

## **A staged geogenetic approach to underwater archaeological prospection in the Port of Rotterdam (Yangtzehaven, Maasvlakte, The Netherlands): a geological and palaeoenvironmental study of Mesolithic lowland landscapes.**

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### **Abstract**

*The talk presents the methodology that was applied to detect drowned archaeological sites in the subsurface of Maasvlakte harbour extension area (Yangtzehaven, Port of Rotterdam). The subsurface up to 25 m –NAP consist of marine sand, Early Holocene deltaic deposits and fluvial Late glacial sands. When the construction works were planned, it became clear that dredging this harbour would disturb the subsurface stratigraphy to around -21 m below present mean sea level, a depth zone which was known to contain archaeological remains. The staged approach makes use of geological data starting from a conceptual model that indicates the depths of layers that could be rich in Upper Palaeolithic / early Mesolithic artefacts. This initial model is used to determine the strategy of the subsequent phases of investigation, such as whether to proceed with dredging as part of the engineering work, in this case down to 17 m. This removed the upper (younger) sands and improved opportunities for underwater survey of fluvio-deltaic layers of Mesolithic age. Following the development of the initial site model, a full-area investigation was carried out using geophysics and coring. This provided the materials for palaeoenvironmental analysis and the reconstruction of the long-drowned Early Holocene terrestrial landscape in what became the southern North Sea. This landscape included inland dune areas and local drainage systems and provided the physiographic context for the geoprospection of Mesolithic archeology. This predictive modeling identified two areas in the harbour for investigation in higher detail. Again geophysics and corings were deployed, in denser grids, allowing fine tuning of the palaeolandscape models at the localities of presumed highest archeological potential. Cores from one of the selected areas, an inland dune complex in wetland surroundings, yielded in-situ evidence of Mesolithic occupation of this site. These finds and the palaeolandscape context created with the data from the prospection phases were critical in the decision to undertake an underwater archaeological excavation using a large, boat-mounted grab sampling system. We provide an account of the geological and palaeoenvironmental work undertaken in the prospective phases leading up to the discovery of the site. We highlight the importance of the staged geogenetic approach for informing sampling strategies, tailored for integration with execution of engineering works, and for securing high-quality information on landscape contexts, which in turn, informs archaeological decision-making and prospection strategies. The approach has wider generic application for palaeolandscape reconstruction and mapping at regional scales.*