

A novel, 10,000-year study of strata compaction and sea-level rise on English coast

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Researchers from both sides of the Atlantic Ocean are coring a coastal lake in the United Kingdom. Credit: University of Pennsylvania and Durham University

Environmental scientists at the University of Pennsylvania and Durham University have employed a novel combination of geological and model reconstructions of wetland environments during a 10,000-year period to address spatial variations in sea-level history and provide quantitative estimates of subsidence along the east coast of England.

The findings indicate that glacial rebound — the rise or fall of land masses that were depressed by the huge weight of ice sheets during the last glacial period — explains differences in relative sea levels along the

English coast. Current sea levels in Northeast England, the most northerly study area, have been receding to their present level for the past 4,000 years.

Unlike Northeast [England](#), however, the Tees Estuary, Humber Estuary, Lincolnshire Marshes, Fenlands and North Norfolk area all reveal sea-level histories trending upward during the past 10,000 years. Using data from [sediment cores](#) up to 20 meters deep, researchers found that sediment compaction explained the variations in sea-level observations at every study area, revealing striking correlations to the thickness of overlying sediment.

Coastal subsidence enhances recent [sea-level](#) rise, which leads to shoreline erosion and threatens to permanently submerge socio-economically and environmentally valuable wetlands. Yet the causes of subsidence remain controversial, and estimates of subsidence rates vary widely. This collaborative study offers insight into the future behavior of these environmental systems and is an effort to inform policy and management decisions for coastal protection.

"Rising sea levels threaten to permanently submerge wetland environments," said Benjamin P. Horton, assistant professor in the Department of Earth and Environmental Science at Penn. "Management decisions regarding the best way to intervene to protect these environments depend upon empirically informed, scientific data for each of the processes operating in wetland systems, including sediment compaction. This is a high-profile topic, which is subject to a great deal of controversy, especially concerning the on-going discussions of why deltas around the world are losing wetlands at a particularly alarming rate."

The study is published in the current issue of the journal *Geology*.

Source: University of Pennsylvania ([news](#) : [web](#))

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