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Beach ridge and lagoon systems as indicator for sea-level changes

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The island of Samsø is located in the southern Kattegat region of Denmark, an area which experienced a period of rapid transgression during the early Atlantic (approx. 7,600 a BP). Since then, isostatic uplift gradually caused relative sea-level to drop. The shoreline of Samsø is today mainly characterized by proceeding coastal erosion, though longshore transported sediment was successively accommodated between two main islands, which were originally separated by the transgression. An extensive system of beach ridges formed and eventually connected the islands giving Samsø its peculiar shape. A semi-enclosed coastal lagoon developed around an archipelago of submerged moraine hills. The sedimentary record from these two different sedimentary systems will be used to establish a multi-proxy relative sea level curve for Samsø for the period since the mid-Holocene.

Vibracores and geophysical surveying will facilitate insight into the stratigraphy of the unconsolidated coastal deposits overlying the Pleistocene base. Ground penetrating radar (GPR) was found to provide a solid marker for sea-level from beach ridges in similar conditions (Nielsen & Clemmensen 2009) and will be related to facies associations from lagoonal sediments. Boundaries in the assemblage of benthic foraminifera will be used as a palaeoecological indicator to interpret variations of the sedimentary environment related to sea level.

The project is a follow-up on the REFLEKS-project conducted by the "GEOCENTER Denmark" focusing on a variety of recent and fossil coastal systems along the Danish coast. Interpretation of the surface morphology and the vertical association of the sedimentary record are combined to assess coastal landscape evolution under the premise of changing sea-levels.

Project work was initiated in September 2011.

Nielsen, L. & Clemmensen, L.B. (2009): Sea-level markers identified in ground-penetrating radar data collected across a modern beach ridge system in a microtidal regime. *Terra Nova*, 21, 474–479.

REFLEKS –project: http://geocenter.dk/projekter/2008_refleks/index.html