



## *Maritime Archaeology Graduate Symposium*

March 1<sup>st</sup>- 3<sup>rd</sup>, 2023. Short Report Series.

Doi: <https://doi.org/10.33583/mags2023.04>

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## **Underwater Cultural Heritage in the Strait of Gibraltar: A State of the Art**

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### **Abstract**

The PhD thesis on which this paper is framed is a study of the nautical aspects of the Strait of Gibraltar from the perspective of underwater archaeology, taking as a basis for the analysis its underwater cultural heritage. Therefore, our first objective is to identify the submerged archaeological evidence in these waters, where the first task is the preliminary research presented in this paper, a state of the art developed by consulting the available literature and documentation regarding previous studies, archaeological activities, artefacts of underwater provenance analysis and news about chance finds.

**Keywords:** Strait of Gibraltar, underwater archaeology, antiquity, UCH, shipwreck, anchorage, state of the art.

### **Introduction: the maritime culture of the Strait of Gibraltar**

Located on the western edge of the Mediterranean, the Strait of Gibraltar (fig. 1) is a mandatory passage to navigate between the Atlantic and the Mediterranean and an extraordinary sailing point connecting two continents, Europe and Africa. It provides a highly interesting opportunity to undertake the study of societies' interaction with the sea, since, as a privileged nautical point widely used since prehistoric times, it has promoted, century after century, not only a great number of nautical events, but also the exceptional development of its populations and commercial links, which have benefited from the communications that this nautical environment offers.

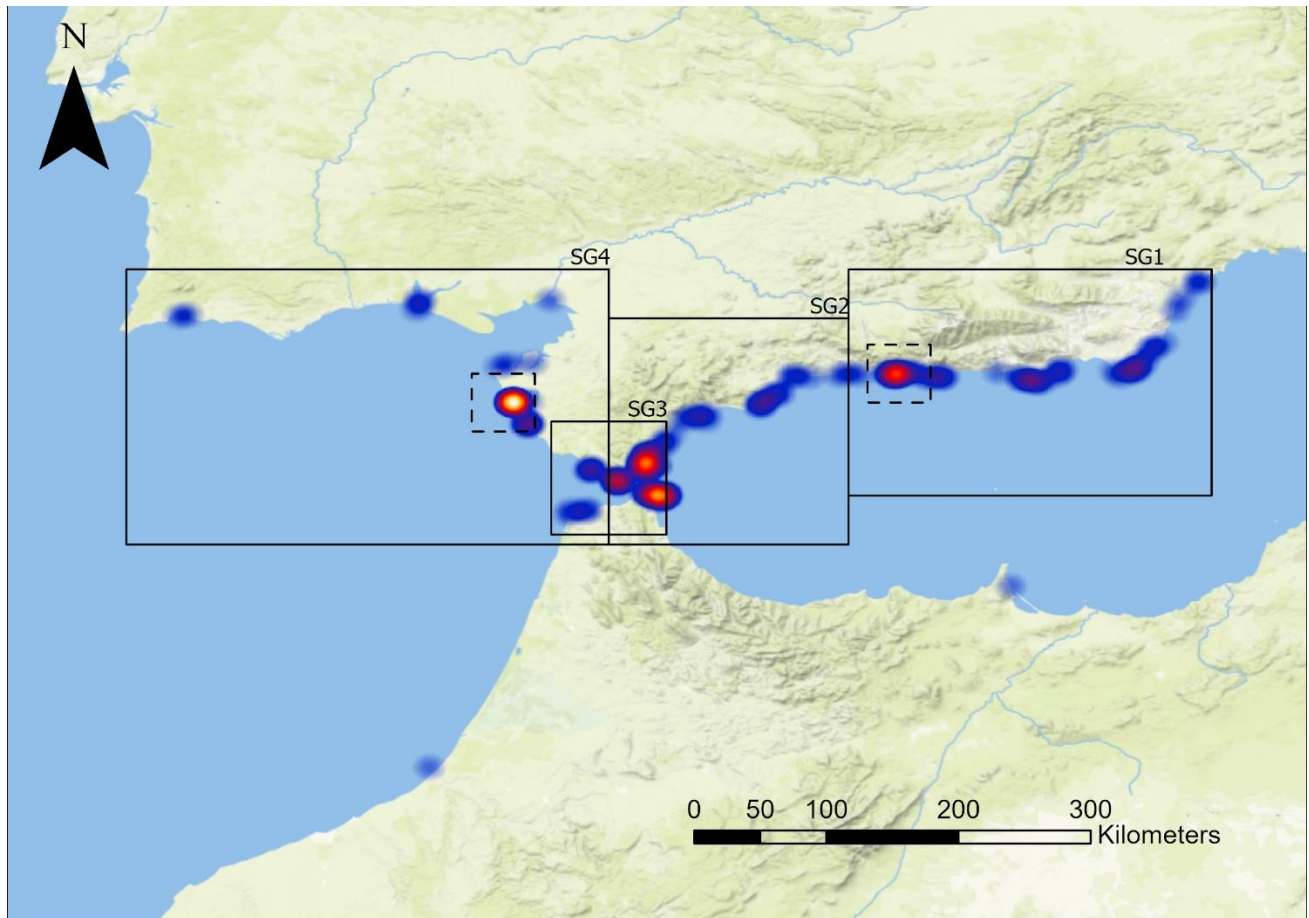


Figure 1 Underwater archaeological site density map and division of the study area.

However, the Strait is dangerous to navigate in adverse weather conditions, due to prevailing currents and winds, which often generate unsustainable wave heights for certain vessels. There are also areas of dangerous reefs that often cause accidents when boats come too close to them, either through ignorance or because they are pushed by strong winds. Even so, navigation was necessary, because it was the best means of communication and exchange of goods, cultures and ideas in ancient times. That is why it is very important to know how these waters were navigated, how storms were weathered and how the coast, the anchorages, the beaches and the inlets were used depending on the needs of the ships and sailors, how the beaches and harbour structures were adapted according to these needs and therefore how the port cities, so studied on land, were born. That is, it is necessary to approach this research by looking at the land from the sea and not the other way around.

Many researchers have studied the common culture on both shores of the Strait of Gibraltar through the analysis of terrestrial archaeological artefacts and sites, generating a great deal of knowledge about what the Strait was like in ancient times, in terms of land settlements (Tarradell 1960; Ponsich and Tarradell 1965; Ponsich 1970; Gran-Aymerich 1992; Callegarin 2008; Ramos 2012; Bernal 2016). Nevertheless, one aspect of this maritime culture that is proportionally smaller is the nautical perspective; that is, how the use of the sea and the conditions and needs of navigation have shaped, throughout history, this culture and its settlements.

Underwater archaeological sites are highly significant remains for solving the questions raised by this nautical perspective, as they hold evidence that we do not find on land. Many of them preserve artefacts that, if they were not underwater and, in many cases, buried under the sand (therefore, in an anaerobic environment), would have degraded over time (such as wood). Still, the exceptional state of conservation in which they are found is not the only peculiarity of these types of sites. Like all evidence of human activity, the geographical place in which they are located reveals a relationship between communities and the natural environment. In the case of shipwrecks, especially if they are in a primary position, their location has a lot to do with the use of the maritime landscape and the dangers it involves for navigation. Moreover, harbour and anchorage contexts inform researchers about the use of safe areas for all kinds of nautical activities but, due to their condition as authentic maritime dumps (Cerezo 2016), also about the diachronic use of these spaces over the centuries. Therefore, we consider that the studies that have collected the available information on underwater archaeological finds in the area to be analysed are the starting point of this research.

### **Objectives and methodology**

Navigation and maritime trade have also left traces under the sea, in the form of underwater sites, whether shipwrecks, anchorage contexts, isolated materials or harbour seabeds. For that reason, this project aims to complete this chapter of the maritime history that is preserved beneath the waves by studying the underwater remains dated between the 9th century BCE and 5th century CE. In the initial stage of this research, the proposed geographical framework is to the north of the Strait, between Cabo de Gata (Almería, Spain) and Cabo San Vicente (Sagres, Portugal); and to the south of the Strait, from Melilla (Spain) to Cape Spartel (Tangier, Morocco).

Consequently, this is a holistic study about the underwater sites in the Strait in order to know their typology and chronology, using non-intrusive techniques (Maarleveld et al. 2013), such as underwater virtual archaeology and geophysical survey. This research will answer questions related to what kind of ships sailed through the Strait, which products were traded, what was their origin and possible destination, and more widely, how navigation and trade evolve from protohistory to Late Antiquity. Besides this, this study will provide information to understand how this maritime space shaped the societies on both sides of the Strait. The analysis of the marine space of the Strait will be addressed through two parallel and intertwined lines of study, which are: the maritime cultural landscape and the archaeological remains of underwater provenance. We consider that by establishing a spatial and chronological relationship between the sites, with the landscape, nautical conditions and land settlements, we can contribute to the understanding of navigation in ancient times, not only between the Mediterranean and the Atlantic, but also between Europe and Africa. Of course, there is already research that has previously addressed some of these issues, with successful results, and they will be our starting point. The stated purposes will be achieved by reaching three main research objectives:

1. Identify the underwater archaeological heritage in the Circle of the Strait.
2. Interpret each of the registered underwater sites and insert them into the historical discourse of ancient navigation and maritime trade in the Circle of the Strait.
3. Develop a database that relates the underwater archaeological sites of the Circle of the Strait spatially, chronologically and culturally, accessible both for the enhancement of its cultural value and for future research.

As we are at the beginning of the research, we are going to focus on the first objective, which will be developed, firstly, by reviewing the bibliographic and archival documentation regarding underwater archaeological findings and interventions on the coasts of Andalusia, southern Portugal and northern Morocco. The results of this review are presented below. Further on, we will complete this objective by studying the archaeological materials of underwater provenance existing in national and regional museums and by locating and analysing in situ the underwater archaeological sites in the Strait.

### **Archaeological data from literature and historiographical review**

As aforementioned, the previous studies that have collected the available information on underwater archaeological finds in the Strait are the starting point of this research. Therefore, our first step has been a literary and historiographical review, which has given rise to a concise summary of the 166 underwater archaeological sites identified to date by gathering the data published by several researchers. In general, we can distinguish between comprehensive and regional research.

#### *Comprehensive research*

A. J. Parker (1992) published a catalogue of underwater sites in the Mediterranean, collected by area, providing coordinates, descriptions and, what we consider most useful for this analysis, literary references. For the Strait of Gibraltar area, it includes a total of 31 underwater sites, 21 on the Spanish coast, 7 in Moroccan waters and 3 near Gibraltar. His work is a compilation of a large amount of previously published information, as well as oral and toponymic sources. Many of the studies that we review in the following section are cited by Parker and have helped us to specify the information on each site, beyond the general information gathered by this author.

We also consider the database developed by the Centre for Underwater Archaeology of the Andalusian Institute of Historical Heritage (CAS-IAPH) to be exceptionally useful because, like Parker's catalogue (1992), it is an extraterritorial source, which provides an overall and much more updated view of the UCH found in Spanish waters. We have considered these results as comprehensive research because, although it only includes sites in Spain, it provides information on five provinces. This database can be consulted on the website for the Digital Guide to the Cultural Heritage of Andalusia and presents data on various sites known from documentation, oral sources or underwater surveys. Its exhaustive consultation has yielded 86 sites, 2 in the province of Huelva, 1 in Sevilla, 31 in Cádiz, 19 in Málaga, 15 in Granada and 18 in Almería.

#### *Regional research*

On the basis of the comprehensive studies mentioned above, which provide very general information about the sites they identify, we have consulted specialised literature both to specify the data of each finding and to include new ones. We will briefly review them by region.

Almería (fig. 2) is the easternmost Andalusian province of the Circle of the Strait and is one of the first regions in which an underwater archaeological map was configured. The results of the surveys and findings were published by Juan Blázquez and Lourdes Roldán (Blázquez 1982; 1984–85; Roldán 1992; 1993; Blázquez and Roldán 1988; 1989; 1990; Blázquez et al. 1992; 1998) and subsequently by Sergio Martínez and colleagues (Martínez and Martínez 1987; 1992). Some of this data was updated by the Centre for Underwater Archaeology of the Andalusian Institute of Historical Heritage (CAS-IAPH). Besides this, Julio Mas, one of the pioneers of Spanish underwater archaeology, identified some underwater sites in Almería, close to the border with Murcia (Mas 1975; Mas 1983). There are also other published works on archaeological material studies, amphorae

analysis or specific interventions (Beltrán 1970; Pascual 1968; 1973; Molina 1983; Liou 1987). Finally, interesting comprehensive research of the province was published by Gilberto Rodríguez (Rodríguez 2014).

Granada (fig. 2) is the next province to the west, with fewer kilometers of coastline, where unfortunately not many studies have been developed, although those that exist are not negligible. Most of the surveys and documented studies on underwater archaeological finds in the province were done by the CAS-IAPH (Rodríguez and Alzaga 2001). In addition, Federico Molina published data on several underwater sites in Granada, especially those related to Almuñécar in Roman times (Molina 1983; Molina 2000). There are also publications on the analysis of materials of underwater origin, especially amphorae (Beltrán 1970; Pascual 1973; Mendoza 1979), and other studies on terrestrial archaeological sites that address the issue of maritime trade and mention underwater finds, the most comprehensive by Pérez and García-Consuegra (2014).

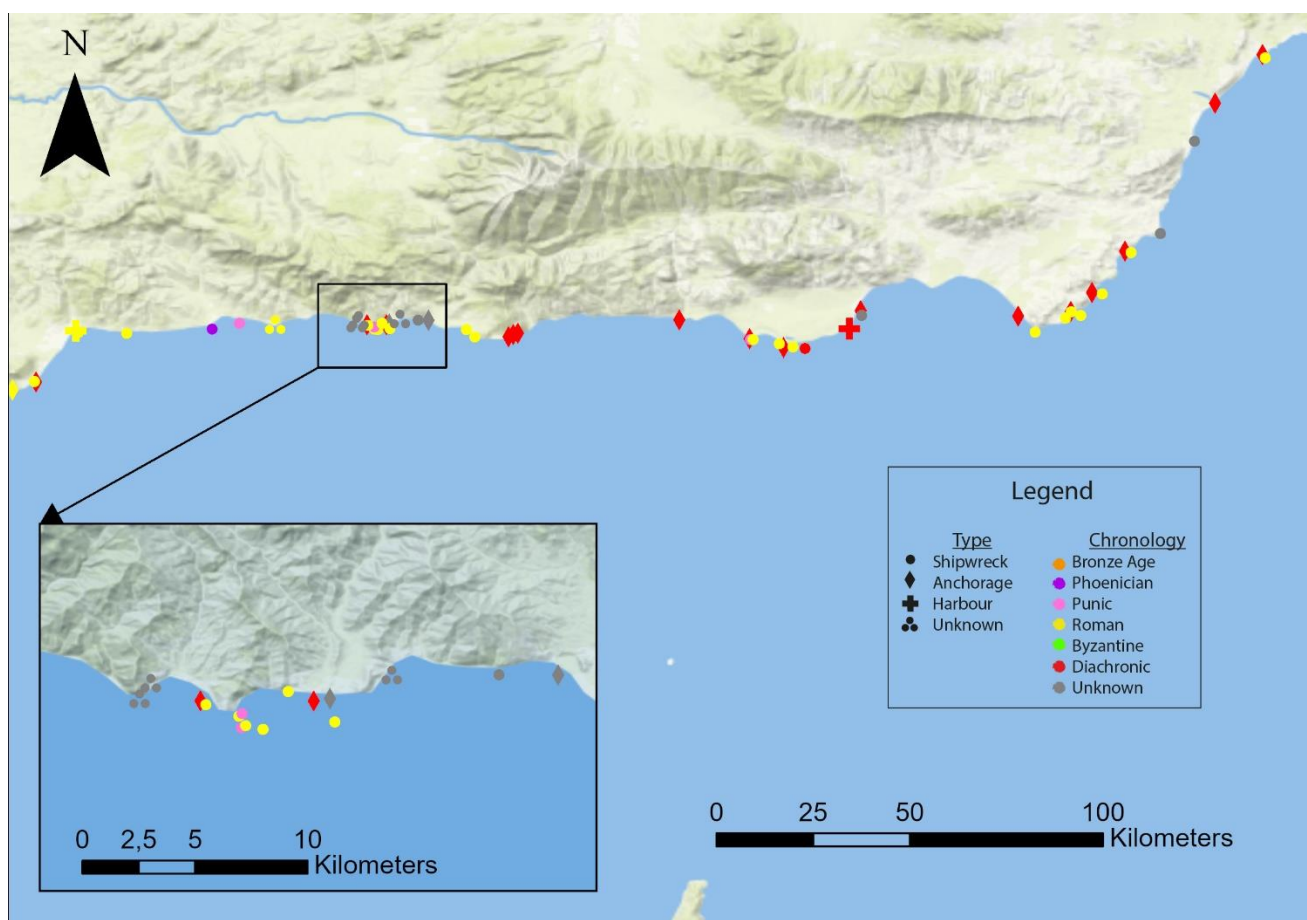


Figure 2 Zone SG1 (Strait of Gibraltar 1), regions of Almería and Granada.

Málaga (fig. 3) is one of the Andalusian provinces with the most kilometers of coastline, where a large number of underwater archaeological sites have been documented. We have obtained most of them from the freely accessible online database of the IAPH. Unfortunately, almost all the information comes from internal CAS reports, which are not public, and there are hardly any references to other sources (Rodríguez, 1997). On the other hand, an underwater archaeological mapping project was also carried out in Málaga (Martínez and Martínez 1987; 1992), in addition to

the analysis of the Guadiaro shipwreck cargo, developed by Macarena Bustamante and Ildefonso Navarro (Bustamante and Navarro 2022). Finally, one of the Málaga underwater sites is mentioned in a work on a study of materials from a wreck in Cádiz (Sáez and Higuera-Milena 2023).

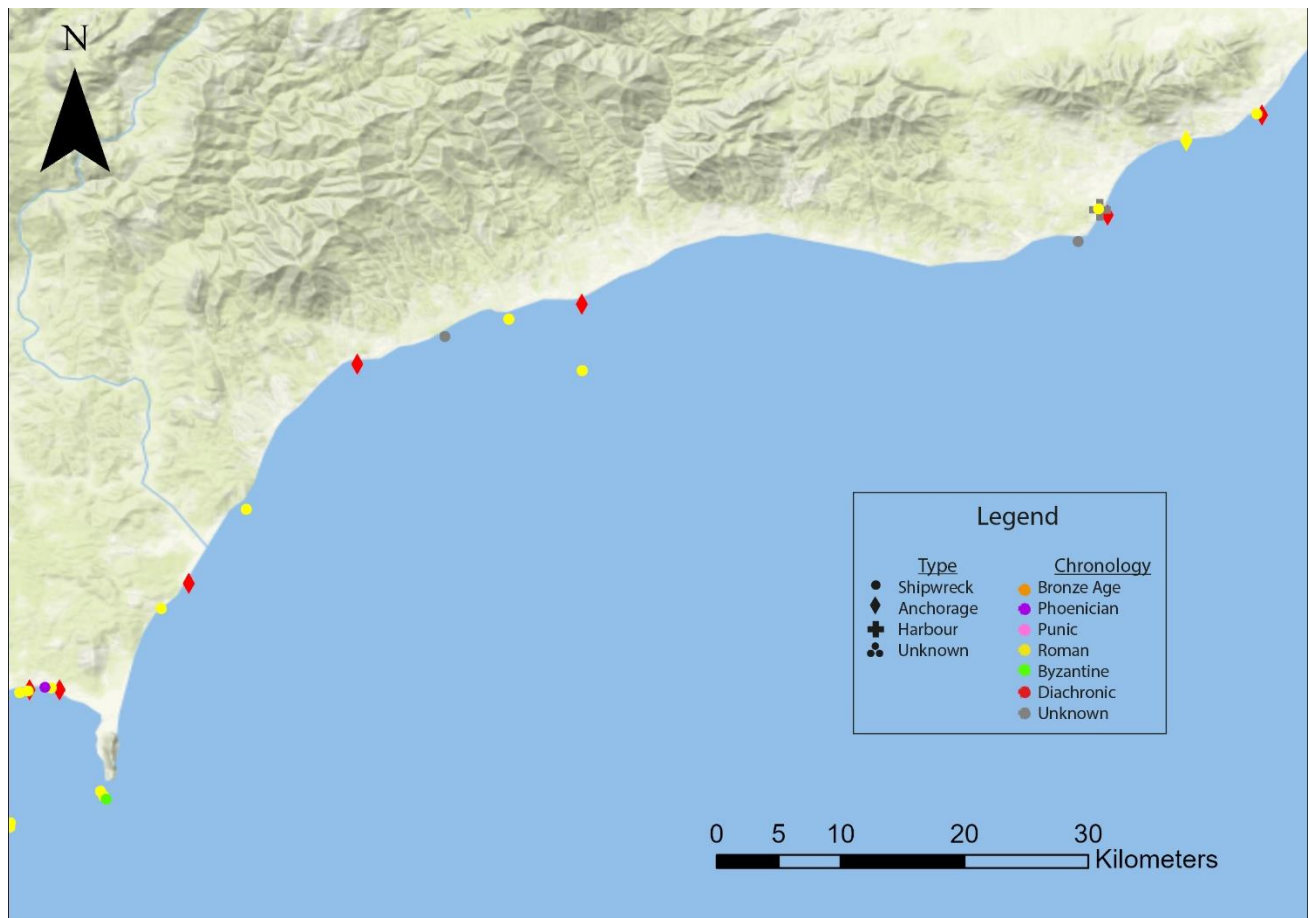


Figure 3 Zone SG2 (Strait of Gibraltar 2), region of Málaga and Gibraltar.

Cádiz (figs. 4 and 5) is the Andalusian province where most underwater archaeological work has been carried out due to its historical importance as a port city since Phoenician times, where chance finds of underwater materials were commonplace. Surveys were undertaken as early as the 1970s by Olga Vallespín, one of the pioneering women who developed underwater interventions aimed at drawing up the Underwater Archaeological Chart in Spain (Vallespín 1977; 1985; 1986; 2000). She carried out most of her work in the Bay of Cádiz (fig. 5), as did other researchers who also undertook similar projects (Blánquez 1982; Martínez 1983; Ramírez and Mateos, 1985). There have also been surveys developed by the CAS, located in Cadiz (Martí 1994; Gallardo et al. 1999; 2000; Rodríguez and Alzaga 2001; Rodríguez and Martí 2001; Martí and Rodríguez 2003; Higuera-Milena, 2008; Martí 2010; Alzaga et al. 2011; Higuera-Milena and Sáez 2021; Higuera-Milena and Cerezo 2021; Sáez and Higuera-Milena 2023), and by the research Line of Nautical and Underwater Archaeology of the University of Cádiz (UCA), especially in the context of its Master's Degree in Nautical and Underwater Archaeology and the Project “ Herakles – Between the Pillars of Hercules, Underwater Archaeology of a Privileged Space. The Bay of Algeciras [FEDER-UCA18-107327]”. Developed in the Bay of Algeciras, this project is an approach to underwater cultural heritage through research, as a first step towards its enhancement, which is novel compared to other approaches, which are usually

motivated by management. Its results have yet to be published, although some data have been kindly provided for this research (fig. 4), and only three shipwrecks have been published, one Punic and two Roman (Cerezo 2019, 167–173; Cerezo and Morón 2021; Solana et al.2023).

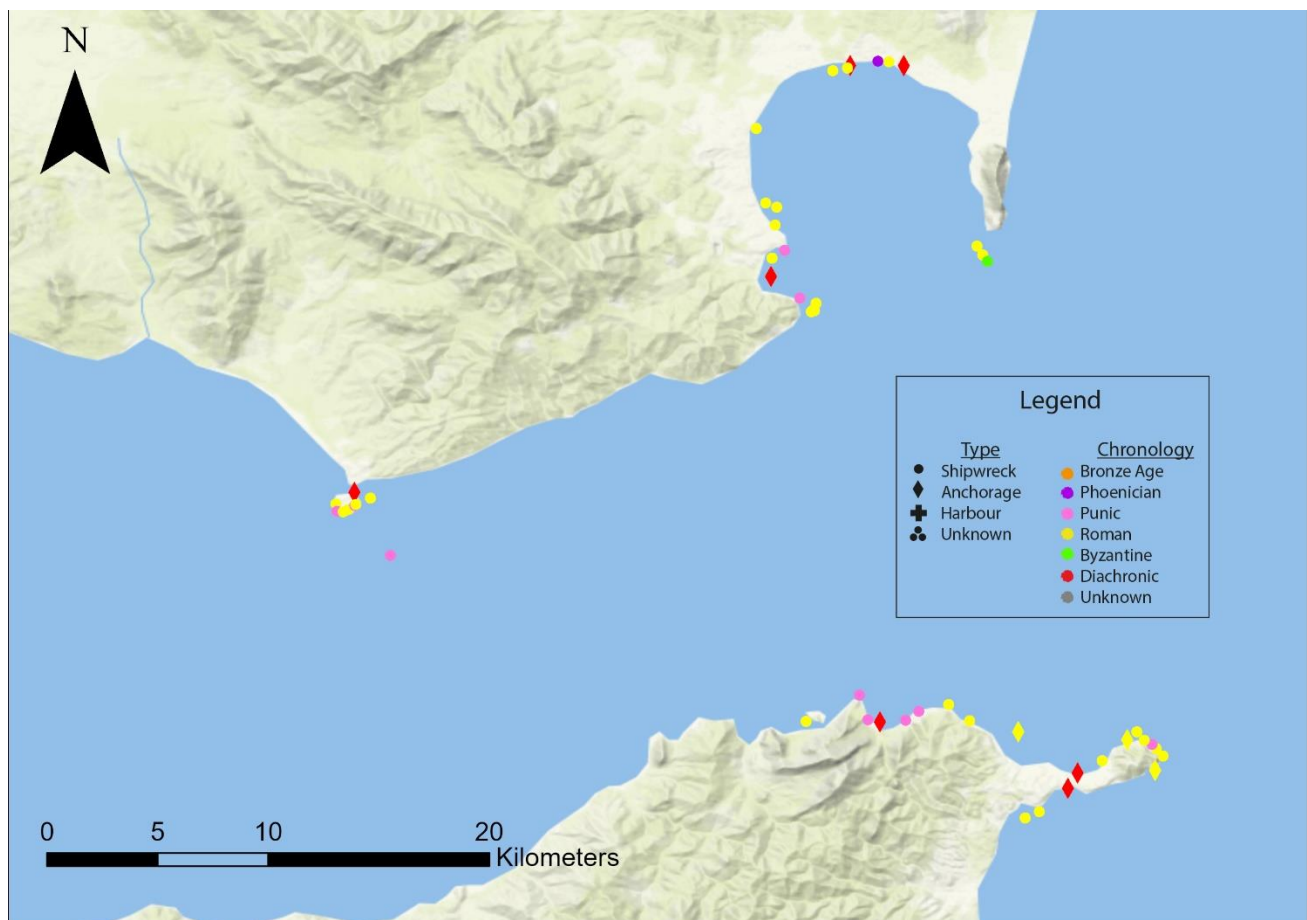


Figure 4 Zone SG3 (Strait of Gibraltar 3), the core of the Strait.

At this point, we must emphasise that the archaeological fieldwork developed by the UCA team took as a starting point the documentation of the underwater cultural heritage carried out by Félix Rodríguez Lloret, a professional diver, who throughout his life dedicated himself to documenting all the archaeological objects he found on the seabed in the Bay of Algeciras, without extracting them, by means of photographs and plans. Moreover, the archaeologist Raúl González Gallero (González 2014) wrote a proposal for an archaeological chart of the Bay of Algeciras in his doctoral thesis (recently defended, but still unpublished) and also generously lent a large part of his data to this work. Finally, other research has been carried out in the province related to specific interventions or studies of materials of underwater origin (Pemán 1959; Blanco 1970; García y Bellido 1971; Beltrán 1987; Menanteau and Pou 1978; Chic 1980; Corzo 1980; López de la Orden and García 1985; Martín Bueno 1988; González et al. 2016; Sáez et al. 2016).

Gibraltar (UK) is located in the Bay of Algeciras, but for diplomatic reasons the research has not been able to include the area in the surveys. Only Parker (1992) refers briefly to short unpublished reports on three wrecks (fig. 4) for which he provides little information.

Sevilla (fig. 5) is one of the Andalusian provinces that does not have a coastline, but it deserves mention in this work due to the discovery of abundant ceramic material during the works to open a new channel known as the Seville-Bonanza canal, in the Guadalquivir River. The different chronology of the ceramic materials found, as well as the fact that these materials were found in areas of former marshland, suggest that they may have been two or more wrecks which should be placed chronologically between the 1st century BC and the 1st century AD (Salas and Mesa 1997).

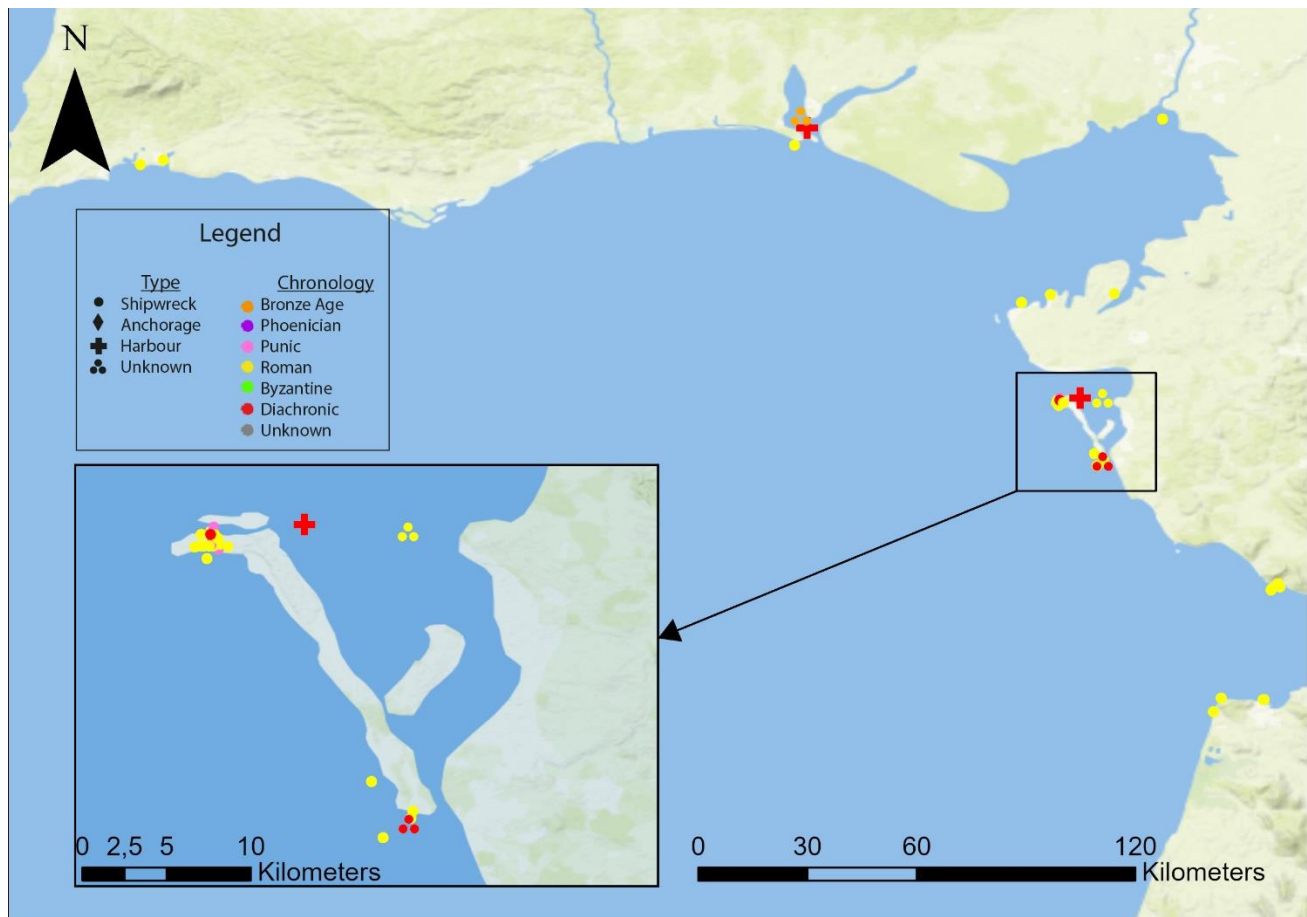


Figure 5 Zone SG4 (Strait of Gibraltar 4), regions of Cádiz and Huelva, Portugal and Cape Spartel in Morocco.

Huelva (fig. 5) is the last Spanish province in our study area, in which very few underwater archaeological interventions have been carried out. The most notable was the discovery of a large number of bronze objects in the Huelva estuary during the dredging work of 1923 (Albelda 1923; Almagro 1940; 1957; 1958–60; 1975; Guzzo 1969; Penhallurick 1986; Terrero 1990). Also, during dredging works in the port of Huelva, between the mouths of the Tinto and Odiel rivers, several bronze objects were found (Terrero 1990). In the area there are oral reports of the existence of several shipwrecks, unverified. Finally, an amphora extracted from the sea near Punta Umbría was analysed (IAPH, Teba 1987).

Regarding the Portuguese coasts (fig. 5), several investigations have been carried out, the results of which have been collected in the virtual database of The Nautical Archaeology Digital Library (NADL), which is part of the Centre for Maritime Archaeology at the University of Coimbra (CAM-UC). This project, as Felipe Castro's initiative, attempt pretend to catalogue, store, and manage



artefacts and ship remains, along with its associated data and information produced by underwater archaeological surveys. As well as this, several researchers have published studies of materials of underwater origin (Tavares da Silva et al. 1987, Diogo et al. 2000), especially those found in the Arade River (Fonseca et al. 2018).

In the south of the Strait, the coasts of Morocco (fig. 1, 4, and 5) are home to several wrecks reviewed by Parker (1992) and other authors who have carried out specific research on some of them, studies of materials extracted from the sea or mention them when addressing related issues (Ponsich 1964; Benoit 1965; Ponsich 1966; Bravo 1970; Euzennat 1971; Bravo and Bravo 1972; Bravo 1975; Boube 1979–80; Bravo et al. 1995; Brown 2011). More recently, systematic surveys have been carried out within three projects (the Oued Loukkos Survey, the CBDAMM Project and the MarEA Project), initiated by the national heritage agency and external research institutions (Erbati and Trakadas 2008; Trakadas and Karra 2023).

Ceuta (fig. 4), one of the two Spanish Autonomous Cities on the African continent, is located in the heart of the Strait of Gibraltar. This strategic location makes Ceuta one of the busiest cities in the Strait of Gibraltar and best connected by sea throughout history, which has given rise to a large number of underwater archaeological remains. With the popularisation of recreational diving, these remains were identified and extracted from the water as early as the 1950s. In 1956, the divers involved created the Club of Underwater and Maritime Sports Activities of Ceuta (CAS-Ceuta), from which the members of its Underwater Activities Section extracted a large amount of archaeological materials from the sea, depositing them in the Underwater Archaeological Museum of the aforementioned club. This team was led by Juan Bravo, who dedicated himself to documenting, mapping, drawing and publishing all the information that was considered important in those years. Thanks to this, invaluable information has been preserved regarding the location, albeit imprecise, of some finds (Bravo 1963; 1964a; 1964b; 1964c; 1965a; 1965b; 1966a; 1966b; 1968; 1970; 1975; 1976a; 1976b; 1988; Bravo and Muñoz 1965; 1966–68; Bravo and Bravo 1972; Bravo and Villada 1993; Bravo et al. 1995). However, the archaeological methodology was not known, and even less so the documentation techniques common today, so when the objects were extracted from the sea, their archaeological context was lost forever.

Melilla (fig. 1) is the other Spanish Autonomous City in North Africa, the southeastern limit of our study. As in the case of Ceuta, the geographical location of this enclave has allowed it to be well connected by sea throughout history, being an almost obligatory stop on all southwestern Mediterranean navigation routes. As it could not be otherwise, this intense maritime traffic is reflected in its abundant underwater cultural heritage. As in the case of Ceuta, the popularisation of recreational diving in the 70s made submerged archaeological material an object of curiosity, being systematically plundered. At best, the objects were photographed for the praise and glory of those who held them triumphantly, but unfortunately, no other documentation of a minimally scientific nature was carried out. The few archaeological materials that were “donated” to the Museum of Archaeology and History of Melilla are currently on display, many of them in a lamentable state of conservation (because there hasn’t been correct desalting and consolidation processes). These are several decontextualised finds, of unspecified or completely unknown underwater origin, which makes it impossible to relate the archaeological materials and their location to the landscape. Therefore, with the information available to date, it is impossible to determine whether they come from port contexts, anchorages or wreck-type deposits. Fortunately, in 2010 a re-examination of these materials was carried out, as well as the revision of the data related to their discovery and

extraction, generating the Catalogue of Underwater Archaeological Heritage of the Underwater Archaeological Map of the Autonomous City of Melilla (Aragón 2010). This catalogue (CASME) offers a general contextualisation of the findings, methodology, historical archaeological study and, what has been most useful, a very detailed file on each archaeological object.

### **Discussion and conclusions**

From the literature review, we have identified 119 shipwrecks, 34 anchorages, 5 harbours and 8 sites without interpretation, so it is clear that shipwrecks stand out from other types of sites. However, these points by themselves do not describe navigation and maritime trade because a shipwreck is something that should not have happened, while harbours and anchorages do evidence a nautical and intentional use of the maritime space. It should be mentioned that, during the construction of modern harbours, many sites, probably ancient harbours, were inexorably destroyed. On the other hand, there are several anchorages in coves sheltered from the winds, specially in the north-Mediterranean side of the Strait and in the bays of Algeciras and Ceuta, the main points of refuge in the core of the Strait. In the Atlantic area, with the exception of those related to the port city of Cádiz, the general lack of sites is unexpected, as well as the lack of points in Moroccan waters. At this point, we must highlight that the information gathered should be used with caution, due to a series of difficulties related to the sources consulted.

First of all, this collection of data is not complete, since some information has not yet been published in an accessible way and there are areas that have yet to be explored, so more sites will undoubtedly be identified in the next phases of this research.

To date, the information produced on this issue is fragmented, dispersed and subject to various biases, related to factors that determine that some areas are surveyed to the detriment of others. For sites that have not been archaeologically verified, the same data is repeated in successive sources and is not up to date. Besides this, we have observed possible contradictions between the different authors consulted, something that we will solve in the future, and although the research that we have called regional is very exhaustive, regionality itself distorts the information.

Regarding the geographical points where there are many finds, it can be assumed that this corresponds to intense maritime traffic, but the possibility of duplicities cannot be ruled out. We must not forget that the information about the location of the sites is, in 100% of the cases, imprecise. Furthermore, there are museum materials whose cataloguing has not been revised since they were deposited, not even in light of subsequent research that has updated the terminology or chronology of some typologies. As for the chronology, there are sites that have been interpreted as a single wreck but with a chronology that is too broad to have a historical explanation, due to the diachrony of the artefacts.

Another important point is that, of all the sources consulted, there are very few that consider maritime cultural landscape as a factor that is not taken into account when interpreting the meaning of the archaeological materials found. For example, some of the sites interpreted as anchorages due to the diachrony of the finds are located in dangerous places for navigation, exposed to the winds, and with a large number of rocky accidents and shallows. The opposite is also the case, in which an anchorage or even a port context is interpreted as a shipwreck.

Nor can we forget that there are many sites that have been destroyed. This is particularly the case in the port areas of the most important former port cities such as Algeciras, Ceuta, Tangier and Cádiz. Besides this, indiscriminate looting has led to the disappearance of many archaeological remains, and valuable information has been lost forever. Although some of these artefacts have been donated to museums, in many cases the contextual information has been irrevocably lost. Much of the archaeological artefacts are in a deplorable state of preservation because they were removed from the salt water without the necessary preventive conservation and consolidation processes. At best, we can only obtain partial information from the artefact itself, but it does not tell us about the vessel, where it sailed, how it sailed, where it anchored, etc. Therefore, the systematic extraction of materials to take them to museums, without documenting or recording their archaeological context as a common practice since the 1980s, is a major obstacle to research.

Underlying all these issues are some challenges related mainly to the stage of the research and to the very nature of the sources consulted so far. This update to the state of the art and the questions it has raised will determine the next steps of the research, related to solving the challenges found. Further research is needed to determine to what extent the lack of information in certain areas actually corresponds to the fact that they were not frequented by ancient shipping routes. In summary, it is necessary to unify denominations, identify the underwater archaeological sites and their exact location, update typologies and chronologies, analyse and reclassify the archaeological materials of underwater provenance stored in museums, and the study of the maritime cultural landscape and nautical conditions (Cerezo 2014). All this will contribute to understanding the nautical use of each geographical item, distinguishing safe passage zones from hazardous areas, which will contribute to the correct classification of underwater sites, and to learn, through the artefacts, the tonnage of the vessels that carried out each type of navigation and the routes followed. For the time being, this research offers a very promising opportunity to progress in the knowledge of one of the most important areas in Mediterranean maritime traffic throughout history, which it still is today. Straits condition navigation, both by helping communication and the exchange of products, people and ideas, and by withholding dangers for sailors. For this reason, it deserves comprehensive study such as the one we propose in this research. If we understand how our ancestors used navigation to satisfy their needs for mobility, we will discover a part of our shared identity. If all this information is made available to society, people will come to understand, love and protect underwater cultural heritage.

### **Acknowledgements**

The project that gave rise to these results received the support of a fellowship from the “la Caixa” Foundation (ID 100010434). The fellowship code is LCF/BQ/DR23/ 12000015. This work has been co-financed by the ERDF Operational Program 2014-2020 and by the Ministry of Economy, Knowledge, Business and University of the Junta de Andalucía. Project –reference: FEDER-UCA18-107327. Special thanks to Manuel Aragón Gómez, for providing us with access to the Catalog of Underwater Archaeological Heritage of the Autonomous City of Melilla; to the team of underwater archaeologists from the University of Cádiz; to the collaborators of the Herakles Project and, particularly, to Raúl González Gallero and Felipe Cerezo Andreo, for sharing their knowledge.

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