

Recent sea-level change in the Baltic Sea, comparison with the North Sea

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As a consequence of increasing concentrations of greenhouse gases in the atmosphere, the global rate of sea-level rise is expected to accelerate in the future. For regional planning agencies more important than the global number is, however, the change in the rate at regional scales.

The Baltic Sea is a semi-enclosed nearly tideless sea, which is connected to the Atlantic through the North Sea to narrow and shallow straits. The region is strongly influenced by isostatic rebound from the last deglaciation, with the Earth crust in the Northern Baltic rising at roughly 10 mm/year and in parts of the Southern Baltic sinking at about 1 mm/year.

Time series of sea-level measured by coastal gauges thus display strong linear trends due to isostasy. The values of these trends form the basis for sea-level rise projections related to coastal protection, with a rough estimate of possible sea-level rise caused by climate change added to the isostatic trends. Deviations from a constant long-term trend, e.g. as an accelerating component, may indicate the presence of a global warming signal.

This contribution focuses on changes in the long-term trend of Baltic Sea level time-series (tide gauge data and satellite data) by statistically identifying accelerations in sea-level changes which are indicative for a climatic contribution to Baltic Sea level rise and thus help to refine the estimations of Baltic Sea level rise in the future.

Based on an assessment of the available knowledge about mean sea-level variability and change in the Baltic Sea Region, the outcome will be compared to the latest research results.

In a second step the analysis will be extended to the North Sea to clarify if and how the detected Baltic sea-level long-term change is following the sea-level change in the North Sea. As the North Sea is the only connection of the Baltic Sea to the world oceans, this analysis is expected to give us information about how strongly global sea-level affects Baltic sea-level.

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