Deep history: Revealing the palaeolandscape of the southern North Sea

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During the Late Quaternary, the southern North Sea (SNS) was subject to major palaeogeographical changes due to the alternation of several glacial–interglacial cycles. During glacial stages, sea level dropped up to a hundred meters during the glacial lowstand. This together with the expansion and decay of continental-scale ice sheets induced significant modifications in the landscape and drainage systems of NW Europe at local and continental scale. The existence of large proglacial lakes has even been suggested Emerged landscapes were subsequently drowned during warm interglacial stages, when sea level gradually rose and transformed river mouths into deltas and/or estuaries fringed by large headlands and shallow embayments.

Until now, palaeolandscape research in the SNS mainly focused within national boundaries and specific (local) areas (e.g. Dogger Bank) or time periods (e.g. Holocene). Recently the first steps were taken towards an international, wide-scale palaeogeographical and geoarchaeological study of the central and southern parts of SNS located between East Anglia and the Netherlands (Brown Bank, Axial Channel and adjoining areas). This study focuses on the entire Late Quaternary period. This area contained large rivers and lakes during Pleistocene glacial stages and remained partially emerged during thousands of years during early interglacial stages. The southern North Sea, especially the Brown Bank area, is rich in Late Pleistocene fossil fauna. Moreover, a small but significant number of Mesolithic artefacts and human remains have been recovered from the study area, attesting to prehistoric human activity.

In April 2018, a first geophysical campaign was performed in the Brown Bank area on board of the RV Belgica by an international team composed of scientists from VLIZ, UGent and Bradford University (UK). High resolution sparker, parametric echosounder (PES) and multibeam data were acquired simultaneously, resulting in a continuous acoustic image, ranging from the seafloor down to c. 100 m below the seafloor (bsf). The sparker data allowed to image the deeper structures (≥ 10 m bsf) such as buried palaeovalleys, estuaries, deltas, etc. The PES data allowed to image the shallow sub-bottom (≤ 10 m bsf) in unprecedented detail (dm resolution). This data has revealed flooding surfaces and several meter-scale enigmatic buried dune-like features. Based on the seismic data, a small number of shallow vibrocores (3–4 m) were collected in July 2018 on board RV Pelagia by TNO and Deltares. The cores are currently being sampled for age dating and other analyses (e.g. OSL, C14, sedimentary DNA, etc.). Based on the results of this study, a series of surveys will be performed in the study area in 2019, during which we plan to collect complementary geophysical and sedimentary/archaeological data. This study aims to better understand the palaeogeographic evolution of the SNS and provides insights on human occupation of this area during marine lowstands.

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