Sea level studies at Institute of Coastal Research, GKSS, Germany

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At the Institute of Coastal Research, GKSS Research Center, Germany, two different lines of analysis are conducted with respect to sea level:

1) Critical analysis of reconstructions of past sea level, and of empirical models designed to derive scenarios of possible future sea level change

2) Analysis and scenarios of ongoing and possible future sea level rise along the coasts of the North Sea and of the Baltic Sea.

Critical examination of empirical schemes to project future global mean sea level, e.g.:

\[ \frac{dH}{dt} = r + a T + b \frac{dT}{dt} \]

Parameters \( r \), \( a \) and \( b \) are estimated from 1880-2000 time series of reconstructions of GMSL.

Regional changes of sea level in the North Sea and Baltic Sea

1. Long records available in the German Bight, but mostly contaminated by non-climatic signals in ports and estuaries; long records in the Baltic reflect mostly isostatic changes.
2. Increase of about 20 cm/100 a in the North Sea.
3. No robust recent acceleration identified so far.
4. Baltic Sea sea level variations strongly correlated with atmospheric circulation (north) and precipitation (south) variations.

A test of the performance of estimating the long-term (century) trends can be obtained with the 'perfect model approach' by sub-sampling the output of a coupled model simulations mimicking the availability of observational records. As an example, the figure on the left shows the estimated global sea-level in a millennial climate simulation, together with the hypothetical estimation from a sub-sampled local data mimicking the availability of long-term tide gauges. The sub-sampling generates an underestimation of the rate of sea-level change in historical times, and an overestimate in the 20th century.