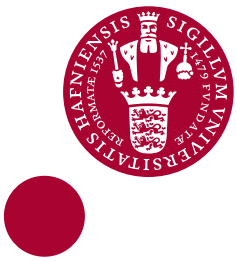

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Testing sea-level markers observed in ground-penetrating radar data from Feddet, south-eastern Denmark

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Ground-penetrating radar (GPR) data have been collected across the modern part (<c. 60 years old) of the beach ridge system on Feddet, Denmark in order to test identification of sea-level markers in GPR data from microtidal depositional environments. Nielsen and Clemmensen (2009) showed that identified downlap points in GPR data from Anholt (an island in the Kattegat Sea, Denmark) can be interpreted to mark sea level at the time of deposition. The data presented here support this hypothesis.

The GPR reflection data have been acquired with shielded 250 MHz Sensors & Software antennae along a number of profile lines across less than c. 60 years old berm, beach ridge and swale structures at the Feddet peninsula. The GPR images allow us to interpret internal sedimentary architecture, and here we focus especially on the identification of downlapping reflections, which are interpreted to mark the transition from beachface deposits to the shoreface deposits below. The identified downlap points are thus interpreted as markers of sea level at the time of deposition and observed vertical differences in the height of the downlap points (relative to a reference value) are interpreted to represent fluctuations in past sea level due to variations in tidal effects and meteorological conditions (isostatic rebound is expected to have a minimal effect on Feddet (Hansen et al., 2011)).

Comparison with existing time series of measurements of actual sea level from the Danish Maritime Safety Administration (from 1991 to 2011) supports the hypothesis that the downlaps represent sea-level variation within measurement uncertainty.

Collection of GPR data across fossil beach ridge and swale deposits in the Feddet microtidal regime thus seems to provide confident markers of past sea level. This finding is consistent with the previous findings from Anholt. We therefore conclude that the GPR data provide a strong basis for construction of curves of variations in past relative sea level in the microtidal study area provided that a good age model can be established.

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