Chapter 1

New Research on the Prehistoric Archaeology of Southwest Saudi Arabia: an Introduction

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1.1 Introduction

This is the second volume of reports on fieldwork carried out on Stone Age archaeology in Southwest Saudi Arabia and the Farasan Islands under the sponsorship of the Saudi Commission for Tourism and National Heritage (SCTH). The first volume (Alsharekh and Bailey 2013) set out the preliminary reports on work conducted between 2004 and 2009. We have followed a similar format in this volume, presenting a series of preliminary reports on successive field expeditions carried out between 2012 and 2015. As before, the reports are largely in the format in which they were originally submitted to the SCTH at the end of each field season, and are presented in the chronological order in which the field expeditions took place. We have brought them together in one volume in order to provide an overview in one place of the various strands of our fieldwork activities. These include reconstructions of the wider geological and topographic setting at the regional scale taking advantage of satellite imagery (Devès et al, Chapter 2), survey for early Palaeolithic sites and artefacts on the SW Arabian mainland in the Jizan and Asir provinces (Bailey et al, Chapter 3, Inglis et al, Chapters 5, 7 and 9), survey and excavation of 'Neolithic' shell mounds on the Farasan Islands (Meredith-Williams et al, Chapter 4), ship-based remote sensing and coring of the deeply submerged offshore landscape (Sakellariou et al, Chapter 6), and the underwater search in shallower water for shoreline features and archaeological material using divers (Momber et al, Chapter 8). Our purpose in this introduction is to show how these different types of investigation fit together, to outline the research strategy that underpins these seemingly disparate activities, and to highlight some of the most important discoveries. We have also taken the opportunity to include in this volume specialist reports on some of the finds recovered from the 2008 and 2009 excavations at the Janaba 4 shell midden, notably the fish bones (Beech, Chapter 10), and the human skeletal remains (Koon, Chapter 11).

1.2 The DISPERSE Project and the Importance of the Southern Red Sea Region

The scope of the new fieldwork has been greatly expanded both on land and underwater, thanks to a substantial grant from the European Research Council under the title of DISPERSE – Dynamic Landscapes, Coastal Environments and Human Dispersals – a 5-year grant made to Geoff Bailey and Geoffrey C.P. King in 2011. The primary aims of the DISPERSE project are: to explore the impact of geologically unstable regions on patterns of early human settlement and dispersal with particular reference to dispersal within Africa and between Africa, Arabia and southern Eurasia; to develop methods of landscape reconstruction exploiting new technologies of satellite imagery and remote sensing; and in particular to extend exploration to the submerged landscapes that persisted during periods of low sea level and that have dominated much of the earlier period of human prehistory before about 6000 years ago, when sea levels stopped rising after the melting of the continental ice sheets.

Accordingly, much of the work has been carried out in regions outside Arabia, in particular in the East African Rift and the eastern Mediterranean (see in particular Devès et al., 2014, Kübler et al., 2015, 2016, Winder 2015, Winder et al., 2015). Nevertheless, the western escarpment of Saudi Arabia and the Red Sea coastline has attracted substantial effort and investigation. This is based on our view that this region would have been a primary zone of attraction for human populations expanding out of Africa both because of its relatively attractive environments and palaeoclimate, and also because of its proximity to the Ethiopian Rift.

The sea channel between the African and Arabian sides of the southern Red Sea is today nearly 30 km wide at its narrowest point. That is a distance that would almost certainly require boat-building and navigational skills to make the crossing. However, at sea levels lower than 40 m below the present, the gap would have narrowed to a long and shallow channel extending from the Bab al Mandab to the Hanish Sill, dotted with small islands that would have required sea crossings of no more than a few kilometres (Figure 1.1; Lambeck et al., 2011).

There is no evidence, at least for the past half million years, that this sea channel ever closed, cutting off the Red Sea from the Indian Ocean and providing a land route from Africa to Arabia. However, this long and narrow sea channel would have persisted for at least 40,000 years during each 100,000-year glacial-interglacial cycle, offering a relatively easy crossing by swimming or simple rafting without the need for construction of boats or sea travel out of sight of land. Given the long periods over which this narrow crossing persisted, and given attractive environments on both sides and inter-visibility between the opposite shorelines, we consider the probability of sea crossings to be high, if only by accident and in the absence of purposeful exploration ('sweepstake' migration). This applies throughout the long prehistory of early human occupation in Africa, and to large mammals with swimming abilities such as elephants.

Figure 1.1 also draws attention to another feature of the southern Red Sea when sea levels were substantially lower than the present, and that is the very extensive areas of fresh territory that would have been periodically exposed and made available for the colonisation of plants and animals and their human predators. Theoretical expectations suggest that this coastal landscape would have been a relatively attractive zone of human settlement with supplies of freshwater made available by numerous springs (Faure et al., 2002). Exploring the underwater landscape for evidence in support of this hypothesis has formed a major theme of our investigations.

Another reason for focussing on the Red Sea region relates to the interest in the potential role of marine resources, coastlines and sea travel in helping to facilitate early patterns of human dispersal out of Africa. The hypothesis that these factors may have been important in the earliest expansion of modern humans (Homo sapiens) has gained wide currency in recent years (Mellars et al., 2013, Groucutt et al., 2015). Exploitation of maritime resources has been particularly associated with the appearance and expansion of Homo sapiens, and various attempts have been made, mainly on the basis of palaeogenetic inference, to put a date on these developments. The dates assigned range variously from 60,000 to 200,000 years ago. None are reliable, and there is considerable controversy about the reliability of palaeogenetic inference in assigning dates or geographical routes for specific dispersal events, and a serious need for archaeological field evidence to test these interpretations.

Of course, there is no reason why coastlines and marine resources could not have played a significant role in the earlier development and geographical expansion of members of the Homo genus (Homo ergaster, Homo habilis, Homo erectus), extending back as early as about 1.8 million years ago. As with later developments, so with these earlier periods, the Red Sea region and the Arabian Peninsula are likely to have played a central role as a gateway for population expansion between Africa and Eurasia.

One fundamental difficulty in pursuing this maritime theme is the fact that sea levels have been significantly lower than the present for most of the period of interest, by at least 40 m and periodically by 100 m or more. This means that the shorelines where the evidence for early human exploitation of marine resources and experiments in sea travel is likely to be found are now mostly submerged and inaccessible. Truly, sea level change has a great deal to answer for in the investigation of Stone Age prehistory.

1.3 Research and Fieldwork Strategy

Our fieldwork is founded on three major principles. The first principle is that the present-day terrestrial landscape and the now-submerged landscape that was available during periods of lower sea level should be treated as a single and seamless whole when investigating the Palaeolithic period. The present-day shoreline is an arbitrary boundary on longer time scales and has obviously shifted with changes in sea level. The area that is now underwater was originally an extension of the terrestrial landscape when sea level was lower, and needs to be treated accordingly. This now-submerged landscape most likely represented an important zone of human settlement and activity when sea-levels were lower than present and it cannot be ignored. Accordingly, we have factored into our fieldwork strategy exploration under water (Sakellariou et al., Chapter 6, Momber et al., Chapter 8) alongside the more conventional strategies of archaeological survey on land.

The second principle, closely allied to the first, is the need, as a first step, to look at the regional landscape as a whole, in order to understand the underlying processes of physical landscape formation and deformation. The physical landscape is not a fixed and unchanging structure. It is subject to change and development on a range of scales, from the large-scale tectonic and volcanic effects associated with plate motions and continental deformation, as for example in the opening of the Red Sea and the separation of the African and Arabian Plates, to smaller-scale processes of erosion and accumulation of sediments and minor modifications of the land surface. These changes are ongoing within the time ranges of human history and prehistory, and mean that the land surface we see today, and the geographical configuration of hills, rivers and other topographic features, may have been very different at different periods of the past.

Volcanic activity in Saudi Arabia has taken place periodically throughout at least the past 2 million years, and has continued in some areas into recent millennia. Volcanic cones and basaltic lava fields are important landscape features in many regions of the western Arabian escarpment, affecting patterns of hydrology, distributions of plants and animals, and availability of rocks for making stone artefacts. Putting dates on this activity in different regions is of obvious importance in assessing what resources were available at different periods. Sea-level change, as already indicated, is another major variable and has changed dramatically over the past 100,000 years, with a huge impact on the changing palaeogeographical configuration of coastal regions. Climate change is an additional variable that interacts with these physical changes to alter the nature of the land surface and the available resources.

Without an understanding of these changes, it is impossible to comprehend what sorts of resources would have been available in the past, how these have changed over time, and what the effects of these changing patterns would have been on the human inhabitants of the region.

This sort of investigation is also fundamentally important in understanding the potential biases in the distribution of archaeological sites. Changes in the land surface may bury archaeological materials under sediments and hide them from view, or expose them to erosion and ultimately to destruction. The variable effects of these geological and geomorphological processes in variously burying, exposing, preserving or destroying archaeological materials are universal. To these natural processes we should add human activities such as agricultural and industrial developments, quarrying, road-building and construction activities more generally. As with natural processes, these can be highly destructive, removing or destroying archaeological material, but they can also be helpful in revealing previously buried material by exposing sections into earlier deposits. The investigation of all these factors is fundamental to evaluating the distribution of archaeological sites and materials in space and time and to potential biases in the surviving distribution. This type of investigation also has a role to play in helping to identify target areas for the discovery of new archaeological sites. Devès et al. (Chapter 2) and Sakellariou et al. (Chapter 6) provide an introduction to the approach we have adopted to this regional scale of investigation on land and under water respectively.

This first step, of course, places a high premium on the integration of expertise from the Earth Sciences, and the range of expertise required may cross a number of disciplines including geophysics, tectonic geomorphology, sedimentology, soil science, geochronology, marine sciences and many more. Investigation of these features has also been greatly facilitated in the digital age by the availability of satellite imagery and the ability to create false-colour images that highlight features of topography, hydrology, geology, vegetation and so on.

A third principle relates to our expectations about the use of coastlines and the exploitation of marine resources. Throughout the world, archaeological evidence for these activities shows a huge increase from about 6000 years ago onwards in the form of shell mounds or other types of coastal settlement with evidence of fishing, shellgathering and seafaring. Shell middens, sometimes in the form of quite substantial mounds, are the most visible expression of this development, and occur in their hundreds of thousands across the world. In the Farasan Islands alone we have discovered some 3000 shell middens. These are clearly relatively late in date, dating from about 6000 years ago, that is to say they are associated with present-day sea level. In the Arabian context they are generally described as ‘Neolithic’, although this is clearly a misleading label, since most are not associated with farming or domesticated plants and animals, and in the Farasan case there are very few stone artefacts associated with the shell middens, let alone ground stone items, and almost no pottery.

This pattern generally holds true elsewhere in the world, with little or limited evidence of marine exploitation in earlier periods before about 6000 years ago, and it is commonly assumed that this vast increase in evidence represents a world-wide intensification in the use of marine resources, if not the very first evidence for their intensive use. As in Arabia, shell middens are assumed to represent a chronological marker, associated with the postglacial period, and variously labelled as Neolithic, as in the Arabian case, Mesolithic, as in Northwest Europe, or some other equivalent chrono-cultural marker in other parts of the world.

However, it is now very clear that this ‘explosion’ of coastal evidence may be more apparent than real, and indeed may be entirely illusory, becoming visible from about the time when sea levels stopped rising after the melting of the Last Glacial ice sheets. It is now widely argued that similar sites, with evidence of maritime activities, could have existed at earlier periods, but that the evidence has been destroyed by rising sea levels. Or else it has been submerged and now lies at depth on palaeocoastlines many metres under the sea (Bailey et al. 2007a, b).

It is no longer valid to assume that because archaeological evidence of coastal and marine indicators is lacking or rare before about 6000 years ago, earlier people took no interest in the resources of the sea. Of course the pattern may be real, but we cannot assume that, and fieldwork strategies in coastal areas need to incorporate the search for underwater evidence on the assumption that earlier coastal shell middens and other evidence of coastal activity could have existed but were later submerged by sea-level rise. Underwater research has therefore played an important role in our field investigations, both in our earliest fieldwork in the region (Alsharekh and Bailey, 2013), and in the current spell of fieldwork reported in this volume (see in particular Momber et al., Chapter 8).

1.4 New Discoveries

Finally, we summarise here some of the most important discoveries. On land we have now discovered over 100 new sites in the Jizan and Asir provinces with stone artefacts of Early Stone Age (Lower Palaeolithic) or Middle Stone Age (Middle Palaeolithic) type. This material ranges from find spots with just one or a small number of artefacts to large concentrations with hundreds and occasionally thousands of stone artefacts. The materials include large flakes most probably used as cutting tools and bifacially worked 'hand axes' very typical of Acheulian-type industries, and prepared cores and smaller flakes, some with retouch, which are typical of Middle Stone Age industries. A small number of artefacts are of Late Stone Age or Upper Palaeolithic type; they are made on fine-grained materials which appear to be of non-local origin and comprise small regular-shaped blades removed by indirect percussion.

A major problem is that most of this material lies on the present-day land surface, posing difficulties of dating. In these circumstances, assignment of age must rely on assumptions about the chronological significance of technological and typological features by comparison with better-dated material elsewhere. These assumptions are not fully reliable, and ideally we need to find artefacts stratified within sediments that can be independently dated by geochronological techniques such as Uranium-series dating of carbonate material, Optically Stimulated Luminescence (OSL) of aeolian, lacustrine or fluvial sediments, Argon-Argon dating of volcanic material, or radiocarbon dating of shell, burnt wood and bone. We have, therefore, devoted considerable effort to the search for stratified material and to the inclusion in our team of specialists with dating expertise.

As we get to know the landscape better and our exploration intensifies, so we are beginning to find stratified material. Of particular importance are two sites. One is the Dhahaban quarry (Inglis et al., Chapter 5), where Middle Stone Age artefacts including some material stratified in alluvial gravels are associated with a fossilised marine coral terrace some 8m above present sea level, most probably associated with Marine Isotope Stage (MIS) 5e, dated at about 130,000 years ago. This material is associated with stratified wind-blown marine sands and a volcanic lava flow, and considerable effort has been devoted to collection of samples for dating by U-series, OSL and Argon-Argon. The second site is the Wadi Dabsa basin (Inglis et al., Chapter 9), with one of the largest concentrations of stone tools so far discovered, including a giant-sized biface typical of Lower Palaeolithic specimens known from Europe and Africa (Foulds et al., 2017). Here, in addition to the major concentration of finds, artefacts are distributed more widely within the basin. All the material is associated with extensive tufa deposits (deposits formed by slowly moving water) suggesting a much wetter environment than today, and volcanic lava flows, offering good prospects for recovery of dates and palaeoenvironmental data.

On the Farasan Islands, we have intensified our work on the shell mounds, with completion of survey, and the excavation and sampling of 17 new shell mounds in addition to the Janaba 4 and Khur Mahdi sites previously excavated. This has generated a large sample of shell material for taxonomic analysis, and a large number of radiocarbon dates. Some of the shell material has been incorporated in a specialist programme of palaeoclimatic reconstruction using measurements of stable oxygen isotope composition and magnesium-calcium ratios, both of which are sensitive to changes in seawater temperature. These results are generating significant new information about climate change in recent millennia, seasonal patterns of shellgathering, the chronological relationships between the different mound clusters and the individual mounds within each cluster, patterns and rates of shell-mound accumulation and variability through time and space in marine subsistence.

Throughout our investigations and site surveys on land, we have payed particular attention to recording the locations of all material using GPS technology and to local geomorphological and topographic conditions both in the immediate vicinity of the finds and in the surrounding landscape. Although much of the material cannot be dated, it nevertheless has locational significance in providing information about the wider distribution of archaeological material and the pattern and distribution of human activities in the spatial and geographical dimension.

Underwater and offshore, a significant new development is ship-based remote sensing of the submerged landscape (Sakellariou et al. Chapter 6). The opportunity to bring a fully equipped survey vessel into the Red Sea in 2013 made it possible to obtain extensive new information including maps of the submerged topography including terrestrial land forms and palaeo-shorelines and coring of sediments in fault-bounded basins and valley fills. One interesting outcome of this work is evidence to suggest that some of the offshore depressions could have been freshwater lakes during periods of sea-level, which would be of great significance for the human potential of this submerged region. Further analytical work on the sediment cores is under way to test more fully this hypothesis.

Finally, we have continued our offshore diving explorations in the Farasan islands in the search for underwater shorelines and archaeological features (Momber et al. Chapter 8). These have included exploration and excavation of deposits under submerged rock overhangs and in other locations with potential for protection of terrestrial deposits and archaeological remains. So far, we have not yet found any equivocal archaeological material, or shell deposits that can confidently be interpreted as cultural remains rather than natural shell accumulations. In part, this reflects the rarity of stone artefact material in this area and the slowness with which underwater work must proceed because of safety conditions. Nevertheless, this work is generating new information and understanding about the ways in which earlier landscape features and deposits are disturbed and transformed during inundation by sea-level rise, what is likely to be preserved, and the types of evidence of human activity that we need to search for.

Some of the results of the current phase of fieldwork have been published as preliminary reports or syntheses (Bailey 2014, 2015a, 2015b, 2016, Bailey et al. 2015, 2017, Inglis et al. 2014) or as specialist papers on specific aspects of the research, in particular techniques of archaeological and geomorphological survey on land and under water, and palaeoclimatic and chronological analysis of shells and shell-midden deposits (Devès et al. 2013, Meredith-Williams et al. 2014a, 2014b, Hausmann et al. 2015a, 2015b, Sakellariou et al. 2015, Hausmann and Meredith-Williams 2016a, 2016b). Further analysis and interpretation are under way.

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Figure

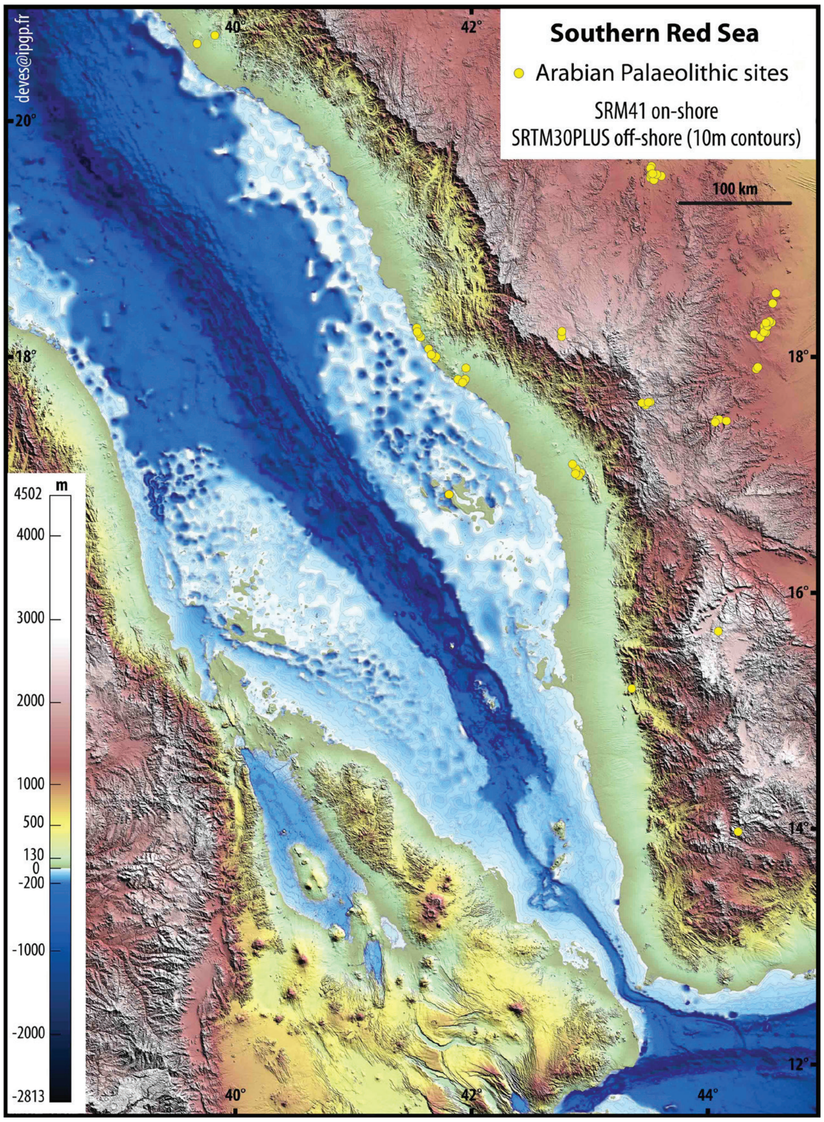

Figure 1.1. Enhanced satellite imagery of the southern Red Sea showing the narrow sea channel through the Hanish Sill and the Bab al Mandab at lowered sea level. The map also shows the position of the Farasan Islands and the extent of the submerged landscape at maximum sea-level regression during glacial periods. Yellow dots indicate the location of Palaeolithic finds. ASTER GDEM is a product of METI and NASA. (Created by Maud Devès).