Theme: Geoscience time series analysis

Mapping extreme sea levels from satellite altimetry in the Dutch North Sea


North Sea summer storm 2020

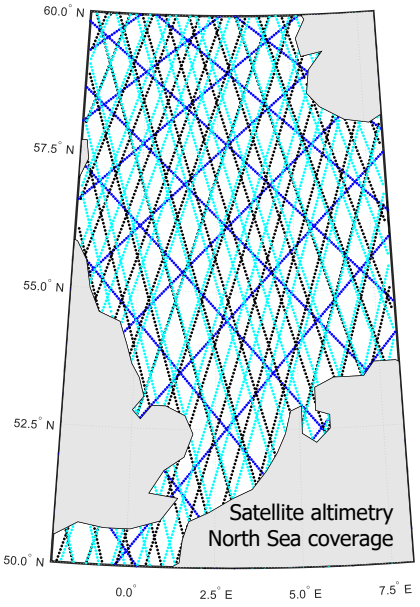
Background

One major consequence of global warming is an increase in extreme sea levels (ESLs). The main driver behind this phenomenon is sea level rise, and that effect is enhanced by more frequent occurrence of stormy weather. According to the latest IPCC report, ESLs that currently occur once in 100 years, will occur annually by the end of the century. This will strongly affect low lying regions such as the North Sea region.

Many studies use hydrodynamic models to make projections of the future ESLs and such models are typically validated using sea level records from tide gauges. However, tide gauges are distributed unevenly across the globe and are in most cases located near the coast, hence providing limited global coverage. A promising approach to obtain a more complete picture of the occurrence of ESLs, would be to use satellite altimetry. Up to now, limited work has been done to map ESLs from satellite altimeter data and this might prove to be a challenge. However, if successful, the benefits will be enormous.

Research objective

The main objective of the proposed MSc. thesis project is to implement a method to estimate the probability of ESLs from satellite altimetry. This study will be focussed on the Dutch North Sea as this region is expected to experience a significant increase in ESLs. Moreover, the relatively large number of tide gauges in the North Sea allows to assess the performance of the altimetry-based method to quantify ESLs.



Supervision

The work will be performed at the chair of Physical and Space Geodesy that is part of the Geoscience and Remote Sensing Department of the Faculty of Civil Engineering and Geosciences. Daily supervision will be provided by Inger Bij de Vaate and Cornelis Slobbe.

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