



EOT10a – a new global tide model from multi-mission altimetry

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The potential to estimate ocean tides empirically by means of satellite altimetry data has been demonstrated by many investigations. EOT08a was derived as a pure empirical model for the constituents M2, S2, N2, K2, 2N2, K1, O1, Q1, P1, and M4, provided on a global $1/8^\circ$ grid. All altimeter missions operating since October 1992 were used. Although TOPEX/Poseidon and Jason altimeter mission are most appropriate for the tide analysis the other altimeter missions (even geodetic phases of ERS-1) provide valuable informations necessary for increasing the spatial resolution. Due to sun-synchronous orbits of ESA missions the solar tides are frozen in their time series. Therefore these time series are suboptimal for the estimation of S2 and a particular consideration is necessary. Meanwhile, nearly all altimeter data has been upgraded by means of re-tracking, new orbits, and improved geophysical corrections. With extended time series of multi-mission altimetry the resolution and separability can be gradually improved. The key for a high spatial resolution is a careful cross-calibration of all altimeter missions. This allows using all data as if it would have been observed by a single virtual mission. Moreover it provides reliable error estimates in terms of auto-covariance functions. This is taken into account in a more rigorous estimation procedure considering correlations among the along track observations. The result is a more realistic error estimate for the tidal constituents. The new model EOT10a provides additional constituents and exhibits improved accuracy with the same grid resolution as the previous solution.