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Differential vertical land movement in Denmark over the past 5000 years

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Downlapping reflections observed in high-resolution ground-penetrating radar (GPR) images of ancient beach deposits and the topography of such deposits provide proxies for relative sea level. Based on such proxies, relative sea level variation through time has been reconstructed for four different localities in Denmark: Præstø, Samsø, Anholt, and Læsø. The sandy and gravelly sediments are dated using optically stimulated luminescence (OSL). The relative sea level curves from the four localities show significant overlap in time over the past 5000 years, and differential vertical movement patterns can be reconstructed. From south to north, the total relative sea level change over the 5000-year time span ranges from about 2 m to more than 8 m. These large differences in relative sea level change are attributed mainly to the northward increasing effect of glacial isostatic rebound. Our study sites are located differently with respect to three major tectonic elements in the study area, i.e. the Ringkøbing-Fyn High, the Danish Basin and the Sorgenfrei-Tornquist Zone. The possible impact of these deep structures on the observed differential vertical movement pattern is discussed.