Data quality assessment of altimetry products in the European Seas with in-situ observations from the CMEMS tide gauge network

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Altimeter missions have been providing accurate measurements of sea surface height (SSH) for the last 25 years. The quality assessment of altimetry data can be conducted by analysing their internal consistency and the cross-comparison between all missions. Moreover, in-situ measurements are also used as an external, independent reference.

In this work, we assess Sea Level Thematic Centre (SL-TAC) operational products in the European Seas using in-situ tide gauges form the Copernicus Marine Environment Monitoring Service (CMEMS) catalogue. Namely, we conduct an inter-comparison of delayed mode and real time sea level anomaly (SLA) from altimetric products with SSH provided by in-situ tide gauges located in the European coasts of the North Atlantic Ocean, and in the Mediterranean and Black Seas.

In a first step, the CMEMS tide gauge database must be prepared. Then specific metrics for the inter-comparison of tide gauge and altimetry measurements are implemented. The processing of the tide gauge data includes corrections of (i) oceanic tidal effects by filtering high frequency diurnal and semidiurnal tides, (ii) long-period tide waves by using an algorithm based on well-balanced tide tables, (iii) atmospheric effects by subtracting the high frequency dynamical atmospheric correction, and (iv) vertical movements. The comparison consists in co-locating altimetry and tide-gauge data. Statistics of sea level differences (correlation coefficient, root mean square error, variance) are then computed. The method is based on a criterion of maximal correlation between tide gauge time series and altimeter L4 gridded products.