

EGU21-9217

<https://doi.org/10.5194/egusphere-egu21-9217>

EGU General Assembly 2021

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Submerged Landscapes across European Seas: Harmonising information through the EMODnet-Geology project

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The EMODnet Geology project is delivering integrated geological map products that include seabed substrates, sedimentation rates, seafloor geology, Quaternary geology, geomorphology, coastal behaviour, geological events such as submarine landslides and earthquakes, and marine mineral occurrences. The newest addition to the EMODnet Geology project are map products reflecting submerged landscapes of the continental shelf which have been compiled across European Seas for the first time.

Sea level is known to have fluctuated by more than 100 m over repeated glacial cycles, resulting in recurring exposure, inundation and migration of coastlines not only across Europe but worldwide. Landscape response to these changes in sea level, and the preservation of these features on continental shelves around Europe, are an invaluable resource for improving our understanding of human history and environmental change over geological time, while also providing data for potential use in examining future sea-level rise scenarios.

Recent advances in both data acquisition and availability over the last two decades has enabled researchers to more accurately reconstruct the extent and dynamics of fluctuating palaeocoastlines. High-resolution multibeam bathymetry and sub-bottom seismic data, in particular, have resulted in a step change in our understanding of palaeoshorelines and other traces of the original landscape topography and sediments.

The dedicated work package aimed to compile and harmonize available information on submerged landscape features by integrating existing records of palaeoenvironmental indicators with interpretations of geomorphology, stratigraphy and type of sediment. The fully attributed GIS layer comprises more than 10,000 features representing 26 classes of submerged landscape and palaeoenvironmental indicators ranging from mapped and modelled palaeocoastlines, evidence for submerged forests and peats, thickness of post-Last Glacial Maximum sediments and submerged freshwater springs across all European seas. These data will be used to underpin palaeogeographic reconstructions at 20,000, 9000, and 6000 ka BP during the fourth phase of the project (2019-2021).

This paper will present the ongoing data compilation and harmonisation process, current work on regional palaeogeographic reconstructions, primarily efforts towards creation of a pan-European 20,000 ka BP (Last Glacial Maximum) palaeogeographic reconstruction, and summarise key

challenges. With preservation of these now submerged features under threat from commercial activities and natural erosion, bringing together existing knowledge through delivery of this work package is timely.

The Submerged Landscapes layer is delivered through the European Geological Data Infrastructure (EGDI) portal (www.emodnet-geology.eu). It is envisaged that the most recent update to the Submerged Landscapes layer (due April 2021) will be of practical use to the NEPTUNE INQUA project.