



## **Vertical land movements from the combined use of satellite altimetry and tide gauges**

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Vertical ground displacements at tide gauge sites were estimated from the differenced time series of monthly satellite altimetry sea level anomalies minus tide gauge. We have used the time series of satellite altimetry that are routinely processed and distributed by four major data providers (three gridded and one along-track products) together with monthly tide gauge records from the datum controlled data set of the Permanent Service for Mean Sea Level (PSMSL). Differenced time series were built using three variants of altimetric time series. Each resulting record was analyzed assuming a combination of white noise and power-law noise of a priori unknown spectral index. The rate uncertainties, computed taking into account the noise content in the differenced time series, will be discussed. In particular, in the context of the departures from the white noise (expected only if both the satellite altimeter and the tide gauge were recording mostly the same sea level signals and their instrumental errors were negligible) and its amplitude. The most suitable altimetric product in terms of correlation and variance reduction at tide gauges, among those investigated, will be identified. Rates of vertical land motion computed with Global Positioning System (GPS) and rates obtained from the combination of altimetry and tide gauge records will be finally compared for those stations where both measurements are available.