

Abstract for G08 Sea-Level Observation and Modelling

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Regional and coastal long-term sea level change assessment from geodetic data

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Considerable progress has been made during the past decade in measuring sea level change and in understanding the climate-related causes of observed changes. New challenges have been identified in coastal regions where spatial and temporal variability of sea level and the underlying ocean dynamics differ significantly from the open ocean.

A long-term satellite-based monitoring of the sea level Essential Climate Variable (ECV) as required for climate studies is provided by the ESA Climate Change Initiative Sea Level Project (SLCCI). We assess in a regional study the quality of the Fundamental Climate Data Record (FCDR) over the German Bight and the Mediterranean Sea. These are ideal test regions, where reliable and long time-series of in-situ data allow a characterization of the error and the comparison of signal and error with the ECV solution.

The first objective is to extract the long-term climate signal with its estimated error in open sea and coastal zone. Altimeter data are validated against geodetic-referenced in-situ data, referred to the Earth's reference ellipsoid GRS80 via the Global Navigation Satellite System (GNSS).

In the second part of the study we consider a “unifying” validation strategy, which combines satellite gravity measurements from GRACE, models and climatic data to assess the altimeter-derived sea level change and the drivers of the change. We derive the net Gibraltar flow from the closure of the water budget at regional scale.

The study highlight the importance of multidisciplinary studies to understand and discriminate causes of current sea level changes integrating the various factors that interfere at local scale (as climatic component, atmospheric and oceanographic processes, ground subsidence, etc.).