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Holocene Sea Level Changes Along the United States' Atlantic Coast

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Abstract

Reconstructions of Holocene relative sea level (RSL) have valuable applications in a number of topics within the Earth sciences, including calibrating and constraining geophysical models of Earth's rheology and glacial isostatic adjustment. The usefulness of these reconstructions depends on application of a standardized methodology that fully considers all age and vertical errors. We outline this methodology and provide a detailed example from New Jersey. We describe Holocene RSL reconstructions from the US Atlantic coast that illustrate both spatial and temporal variability. Spatially, rates of Holocene RSL rise were greatest in the Mid Atlantic (New Jersey and Delaware) with decreasing rates of rise to the north and south. Temporally, rates of RSL rise have decreased since the early Holocene due to the combined effects of continued relaxation of the solid Earth in response to deglaciation and reduction in ice melt since 7,000 years ago. A comparison of late Holocene (last 4,000 years) geological reconstructions to long-term tide-gauge measurements reveals that sea level rise increased above background rates by an average of 1.7 mm yr^{-1} during the twentieth century.

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