



Integrated analysis of beach ridge and lagoon systems as indicator of sea-level changes

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Beach ridges and lagoons are common features of the modern coastal landscape in much of Denmark and represent an important part of the Holocene raised marine deposits. We here present our results from investigations into the possibilities of retrieving continuous relative sea-level (RSL) information from these sedimentary archives, as facilitated by the analysis of surface morphology, coring, subsurface imaging, absolute chronology, and modern analogues. The island of Samsø (55°51'N, 10°36'E) was chosen as a case study example. While each of the used archives merely covers a part of the mid to late Holocene developments, their joint analysis allows identifying and separating periods of rapid RSL rise, stability and fall over most of the island's marine stage. We present possible correlations of the data from the lagoons with data from a wide beach-ridge system and suggest causal relations of the RSL reconstruction with the spatial arrangements of marine and glacial landforms on Samsø. The integrated use of a geographical perspective combined with geological precision and methodology has proven to be of great value for understanding temporal, spatial, and process relations in the investigated coastal environment. The study stresses the value of analyzing genetically independent though complementary sedimentary archives to retrieve more complete and potentially more robust results. The presented approach may be useful in microtidal, sediment-surplus environments with a transgressive-regressive Holocene RSL history.