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Surface salinity assimilation in the Macaronesian Region

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With the launch of the Soil Moisture and Ocean Salinity (SMOS) mission, a new stream of data is now available to the scientific community. In this work, the added value of the actual remotely-sensed sea surface salinity (SSS) is investigated using a regional configuration of the NEMO-OPA ocean model for the Macaronesian Region (Northeastern Atlantic Ocean). One of the interests of this region is that it allows to investigate the amount of information that can be extracted from the SMOS data in a region close to land masses.

The model has a horizontal resolution of 1/3 of a degree and 31 vertical layers (Mourre and Ballabrera-Poy, 2009). The period under consideration goes from September 2010 to November 2010, i.e. three months. The initial state of the model comes from an interanual simulation (starting in January first, 2000) forced with NCEP fields for the 2000-2010 period. The results from a free-run simulation indicate that it takes up to two years for the model to synchronize with the observed sea surface temperature (SST). To improve the model synchronization, the model is nudged towards Reynolds and Smith (1994) SST data for the whole period, and towards a 3D field derived from Argo profiles after January 2002, in which the relaxation coefficient is a function of depth as a result of the expected accuracy of the 3D field. The added value of the new data set is investigated by comparing the simulation with and without assimilation of the SSS product derived from the SMOS data. The ground truth comes from a set of Argo data interpolated at 7.5 meters depth, as in Ballabrera-Poy et al. (2009).