



Analyzing long-term changes of tidal dynamics in the German Bight

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Over the last decades, changing tides have been reported for the German North Sea coast, a highly complex and sensitive system, which is subject to ongoing hydro- and morphodynamic changes. While mean sea level trends over the past 150 years have roughly followed the global mean, analyses of the mean tidal high and low water levels indicate significantly divergent trends. Specifically, high tides have risen much faster than mean sea level, while tidal low waters show significantly lower or even negative trends at some stations. As a consequence, an exceptional increase of the mean tidal range (MTR) has been observed in the German Bight, but a comprehensive physical explanation is still lacking.

In order to identify the involved processes, a wide variety of studies on the interaction between altered boundary conditions and the response of the MTR (also water levels in general) have been conducted in recent years. As a result, there have been controversial discussions about the observed changes and their causes and in particular about the separation of local (anthropogenic) and large-scale (e.g. climatic) factors. In the research project ALADYN* (funded between 2016-2019), a group of researchers focuses on the effects of historical construction measures, morphological, oceanographic and meteorological changes on the MTR at individual tide gauges in the German Bight. Here, we will present the current findings of subproject ALADYN-A focusing on historically observed MTR changes. Finally, we present a comparison between statistical analyses (e.g. trends and breakpoint analyses) and the identified historical construction measures along the German North Sea coast in order to separate natural processes from local anthropogenic interventions.

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