



The FES2014 tidal atlas, accuracy assessment for satellite altimetry and other geophysical applications

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The FES2014 tidal atlas (elaborated in a CNES-supported joint project involving the LEGOS laboratory, CLS and Noveltis) is the last release of the FES atlases series. Based on finite element hydrodynamic modelling with data assimilation, the FES atlases are routinely improved by taken advantage of the increasing duration of satellite altimetry missions. However, the most remarkable improvement in the FES2014 atlas is the unprecedentedly low level of prior misfits (i.e. between the hydrodynamic simulations and data), typically less than 1.3 centimeters RMS for the ocean M2 tide. This makes the data assimilation step much more reliable and more consistent with the true tidal dynamics, especially in shelf and coastal seas, and diminish the sensitivity of the accuracy to the observation distribution (extremely sparse or inexistent in the high latitudes). The FES2014 atlas has been validated and assessed in various geophysical applications (satellite altimetry corrections, gravimetry, etc. . .), showing significant improvements compared to previous FES releases and other state-of –the-art tidal atlases (such as DTU10, GOT4.8, TPX08).