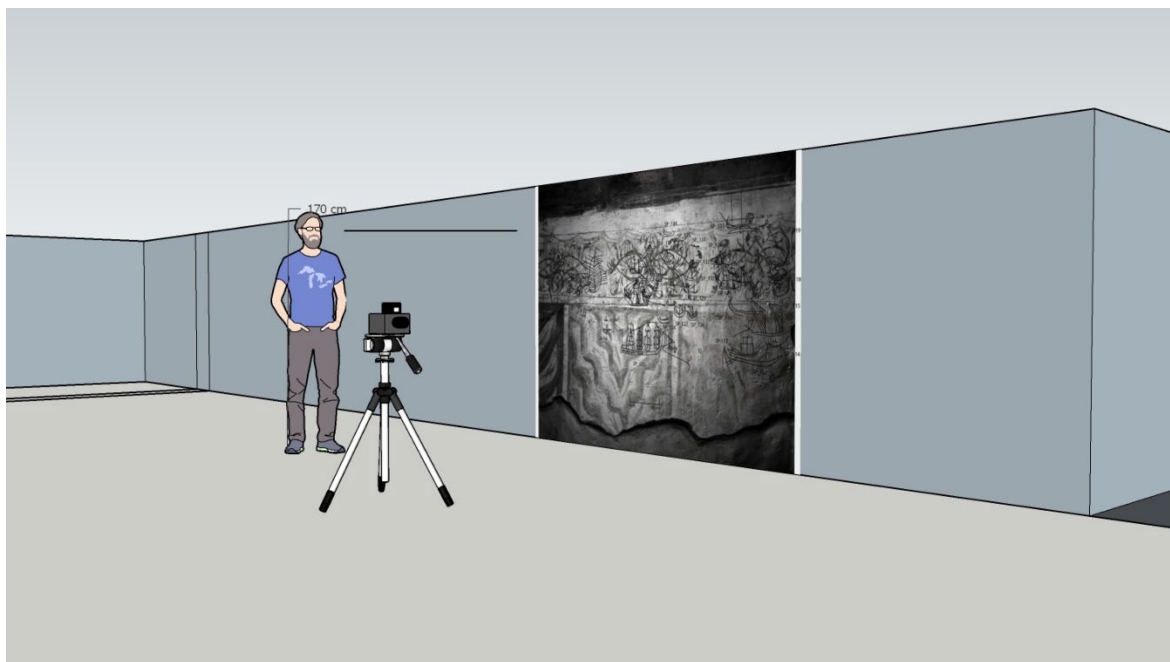
Figure 26   Model of the north wall in the nave of the church of St. Spas illustrating the most common location of ship graffiti in the interior of the churches - at human eye level (1.7 m) ©Zdravka Georgieva

5.5.3   Typological analysis

A typological analysis was performed on the ship graffiti incised in elaborate and simple styles.

In his previous research on Bulgarian seafaring, Ovcharov (1992) recognises four main groups of ships based on the analysis of ship graffiti from Nessebar: the medieval cog of Savoy and the carrack of Dubrovnik; ships with Western Europe shipbuilding origin from the 17th-19th centuries; ships built in Eastern Mediterranean and local Black Sea shipbuilding tradition in the 17th-19th centuries; local fishing boats (Ovcharov 1992). In the current analysis, a different approach was adopted. The ship graffiti were categorised according to characteristic features from their hulls: number of masts, type of sails, hull shape, presence of flags, rudders, oars, anchors.

Generally, most ship graffiti in the church of St. Stephen are depicted with a single mast and a bowsprit, followed by some with two masts, and single examples of ship graffiti with three or four masts. Most graffiti are represented with furled sails, one to four yards, and either stays or shrouds. These furled sails probably indicate that the creator aimed to represent a vessel at its mooring rather than one on the open sea. The unfurled sails on the vessels most commonly represent the square and a combination of fore-and-aft and square rig with one to three sails, rarely with four; there are fewer examples of vessels arranged with lateen sails. A few depictions are represented with one or two flags hoisted, usually on the main mast. According to the Ottoman epistle, the ships of the native Black Sea ship owners had to carry the rajah's flag to distinguish the Orthodox Christians from the Muslims, but their ships were still part of the Sultan's merchant fleet and

formed a large number of ships that navigated in the western Black Sea (Gardiner 1995, 84; Shterionov 1999, 88). However, due to the schematic appearance of the graffiti, the flag's origin will certainly remain only a guess.

There are similar numbers of ship graffiti with hulls with a curved shape and with a flat keel and highly raised bow and stern. A large number of graffiti are represented with long vertical lines appearing from the hull's bottom, quite likely to be anchors. On some depictions it is unclear whether these were meant to be anchors or oars. Curiously, some of the depictions are represented with unfurled sails, but released anchors. This could represent a vessel that is still anchored in the home harbour or bay, but on its way to depart, showing that the persons who depicted the graffiti were familiar with this fact. Whether the number of anchors on some of the graffiti is exaggerated purposefully or is a result of the person's knowledge about the nautical elements of a ship is unknown. Usually, the number of anchors would depend on where the ship is anchored and what the prevailing winds are. Dhoop (2016) makes a similar suggestion about the depiction of two anchors on bow and stern in ship graffito St. Thomas 1 from Winchelsea, instead of only one on the bow - the traditional anchoring of a ship. He deduced that deploying two anchors at bow and stern would better stop the drift of the ship caused by tides in the Winchelsea harbour, which has been well acknowledged by the person who inscribed the graffito (Dhoop et al. 2016, 302).

The largest proportion of the 174 ship graffiti in the church of St. Spas are those with a single mast. The number of depictions that represent ships with furled sails and showing only the stays and shrouds of the standing rigging is quite high. Examples of fore-and-aft rigged vessels are commonly depicted on the walls of this building, outnumbering the ones with square rig arrangement. Quite distinctive elements of the graffiti here are the oars, usually represented in the vessels with fore-and-aft rigs. Most of the square-rigged vessels are depicted with one or two, rarely three, masts. Only one example of a square rigger with four masts is carved in the southern wall in the nave of St. Spas church. It has unfurled sails and the starboard bower released. It is a typical example of a clipper (Appendix A, cat. No. SP_125).

Graffiti of boats are also randomly depicted among the rest of the ship graffiti in Nessebar. These are often carved among larger ship graffiti and seem to form various scenes. The most distinctive features depicted in the boats are the transom and the single mast with lateen rig arrangement, in most cases with furled sails. Some of these are represented with oars as well.

The analysis of the ship graffiti from Nessebar from three different perspectives: space, incision style, and technological typology, allowed us to study these monuments in a more systematic way, and contributed significantly to their classification. Thus, further more detailed analysis related to

the technological features is relevant, particularly in relation to the interpretation of their rigging. This analysis follows the scheme traced below, and is based on incision style (Table 3).

Table 3   Potential for further interpretation and hypothetical reconstruction of the ship graffiti according to their incision style

Graffito's incision style	Potential for further interpretation and hypothetical reconstruction
Schematic	Low
Simple	Moderate (only some of the details are interpretative)
Incomplete	Minor
Elaborate	High

5.6   Interpretation and hypothetical reconstruction of ship graffiti rigging

The current analysis focuses on the hypothetical reconstruction of rigging of the post-medieval ship graffiti which are depicted in simple and elaborate manner and have the most well-presented and preserved features. This analysis of the rigging is done with the full awareness that graffiti art is subjective, hence it cannot pretend to give a fully detailed picture of its object. The analysis is strongly based on the interpretation of the features presented in the graffiti, as well as their evaluation through comparative material from the archaeological record, drawing plans of ships' rigging, marine art, and information provided by travellers.

The analysis starts with the ship graffiti carved in the finest details, which are located on the exterior of the church of St. Stephen. Each graffito's analysis begins with a description of its elements, followed by their interpretation and, wherever possible, the hypothetical reconstruction of the rigging. Each reconstruction is presented in separate non-scaled plans showing the overall view of the ship.

5.6.1   Ship graffito ST_163

This ship graffito is one of the most detailed depictions of a ship which displays extremely precisely some elements of the rigging (Figure 27). This square-rigged ship with fidded main mast and a mizzen with lateen yard represents elements of the standing rigging in quite elaborate detail. Masts

tops, crow's nest and trestle trees, as well as the main mast's construction, are presented in a larger size, which seems to have been the artist's purpose. Elements of the running rigging seem to be omitted. Besides the well-represented rigging elements, the ship graffito illustrates the hull shape in quite excellent detail, but with disproportionate length compared to the rigging set. The stempost and sternpost seem straight. The stern rudder is also straight, following the line of the sternpost. There are no pintles and gudgeons illustrated, or any other elements of the method of attachment of the stern rudder to the stern. Only the tiller is drawn with one line whose end lowers at the stern.
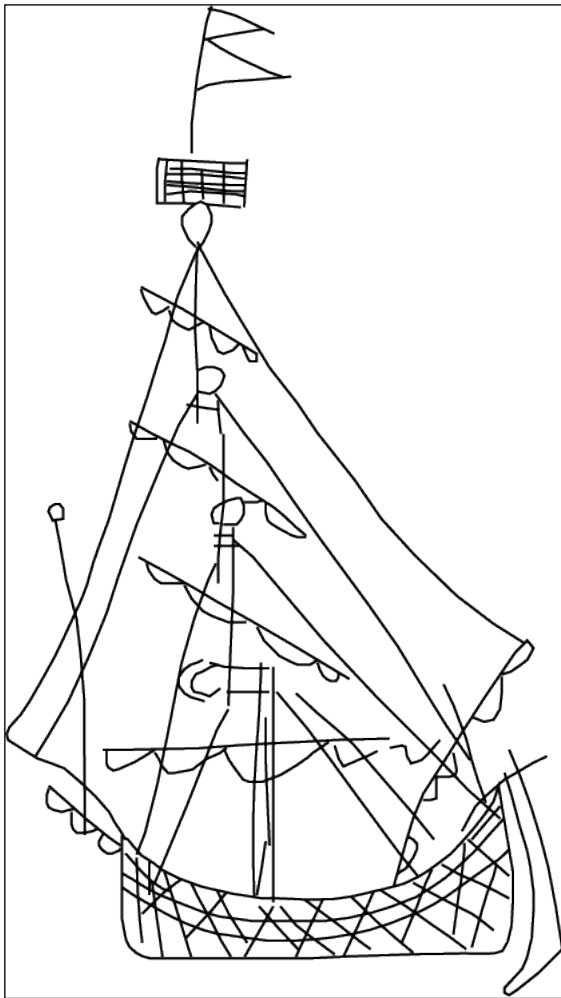
Figure 27   Graphic illustration of ship graffito ST_163 ©Zdravka Georgieva

Unlike Ovcharov's representation of the graffito's main mast in which the topgallant mast is omitted, the careful examination of the RTI model revealed that the lower main mast, which seemed to be emphasised as such by the artist through illustrating it as the thickest, is fidded with topmast, topgallant mast, and royal mast, on top of which besides the mast top, there is a crow's nest-like fitting. Above the crow's nest, there is also a flagpole where a pennant is hoisted. The

lower main mast and the rest of the fidded masts have their mainsail, topsail, topgallant sail, and royal sail furled. The mizzen mast, positioned at the sterncastle, has its lateen sail furled as well. The bowsprit also has its spritsail furled. There is a peculiar vertical line on bowsprit that seems to be connected to the graffito; however, because of its greater length, its interpretation as a sprit topmast would be less likely. Rather, it could depict a hawser throw to the boat positioned ahead of the bow. Main forestays and backstays for all fidded masts are also depicted. It is not obvious which line from the graffito would represent the lateen halyard, but most likely the lateen yard itself would stay inside shrouds (which are not depicted here), because it would not be the main source of propulsion. The representation of details from the ship's rigging allows an attempt at a more accurate reconstruction of some of the depicted elements.

Royal topmasts were used on the largest fully-rigged ships, even if very rarely, and not earlier than the late 18th century. Stepped on the topgallant topmast, the royal topmast is set in light winds (Marquardt 1992, 102). Verwey (1932, 192) recorded a similar single-masted square rigger with a spanker with displacement of about 100 tons at anchor off Kavak, and described it as having a very lofty rig, which can be inferred for this one, too.

The ship graffito gives an accurate illustration of the method in which the mainmast's parts were stacked together. One of the elements presented here are the trestle trees. Three trestle trees are depicted across the mast head of the lower mast, whereas two trestle trees cross the topmast and the topgallant mast. They are part of the trestle and cross tree construction. Usually, trestle and cross trees are fixed fore and aft on the lower mastheads, to support the topmast and the top on which a platform for the standing rigs may be fitted. They differ throughout the centuries and regions in shape and number. Until 1720, only two shroud pairs were secured on the cross trees; after this date, their number increased to three (Marquardt 1992, 25). Unfortunately, the shape and the types of the trestle trees represented in the graffito cannot be categorised, but can only be suggested by comparison with other examples evidenced from the archaeological and, to a lesser extent, the iconographic record. In the current reconstruction of the ship graffito's rigging, an example of a continental trestle and cross trees dated about 1780 is used (Figure 28).
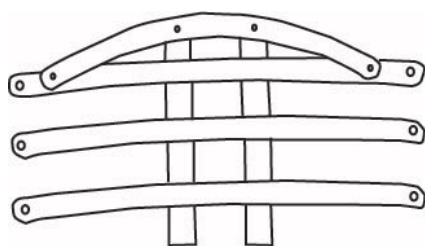
Figure 28   Top view of a continental trestle and cross tree redrawn from (Marquardt 1992, 18, fig. 6p)

Because of their size, semi-circle shape and position next to the masthead and the trestle trees, the interpretation of these fittings as mast tops is probable. They find a quite precise parallel in an illustration of a continental top for a merchantman from about 1800 with a half-rounded forward section and a rectangular aft (Figure 29). Mast tops' main function is to provide a large enough angle to support the topmasts effectively, and their platforms are used to service and repair topsails (Marquardt 1992, 20).
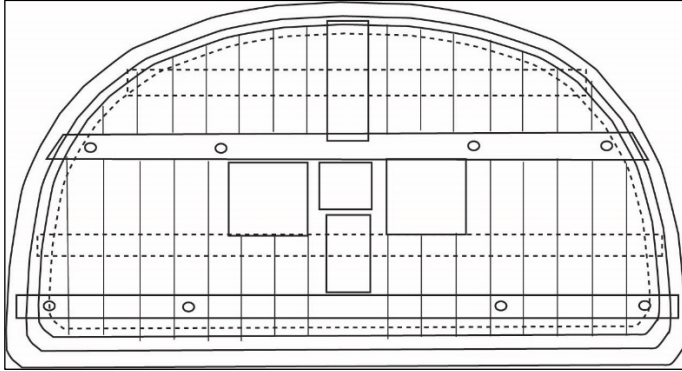
Figure 29   Top view of a continental mast top redrawn from (Marquardt 1992, 20, fig. 9d)

At the top of the royal topmast of the graffito, a net-like depiction which at first glance resembles a crow's nest is carved. However, it could also represent a top platform. It bears similarities to illustrations of a French main top from 1780 (Figure 30). The presence of the standing rigging allows a reasonable reconstruction, including blocks and tackles (Figure 31).
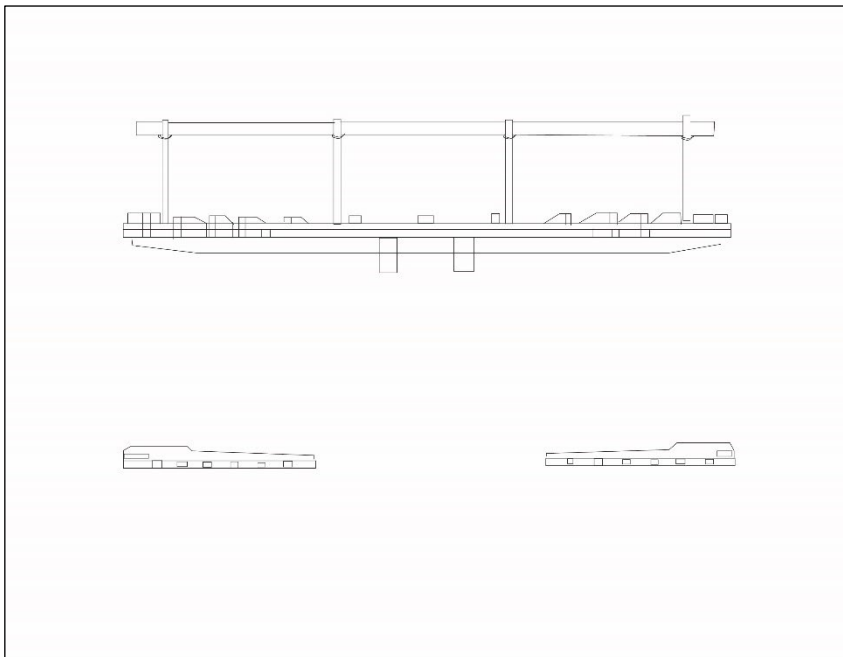
Figure 30   French top platform from the 1780s redrawn from (Marquardt 1992, 20, fig. 9c)
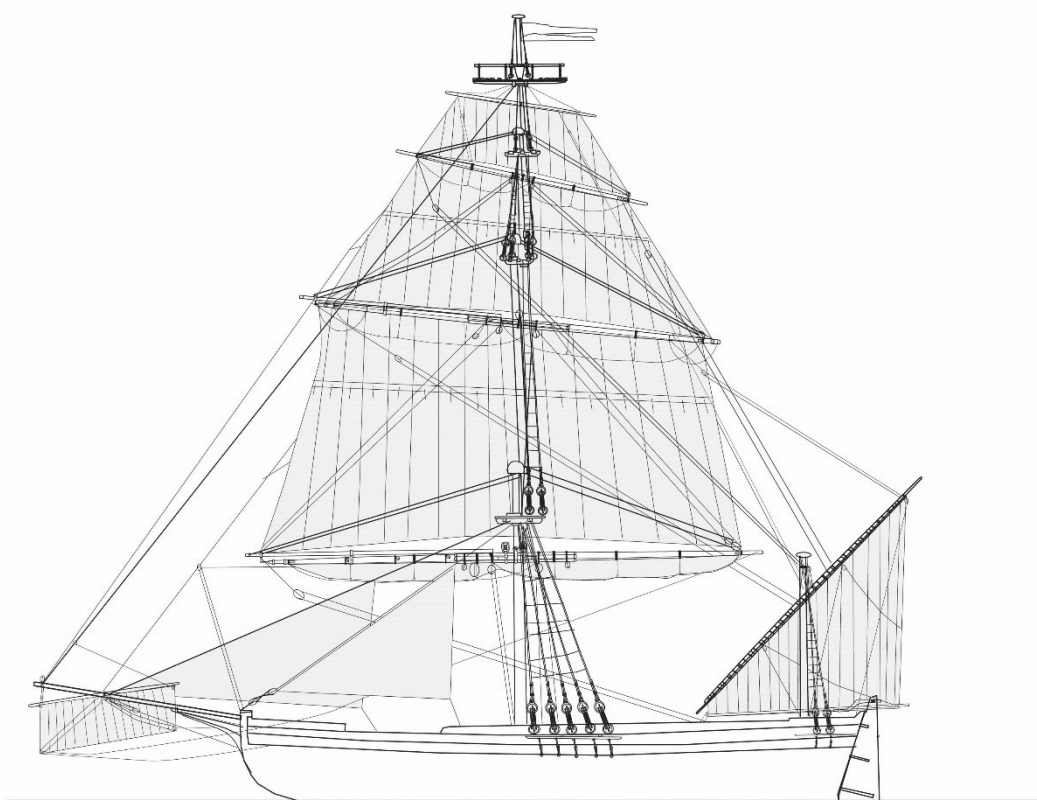
Figure 31   Hypothetical graphic reconstruction of ship graffito ST_163 according to the analysed features and comparative material from marine art depictions, and ship modellers' works. Non-scaled graphic illustration ©Zdravka Georgieva

5.6.2   Ship graffito ST_156

This ship graffito is one of the largest and most elaborately depicted, even though important elements of the carving were eroded and are not preserved today (Figure 32). A section of the bow and the upper part of the topmast have not survived. However, the rest of the elements are quite elaborately incised and merit further analysis. The hull is quite well illustrated, and it gives information about the stern's sheer with pronounced raising abaft the mizzen. The sternpost and the rudder are bluff with the tiller hung on the stern. On the raised deck at stern, close to the tiller, a triangular element is illustrated, which I interpret as a handspike-operated capstan. Another one is illustrated forward of the mainmast. Two bitts are depicted abaft the bowsprit. Forward of the mizzen, a square-shaped element which may resemble aft riding bitts is depicted. The ship has two masts – a main mast and a mizzen. The main mast is fidded with a topmast, and the connection of either three caps (seen from the archaeological remains described in Chapter 4), or of a system of trestle trees and a cross tree, is presented schematically. A yard with furled lateen sail composed

of two spars is suspended on the lower main mast. The mizzen is also depicted with a yard, again consisting of two spars with furled lateen sail. Three or four lines carved along the lower main mast may represent the main tackle and lateen yard's halyard. The lines from the main masthead that lead down to presumably the stern most likely illustrate the main sheets and vangs, or shroud tackles. Two lines presumably from the topmast head that lead to the upper yardarm of the lateen most likely represent elements of the mizzen lateen yard halyard. Three lines from the mast head of the lower main mast lead forward, most likely belayed on stem, and are probably part of the fore tackles. One line is likely looped around the topmast head, from where it probably leads down to bowsprit. Some elements of the ship graffito are discussed and hypothetically reconstructed below.
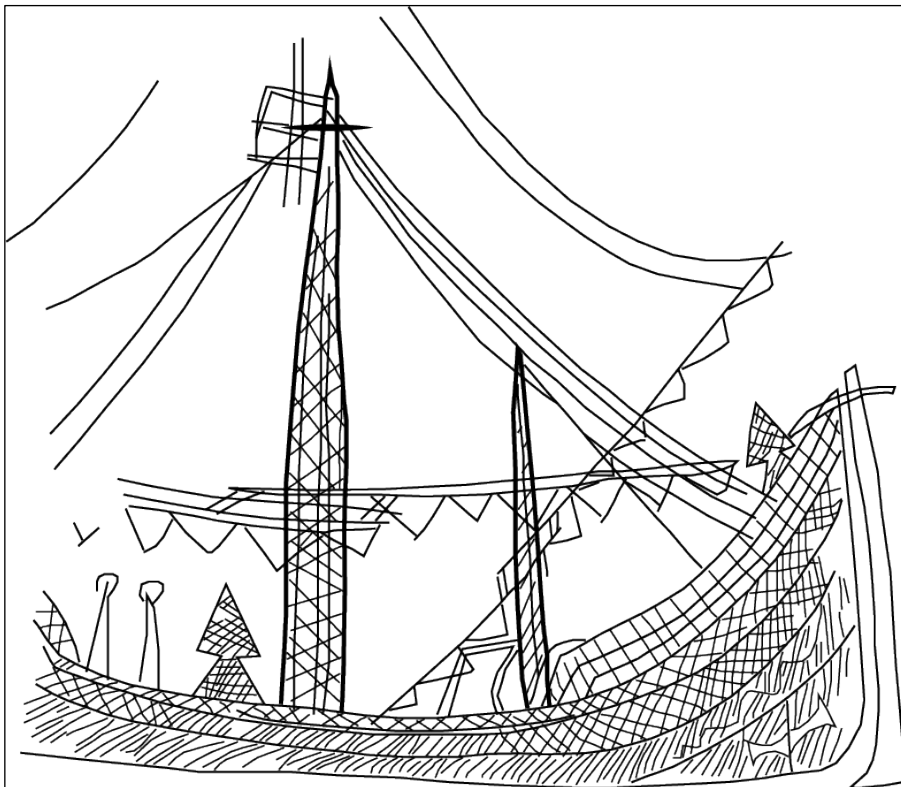
Figure 32   Graphic illustration of ship graffito ST_156 ©Zdravka Georgieva

I interpret the other elements illustrated in the graffito at the raised deck at stern and in front of the main mast as handspike-operated capstans. The handspike-operated capstans started to be modified after the end of the 18th century, and in the beginning of the 19th century, the manually rotated capstans were gradually replaced by steam ones (Harland 2013, 74; 2015, 38). The process of handling handspike-operated capstan by mariners can be seen illustrated rather cryptically on a graffito (ST_160) located on the wall below the currently discussed one. The position and appearance of the capstan in the graffito finds strong support in the archaeological record obtained during the BSMAP fieldwork. Handspike-operated capstans are recorded in two of the shipwrecks

of the northern cluster of the western Black Sea - SS_2014_BS_1428 and SS_2014_BS_1392. Their analysis in Chapter 4 suggested a lateen rig for at least one of the vessels.

A hypothetical reconstruction of ship graffito ST_156 was undertaken, complemented by the interpretation of ship graffito ST_149, which exhibits similar characteristics and whose hull is completely preserved, and can thus serve to fill the missing parts of the bow section of ST_156. These ship graffiti both illustrate sterns with pronounced raising. The sternpost and the stempost are bluff.

Both ST_149 and ST_156 are depicted at anchor with their sails furled (Figure 33). Another ship graffito, ST_153, located in the same panel (Panel_StStefan_Exterior1/ 2), has the exact same rigging setting, but with reefed main lateen sail and mizzen lateen, which favours this interpretation and the hypothetical reconstruction of the rigging by providing a more accurate and fuller image of the ship's sail plan (Figure 34). By comparing ship graffiti ST_156 and ST_153, it became clearer that the yard suspended on the lower main mast in ST_156 and ST_149 indeed represents a lateen yard consisting of two spars.

Figure 33   Graphic illustration of ship graffito ST_149 ©Zdravka Georgieva
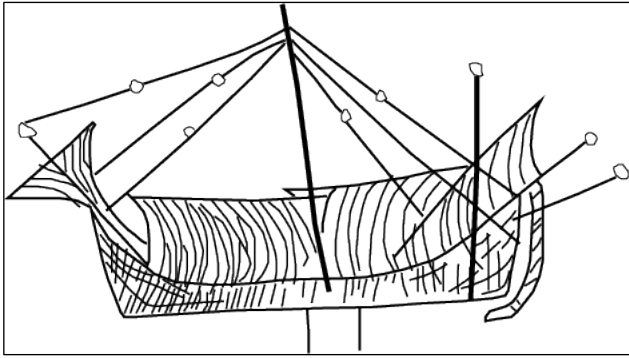
Figure 34   Graphic illustration of ship graffito ST_153 representing similar ship rigging to the one in graffiti ST_149

and ST_156, but unfurled ©Zdravka Georgieva

The bowsprit does not seem to be fitted with a jibboom, as can be wrongly inferred from ST_149, but instead is most likely rigged with a spritsail. The lines from graffito ST_153 represent part of the fore tackle and purchases at stern. On stern, it seems that a bumpkin was also rigged; however, this is rather unconvincing.

The appearance of the hull and the rigging of graffiti ST_156 and ST_153 find close parallels with a late 17th-century fishing boat from Messina depicted in an engraving by Abraham Casembroot. It is categorised as a typical example of early Mediterranean, and Ottoman, ships (Gardiner 1995, 79) (Figure 35).
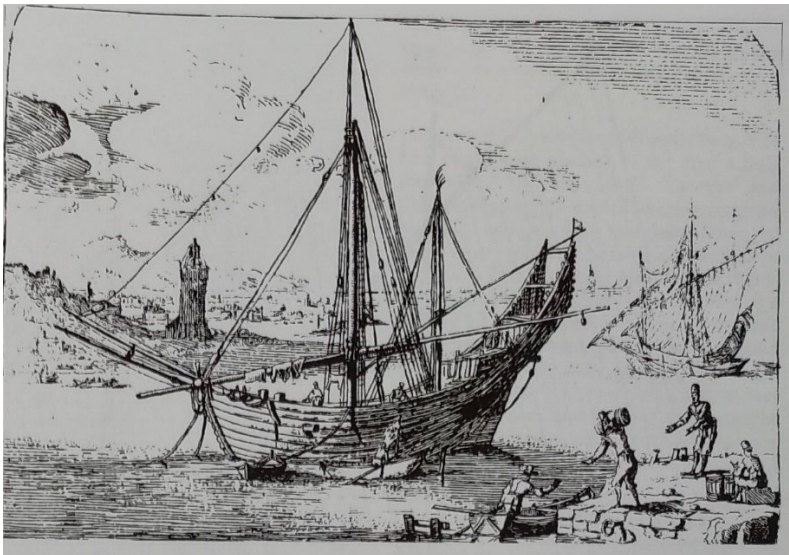
Figure 35   Late 17th-century engraving of a fishing boat in Messina by Abraham Casembroot, after Gardiner 1995,

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The rigging in ST_149 is represented in a similar manner as in graffito ST_156. What are probably the main tackle and lateen yard's halyard go down to rail on deck or the mast's base. Shroud tackles and halyard, represented by five lines, that probably served at the throat of the lower mast (not

depicted in the graffito), lead to the raised deck either at port or at starboard stern depending on the tack. Two lines depicted from the topmast presumably heading down to stern might be a representation of the backstays, and the other four lines - a representation of the forestays, one pair to stem, and one to a cleat on the bowsprit's end. There is a couple of dots notched on the lines of all three graffiti discussed here, with which the artist might have wanted to indicate fitting of tackles on shrouds, fore and backstays. The need for using shroud tackles is related to the procedure of shifting lateen yards on each new tack, which presumes the resetting of sheets, vangs, and eventually the shroud tackles on the new tack (Batchvarov 2014a, 195).

The correlation between the three graffiti carved on the same wall along with other vessels rigged in similar fashion indicates a common scene from a bay, in which the vessels were piloted by oar-powered boats both when entering and when leaving anchorages.

The following hypothetical reconstruction of the standing and running rigging aims to fill a knowledge gap in the complete appearance of this ship's rigging, and eventually determine a type (Figure 36).
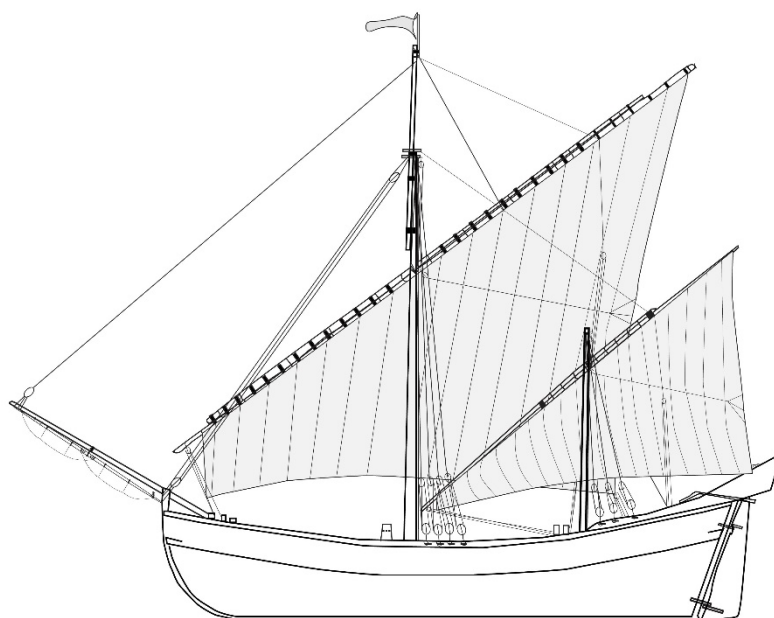
Figure 36   Hypothetical reconstruction of ship graffito ST_156's sail plan ©Zdravka Georgieva

5.6.3   Ship graffito ST_141

Even though the consistency of the lines is interrupted by a mixture of lines from other nearby and overlapping inscriptions, it is still distinguishable that this ship graffito seems to represent a full square-rigged ship (Figure 37). The appearance of the rigging is still coherent and provides valuable information about its type, which might fall into the group of barques. The vessel has three masts – a fore mast carrying two or three furled square sails, a main mast with three furled square sails, and a mizzen with two furled square sails and a spanker. Unlike the larger-scale details of the masts' extensions illustrated in the previously described ship graffiti, here such elements are not visible, even after RTI application. Nevertheless, it seems that the graffito stresses more on the representation of the standing rigging rather than the running rigging. The construction of the bowsprit is well illustrated – it is extended with a jibboom, a flying jibboom, and a martingale-boom. The lines below the bowsprit correspond quite well with the flying-jib-boom-stay, the flying-martingale-stay, and the martingale-back-ropes. The following lines of the standing rigging from bow towards stern are represented in the graffito: fore lower rigging and the fore topmast backstays; main lower rigging, main topmast backstays, main topgallant, and royal backstays; the mizzen lower rigging, mizzen topmast, and mizzen topgallant backstays. Next, the following lines of the stays from fore to aft are illustrated: the flying jibstay, fore topgallant-stay, jibstay, fore topmast stay, and fore stay; the main stay, the main topmast stay, main topgallant stay, and main royal stay; the mizzen stay, mizzen topmast stay, and mizzen topgallant stay. Unfortunately, all braces, blocks, and other equipment of the running rigging from this graffito are obscured or not represented at all, except for the spanker vangs; however, it should not be difficult to reconstruct them hypothetically based on various plans of barques that exist in the record. The current reconstruction is based on an illustration by Paash (1890, pl. 77) (Figure 38).
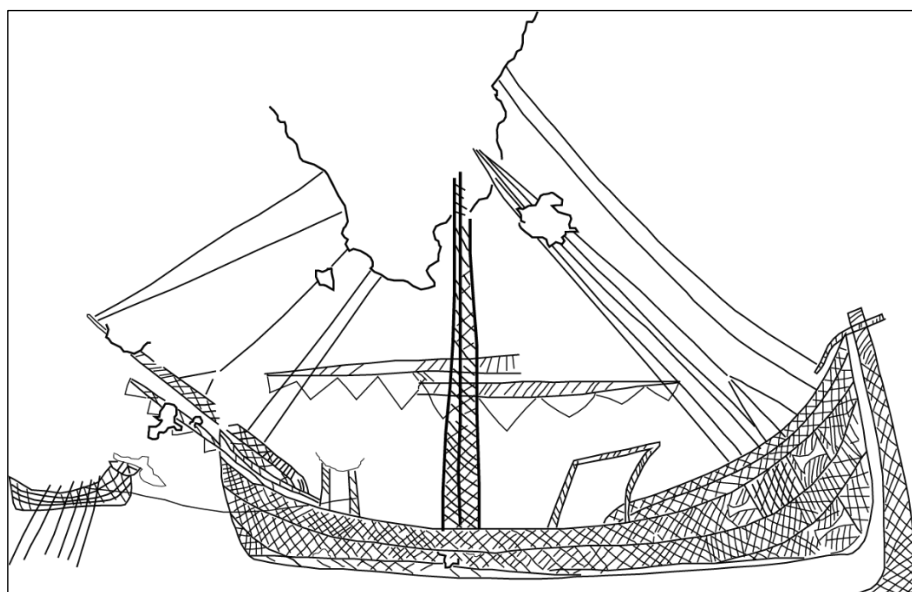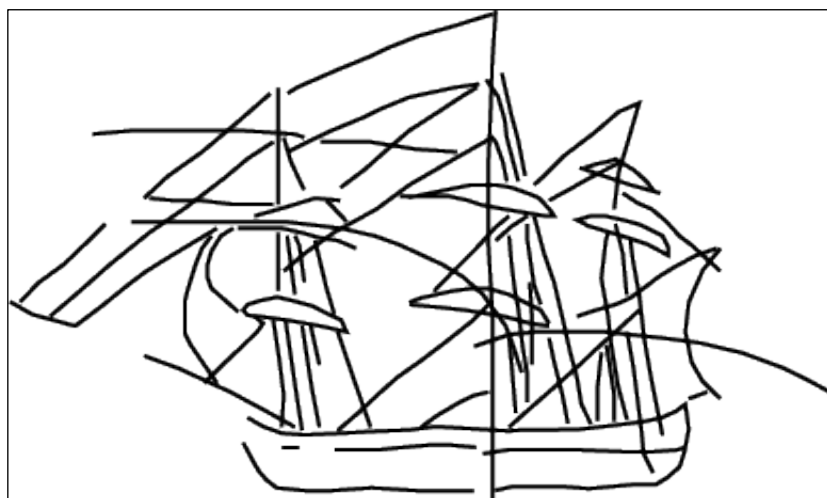

Figure 37   Graphic illustration of ship graffito ST_141 ©Zdravka Georgieva
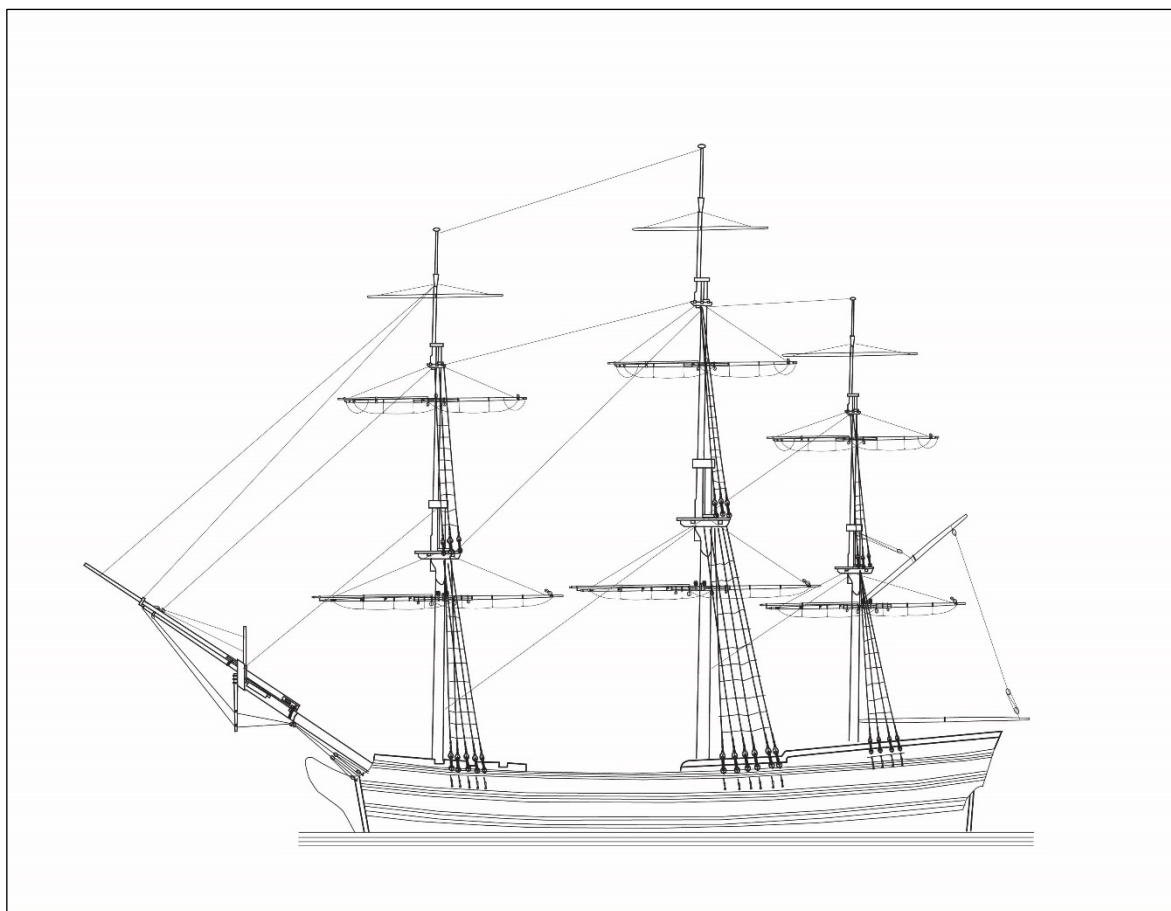
Figure 38   Hypothetical reconstruction of ship graffito ST_141 representing a barque rigging ©Zdravka Georgieva

5.6.4   Ship graffito ST_147

The graffito represents a ship with straight stem and a transom stern. The position of the bowsprit looks almost upright. Details of its construction are not clearly visible, and the only certain lines are the ones from the forestays. The planking of the ship is clearly represented through four curved horizontal lines (Figure 39).
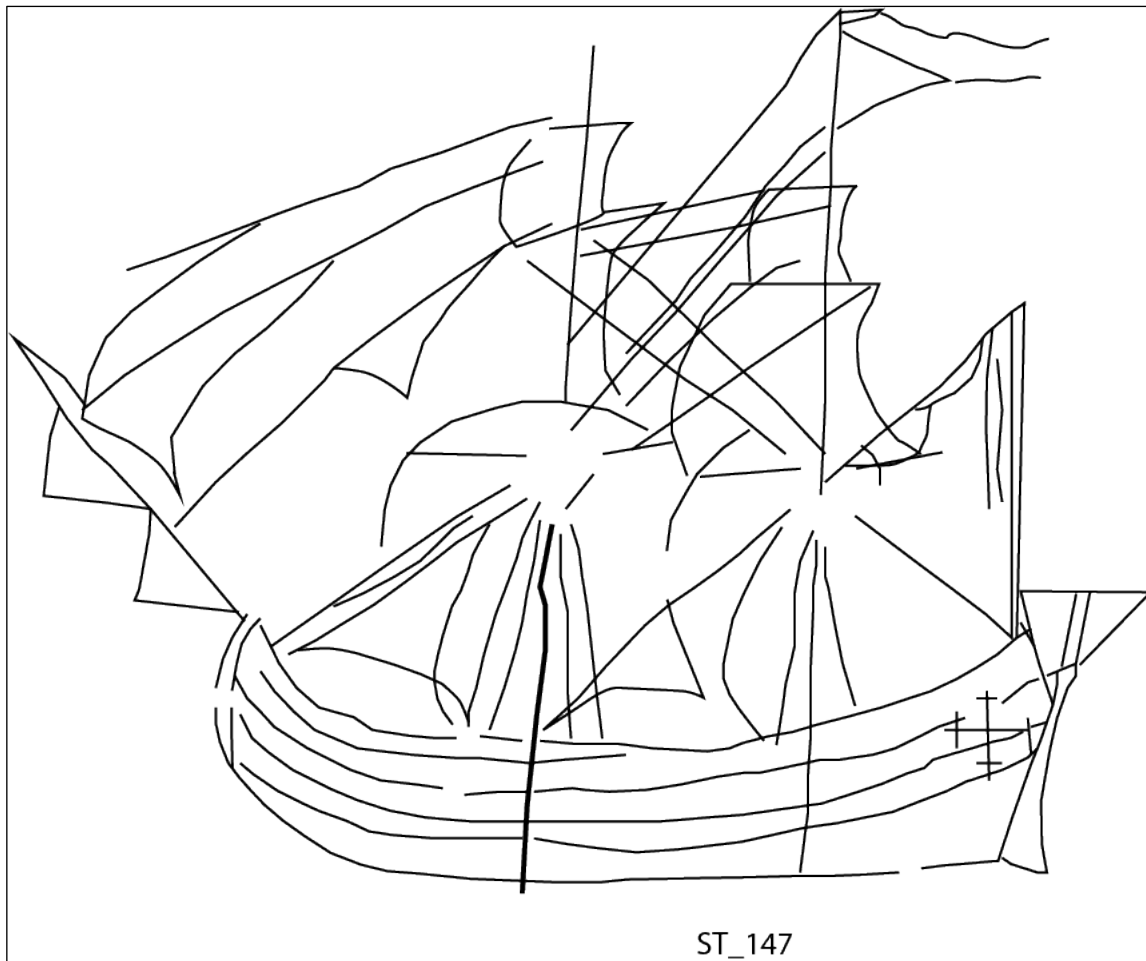
ST_147

Figure 39   Graphic illustration of ship graffito ST_147 ©Zdravka Georgieva

At first glance, the ship seems to have two masts – a foremast (positioned near amidships) and a mainmast (positioned further abaft). Details of the masts' construction, such as the stacking on topmast and topgallant mast, are not visible; the focus seems to be the representation of the staysails rigging itself. It is suggested that the fore and main masts are pole masts, fidded with a topgallant, as deduced by the presence of topgallant sails. The lower foremast carries an unfurled lower foresail and a fore topsail, while a topgallant sail is raised on the topmast. These lines were discerned thanks to the application of a RTI normal visualisation filter. The main mast is depicted carrying a raised main topsail and a spanker, discernible by two pairs of vangs and a gaff suspended over the lower main mast throat. There is no depiction of elements outlining the mainsail. The main topmast has a raised topgallant sail. This description leads to the conclusion that the ship graffito may represent a brig whose appearance might find parallels with the Turkish brig *'gagali'* with pollacre rigging and transom stern, a somewhat Mediterranean rig under North European influence (Figure 40). The staysails' rigging is represented by main lower rigging and main topmast backstays, as well as forestays. The stays are represented as follows from fore to aft: unfurled flying jib, outer jib, inner jib, and fore topmast staysail; furled main stay, middle staysail stay, main topmast stay.

The lower main topsail brace and the upper main topsail brace of the ship graffito's running rigging are also illustrated here.
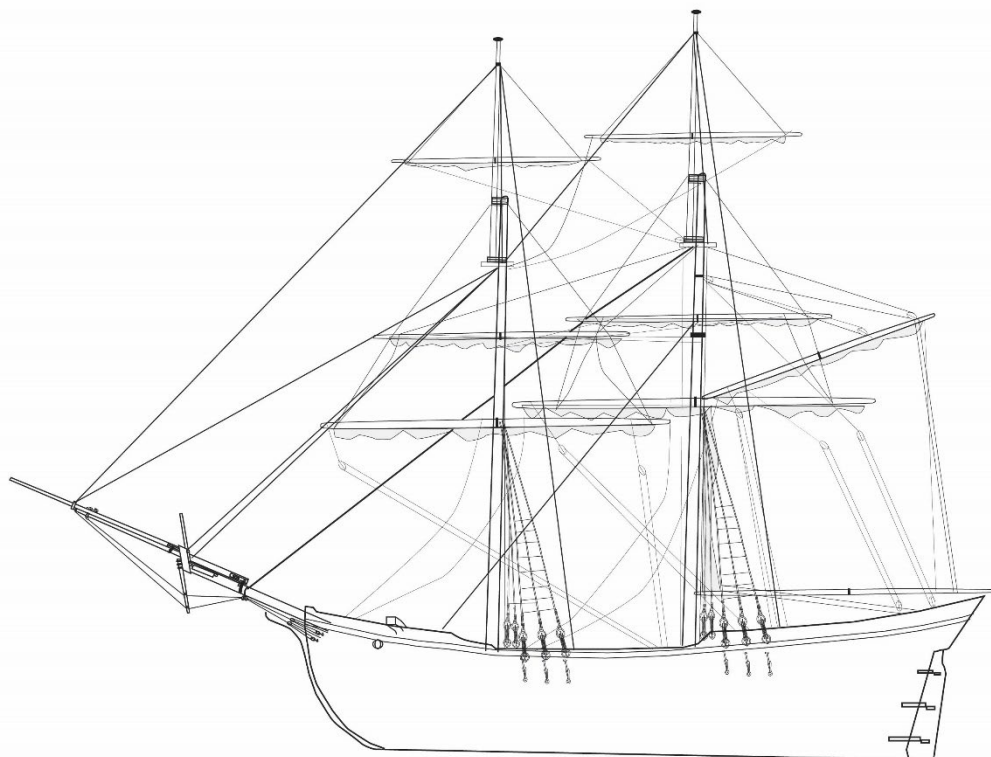
Figure 40   Hypothetical reconstruction of ship graffito ST_147 based on polacre rigging of brigs from drawing plans by (Pâris 1882), ©Zdravka Georgieva

5.6.5   Ship graffito ST_148

The graffito is relatively well preserved, with the exception of some elements of the fore rigging (Figure 41). The bow has a gradual curve, whereas the stern terminates more steeply and seems to be depicted with a transom. The vessel has two masts – a main mast, which is positioned near amidships, and a shorter fore mast with forward rake. However, there are no traces of a yard or a fore sail. The shrouds that support the main mast are still visible. The main mast seems to be suspended with a sprit yard, similar to the arrangement of the main sprit sails on the Ottoman-Greek coasters *Çekeleve* (*sacolevas)*. The bowsprit of the vessel seems to be highly raised, and the three lines at its end represent the forestays for probably two jibs. However, small-scale elements of the rigging are not visible. Unfortunately, the graffito does not provide detailed information about the rigging elements of the vessel, and its reconstruction will remain more general and based

on available graphic illustrations of similar vessels seen in travelogues, engravings, marine art, and an illustration of a ship with similar rigging painted on an icon of St. Vasilious, today located in Nessebar's church "Dormition of the Mother of God". The icon was painted in 1804 with the financial support of Konstantinakis Reis from Messemvria - the icon's owner and chief donor to the church of St. Stephen, who is suggested to be a mariner, and likely the shipowner of the depicted vessel (Moutafov 2022, 374) (Figure 42; Figure 43).
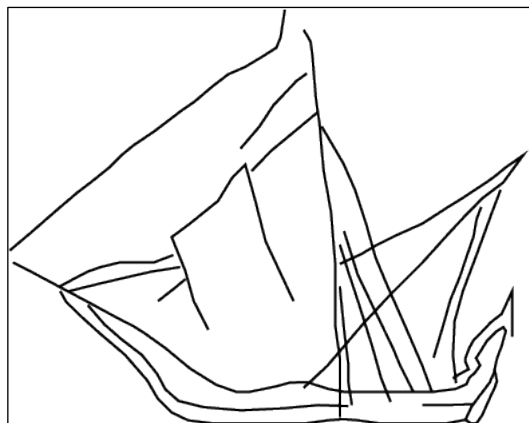
Figure 41   Graphic illustration of ship graffito ST_148 ©Zdravka Georgieva
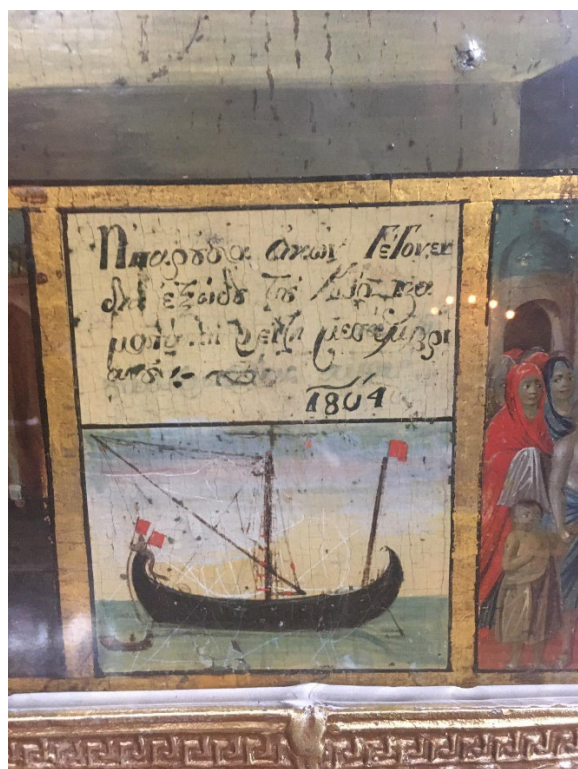
Figure 42   A section of the icon of St. Vasilious from 1804, illustrating a ship. The icon is located in the only currently functioning church in Nessebar – "Dormition of the Mother of God", image by Z. Georgieva
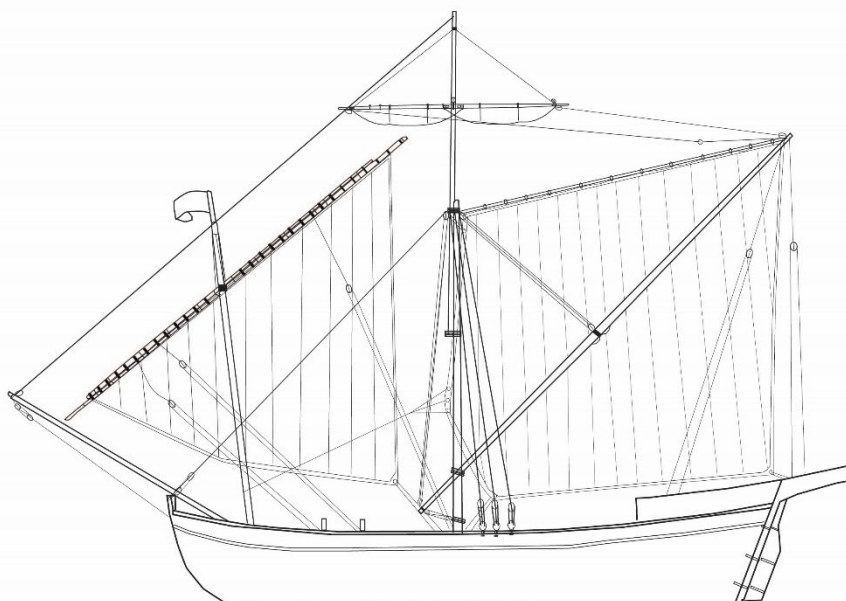
Figure 43   Hypothetical reconstruction of ship graffito ST_148's rigging ©Zdravka Georgieva

5.6.6   Ship graffiti ST_004, ST_011, ST_059

These three graffiti will be analysed together since they seem to have the same appearance. They were incised in identical style – with oblique lines at their sails, which is a characteristic feature of most ship graffiti in the nave of the church of St. Stephen. It is currently uncertain what this depiction style means. It rather seems like an artistic convention used only for the group of ship graffiti located in the interior of this church. More importantly, the regularity of this style being used in single-masted ships carrying square sails is noticeable (Figure 44; Figure 45; Figure 46).
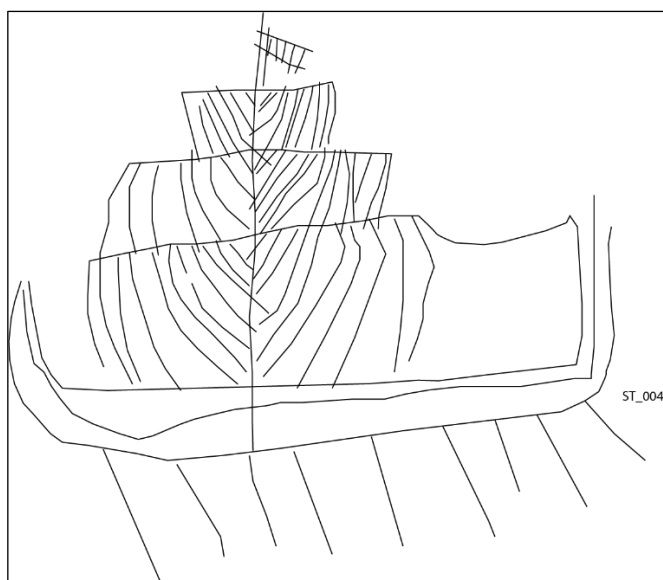
Figure 44   Graphic illustration of ship graffito ST_004 ©Zdravka Georgieva
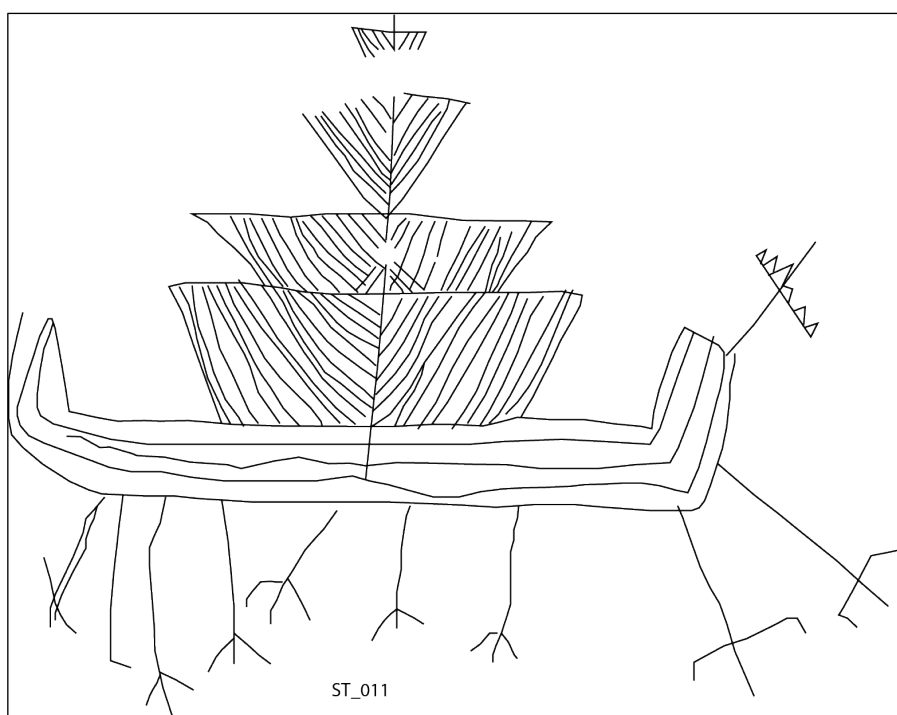
Figure 45   Graphic illustration of ship graffito ST_011 ©Zdravka Georgieva
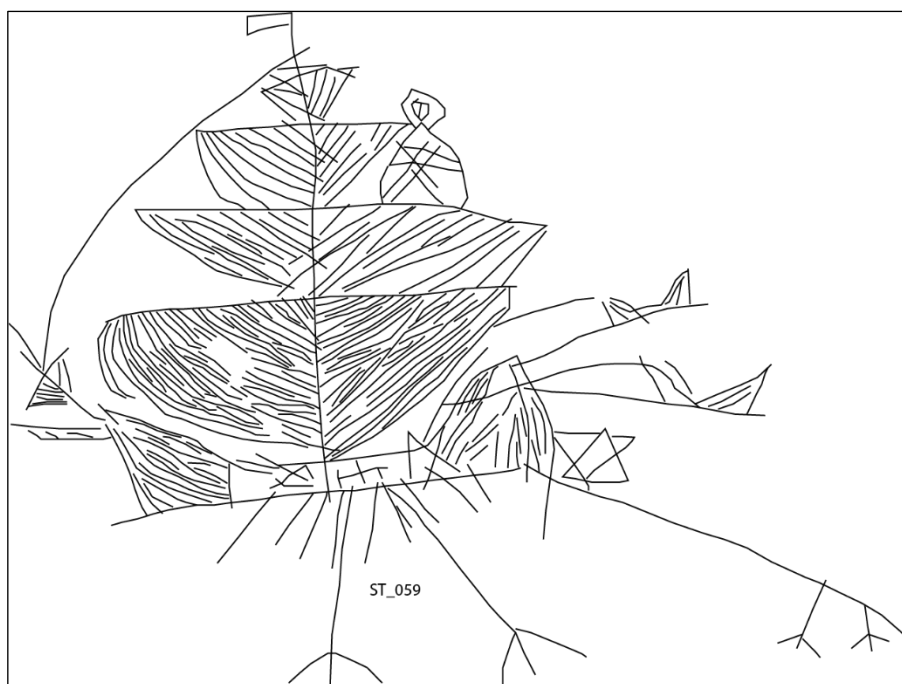
Figure 46   Graphic illustration of ship graffito ST_059 ©Zdravka Georgieva

Their hulls are depicted with highly raised bows and sterns. Graffiti ST_011 and ST_059 are depicted with bowsprits, with the one in ST_059 having an unfurled sprit sail, whereas the one in ST_011 has its sprit sail furled. A bowsprit is either not depicted or not preserved in ST_004.

The three graffiti are single-masted square riggers. ST_011 and ST_059 carry a main sail, a topsail, a topgallant, and royal topgallant sail, whereas a royal topgallant is not illustrated in ST_004. All of these sails are unfurled. However, due to their schematic appearance and small dimensions, many elements of the standing and running rigging are omitted or not detailed. An interesting element of the graffiti are the lines under their hulls, which at first glance seem to resemble anchors, but could also conceivably be oars. The vessel illustrated in graffito ST_059 seems to be pulled by two boats at its stern.

The simplicity of these graffiti makes the reconstruction of the rigging system more general by necessity, as many of the elements are omitted and a large portion of it would be speculation (Figure 47).
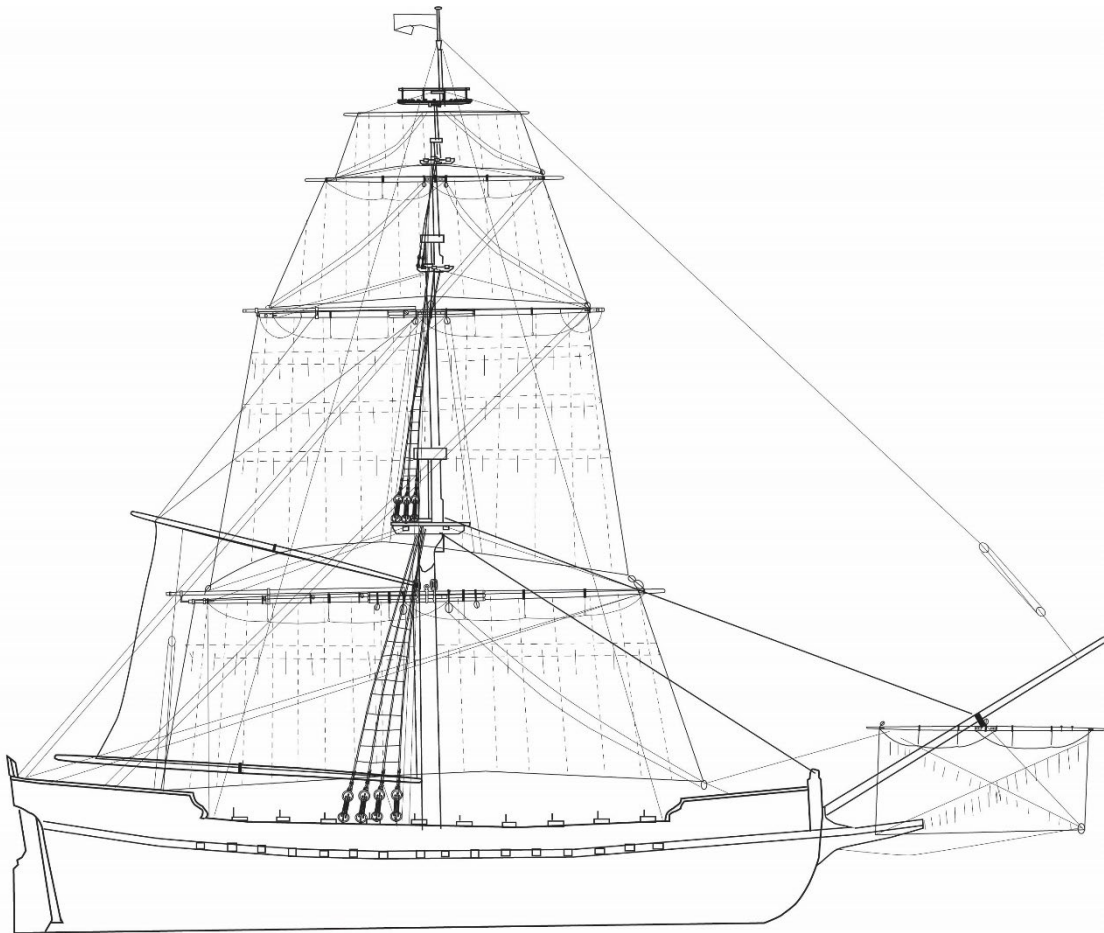
Figure 47   Hypothetical reconstruction of ship graffiti ST_004, ST_011, ST_059 ©Zdravka Georgieva

5.6.7   Ship graffiti SP_023, SP_024, SP_025, SP_026

Since these graffiti form a single scene of four ships connected by straight lines (towing one another by tow lines) and identical in appearance, they will be analysed together. All ships have highly raised and curved sterns and slightly lower bows (Figure 48). It seems that graffito SP_023 has a transom stern. The ships' rigging is depicted in a quite schematic style, but it is certain that they are fore-and-aft rigged. No bowsprits or stern rudders are illustrated. Because of their schematic appearance, it is difficult to discern the number of masts. At first glance, it seems that the ships have three masts – a highly raked fore mast and straight main and mizzen masts. Careful observation, however, reveals that the graffiti actually have two masts – a fore mast and a main mast rigged with sprit sails, which look to be furled, with only the sprit yards and most likely the vangs depicted. A hypothetical reconstruction of the rigging is proposed (Figure 49). The hypothetical reconstruction of the running rigging elements is based on the closest available parallel – the ship illustrations on an icon from Nessebar from the beginning of the 19th century, where a rigged sprit sail is clearly visible (Figure 50). In the graffiti, it is unclear how the luff of the

sails was kept to mast - through hoops (characteristic for the English bark, as it is called by (Marquardt 1992, 142)), laced around the mast like in the Dutch spritsail, or tied with ribbands (Marquardt 1992, 142). The lace around the mast method is likely, as there is a regional example of such in a photograph of *Trechadiri* from Nessebar from the beginning of the 20th century (Figure 51). It is also likely that the spritsails were loose-footed and with sail's luff clear of mast, in a rather Mediterranean fashion, and their heads were fitted through a series of rings on a stout wire from the mast to the sprit's peak. The lines above the masts might indeed be a representation of this rig arrangement, depicting the wire and the vangs. Similar rigging can be seen in illustrations of Black Sea coasters from Constantinople by Admiral Edmond Pâris (Pâris 1882, pl. 77). The spritsail is evidenced in *Çekeleve* (*Sacolevas)* and *Çektirme* (*Tsernikis)* – vessel types commonly used in the Eastern Mediterranean and Anatolia (Damianidis 1991, 78–79). Such a rig arrangement, assembled as Alamana rig, is also evidenced in the Aegean and Marmara regions on barçes.
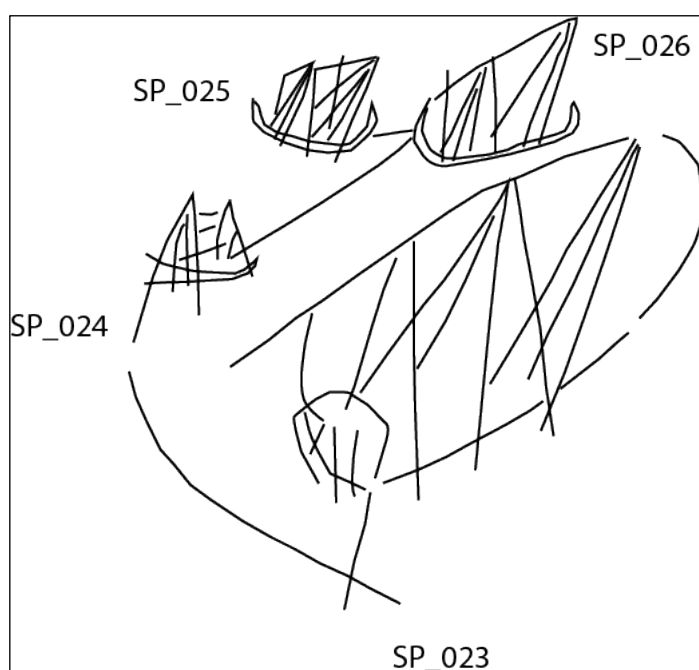
Figure 48   Graphic illustration of ship graffiti SP_023 – SP_026 ©Zdravka Georgieva
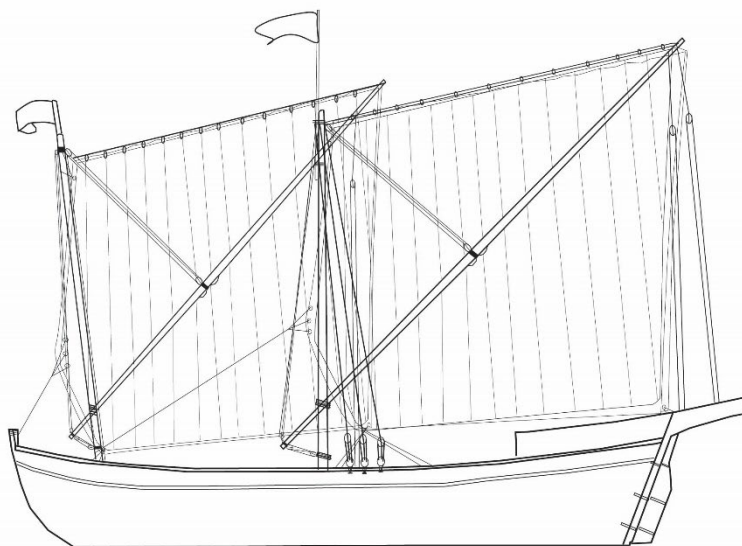
Figure 49   Hypothetical reconstruction of ship graffiti SP_023 – SP_026 ©Zdravka Georgieva

Figure 50   A section of the icon of St. Galini illustrating a ship with a spritsail rig from 1809. The icon is located in
                 the permanent exhibition of the Museum Ancient Nessebar, photograph by Kalin Dimitrov

Figure 51   Photograph of a trehadiri from Nessebar from the beginning of the 20th century

5.6.8   Ship graffito SP_103

The graffito's hull appears bulky; the bow and stern are bluff, and the stern has a transom (Figure 52). The vessel seems single-masted, with the bow pointing west. The vessel seems to be square-rigged with two sails – an unfurled mainsail and a topsail. Either an additional sail seems to be raised from potentially an obscured mizzen, or the canvas of the main sail was vast. There are no traces of a depicted bowsprit. The main mast is illustrated with a single line, and no information can be inferred about how it is extended. A parallel of the main mast rigged with two square sails can be made with the rigging of a Greek *saik* (Marquardt 1992, 158), or, as Falconer defines it, a Turkish vessel with a quite high mast commonly used as a merchantman in the Levant (Falconer 2012, 422). However, the lack of illustrated bowsprit and the undistinguishable sail at stern, if depicted at all, do not give enough evidence to categorise the graffito firmly as a *saik,* or any other particular type. Hence, a hypothetical reconstruction of the vessel would be rather speculative.
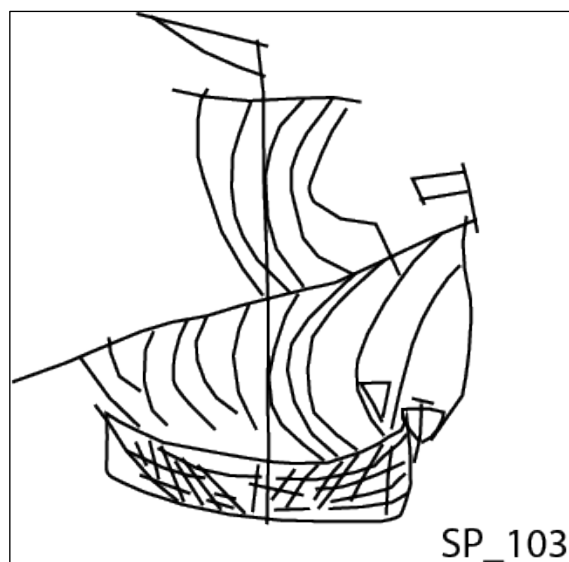
Figure 52   Graphic illustration of ship graffito SP_103 ©Zdravka Georgieva

5.6.9   Ship graffiti SP_104 and SP_105

Both graffiti represent oar-sail-powered vessels with fore-and-aft rigging (Figure 53). The oars of graffito SP_104, however, are not currently visible. It is represented with a transom and a curved stern rudder, whereas a stern rudder is not visible on graffito SP_105. Both illustrations are represented with two masts – a main mast and a mizzen, both carrying lateen yards with unfurled lateen sails. Based on the overall appearance of the graffiti, these could be any of the group of rowing lateen rigged vessels either purpose built for the Ottoman Navy, or part of the Russian Navy.
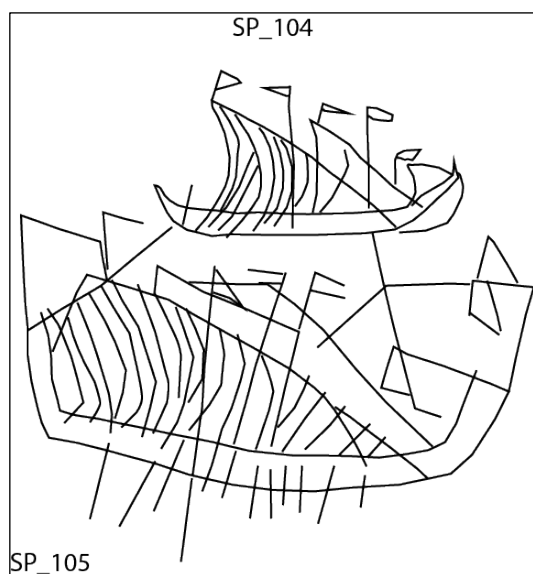
Figure 53   Graphic illustration of ship graffiti SP_104 and SP_105 ©Zdravka Georgieva

5.6.10   Ship graffiti SP_123, SP_143, SP_144

These graffiti are the most representative examples of vessels from the church of St. Spas. SP_123 and SP_144 are depicted with unfurled sails, whereas SP_143's sails are furled (Figure 54). They are analysed together, since they have identical rigging and hull shape. The graffiti represent fully rigged brigs, with two masts – a main mast, usually positioned abaft of the amidships, and a fore mast forward of the amidships – both arranged with top- and topgallant sails, three jibs set ahead of the fore mast, and a spanker abaft the mainmast. The appearance of the main sail is not clearly visualised on the graffiti. Usually, the mainsail in brigs is carried by a gaff and a boom like the system in which the spanker is set. In the British Royal Navy, this arrangement was replaced by a square sail attached to a square yard at the end of the 18th century (Marquardt 1992, 115). Marquardt also describes the spanker as much larger in size than the usual spanker to a mizzen mast, and in brigs it is usually fastened to wooden hoops loosely bent around the mast in order to ease its hoisting (Marquardt 1992, 115). The spanker on graffito SP_123 seems to be much larger. The bowsprits of the vessels are illustrated with a steeply raked angle and martingale booms and back-ropes. The main shrouds of the two masts and lines from the main staysail are also depicted. Boats are tied to two of the brigs through tow lines. They have a forward raking stem and a highly raised stern with a transom, and a rudder fitted. The graffiti do not provide further detailed elements from the running rigging. However, the following hypothetical reconstruction proposes a variant based on brigs from 1829-1830 depicted on an engraving by the travellers C. Sayger and A. Desarnod from the island of St. Anastasia in Burgas Bay (Sayger and Desarnod 1834, Pl. 43) (Figure 55; Figure 56).
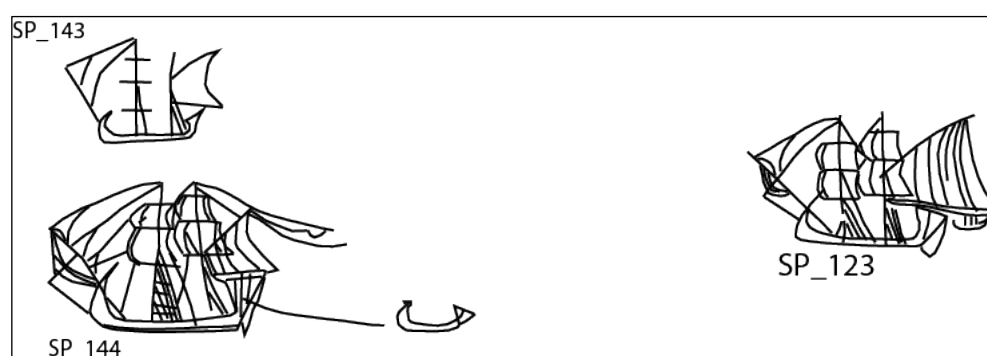
Figure 54   Graphic illustration of ship graffiti SP_123, SP_143, SP_144 ©Zdravka Georgieva
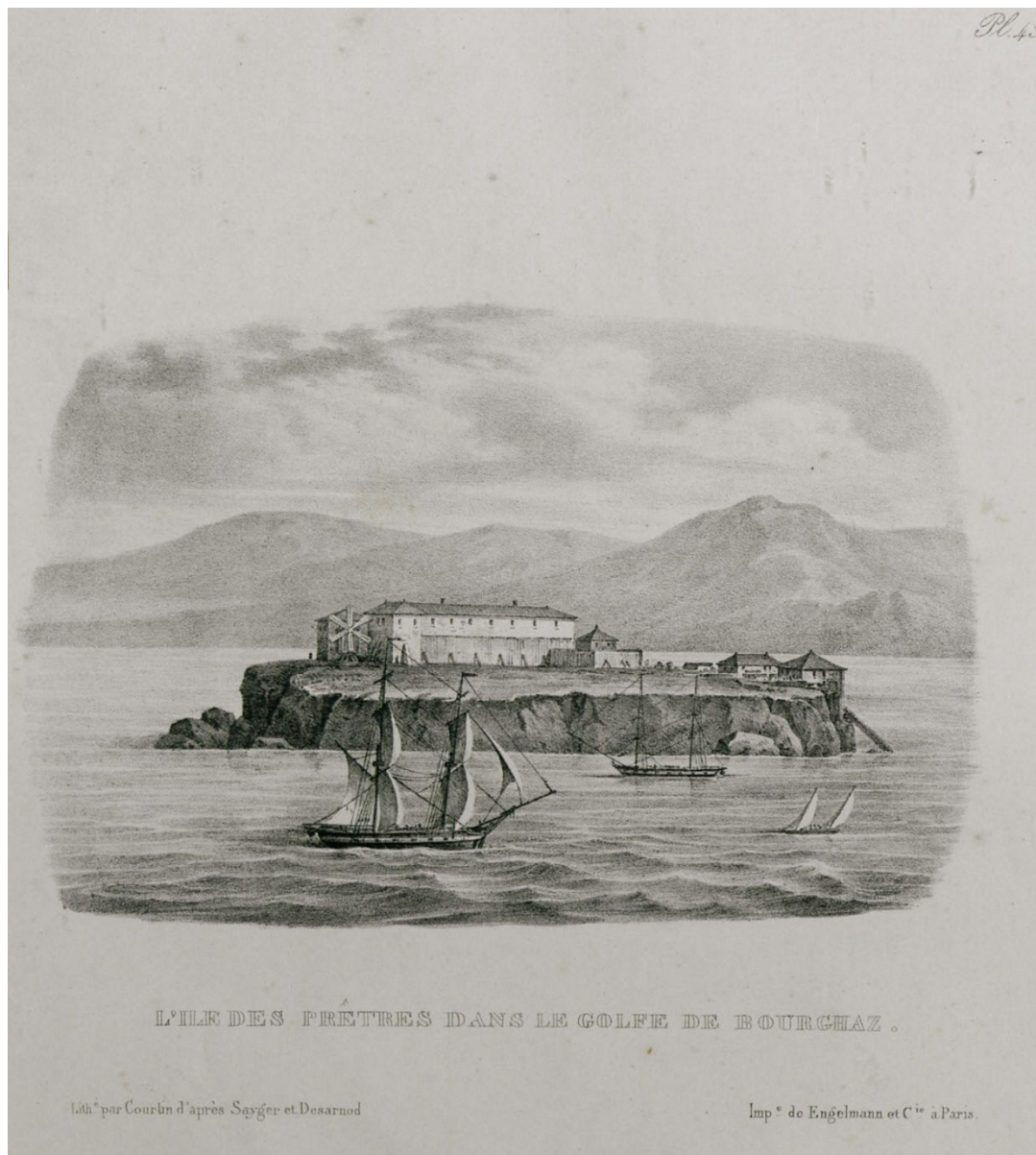
Figure 55   Engraving of brigs from 1829-30 in the waters off the island of St. Anastasia, Burgas Bay, illustrated by C. Sayger and A. Desarnod (1834, Pl. 43)
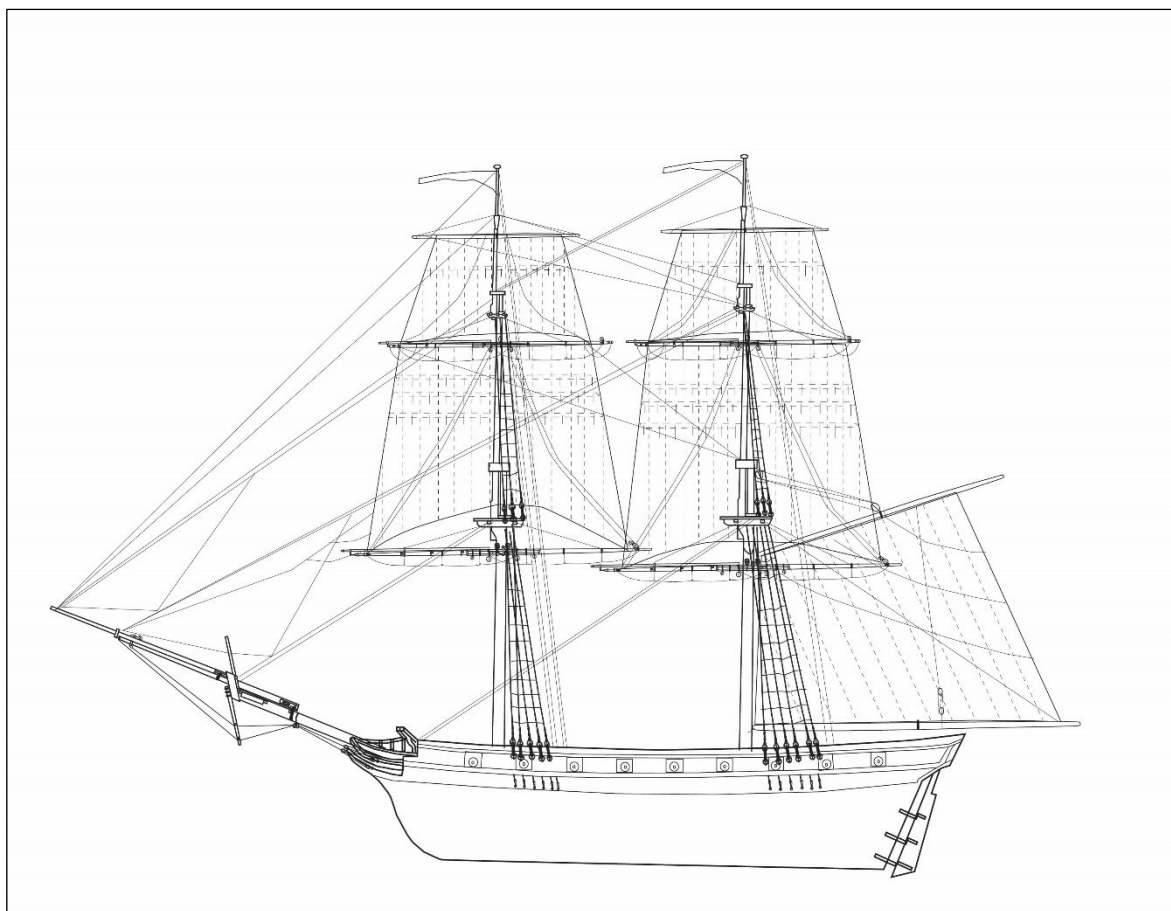
Figure 56   Hypothetical reconstruction of ship graffiti SP_123, SP_143 and SP_144 ©Zdravka Georgieva

5.6.11   Ship graffiti SP_165, SP_167, SP_169, SP_170

These graffiti, similarly to SP_104 and SP_105, are rigged with two lateen sails. SP_167 is the only single-masted ship carrying one unfurled lateen sail. SP_169 and SP_170 are illustrated with oars, while such are not visible in SP_165 and SP_167 (Figure 57; Figure 58). Similar to the lateen rigged vessel illustrated in graffiti SP_104-105, these could all fall within the group of auxiliary craft used by the Ottoman and Russian Navies.
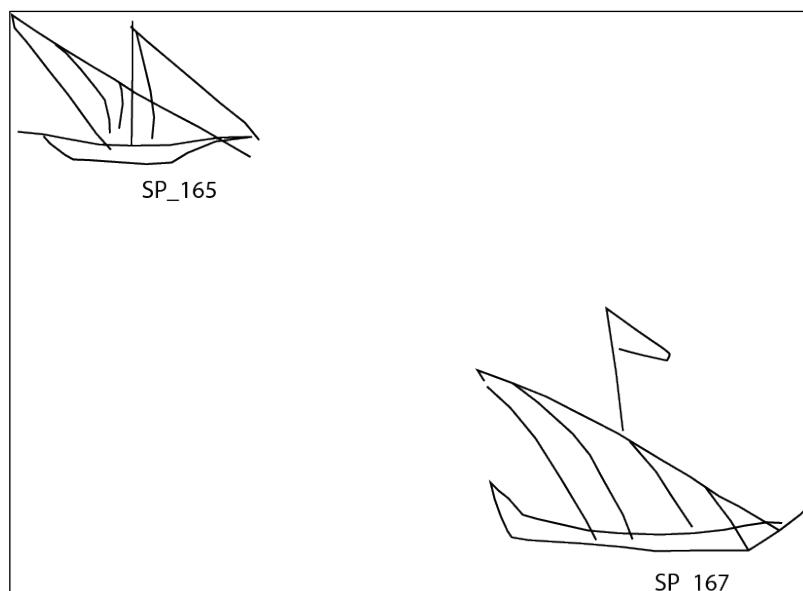
Figure 57   Graphic illustration of ship graffiti SP_165 and SP_167 ©Zdravka Georgieva
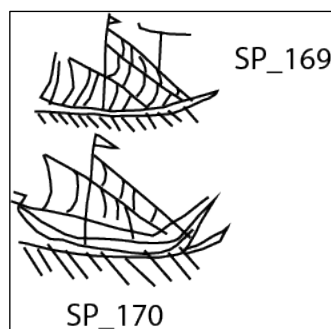
Figure 58   Graphic illustration of ship graffiti SP_169 and SP_170 ©Zdravka Georgieva

5.6.12   Ship graffiti SP_178 and SP_181

Ship graffiti SP_178 and SP_181 have identical hulls and rigging. Both are oar-sail-powered vessels with two masts carrying two lateen sails (Figure 59). There are no bowsprits visible on the depictions. Their hulls appear flat-bottomed with straight bows and sterns, without traces of stern rudders. The mizzen lateen sail in SP_181 extends further aft of the stern, and seems to be supported by a bumpkin.
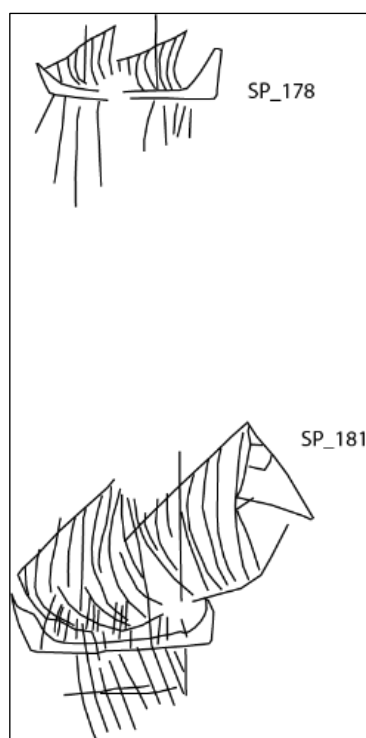
Figure 59   Graphic illustration of ship graffiti SP_178 and SP_181 ©Zdravka Georgieva

5.7   Discussion

The results presented in this chapter bring us closer to answering some of the questions about the ship graffiti and their context posed at the beginning of the analysis. The classification of the graffiti into categories facilitated and structured their further interpretation. The cataloguing and typological analysis helped to differentiate the ship graffiti from the churches in Nessebar according to their rigging into two main categories: fore-and-aft and square, and an attempt was made to determine which type predominated (Table 4). Those not included in this categorisation are either a combination of fore-and-aft and square rig, or are rather too cryptic to interpret. The latter constitute the largest group of graffiti depicted identically – single-masted vessels with two raised yards above either shrouds, fore- and backstays, or other purchases. From those characteristic enough to be recognised, square-rigged vessels appear to be the predominant type inscribed in the churches. It is notable that in the church of St. Spas, the number of ship graffiti with fore-and-aft rigging is slightly higher than in the church of St. Stephen. However, this classification of the rigging into only two groups is often too simplistic, given the variety of ship types with an abundance of rig arrangements that are not always easy to categorise and name. Damianidis (1991, 66) encounters the same problem in classifying ship types according to their rigging when faced with the variety of rigs and the limited information from the Aegean.

Table 4   Number of ship graffiti by rigging type inscribed in the churches in Nessebar

	Fore-and-aft rigging	Square rigging
Church of St. Stephen	14	47
Church of St. Spas	37	12
Church of St. Todor	undistinguishable	undistinguishable
Church of St. John Alitourgetos	1	1

Nevertheless, the interpretation and the hypothetical reconstruction of some of the ship graffiti made it possible to not only recognise various ship types, but also to trace small elements of their rigging, although many of these elements are exaggerated, omitted, or deceptive. Their recognition was facilitated by the available supportive material and the presence of relevant archaeological remains that corresponded quite well to the features that had remained unrecognised until now. The RTI technique revealed key elements of the graffiti that had not been registered in the previous documentations, and contributed to a more accurate interpretation. Several ship types were recognised with certainty: brigs; spritsail and lateen-rigged merchant vessels; and oar-sail-powered lateen-rigged vessels, which can find parallels to both Russian and/ or Ottoman naval auxiliary craft – e.g. galleys, small frigates.

To narrow down the chronological boundaries of the ship graffiti, and possibly relate them to particular historic events, or even to a practice established by a social group, I used the approach suggested by Walsh (2008, 2), and not only searched for distinctive features in their rigging, but also explored the relationship between the ship graffiti and other adjacent graffiti (of years, personal names and inscriptions in Greek), and contextualised them within the churches' building history, as well as the town's and the Black Sea region's history and archaeology. The building development of the churches in Nessebar never stopped throughout the centuries. In the case of the church of St. Stephen, there are several building periods between the erection of the basilica around the 10th -11th centuries, the enlargement of the nave to west and attachment of a narthex in the 16th century, the building of additional living spaces and a second floor-gallery to the west and south in the beginning of the 18th century, and the second phase of restoration of the latter between 1780 and 1791 (Kuzupov 2005; Gerov 2014). This chronology is used as *terminus post quem* for the dates of the graffiti. The series of graffiti carved in the western half of the nave and the narthex cannot be earlier than the 16th century, and the ones located on the surviving wall from the additional spaces to the south and west cannot be earlier than the beginning of the 18th century.

However, graffiti of years (1800, 1806, 1809, 1888, etc.) carved around ship graffiti, mostly on the east wall of the narthex in the church St. Stefan, tentatively put the ship graffiti within these chronological boundaries. The ship graffiti carved there represent mostly vessels rigged with spritsails and full square-rigged ships probably arranged under Mediterranean European tradition. This proposition is supported by the presence of another group of numerous graffiti carved onto the same wall, either surrounding or interlaced with the graffiti of ships and years - those of inscriptions and personal names in Greek. The carving of graffiti in holly monuments is a long-established practice that can be bound with a votive meaning. Such a practice is evidenced within the history of the churches in Nessebar at the beginning of the 19th century, in which personal names of Greek Orthodox citizens – donors of a church - were carved on the plasters by priests, as a sign of gratitude and to ensure that their names would be continuously read during prayers. There are various examples of notes discovered in documents preserved in one of the Monastic community monasteries of Mount Athos – the Monastery of Iviron. Moutafov (2022: 376) translates, for example, one of these notes as: "Mr. Georgitsis spent a thousand and... coins to replace the tiles of the church, which is why his name was written on the altar for remembrance and health". Most of the donations seemed to be made in the beginning of the 19th century, where a considerable number of the donors' given names are followed by the word '*Reis'*, which relates the person to a maritime occupation, as a shipowner, captain, or merchant. The information that graffiti were carved by priests (contrary to the suggestion at the beginning of the chapter that the clergy would oppose the practice) is further supported by the fact that during the project for recording the graffiti corpus, there were graffiti of personal names, ships, and years carved on the wall inside the altar of the church of St. Stephen – a holy space with access limited to only the clergy.

The use of spritsails (Alamana-rigged vessels) during the early years of the 19th century, besides being deduced by the graffiti corpus, was also confirmed by the examples of such vessels painted on the icons from Nessebar. The analysis of some of the BSMAP archaeological remains also suggests that sprit-rigged vessels sailed along the western Black Sea in the early years of the 19th century.

The other type of vessels registered in the graffiti is the brig. These ship types were intensively used as men-of-war in naval operations in the late 18th - mid. 19th-century Russo-Turkish wars in the Black Sea. A close tie to the events from the Russian-Turkish war of 1829 is historically and archaeologically present in the town of Nessebar. In 1991, a marble gravestone with an inscription in Russian was discovered in one of the town's churches. The text says that this was the burial place of captain-lieutenant Polozov - the commander from the Russian Black Sea fleet who captured a Turkish corvette and gave her the name Olga (Gospodinov 2015, 55). On July 11, 1829, the Russians occupied the town, and captured the Turkish corvette. After, the corvette was assigned to the Black

Sea fleet of Russia. After 1833, she was converted into a transport ship under the name Ahiolo, and sailed until 1847 (Gospodinov 2015, 57–58). In the merchant sector, the brigs became widely spread in the Black Sea as grain careers after the 1840s. These ships were most likely purchased from shipbuilding centres in the Eastern Mediterranean that developed their shipbuilding industry and production of north European-style class of vessels (mostly brigs) after the end of the Greek Wars of Independence (1821-1830).

In addition to the inscribed years, Greek inscriptions and names, the studied rigging of the abundant collection of graffiti are evidence for the intensive Greek shipping and wide maritime network in the dominions of the Ottoman Empire – between the Black Sea, the Eastern and Western Mediterranean, - during the early years of the 19th century. The period coincides with the time of establishment of Ionian islanders in the Black Sea, as a consequence of the Russian-Turkish wars in the second half of the 18th century, when the territories of Crimea had to be populated and cultivated (Pagratis 2015, 308). The Ionians, already active as carriers to the Russian ports as subjects of Venice, later seized opportunities for development in the grain business in the Black Sea (Pagratis 2015, 308–309).

The large cluster of ship graffiti in the town of Nessebar dated between the early years of the 18th and the middle of the 19th century is evidence for the strong presence of the Greek merchant network also along the western shores of the Black Sea.

Chapter 6 Hypothetical reconstruction of the post-medieval rig of a Black Sea merchantman

The accumulation of a considerable amount of technological data from both the archaeological and the iconographic sources made it possible to attempt to hypothetically reconstruct the rigging of one of the wreck sites described in Chapter 4, BSMAP_2015_WRK_006. This case study would additionally contribute to better understand sailing practice in the Black Sea in the second half of the 18th century. The two sources provided us with different, complementary results: the archaeological remains revealed more details about individual rigging elements, whereas the iconography (ship graffiti) traced the rigging silhouettes and contributed to the recognition of some ship types that navigated along the western Black Sea shores during the post-medieval period. Both provided examples of fore-and-aft rigging as a product of the Mediterranean shipbuilding tradition, and some square rigging influenced by North European merchantmen and warships. These penetrated the Ottoman market first through the Levant trade, and then spread to the Black Sea as a result of the policies of the European powers toward the Ottoman Empire following the two Ottoman-Russian wars from the last quarter of the 18th century. Thus, the globalisation of the Black Sea market in the 19th century inevitably brought examples of rigging arranged under the influence of both shipbuilding traditions. With the increase of grain trade after the 1830s, standardisation in hull design and rigging became a norm that followed international trends (Delis 2014a, 54). As Delis (2014a, 52) further points out after the 1790s (the reigns of Sultans Abdul Hamid I and Selim III), the single mould method of hull design was abandoned with the introduction of a shipbuilding plan improving the size and quality of ships built in Aeagean shipyards, which was transferred there by shipwrights who had worked in the Ottoman Arsenal during the programmes of the Ottoman Navy. The square-riggers built in the Aegean (mostly brigs) with two-three masts were polacre-rigged, some with fidded topgallant mast in a Mediterranean fashion (Delis 2014a, 54). With the increase of the number of square-riggers in Greek shipping due to the expansion of their maritime contacts with the Adriatic and the Italian Peninsula, in the last quarters of the 18th century, the lateen-sailed ships (lateeners and caiques) gradually started to disappear (Delis 2014a, 55). The maritime connectivity of the Western Mediterranean with the Eastern Mediterranean and the Black Sea would suggest that those changes in rigging were also introduced to the western shores of the Black Sea at the same time or a while later, after the fall of the Ottoman Empire's monopoly over the grain trade in the region in the 1840s. One example of an Ottoman lateener that sailed in the Black Sea in the late 18th- early 19th century is the archaeologically studied shipwreck *Kitten 1*, and Batchvarov (2014) observes that during this period, "the lateen was the dominant rig in the Black

Sea region" (Batchvarov 2014a: 195). Evidence for lateen sail still in use in the early years of the 19th century can also be found in an iconographic example from 1809 (Figure 60).

Figure 60   A section of the icon of St. Galini illustrating a ship with a lateen sail from 1809. The icon is located in the permanent exhibition of the Museum Ancient Nessebar, photograph by Kalin Dimitrov

The *"Black Sea rose"* wreck site is proposed to date to the second half of the 18th century (see Chapter 4). An Aegean and Marmara origin is deduced by the presence of floral carved ornaments in several fittings, which are associated with decorations with the same flower pattern evidenced on hulls of 18th-century Izmir and Aagean barçes (Güleryüz 2014, 50–53). Merchantmen of local Missivrian (Nessebar) shipowner/s painted on icons currently located in Nessebar offer detailed examples of sprit mainsail rigging. The sail plans on these paintings correspond well with identified rigging elements from some of the BSMAP archaeological remains. Some of the remains of the wreck sites from the northern cluster can also be associated with this rig arrangement. The studied ship graffiti also provide examples of spritsail-rigged ships from the late 18th – mid 19th centuries. All of these parallels provide a sufficient basis for a further tentative reconstruction of the shipwreck's probable sail plan.

The complexity of this reconstruction arises from two main factors. The first is related to the uncertainty in the position of the fallen and shattered elements of mast/s and spars, as a result of disintegration processes. The other stems from the current availability of only approximate dimensions of the overall hull, coming from the multibeam record. This hindered the initial identification of the exact number and types of masts and spars within the hull, with one possible

version for the sail plan proposed in chapter 4 – a single-masted spritsail rigger with fidded topmast and topgallant mast. However, this rigging arrangement seems to be slightly misinterpreted mainly because of the two above-mentioned factors. Further careful analysis of the archaeological remains shows that the length of the spar initially proposed to be a topmast is of too great a size in order to stay well lashed or fidded to the lower mast as visualised in the example of a Marmara caique by Admiral Paris. Therefore, a comparison with the auxiliary sources (iconography, marine art) rather points to it being a sprit yard of massive size, with a length almost identical to the mast's. Moore (1925) also reported the existence of considerably long sprit yards (Moore 1925, 150). This hypothetical reconstruction may still find decent parallels with the spritsail rigging of a Marmara caique drawn in 1870 by Captain Mannarino of the *Messageries Company ships,* and a western Black Sea Anatolian coastal trading boat sketched by Admiral E. Paris in 1878, with crucial dimensions given, which will be paramount for this reconstruction. These ship types were suggested as being ancestors of the *Çektirme* and *Mavnas* coastal boats that continued to exist up to the middle of the 20th century in the region (Güleryüz 2014, 96). Details about Ottoman *Çektirme* rigging mastery on the Bosphorus from the beginning of the 20th century described by Sir Moore also deserve to be included in the current reconstruction attempt.

Knowing the shipwreck's approximate length of 22 m and breadth of 6 m allows us to put it within a specific dimensional framework. Similar dimensions are available from the work of Admiral E. Paris for an Alamana-rigged ship from the western Black Sea Anatolian shores (Güleryüz 2014, 94), on which the current rigging reconstruction attempt will be based.

Several elements of the superstructure are recognised as indicative of the possible rigging arrangement (Figure 61). Hence, the hull is divided into three areas for the better visualisation of the positions of each of the elements, and their subsequent correlation to a certain part within hull: A (bow), B (hold) and C (stern).
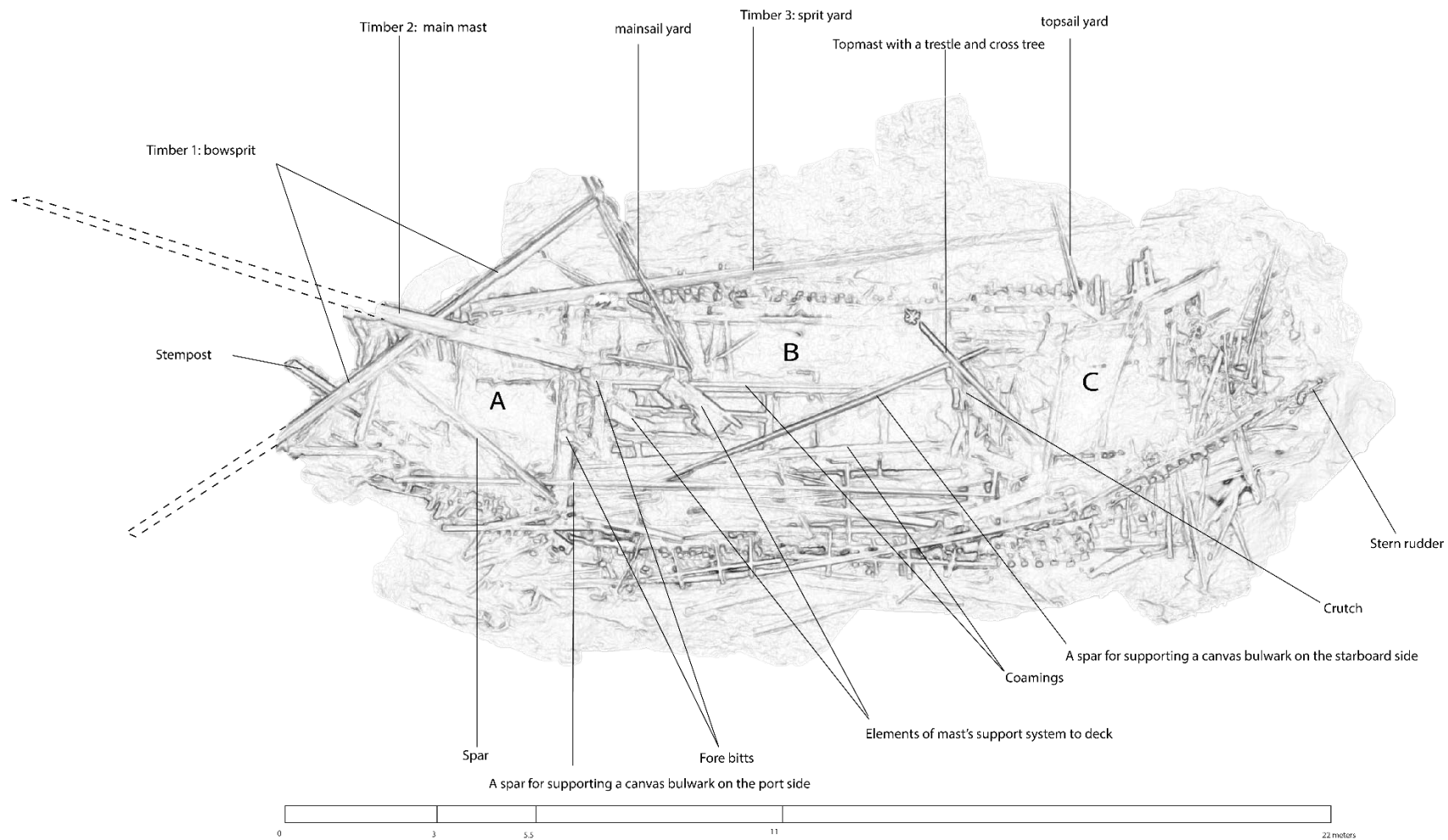
Figure 61   Annotated sketch of wreck site BSMAP_2015_WRK_006's rigging, photogrammetry model ©BSMAP database, sketch illustration ©Zdravka Georgieva

6.1   Area A: Bow

This area is outlined by the stem and ends with the deck beam at bow. This constituted the raised deck at bow. It seems to be affected the most by the wrecking and subsequent disintegration processes. Three spars have fallen over the deck; timber 1 is proposed as the bowsprit; timber 2 as a pole mast, and the third spar seems to have the characteristics of a jibboom considering the existence of a tenon cut at its outer end, and a cleat for belaying forestay(s). No blocks or other elements from the running rigging are visible in this area.

6.2   Area B: Hold

6.2.1   Main mast and topmast

The pole mast is of considerable diameter and length comparable to that of the hull. The pole mast with a preserved heel-tenon is leaning over the deck beam at bow closer to the bitt on starboard side. Abaft the bitts, two of the planks look like parts of the supporting system for tightening the mast to deck, and might hint at the position of the mast forward of the centreline – one has the appearance of a mast partner, and the other looks like a mast support timber with a forward rake touching the bitts' crossbeam. This rake (if not a consequence of the wrecking) indicates a forward inclination of the mast. Such a position of the mast is not unusual for single-masted Mediterranean ships that carried sprit main sail, and is evidenced in numerous examples. Damianidis reports that the position of *Tserniki* (*Çektirme*) masts was "at 1/3 from the stem and raked forward to provide greater area for the sail" (Damianidis 1991b: 69). Similar raked post is recorded in wreck site SS_2014_BS_763. One engraving by the Austrian officer Armand Schweiger Lerchenfeld who travelled around Greece in 1875 after resigning his commission in the Army, depicts Greek ships rigged with sprit main sails; this can provide an adequate reference for the position of the mast forward of amidships (Figure 62). The length of the mast of the Alamana-rigged ship illustration annotated by Admiral Paris is 18 metres - equal to the length of her hull. This ratio supports the observations from the BSMAP shipwreck of the mast being about the same length (about 20 metres) as the hull. The pole mast had a topmast fitted to its upper end; however, the method of fastening is not visible from the archaeological record. A possible method of lashing can be guessed based on Paris' drawing, as well as the Greek *sacolevas*/sprit rig (often with long sprit "Livard sprit"), described as having their topmasts fastened to the lower mast by means of reinforcing lashings

(Güleryüz 2014, 38). Another possible method would be fidding via caps, as evidenced in archaeological record examples (i.e. the wreck sites from the northern Black Sea cluster).

Figure 62   Illustration of Greek sailing ships with spritsails by Schweiger Lerchenfeld, Amand: in Griechenland in Wort und Bild, Eine Schilderung des hellenischen Konigreiches, Leipzig, Heinrich Schmidt & Carl Günther, 1887/ Kettwig, Phaidon, 1992, https://eng.travelogues.gr/item.php?view=39796

6.2.2   Sails

Three spars that might be attributed to a sprit mainsail, a square mainsail, and a topsail are identified in this area. A long and massive spar (a sprit yard) is leaning outward along the starboard side of the hull; its length is almost equal to the length of the wreck site. The end closer to the bow seems to be thicker than the other, fallen over along the stern. The mainsail yard has fallen over across the sprit yard; its thickness is hard to estimate. The topsail yard, shorter than the one proposed as mainsail yard, has also fallen over across the sprit yard, but further astern. Unfortunately, the exact dimensions of these features are unknown. The information gained from their appearance and positioning within the hull, when correlated with proper supporting sources, might be evidence enough for an interim reconstruction of a plausible sail-plan. It is currently impossible to provide exact dimensions for the following reconstruction, but only approximate ones

based first on the measurements given by E. Paris for an eighteenth-metre Anatolian Black Sea caique (Güleryüz 2014, 94), and second, on the principal dimensions provided by Damianidis (1991b, 76).

Anatolian Black Sea caique:

- length of the mast: 18.0 m;
- Alamana sprit: 14.60 m;
- bowsprit: 7.00 m;
- jib boom: 2.50 m;
- lower spar: 10 m;
- middle spar: 6.90;
- The upper spar: 4.80.

6.2.2.1   Rigging of the sprit mainsail, square main and topsails and jibstay sails of *"the Black Sea rose":* a provisional reconstruction

Considering the great length and diameter of the vessel's sprit, the sail would be of considerable size; however, exact dimensions cannot be surmised at the current stage. This is because it would be unlikely that any standard trends for rigging would have been followed at the last quarter of the 18th century, when the vessel is proposed to be dated. Shipwrights would follow fundamental dimensions, but as Damianidis (1991) pointed out, every boatbuilder of 20th century *Trehadiri* in the Aeagean had their own views for modifications (Damianidis 1991, 47). Delis (2014) notes that the Greek sailing ships of the merchant marine started to adopt international trends in hull design and rig in the period after the Greek War of Independence (Delis 2014b, 54).

Based on the ratio of principal dimensions between the length of the mast and the length of the sprit of the Alamana-rigged Anatolian Black Sea caique – 18.00 m/ 14.60 m, a similar principal ratio could plausibly be applied to *"the Black Sea rose"*. Thus, a length of about 20 m for the mast, and about 17 m for the sprit would seem applicable. Other fundamental dimensions might also be relevant for *"the Black Sea rose"* if we consider ratios for *Çektirme* (*Tserniki)* vessel type given by Damianidis (1991b, 76). Several traits may allow the BSMAP shipwreck to be categorised within the *Çektirme* class of vessels, which were already discussed above. Therefore, an example for the fundamental dimensions of *Tserniki* (*Çektirme*) according to Damianidis (1991b, 76) is appropriately given below. I converted the measurements to the metric system for the purposes of the current reconstruction:

- L.Keel (43ft/13.10m);
- L.Stem (7ft/2.13m);
- L.Stern (4ft/1.21m);
- L.O.A (54ft/16.45m);
- M.B (16ft/4.87m);
- M.D. (7ft/2.13m).

These principal dimensions are similar to the Alaman-rigged Anatolian caique. The latter's overall length is given as 18 m - one metre longer than the seventeen-metre *Tserniki*. Hence, an interim scaling and arrangement of the rigs of *"the Black Sea rose"* is presented below (Figure 65).

6.2.2.1.1   Sprit mainsail

The sprit yard is suspended to the starboard side of the mast, as evidenced in the numerous sources used for the reconstruction (the presented iconographic examples - Figure 42; Figure 50; Figure 62), and further supported by Moore's observations), and the fact that the sprit of the BSMAP wreck site leans along the starboard side. Although blocks and other features from the running and standing rigging are obscured, regional references for the method of rigging the sail are available (Figure 42; Figure 50). According to the Mediterranean tradition, the general method of rigging a sprit sail is to fasten its head via a series of rings (hanks), which carry the sail between the masthead cap and the sprit peak by means of a wire or topping lift (Marquardt 1992, 158). Besides the fact that *"the Black Sea rose"* quite likely would have rigged the sprit sail under this traditional Mediterranean fashion, it would be also very likely for its sprit to have been fastened near the base of the mast on the starboard side through stanliff and a snotter. Similar rigging of an early 19th-century sprit can be seen on the icons in Nessebar, where the snotter notably has tackles to manage the lower end of the sprit in the Dutch manner (Figure 63). This arrangement allows moving the sprit to a more horizontal position, which presumably balances the sail area better relative to the ship when running before the wind. The sprit main sail of the BSMAP vessel most probably was loose-footed, since all regional-related sources point towards this method. However, the various regional sources drawn upon use the two different methods of attaching the luff of the sail on the aft side of the mast. One engraving of single-masted sprit sail-rigged ship from Smyrna (Izmir) harbour clearly shows its luff laced around mast (Figure 64). This method seems to be common for the western shores of the Black Sea, with examples in evidence up to the middle of the 20th century in the last surviving traditional *Trehandiri* boat from Nessebar carrying a sort of a gunter lug sail laced around mast (Figure 51). The other method, which may be seen in the local iconography and marine art, shows the luff of the sail attached to the mast at the throat and the tack corners of the sail, and the luff tension controlled using the downhaul on the tack. Similar craft were observed by

Moore (1925: 161-162) in the Bosphorus, where he noted that the Eastern sails were "set much less carefully, and often the luff of the sail is loose and clear of the mast", compared to the Northern spritsails (on North European *barges*). Two pairs of vangs controlled the sprit peak, each consisting of a long pendant and a purchase which would be terminated downwards at starboard stern and port stern, and fastened to a belaying point not visible from the record. The vangs would be slackened when the wind was fair, and drawn in to windward when the sprit's position became unfavorable to the ship's course. An example of belaying fore vangs to a bulwark rail on a 19th-century American schooner is depicted by Petersson (2007, 95). However, such arrangements are region- and period-variable, and the exact method of securing the vangs astern "*the Black Sea rose*" is not visible in the archaeological record.
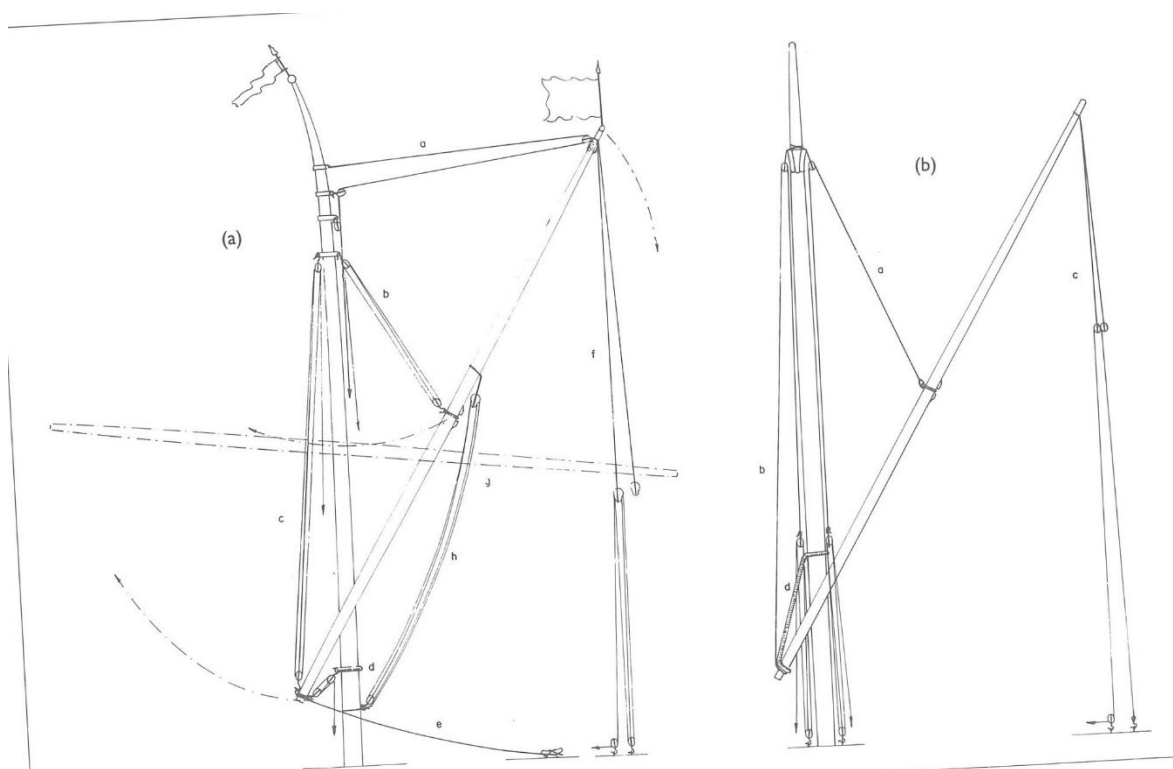
Figure 63   Rigging of sprit sail: a) Dutch method; b) English method, after Marquardt (1992, 141-142)

Figure 64   Illustration of sprit-rigged ship in the harbour of Smyrna by Robert Walsh and Thomas Allom in: Constantinople and the Scenery of the Seven Churches of Asia Minor illustrated. In a Series of Drawings from Nature by Thomas Allom, London/Paris, Fisher, So & Co. [1836-38, https://english.travelogues.gr/items/show/38951

6.2.2.1.2   Mainsail and topsail

Except for the considerable lengths of the pole mast and the sprit, the presence of two yards for square topsail, and probably a mainsail, in the record suggests that the tonnage of *"the Black Sea rose"* was probably more than 40 tons. Damianidis (1991a, 79) thought, based on Verwey's (1932) and Moore's (1925) views, that one-masted sprit sail vessels carried square sails if larger than 40 tons. The yards of *"the Black Sea rose"* would be looped around both the lower mast and the topmast, which itself was most likely fastened to the lower mast by means of reinforced lashing. Alternatively, evidence from iconography (ship graffito ST_156) suggests that fidding of topmasts to lower masts by means of caps and cross and trestle trees had already been introduced on the western shores of the Black Sea in the last quarter of the 18th – the beginning of the 19th c. The topmast from the archaeological record has cross and trestle trees, and its head is cut with a tenon, probably to reduce the amount of material removed from the cap, rather than putting the whole thickness of the mast through the cap. This system would serve also as a belaying point for the

standing rigging and one of the forestays, and eventually for flag hoisting. According to Moore's (1925) description, the topmast head receives a flying jibstay from the end of the jibboom, and two topmast backstays assembled with dead eyes and lanyards to the top of the bulwarks (Moore 1925, 42). The lower yard would be held up by a chain sling to be lifted by light lifts through blocks on the mast head cap. As per Moore's observation (1925, 42), the lower yard was trussed aloft permanently through an iron truss. The topsail yard would likely had a block held to its centre, and two single blocks, one for each tie with a loop around the top of the topmast. In the Turkish vessel observed by Moore, there would have been a chain tie in one part of the yard reeving through a sheave hole in the topmast head, and then the tie and halyards back to deck port (Moore 1925, 43). The braces of the topsail would have been held up by doble blocks leading to the end of the sprit's peak. The mainsail and topsail would have been fitted with bowlines going through rings and brought down to deck and bowsprit as one line. These running rigging arrangements are quite distinguishable in the vessels painted on the local icons in Nessebar. The presence of bowsprit and a jibboom-like spar in the archaeological record suggests the use of at least two forestay sails. Evidence about their use in larger ships also comes from the engraving of Greek vessels by Shweiger Lerchenfeld (Figure 62). A jibstay would be looped around above the lower mast head cap, and led to the bowsprit end, and a flying jibstay - from the topmast head to the cleat of the jibboom (Moore 1925, 42). The standing rigging of *"the Black Sea rose"* is again deduced only indirectly from the available references. It likely consisted of two backstays from the topmast, and four wire shrouds set up probably with deadeyes and lanyards on top of the starboard and port bulwarks.

6.3   Area C: Stern

6.3.1   Spars and crutch

The crutch may have served multiple functions, but the presence of spars around it hints that they may have been used together as an additional setting in the hold of the vessel installed in rough sea. The caiques from the Anatolian Black Sea and the Sea of Marmara are proposed to have in their "middle of the boats, a canvas bulwark for additional safety in rough seas, which is nailed on its bottom edge to the bulwark-rail on both sides of the boat and roped on its upper edge to a horizontal pole supported at both extremities by two forked metal rods. During loading and unloading this set up has to be dismantled." (Güleryüz 2014, 93). Although this was very likely one of the functions of the crutch, other interpretations are also possible.

Biddlecombe (1848: 11) describes the crutch as "a support of the main boom of a sloop, brig, or cutters, and for the spanker boom of a ship, when their respective sails are furled." In light of this, the crutch positioned astern the wreck site better fits the description of crotches: "pieces of wood

or iron, the upper part of which is composed of two arms, resembling a half-moon; they are chiefly used in boats, of the larger size, to support spare masts." (Biddlecombe 1848: 11). A stout crutch with gallows for the support of a boom is also observed in Greek lateeners at stern; the boom extends over the stern, and the foot of the sail is usually spread there (Moore 1925, 142).
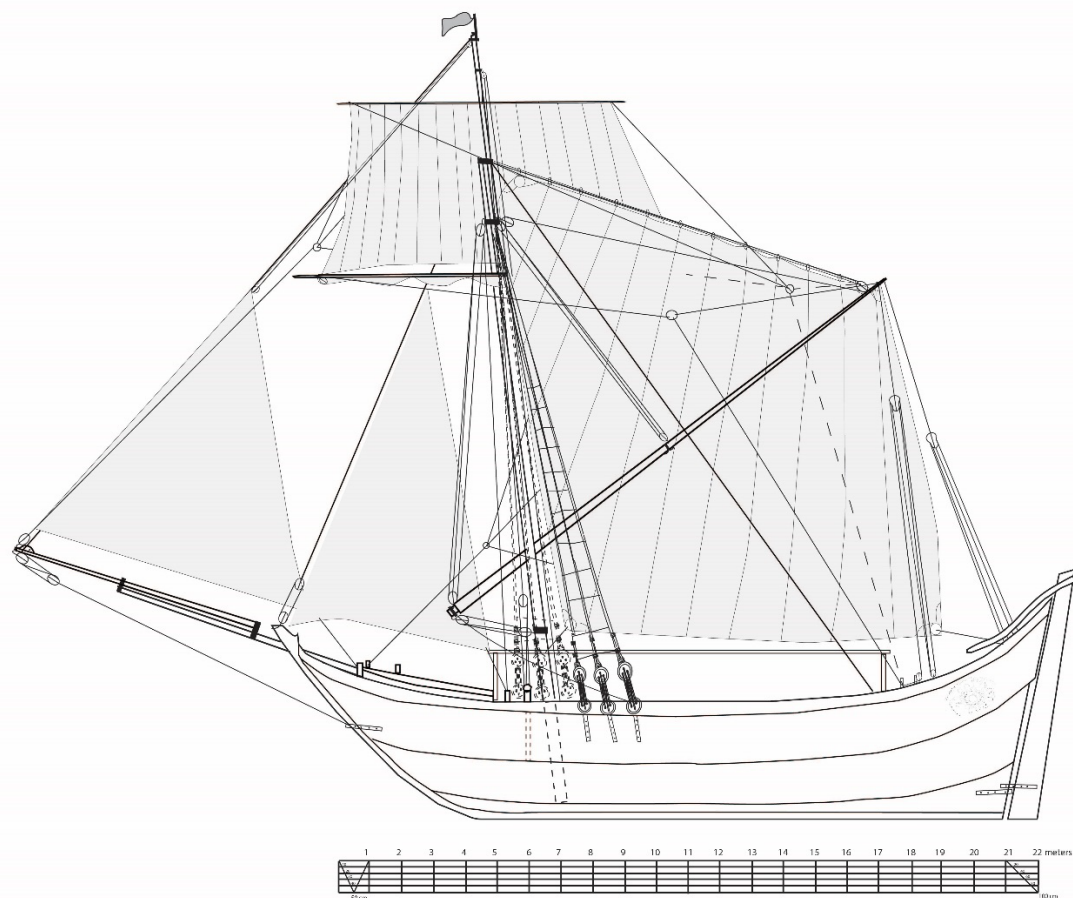
Figure 65   Hypothetical graphic reconstruction of the rigging of wreck site BSMAP_2015_WRK_006 ©Zdravka Georgieva

6.4   Discussion

The correlation between the archaeological remains, regional iconography, and parallels with examples from marine art, travelogues, and contemporary drawings, suggests that the vessel was one-masted, rigged with sprit mainsail, square mainsail, and a topsail. Based on Damiandis' observations regarding the ratio of the principal dimensions in Greek *Tserniki* (*Çektirme*) class of vessels, the position of *"the Black Sea rose"*'s mast is proposed to be at 1/3 from the stem and raked forward, which locates it 7.33 m from stem. This position corresponds well with the localisation of remains that may have belonged to the supporting system of the mast to deck at about the same distance from stem. Moreover, one of these elements recognised as a support timber for the mast with a rake forward suggests the inclination of the vessel's mast. The forward rake of the mast may be sufficient to relate the ship with the *Sacoleva/Çektirme* class of vessels. Another substantial piece of evidence for an origin of the vessel from the Eastern Mediterranean or Anatolian Black Sea coast are the numerous carved floral ornamentations on many of the vessel's fittings. Parallels of such ornamentations can be seen on 18th-century Aegean/Izmir *barçes* (Güleryüz 2014, 51–53)*.* Later examples of Alamana-rigged (rigged with Livard spritsail) vessels decorated with similar carvings are known from drawings of coastal merchant boats from the western Anatolian coast dated to the 1870s and attributed to the *Messageries Company's* Captain M. Mannarino and to Admiral E. Paris (Güleryüz 2014, 92). Güleryüz (2014, 94) testified that in older boats from the region, the carved decorations were seen more frequently, and the hulls were either painted black or unpainted (Güleryüz 2014, 94). The elements that were mostly decorated with carving were located at bow and stern, where the rudder and tiller were the most lavishly decorated, and probably gold-painted, as traces of gold paint have been discovered on decayed elements from a boat's stern (Güleryüz 2014, 96). The vessels illustrated on the local icons from Nessebar dated to the early years of the 19th century also have hulls painted black, and rudders and tillers decorated with carving and gold-painted. Moreover, these vessels were spritsail-rigged. All this evidence suggests the substantial financial resources of the shipowner of "*the Black Sea rose"*. The beginning of the 19th century was a prosperous period for Greek merchants, when they benefited the most from the political circumstances as neutral carriers in the Mediterranean and Black Seas, taking advantage of the decline of the French dominance in the Levant trade within the dominions of the Ottoman Empire, as well as the increasing shipping to Crimea after the Russian conquest. The "*Black Sea rose"* might be a product of a period when spritsail-rigged vessels may have started to

predominate over the lateen-sail coastal traders of the Ottoman Black Sea. This period included the reign of Sultan Selim III, and his policy for Ottomanisation of the merchant marine through an increase of the number of merchants and ships, to compensate for the increasing number of foreign merchant ships active in the eastern Mediterranean (Harlaftis et al. 2008, 24).

Chapter 6

Chapter 7   Conclusion

Western Black Sea seafaring, and particularly its technological aspect, is a relatively poorly researched topic. First, in the beginning of the 20th century, it was studied only from a single perspective - either a historical or an iconographic one. Second, the focus of underwater archaeologists at the time was predominantly towards the exploration of submerged prehistoric sites. Nautical archaeology in Bulgaria was a blank, and there was a lack of such specialists. It can be said that the beginning of the 21st century marked also the beginning of nautical research in the country. It started with the renewal of the excavation, initially undertaken in the 1980s, of the shipwreck Kitten 1 in the period between 2001 and 2003 in a collaborative project between the CUA and the INA, USA led by Professor Kroum Batchvarov. This was the first archaeologically studied shipwreck in Bulgaria, and the only one extensively published until 2015 (Batchvarov 2009, 2011, 2014a, 2014b). Thoroughly recorded and studied, the remains of the Kitten 1 shipwreck were determined to belong to a late 18th - early 19th century merchantman built in the Mediterranean shipbuilding tradition, that may have carried a lateen sail (Batchvarov 2014a, 2014b). In 2015, the second shipwreck to be excavated in Bulgarian waters was discovered in St. Nicholas Bay, Chernomorets - a rescue excavation undertaken by the CUA under the leadership of Dr. Dragomir Garbov (Garbov et al. 2016). Moreover, this was the first shipwreck in the country to be recorded with photogrammetry and studied through interdisciplinary methods (Garbov et al. 2021). The following extensive research of the Chernomorets shipwreck concluded that it was a sailing merchantman with Mediterranean European provenance, which sailed in the Black Sea during the second half of the 19th century (Garbov 2021a; Garbov et al. 2021). During the writing of the current thesis, a further correlation between the archaeological remains and archival sources led the principal researcher Dr. D. Garbov to formulate a convincing hypothesis about the full history of the ship, including its date of building, origin, type, name, sailing route, and date of wreckage. The hull remains on the bottom of St. Nicholas Bay were proposed to belong to the barquentine *Alleanza* built in Fiume, Austria-Hungary (today Rijeka, Croatia) in 1865, and to have sunk near Burgas in 1875 (Garbov 2022).

The peak in the development of nautical archaeology in Bulgaria came with the discovery of 65 shipwrecks on the bottom of the Bulgarian Black Sea during the fieldwork of the BSMAP undertaken between 2015 and 2019. The remains, some of which were preserved to an extraordinary degree, represent a historical timespan of about 2400 years. Most numerous (about 40) are the shipwrecks of the late medieval period, some with well-preserved superstructures and visible rigging elements – a rare find in the archaeological record. Seven of these late medieval shipwrecks with the best-preserved rigging features, recorded with advanced technological instruments and methods, e.g.

photogrammetry, formed one of the main datasets in this thesis. A proposition of this research was that these archaeological remains could contribute to the more comprehensive analysis and interpretation of the other main dataset in the thesis - a corpus of ship graffiti from four medieval churches in Nessebar, a harbour town on the southern Bulgarian Black Sea coast. The accumulation of such rich technological material influenced my decision to revise and add to the wide topic of Black Sea post-medieval seafaring through the following multi-layered research question set out in chapter 1:

1. To what extent the political, social, and economic changes between the 17th and 19th centuries affected the development of Western Black Sea seafaring, particularly in the arrangement of rigging?

This research question comprises several interlinked aspects that I attempted to answer through setting up the overall aim of the thesis – to combine and draw parallels between the two datasets in order to study the rigging of the post-medieval ships that once navigated the waters of the western Black Sea, and to use the insights thus gained to elucidate the rigging developments in the Ottoman maritime world of the Black Sea. A rigorous maritime archaeological approach, along with its accompanying tools such as comparison, interpretation, and reconstruction, were used to analyse the diverse material, and thus contribute to the study of western Black Sea seafaring.

The first part of the research question includes political, social, and economic topics, without which it would be impossible to understand any of the processes that influenced societal and technological development. Because of this, the archaeological and iconographic materials were synthesised and put in historical context, providing the necessary guideline to trace and enhance our knowledge of the societal responses to the changes in the region that happened mostly after the third quarter of the 18th and throughout the 19th century, and the related diversification of rigging arrangement.

The second part of the question is technologically oriented, and attempted to trace changes in the Black Sea rigging arrangements. Evidenced mostly in the plausible drawings left by contemporary Western travellers, where small details of the rigging elements are barely visible, until now, the local rig arrangement was described generically as archaic, and various small to mid-tonnage vessels rigged with lateen sails were thought to predominate in the Western Black Sea until the beginning of the 19th century.

The third part of the research question derives from the analysis of the post-medieval ship graffiti in Nessebar's churches, and what these monuments tell us about Black Sea rigging and the response of the maritime-oriented society to the dynamically changing seafaring in that period. It also raised

additional important questions related to their origin - what group of people inscribed them, within what historical setting, and why. Finally, the study of the ship graffiti also attempted to fill in a gap in the knowledge of the local maritime history of Nessebar during the post-medieval period.

The graffiti dataset was compiled during the project *'Non-destructive recording of ship graffiti in four medieval churches in Nessebar'*, undertaken between 2018 and 2020. It comprises 340 ship graffiti which were recorded for the first time through modern photographic methods. The main method applied was Reflectance Transformation Imaging (RTI), because it was the most suitable for both discovering small-sized elements, and for long-term preservation of high-quality digital models. The corpus of Nessebar's ship graffiti is the largest one recorded so far on the territory of Bulgaria, and it is included as a catalogue in Appendix A. The ship graffiti from the church of St. Todor, registered for the first time in the framework of the project, are also included in the catalogue. The corpus from Nessebar was the subject of previous published research during the 20th century, of which only Professor N. Ovcharov's has a full catalogue of about 174 ship graffiti recorded by hand. His approach for the recognition of particular ship types was through comparison of visible ship graffiti elements with examples from marine art paintings and drawings - acceptable in the absence of archaeological material, but unavoidably limited and dependent on interpretation of variously cryptic features. This is the main weakness of iconography, and it is why it was generally used subjectively as an auxiliary source in the study of the technical assets of ships' remains. However, the well-preserved rigging elements on the Western Black Sea shipwrecks allowed more confidence in the comprehensive interpretation of the ship graffiti, and an attempt to mitigate this subjectivity.

This chapter aims to summarise the answers to each of these interlinked questions and their derivative subquestions, thus filling a gap in our knowledge on western Black Sea seafaring.

A historical contextualisation attempted to answer the first part of the research question (and partially the second one), about the effects of the political, social, and economic changes in the 17th and 19th centuries on the development of rigging arrangement in the region. This was a necessary first step for a comprehensive synthesis of the post-medieval watercraft. The Black Sea has always connected the lands of Bulgaria with the rest of the world through the Bosporus and the Dardanelles. In 1453, the Black Sea fell under the control of the Ottoman Empire and became an isolated basin known as the 'Turkish lake'. The periods of openness and closure of the Black Sea to navigation periodically alternated, depending on which empire managed to control the straits. This influenced the development process of the local shipbuilding technology. Shipping in the Empire was carried out on a variety of ship types that inherited traits characteristic of the Mediterranean shipbuilding tradition. The shipping from and in the largest harbour centre in the Black Sea (and the

whole Mediterranean) - Istanbul - was performed on ships sailing under the Sultan's flag, at least up to the second half of the 18th century. Gardiner (1995, 78) mentions that coastal trade, mainly of grain, timber, and firewood, was carried out by *caïques* (*saïques*), *peramas*, *bergantins.* Panzac (1992: 195) thought that at least until 1783, the navigation of the Black Sea "served mainly to supply wheat to the enormous consumer market in the Ottoman capital". An example of the rigging features of one of these types, the *saïque,* can be seen in an illustration from the *Album du Levant* of 1679 by Jean Jouve. The rig of the *saïque* can be described as a Levantine form of ketch: it consists of a main mast carrying square main course and topsail, and a lateen mizzen (Gardiner 1995, 78).

The Black Sea occasionally opened for navigation to foreign ships depending on the different terms of the successive peace treaties. The most dynamic changes for the Black Sea region happened after the last quarter of the 18th, and continued throughout the 19th century. The continuous conflicts in the region, summarised under the term "the Eastern Question", or the Black Sea problem, involved Russia and the Western European powers competing for control over the Black Sea straits. With the signing of the Peace Treaty of Küçük Kainarca in 1774, Russian merchantmen and men-of-war began to penetrate the waters of the Black Sea, which ended the Turkish domination over the basin. After centuries of protective restrictions, the Black Sea gradually opened, marking the beginning of one of the most crucial periods in Black Sea seafaring known as the Golden Age of Sail (Garbov 2021a, 1). The increased volume of trading stocks inevitably required the development of merchantmen with greater capacity, which changed ship stability, and in turn led to modifications of the rigging arrangement. The latter was more frequently subjected to changes compared to the hull, according to Gardiner (1995, 77). Following this point, frequent changes of the Black Sea rigging arrangement most likely would have happened in the 19th century, when the political conditions in the region allowed for the increase of trade exchange with Western Europe, and the consequent need for larger hulls for transportation.

An attempt to trace changes in the Black Sea rigging arrangements was made in answering the second part of the technologically oriented question, through a structured description of each of the seven post-medieval wreck sites, with a focus on their rigging. Five of the shipwrecks (SS_2014_BS_1287, SS_2014_BS_1392, SS_2014_BS_1428, SS_2014_BS_763, and BSMAP_2015_WRK_006) share to a certain extent similar technological characteristics – from identical hull shape to elements of the rigging. With the exception of BSMAP_2015_WRK_006, all of them fall in the group discovered in the northern waters of the Bulgarian EEZ, which may indicate that they belonged to a common fleet. Pronounced raising of decks at bow and stern, and additional raised platforms (poop decks) above are clearly discernible at all four shipwrecks (somewhat less certainly at SS_2014_BS_763). Two of the shipwrecks (SS_2014_BS_1428, SS_2014_BS_1392) have handspike-operated capstans at their holds. The presence of such fittings within their hulls suggests

earlier dates for these vessels compared to the rest of the cluster. Moreover, together with a hook-shaped masthead at SS_2014_BS_1392, the hand-operated capstans were suggested to be an early form of fittings that was preserved for a longer time in the Black Sea due to the limited access for foreign shipping in the basin for three centuries imposed by the Ottoman Empire. Inferring later dates for these features, probably from the early years of the 18th century to the second half of the 18th century, is supported by iconographic examples. Handspike-operated capstans are illustrated in ship graffiti on the exterior wall of the church of St. Stephen in Nessebar, formerly a part of an additional space attached to the southwestern corner of the church in the beginning of the 18th century, with a second phase of restoration between 1780 and 1791 (Gerov 2014, 710).

Three of the five wreck sites (SS_2014_BS_1287, SS_2014_BS_1392, BSMAP_2015_WRK_006) appear to have one tall pole mast amidships with fidded topmasts or topgallant masts. SS_2014_BS_1287, SS_2014_BS_1392, BSMAP_2015_WRK_006, and BSMAP_2015_WRK_001 are suggested to be single-masted, while the rest of the group included in the analysis have two masts – a main mast and a mizzen. One of the wreck sites (BSMAP_2015_WRK_006) is proposed to be spritsail-rigged. Six wreck sites are suggested to be rigged in Mediterranean fashion, and only one (BSMAP_2015_WRK_001) – to be rigged in a northern European manner. Some of the shipwrecks on the bottom of the Bulgarian Black Sea exhibit somewhat archaic forms of rigging and fittings still in use in the late 18th – first half of the 19th c., as correlated with iconography, marine art, and archaeological records. However, the use of lateen sail carried on a main mast is not categorically proven via these archaeological remains. So far, the only archeologically tested argument for the use of lateen sail is from the late 18th - early 19th c. *Kitten 1* Black Sea merchantman accomplished by Batchvarov (2014a, 193). The BSMAP_2015_WRK_006, on the other hand, may be referred to as the latest example of the group discussed here. Besides, this ship may be considered the most expensive of the group, given the abundance of carved ornaments of some fittings within the hull. Therefore, the high financial status of its shipowner/s suggests a profitable period of trading in the region of the Black Sea in the second half of the 18th century. On one hand, political, economic, and socio-cultural factors impacted the preservation of old-fashioned forms of watercraft along the shores of the Black Sea for a longer period. On the other hand, political-economic reasons certainly also caused the main changes that occurred in the Ottoman merchant fleet, with references about its shrinkage that most likely started in the late 18th century and the first years of the 19th century due the outflow of Ottoman subjects along with their ships to the newly established Russian ports, as per article 17 of the treaty of Küçük Kaynara (1774).

The analysis of the ship graffiti raised additional questions related to the better comprehension of the local maritime-oriented society and their perception of the environment, and naturally links to the third part of the thesis' research question on the development of rigging technology. For the

purpose of the analysis, the ship graffiti were first categorised by three main criteria: incision style, spatial position, and technological performance. A comprehensive interpretation was only possible for the ones incised in simple and elaborate incision style, because most of their elements are explicit and legible. Therefore, interpretation of the rigging elements presented in the graffiti was performed on 12 ship graffiti in total. Complementary material from plans of ships, illustrations (engravings) from the marine art, information in travellers' accounts, was used for the evaluation of the graffiti's rigging elements, and for their further hypothetical reconstruction. Only the group of graffiti carved in elaborate incision style were used in the further analysis of some of the archaeological rigging remains, and vice versa, which to some extent contributed in the attempt of mitigating the auxiliary character of ship graffiti. To further overcome this, I applied Walsh's principle of studying graffiti within the historical context, and taking into account the relationship between the graffiti of ships and the space where they were carved. This allowed me to successfully narrow down the chronological boundaries of some of the illustrated ship graffiti to the beginning of the 18th –middle of the 19th centuries, and also to relate these to a particular social group of Greek families or merchant network. After the 1790s, Greeks began to play an episodic role in transportation between the Ottoman Empire, the Russian Black Sea ports, and Europe, the Mediterranean and Adriatic Sea. Their role in maritime affairs as neutral carriers in the dominions of the Ottoman Empire gradually expanded, thus having influence upon Black Sea rigging arrangements. Moreover, through the analysis of the relationship between the adjacent graffiti of years, ships, and personal names in Greek, the symbolic meaning of the graffiti was confirmed, including ship graffiti as *ex-votos* representations of people's belief. Furthermore, it was revealed that their creators were members of the clergy, and graffiti were inscribed on churches' plasters as a sign of gratitude to the citizens who contributed to the welfare of the church. Many of these citizens were people with ties to the sea – members of Greek merchant families, either captains, shipowners, or merchants, as indicated by the title *"Reis"* in front of their names.

The hypothetical reconstruction of one of the wreck sites (Chapter 6) was used for correlation of the archaeological and iconographic datasets by illustrating and adding physical measurements of the accumulated rigging features, and comparing them to examples from the historical record, marine art, drawn plans. It also attempted to determine the tradition in which the rig was set up, the historical setting in which the ship sailed, and its sail plan and type. Having determined the overall dimensions (length – about 22 m and breadth – about 6 m) of the wreck site from the multibeam record, and based on a thorough analysis of its rigging elements through parallels with existing literature examples, it was proposed that the ship might be single-masted spritsail-rigged, with an Aegean or Anatolian provenance, that sailed along the western Black Sea during the last quarter of the 18th century. It was assumed that the vessel was probably associated with a merchant

network that were established in the Black Sea after the Russian-Turkish wars in the last years of the 18ᵗʰ century.

In contrast to the archaeological material which revealed details about individual rigging elements, the iconography illustrated overall rigging silhouettes and the variety of ship types that sailed in the region during the post-medieval period. Bound by symbolism and the religious monuments in which the ship graffiti are located, these also contributed to some extent to shedding light on the local coastal communities' ideas, perception of the sea and adjacent locales, and a certain knowledge about watercraft technology. The life of the local coastal population, which reacted and adapted to contemporary events, was inevitably affected by the political, social, and economic processes in the region. Nevertheless, these monuments (a response at the time) reveal only fragmentary technical information on the manner in which the local seafarers were likely to set their rigging. Having closely studied the graffiti, I can say that the people who carved them were precise to some extent in many of their representations, which was confirmed by the archaeological material and the complementary sources used in the current research. The use of ship graffiti and other iconography as sources of information on the maritime knowledge of the people, and their adequacy for reconstruction of ship types, could be justified only when their auxiliary character is mitigated with enough archaeological remains, other comparative material, and historical contextualisation.

Bringing such an array of sources together advanced the more comprehensive study of Black Sea rigging, and more widely, added to the knowledge of post-medieval Western Black Sea seafaring in the context of socio-political and economic change. The integration of sources and the use of new recording technologies enabled the building of a solid baseline for the future study of rigging from the region, allied to forthcoming studies of hull form and construction. In these ways this study has taken a step towards a fuller understanding of the history, archaeology and art of the period from an explicitly maritime perspective.

Future tasks include the dissemination of the studied material to the wider public by publishing a catalogue of the ship graffiti accompanied with rich textual and photographic material, as well as by including these epigraphic monuments in the guided tours of the Museum Ancient Nessebar.

Glossary of Terms

Bilge......................................the bottom section of a vessel where it curves from flat to upward rising sides

Bitt..upright timber above a ship's deck (usually a pair) used for belaying point for hawsers, ropes, cables. Often located around a mast

Bowsprit ....a spar extended forward from the bow

Braces...................................ropes for hauling yards, usually connected to the yard-arms

Bulkhead ....vertically inserted timbers (beams) which formed a space (partition) in a vessel's hold

Bulwark ....the side of a vessel above the upper deck which comprises stanchions, planking and a rail

Capstan (handspike-operated capstan)..........a wooden cylinder inserted vertically on an upper-deck, forecastle deck, poop deck, raised quarter deck through a spindle and bearing, and moved through rotating with levers or bars. It is used for lifting up heavy loads, e.g. anchors, yards, etc.

Cheek ....a knee (could be wooden or metal) inserted on both sides of a mast below its masthead to support the trestle trees

Chock....................................piece of timber intended to fill in a space between other wooden elements of a hull construction. It can vary in shapes

Companion way..................... raised hatchway in the ship's deck leading to the main cabin

Cross tree ....a piece of timber crossing the trestle tree of a mast, a topmast or topgallant mast

Crutch...................................piece of timber in the shape of a knee inserted in the lower section of the stern for additional strength, e.g. of a mast preventing it from shifting

Deadeye ....circular block of wood with holes for reception of lanyards

Gaff.......................................the spar of a trapezoidal in shape sail (gaff sail). Usually has a jaw at the end through which the head-rope of the gaff sail passes

Gudgeon...............................metal bracket horizontally attached to the sternpost to which the rudder pintle is connected

Glossary of Terms

Halyard................................a rope used for hoisting sails

Hatch...................................the cover of a hatchaway, a companion way

Hatchway………………………….a square-shaped opening in a ship's deck, through which cargo is laden or discharged

Jib-boom ....a spar used to elongate the bowsprit. Usually thinner than the spar of the bowsprit

Mast partners ....mast carlings and chocks form together the mast partners, fore and aft beams that helped support a mast where it pierced a deck

Pintle..................................metal pins inserted vertically in the forward edge of the stern rudder in a way that fits in a gudgeon

Poop....................................a raised structure the aftermost end of the upper deck, usually the interior is being arranged as a cabin.

Block ....a block comprised of single or multiple pulleys, side plates, shaft and bearing through which a rope passes

Shrouds...............................the ropes which supported masts; also the stronger ropes used in rigging a vessel

Tiller...................................wooden or metal level horizontally inserted to the rudder head used for moving the ruder from side to side

Topmast...............................the mast fitted above the lower mast

Transom...............................an athwartship timber attached to the sternpost which formed and reinforced the stern

Trestle tree ....pieces of wood inserted on the hound of a mast which serve as a base of a top, cross trees of a topmast or topgallant mast

Truss-hoops ....the hoop that encircles a mast and also the sling-hoops of a yard to which the arms of the truss are attached

Windlass ....horizontally positioned barrel attached to bitts which is used for hauling anchors and hawsers

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