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Analysis of global ocean tide models in critical areas with focus on EOT19 preliminary model

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In open ocean the accuracy of tide models is considerably higher than in shallow-water, coastal and polar regions. This is due to physical factors, such as a complex dynamic conditions and compound tidal regimes, or data limitations like low resolution of bathymetry models and poor-quality (or quantity) altimetric data.
The DGFI-TUM is working on an updated version of the Empirical Ocean Tide (EOT) model whose focus is to improve the accuracy of tidal estimation at the coast. EOT is a gridded, semi-empirical model that exploits altimetric observations to compute residual tidal harmonic constants from sea level anomaly values. The model is based on multi-mission data that include circa 26 years of observations, from 1992 to 2018.
In this work we compare global state-of-the-art tide models to identify the regions with most critical differences and errors, aiming to characterize the uncertainties of the single models or model types (empirical, assimilation, hydrodynamic models). The model differences are evaluated through root-mean-square and absolute-median errors against in-situ observations, as well as pairwise differences and standard deviations for single constituents. Only constituents included in at least three models are considered.
In this analysis a preliminary version of the Empirical Ocean Tide (EOT19p) model is also included. The development of EOT is focused on improving tidal estimations in the aforementioned critical areas, together with the delivery of realistic and standard error estimates in view of its exploitation for gravimetry applications. The assessment of EOT will be considered for further improving the model, and for the development of a global version.