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Contents

The Editors	vii
List of Contributors	viii
Preface (<i>The Editors</i>).....	xii
1. Ertebølle Canoes and Paddles from the Submerged Habitation Site of Tybrind Vig, Denmark.....	1
(<i>Søren H. Andersen</i>)	
2. The Excavation of a Mesolithic Double Burial from Tybrind Vig, Denmark	15
(<i>Otto Uldum</i>)	
3. Mesolithic Hunter-Fishers in a Changing World: a case study of submerged sites on the Jäckelberg, Wismar Bay, northeastern Germany	21
(<i>Harald Lübke, Ulrich Schmölcke and Franz Tauber</i>)	
4. The Unappreciated Cultural Landscape: indications of submerged Mesolithic settlement along the Norwegian southern coast	38
(<i>Pål Nymoen and Birgitte Skar</i>)	
5. How Wet Can It Get? – approaches to submerged prehistoric sites and landscapes on the Dutch continental shelf.....	55
(<i>Hans Peeters</i>)	
6. Seabed Prehistory: investigating palaeolandsurfaces with Palaeolithic remains from the southern North Sea.....	65
(<i>Louise Tizzard, Paul A. Baggaley and Antony J. Firth</i>)	
7. Experiencing Change on the Prehistoric Shores of Northsealand: an anthropological perspective on Early Holocene sea-level rise	75
(<i>Jim Leary</i>)	
8. Submerged Landscape Excavations in the Solent, Southern Britain: climate change and cultural development.....	85
(<i>Garry Momber</i>)	
9. Submarine Neolithic Stone Rows near Carnac (Morbihan), France: preliminary results from acoustic and underwater survey	99
(<i>Serge Cassen, Agnès Baltzer, André Lorin, Jérôme Fournier and Dominique Sellier</i>)	
10. The Middle Palaeolithic Underwater Site of La Mondrée, Normandy, France	111
(<i>Dominique Cliquet, Sylvie Coutard, Martine Clet, Jean Allix, Bernadette Tessier, Frank Lelong, Agnès Baltzer, Yann Mear, Emmanuel Poizot, Patrick Auguste, Philippe Alix, Jean Olive and Joë Guesnon</i>)	
11. Investigating Submerged Archaeological Landscapes: a research strategy illustrated with case studies from Ireland and Newfoundland, Canada.....	129
(<i>Kieran Westley, Trevor Bell, Ruth Plets and Rory Quinn</i>)	

12.	Submerged Prehistory in the Americas.....	145
	<i>(Michael K. Faught and Amy E. Gusick)</i>	
13.	Underwater Investigations in Northwest Russia: lacustrine archaeology of Neolithic pile dwellings	158
	<i>(Andrey Mazurkevich and Ekaterina Dolbunova)</i>	
14.	A Late Neolithic Fishing Fence in Lake Arendsee, Sachsen-Anhalt, Germany	173
	<i>(Rosemarie Leineweber, Harald Lübke, Monika Hellmund, Hans-Jürgen Döhle and Stefanie Kloß)</i>	
15.	A Palaeolithic Wooden Point from Ljubljansko Barje, Slovenia	186
	<i>(Andrej Gaspari, Miran Erič and Boštjan Odar)</i>	
16.	Investigating the Submerged Prehistory of the Eastern Adriatic: progress and prospects.....	193
	<i>(Jonathan Benjamin, Luka Bekić, Darko Komšo, Ida Koncani Uhač and Clive Bonsall)</i>	
17.	The Pavlopetri Underwater Archaeology Project: investigating an ancient submerged town	207
	<i>(Jon C. Henderson, Chrysanthi Gallou, Nicholas C. Flemming and Elias Spondylis)</i>	
18.	Submerged Sites and Drowned Topographies along the Anatolian Coasts: an overview.....	219
	<i>(Mehmet Özdoğan)</i>	
19.	Palaeoecology of the Submerged Prehistoric Settlements in Sozopol Harbour, Bulgaria.....	230
	<i>(Mariana Filipova-Marinova, Liviu Giosan, Hristina Angelova, Anton Preisinger, Danail Pavlov and Stoyan Vergiev)</i>	
20.	Was the Black Sea Catastrophically Flooded during the Holocene? – geological evidence and archaeological impacts.....	245
	<i>(Valentina Yanko-Hombach, Peta Mudie and Allan S. Gilbert)</i>	
21.	Underwater Investigations at the Early Sites of Aspros and Nissi Beach on Cyprus.....	263
	<i>(Albert Ammerman, Duncan Howitt Marshall, Jonathan Benjamin and Tim Turnbull)</i>	
22.	Submerged Neolithic Settlements off the Carmel Coast, Israel: cultural and environmental insights.....	272
	<i>(Ehud Galili and Baruch Rosen)</i>	
23.	Research Infrastructure for Systematic Study of the Prehistoric Archaeology of the European Submerged Continental Shelf.....	287
	<i>(Nicholas C. Flemming)</i>	
24.	Stone Age on the Continental Shelf: an eroding resource	298
	<i>(Anders Fischer)</i>	
25.	Continental Shelf Archaeology: where next?	311
	<i>(Geoffrey N. Bailey)</i>	
26.	Epilogue.....	332
	<i>(Anders Fischer, Jonathan Benjamin, Catriona Pickard and Clive Bonsall)</i>	

Epilogue

*Anders Fischer, Jonathan Benjamin, Catriona Pickard
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Terra incognita

For much of prehistory sea levels were much lower than at present, exposing vast tracts of the continental shelves, which then became available for human settlement. These now submerged landscapes are the least represented regions within prehistoric archaeology, and they offer great promise for research and present various challenges in the technical means needed for their exploration and understanding.

Global sea level rose *c.* 120 m as the ice sheets of the Last Glaciation melted (cf. Fairbanks 1989; Lisiecki and Raymo 2005; Preface: Fig. 0.1). For decades scattered finds of marine shells, bones of fish and sea mammals, and stable isotope analysis of human remains from sites on land have indicated the existence and importance of human activity in now submerged coastal zones all over the world and far back in time (e.g. Cleyet-Merle and Madelaine 1995; Fischer 1996; Stiner 1999; Henshilwood *et al.* 2001; Pettitt *et al.* 2003; Balme and Morse 2006). This volume has demonstrated, with examples from three continents, that significant evidence of prehistoric settlement did in fact survive the transgression and that submerged landscapes are accessible for archaeological research. The quality and significance of some of this material is unparalleled in world archaeology.

The now submerged coastal lowlands must have been some of the world's most attractive environments for prehistoric foragers, fishers, and farmers. They are likely to have had some of the highest population densities, and to have been strategically important in the spread of people and ideas between regions and, ultimately, around the globe (Bailey; Fischer; Flemming;

Galili and Rosen; Westley *et al.*; cf. Masters and Flemming 1983; Johnson and Stright 1992; Fischer 1995; Flemming 2004).

Submerged archaeological sites that are preserved in oxygen-deprived conditions, whether salt water or freshwater environments, are of special importance owing to their potential for survival of fragile, yet informative organic materials (Fig. 26.1). We have presented examples from marine environments (e.g. Andersen; Benjamin *et al.*; Filipova *et al.*; Galili and Rosen; Momber; Nymoen and Skar; Yanko-Hombach *et al.*) and included three chapters illustrating the range of settlement, subsistence, and technological evidence recovered through underwater archaeological work in lakes and rivers (Gaspari *et al.*; Leineweber *et al.*; Mazurkevich and Dolbunova).

Uneven distribution of submarine finds

The western Baltic appears exceptional because of its many archaeological finds from the seabed (Andersen; Fischer; Lübke *et al.*; Uldum). Some of this richness is perhaps, in part, the result of conditions specific to the marine sediments of the region. Generally, sites are better protected against erosion as the shallow water archipelagos and fjords provide relatively calm environments compared to areas exposed directly to the waves of the world's major oceans. It may be that the wealth of finds from the western Baltic is also the result of its relatively hospitable environment. Archaeologists can work there without the complications of deep water, large waves, strong tidal currents, or dangerous animals. In addition, the stone artefacts that are the most abundant



Figure 26.1: Occupation refuse deposited in shallow water off the Mesolithic coastal site of Tude Hage, Denmark. Such permanently waterlogged sediments rich in detritus and deprived of oxygen often have excellent preservation of faunal and floral material (Photos: Jørgen Dencker, The Viking Ship Museum, Roskilde)

evidence for early post-glacial settlement in the western Baltic are frequently relatively large in size, and thus can be fairly easily observed when compared to many other coastal regions around the world. Furthermore, the conditions for the preservation of prehistoric wood are perhaps better than in other areas with higher salinity and water temperature where biological destruction of organic materials is more rapid.

The existence of a well-preserved site off the coast of southern England is, however, testimony to the survival of Holocene landscapes rich in wood (some of which may have been worked by humans) – and this in spite of its location in relatively saline water that experiences strong tidal currents (Momber). This point is reinforced by reports of submerged peat and tree stumps rooted in the seafloor beneath the saline waters of the central and southern North Sea and elsewhere around the coasts of England (also compare Özdoğan's description of tree stumps at a coastal wetland site near Istanbul, and the evidence presented by Benjamin *et al.* and Filipova *et al.* for vertical piles of prehistoric age at submerged sites in the Adriatic and Black Sea, respectively). In addition, the North Sea has produced scattered finds of Upper Palaeolithic and Mesolithic artefacts of bone and antler (Peeters; Tizzard *et al.*) as well as numerous unworked animal bones of Pleistocene and Early Holocene age, and even a fragment of a Neanderthal skull (Peeters). Rich assemblages of plant food remains, wooden implements and animal bones, and graves with well-preserved human skeletons have been recovered from underwater sites off the coast of Israel (Galili and Rosen). Moreover, finds of worked bone, antler, and/or stone are reported from such different underwater environments as the Gulf of Mexico (Faught and Gusick), Norwegian fjords (Nymoen and Skar), Atlantic France (Cliquet *et al.*), the Adriatic (Benjamin *et al.*), the Black Sea (Filipova *et al.*; Özdoğan; Yanko-Hombach *et al.*), and the coastal waters of Cyprus (Ammerman *et al.*).

This volume has presented an array of archaeological features that have survived inundation, including water wells, dwellings, and human burials (e.g. Cliquet *et al.*; Uldum). Some of the more breathtaking finds come from water depths of up to 12 m off the coast of Israel (Galili and Rosen). One might expect that very few *in situ* traces of human activity would have survived inundation and subsequent wave action along the relatively exposed eastern Mediterranean

coast. However, submarine sandstone ridges, roughly parallel with the present coast led to the formation of pockets of sediment that buried and protected archaeological evidence of international importance. We envisage similar *in situ* preservation of archaeological sites in many places, especially in sheltered locations, but also occasionally in high-energy zones that may appear, at first glance, to be unlikely candidates for the preservation of prehistoric sites.

From this we conclude that parts of the continental shelves elsewhere in the world may be equally rich in prehistoric remains as the western Baltic. To a large extent the current richness or scarcity of archaeological finds from different regions is likely the result of differing research intensity and approaches to submerged cultural landscape studies by archaeologists, environmental scientists and museum curators and, importantly, variations in the interest taken by coastal populations, the maritime community, and the general public.

Getting started in new areas

Some submerged landscapes that so far have provided little or no archaeological evidence may for other reasons be considered potentially rich and important (Fig. 26.2). They include, for example, the shallow areas of the Central and Western Mediterranean, which are relevant to discussions of the spread of agriculture from the Near East into Europe (Benjamin *et al.*), the Late Glacial coastal zones of the North Sea, relevant to the study of the recolonization of the previously glaciated regions of Northwestern Europe, and the submerged migration routes out of Africa and into Australia and the Americas (Bailey; Faught and Guswick; Flemming).

Scholars have all too often succumbed to the idea that there was simply no hope of anything surviving the transgression of the continental shelves. As editors of this volume we take a more optimistic view based on accumulated evidence and experience, and recommend a concerted effort to develop practical approaches to understanding and exploring such underwater landscapes.

There are examples in this volume of approaches to initiating underwater research projects in the Mediterranean (Ammermann *et al.*; Benjamin *et al.*) and North America (Faught and Gusick; Westley *et al.*). In addition it has been shown how the adoption and refinement of

underwater methods first developed and applied in the Danish Baltic have produced significant archaeological results in the neighbouring, and until recently unexplored, German Baltic (Lübke *et al.*). Cassen *et al.* have demonstrated the potential for extending field research on the ‘enigmatic’ stone alignments along the Breton coast of France into those parts of the Neolithic landscape that now lie beneath the Atlantic. Other contributions illustrate how cooperation with offshore industry is important, rewarding, and necessary (Peeters; Tizzard *et al.*).

Need for training

Several contributions to the volume have emphasized the need for the training of present and future practitioners in underwater research and heritage management (Bailey; Fischer; Flemming).

Over the past few decades, underwater archaeologists have researched many marine environments without making prehistoric discoveries. However, we believe that carefully directed training and outreach have the potential to alter this situation. The chances of prehistoric discovery, including small and seemingly mundane items such as worked lithics – often modified in shape and colour through natural processes of abrasion, leaching, and patination – increases dramatically when archaeologists with the relevant skills make a conscious effort to seek and identify such material.

As a first step we recommend that underwater archaeologists be trained at early prehistoric sites on land. For the purpose of practising site discovery, participation in fieldwalking and other



forms of terrestrial survey is recommended. Second, as a prelude to actual underwater excavation, practical experience on wetland sites would be particularly beneficial since these frequently possess sediment types and preservation qualities comparable to underwater localities. In addition, they provide conditions where the possibilities for both observation and instruction are much better than underwater (Fig. 26.3). As a third step we recommend international collaboration and training in underwater field methods and practice (Fig. 26.4). The objective should be to increase competence in evaluating and investigating the prehistoric cultural heritage. Ideally, such field training would be conducted in a range of sites and environments, thus providing experience of different methods, sediments, and cultural materials.

Developing underwater heritage management

Among research communities involved with the cultural heritage of the continental shelves

Figure 26.2: Gathering and fishing are important parts of subsistence along the present-day coast of Zanzibar, East Africa. If the marine resources of these coasts were also exploited intensively during the Pleistocene, there is likely to be an abundance of interesting archaeology to be found on the continental shelf of this region – as in many other coastal locations worldwide that were populated by human migrants from Africa (Photo: Anders Fischer)



Figure 26.3: Excavating organic sediments on land is a recommended educational component for underwater archaeologists. Here an international group of students and young researchers are trained in excavating a Mesolithic habitation site in an artificially drained peat bog near Rönneholm, Sweden (Photo: Torben Malm, Heritage Agency of Denmark 2010)

Figure 26.4: Images from an underwater archaeological training session hosted by the Langelands Museum 2010 and sponsored by SPLASHCOS. Top: A group of international scholars, students and volunteers from Denmark, Germany, Israel, Poland, the United Kingdom and the USA. Bottom: (left) Lithic material discovered during survey; (centre) a peat core taken with a Russian corer; (right) Archaeological divers examining the seabed for lithic material (Photos courtesy of the Langelands Museum)



there is growing awareness of the need to react to modern human impact on the seafloor and its potential to disturb and destroy archaeological evidence. Significant damage is clearly caused by activities such as construction (Nymoer and Skar), raw material extraction (Galili and Rosen; Peeters; Tizzard *et al.*), trawling, and mollusc scraping (Peeters). Pollution and rising sea levels are also causing damage to the underwater cultural heritage in many places (Fischer; Nymoer and Skar).

The development of practical tools, formal

procedures and legislation that would enable academic researchers and heritage professionals to respond to major changes in the economic exploitation of the seafloor are among the priorities for underwater archaeology (Peeters; Tizzard *et al.*). Special emphasis is placed on the establishment of digital archives of sites and isolated finds (Fischer; Flemming). Such archives are fundamental to systematic heritage management, including planning for industrial activity on and in the seabed. In addition, they will be helpful in promoting public awareness

of submerged prehistory, and will be valuable resources for researchers concerned with the cultural history and Quaternary geology of the seabed. We suggest that these archives should be combined across entire continental shelves, as human development of the seabed is taking place far out to sea and across the boundaries of the territorial waters of individual nations.

Several papers also draw attention to the need for systematic underwater surveys in unexplored regions (Benjamin *et al.*; Nymoen and Skar; Özdoğan) as well as for the regular inspection of known sites – especially in those regions where recent human interference with the marine environment appears to have initiated large-scale erosion of the seabed (Fischer; Henderson *et al.*). In this case the institutions responsible for the underwater cultural heritage need not wait for methods and equipment to be developed. Many of the basic requirements needed for examining the seabed for prehistoric remains can, to a large extent, be met through available technology and expertise (Fig. 26.5). There is, however, a need in most parts of the world for investment in staff and training if this specialized field is to

be developed and appropriate levels of expertise accumulated and maintained.

In many countries there is an evident need for reorganizing the responsibilities of the archaeological institutions dealing with the marine environment. Traditionally, the activities of most such organizations have a strong bias toward shipwrecks and maritime history (Benjamin *et al.*; Nymoen and Skar; Özdoğan). Moreover, the technical means for accessing underwater sites has too often defined the field of underwater archaeology. We see a need for institutions that are technically and academically qualified to conduct prehistoric archaeology of submerged landscapes, not only as part of marine archaeology, but also as an integral part of the wider fields of human prehistory and cultural history.

Conclusion

Until now syntheses of early human history have had to be based almost exclusively on archaeological data from present-day dry land. This book demonstrates that future interpretations

Figure 26.5: To date research in the field of submerged prehistory has been carried out mainly by staff using small vessels and standard scuba equipment.

Top: (left) a team of students and volunteers surveying in the Adriatic (Photo: Debra Shefi 2005); (right) Danish government vessel serving as working platform, field laboratory, and accommodation for underwater surveying and test excavation (Photo: Anders Fischer 1997). More sophisticated equipment available to other marine research disciplines will enable investigations in deeper water (100 m or more). Bottom: (left) Members of the Deukalion network for the promotion of research into submerged sites and landscapes of the European continental shelf inspecting state-of-the-art equipment in Athens (Photo: Dimitris Sakellariou, Hellenic Centre for Marine Research 2009); (right) Participants in a field seminar in Denmark, 1991 (Photo: Anders Fischer)





Figure 26.6: Members of the EU-sponsored SPLASHCOS network gathered in Rhodes, October 2010. This steadily growing group of senior and early stage researchers, heritage managers, and students has been active in developing the study of early prehistory on the continental shelf of Europe since 2009 (<http://php.york.ac.uk/projects/splashcos>) (Photo: Anders Fischer)

of prehistory need not be so strongly biased in this way. Archaeological evidence has been recovered in many places in and on the seabed, and there are reasons to believe that much more is within practical reach in critically important prehistoric landscapes that are now submerged.

Much remains to be done to develop methods and organizations capable of dealing with the prehistory on the world's continental shelves. As demonstrated by many contributions in this volume, we possess the experience, expertise, and technology required to explore promising parts of the seabed in shallow waters (<20 m) (Bailey; Benjamin *et al.*; Cassen *et al.*; Galili and Rosen; Henderson *et al.*; Lübke *et al.*; Uldum; cf. Leineweber *et al.*), while material found in deeper waters has also been successfully recovered (Cliquet *et al.*; Tizzard *et al.*).

The development of international research networks like SPLASHCOS (Fig. 26.6) are welcome initiatives that will lead to more research aimed at 'filling the gaps' in our knowledge of submerged prehistory worldwide (Bailey; Flemming; Peeters; Westley *et al.*). An increase in activity and cooperation between academic research groups, heritage managers, and professional archaeologists working with industry will doubtless lead to an increase in the number of significant underwater archaeological sites. As more interdisciplinary research is conducted, and awareness among non-specialists and the general public expands, we can expect new and exciting discoveries in the field of submerged prehistory.

The effects of sea-level change on hominin populations inhabiting coastal lowlands likely resulted in high rates of social and technological innovation in these regions. Owing to the submergence of these landscapes we lack not only a significant portion of the original landmass, but also unique components of the archaeological record of early human culture that are key to understanding some of the most

important formative processes in the evolution of humankind (Bailey; Fischer; Leary; Momber). The study of submerged prehistory, therefore, adds a qualitatively different and critical element to the prehistoric archaeological record.

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