Abstract:
Since the launch of the first altimetry satellites, ocean tide models have been improved dramatically for deep and shallow waters. However, issues are still found for areas of great interest for climate change investigations: the coastal regions. The purpose of this study is to analyze the influence of the ALES coastal retracker on tide modeling in these regions with respect to a standard open ocean retracker. The approach used to compute the tidal constituents is an updated and along-track version of the Empirical Ocean Tide model developed at DGFI-TUM. The major constituents are derived from a least-square harmonic analysis of sea level residuals based on the FES2014 tide model. The results obtained with ALES are compared with the ones estimated with the standard product. A lower fitting error is found for the ALES solution, especially for distances closer than 20 km from the coast. In comparison with in situ data, the root mean squared error computed with ALES can reach an improvement larger than 2 cm at single locations, with an average impact of over 10% for tidal constituents K2, O1, and P1. For Q1, the improvement is over 25%. It was observed that...
improvements to the root-sum squares are larger for distances closer than 10 km to the coast, independently on the sea state. Finally, the performance of the solutions changes according to the satellite’s flight direction: for tracks approaching land from open ocean root mean square differences larger than 1 cm are found in comparison to tracks going from land to ocean.