

## **DROWNED STONE AGE ARCHAEOLOGY WORLD-WIDE: THE NORTH SEA IN A GLOBAL CONTEXT**

Nic Flemming. NOC, UK.

The study of submerged prehistoric sites by professional archaeologists has evolved through three stages in the last 100 years. Now, thanks to modern technology and data management, it is set for rapid progress and expansion. From about 1910-1955 random finds by fishermen and dredgers were recognised as Pleistocene glacial low sea level relics of human occupation of the continental shelf. But it was assumed that there was no possibility of proactive research to find sites. From the 1950's to 1990's a steadily increasing effort was made to find sites, to respond quickly to chance discoveries, and to map or excavate discoveries using divers, sediment analysis, and modern acoustic instrumentation. The North Sea and Baltic Sea were the focus of this activity, with a further strong group developing in Israel, and considerable activity in the USA. Since 2000 there has been strong European collaborative research, exploiting a wide range of survey technologies, the discovery and reporting of sites in all the marginal seas of Europe, and the further development of research in South America, China, Japan, and Australia. Publications in refereed journals, edited multi-author volumes, and conferences have proliferated.

This activity has produced a wealth of information about the human and pre-human hominin occupation of the continental shelf on a global scale, which can be collated with the study of modern and fossil human genetic DNA defining some of the key dates of migration by anatomically modern humans to all the continents. The word migration conceals the fact that such diffusion usually took place at less than 1km per year. Thus tribes must have been able to pursue their normal life-style of foraging, hunting, gathering, and population-replacement breeding at all stages. There was no equivalent of packing a trunk with a month's supply of food and rapid marching continuously for 30 days. People did not rush across "land bridges". This means that the archaeologists who study prehistoric remains on the sea floor are always analysing a life style that is either quasi-sedentary, or a seasonally nomadic self-supporting life-style that is permanently viable in that environment. Understanding the vegetation and fauna of that palaeo-environment, especially the coastal zone and hinterland, becomes essential. The areas where hominins/humans were living on the continental shelf thus provide an essential component to both the understanding of the distribution of populations during the Pleistocene, their mode of expansion throughout the globe, and the development of coastal and marine exploitation of resources.

The mechanism of survival of prehistoric sites in mid-latitude coastal seas is now partially understood, although exact prediction of site location is still very difficult. The SPLASHCOS project has provided data showing the main determinants for the survival of sites in mid-latitudes for one marine transgression, that is post-LGM. A small number of sites pre-LGM have been found, and we can now see broadly the conditions that enable them to survive multiple transgression/ regression cycles, both in glacial stadials, and Dansgaard-Oeschger events. Globally no sites have been found in the tropics, and the reasons for this are not clear. The North Sea, with its slow passive-margin subsidence, basin topography, numerous infilling rivers, and partial screening from Atlantic storms, is a unique environment (so far) within which prehistoric sites can survive multiple glacial cycles, although the pre-LGM deposits are usually buried by several or many metres of fluvial and marine sediment. For this reason, industrial activities, dredging and port construction, provide a unique opportunity to study coastal and marine prehistoric archaeology in the Palaeolithic.

The Maasvlakte 2 excavations and the co-operation with archaeologists is a perfect example of how the data from a Mesolithic site can be obtained from 20-30m depth, with maximum co-operation between the parties. The North Sea depocentre as a whole provides the potential for further work of this kind, which is important for understanding the distribution of modern humans and hominins throughout Europe.