AN INTERNATIONAL COASTAL OCEAN TECHNOLOGICAL OBSERVATORY IN THE BALEARIC ISLANDS: THE RELEVANCE OF IMPROVED SATELLITE ALTIMETER PRODUCTS FOR REGIONAL APPLICATIONS

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We present the research and technological activities ongoing at IMEDEA as a basis for operational oceanography. Theses activities are carried out in the frame of European, National and Regional funded projects (MERSEA, SESAME, ECOOP, COOL, CABRERA, UGIZC, etc.) and are presently structured in three axes: Observational, Numerical and Data Management.

The presently existing system includes gliders, moorings, drifting buoys, and satellite data on the observational side, and different types of high resolution forecasting systems on the modeling side, from beach to sub-basin scale. This system is a first step towards establishing an international coastal ocean technological observatory in the Balearic Islands, an R&D facility open to international peer reviewed scientific cooperation.

We present the major lines of this new initiative and focus on a specific component of the observing system: i.e. satellite altimetry from a global to a coastal perspective. Different aspects on the quality of altimeter products will be addressed. On one hand, we show the impact of merging up to 4 altimeter missions which can be crucial for a proper recovery of the mesoscale variability, an important scientific problem of particular relevance in semi-enclosed seas (Gulf of Mexico, Mediterranean, China) where the major currents might be weak. We show that the consistency between altimetry and independent in situ data is significantly improved when four satellites are merged (compared to the results derived from the classical two satellites configuration).

We also analyse the accuracy of the geophysical corrections that are applied to the altimeter data (i.e. tidal models, wind and pressure effects). Namely, we compare and evaluate the performance of different versions of tidal and barotropic models and show they have a relevant impact for coastal/regional applications. Finally, the quality of real time products, which are required for operational applications, is explored. The validation with independent in-situ data (tide gauge and drifter data) demonstrates a clear degradation of real time maps in relation to delayed time maps. Namely, in real time, 4 altimeters are needed to get the same performance as in delayed time with only 2 altimeters.

Theses improvements in satellite altimetry will be integrated in the coastal ocean technological observatory of the Balearic Islands, an initiative in line with ORION US Program, GODAE Coastal and Shelf Seas Working Group and will be also linked to future European operational initiatives such as MyOcean.