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Deployment of the global tide and surge model for estimating sea-level trends along the Dutch coast

Sanne Muis[1,2], Natalia Aleksandrova[2], Fedor Baart[2,3], Willem Stolte[2], and Jelmer Veentra[2]
[1]Vrije Universiteit Amsterdam, Institute for Environmental Studies (IVM), Amsterdam, The Netherlands (sanne.muis@vu.nl)
[2]Deltares, Delft, The Netherlands
[3]Delft University of Technology, Delft, The Netherlands

The monitoring of the sea level trend is important for decision-making in the near-future. For the Dutch coast, the Sea Level Monitor periodically publishes new estimates of the sea level rise trend. This observed trend, based on a selection of Dutch tide gauge stations, is used for the planning and management of our coastal defenses in the next 10-15 years. To estimate the trend in mean sea level, the influence of land subsidence, long-term tidal cycles and storm surges levels need to be removed from the observations.

In this contribution, we focus on the contribution of storm surges, that are driven by variations of atmospheric pressure and wind. We will present an updated methodology to remove the effects of these variations on the sea-level trend, which is based on monthly mean sea levels derived with a depth-averaged hydrodynamic model instead of a linear regression. A fully automated and portable workflow was developed to deploy Global Tide and Surge Model (GTSM) on a high-performance computing cluster. Leveraging recent updates of the ERA5 climate reanalysis, we extent existing GTSM simulations back to 1950 and to present-day. Based on these new simulations, we will discuss the variability in mean sea levels due to atmospheric conditions, and present how the sea-level trend changes due to the improved correction.