COMBINING 15 YEARS OF MICROWAVE SST AND ALONG-TRACK SSH TO ESTIMATE OCEAN SURFACE CURRENTS
Tandeo et al.

Abstract

Ocean surface current is one of the main oceanographic variables. To estimate and track these currents, we use satellite measurements of Sea Surface Height (SSH) to infer these currents directly, but these data are sparse in space and time, as they are collected along altimeter tracks. However, Sea Surface Temperature (SST) are much more complete in both space and time, and so the covariance of SST and SSH can be exploited to use SST datasets to help fill in the missing information about ocean currents where SSH data are lacking. Here, in an Observing System Simulation Experiment (OSSE) context, we test this new data-driven methodology combining SST and SSH information to estimate the ocean surface currents.

Data

In this work, we demonstrate the use of a new data-driven approach to exploit the synergy (i.e., the spatial consistency) between satellite measurements of microwave SST fields and along-track SSH measurements. The idea is to apply the analog method (also known as the nearest neighbor search) on a large collocated SST/SSH database to artificially create pseudo-observations of along-track SSH from abundant SST.

We test our methodology on 2004 where the maximum of altimeters were available for the period 1998-2014 (see [1]). We center the study in the Agulhas region where SST and SSH are highly correlated (see [2] and [3]).

Method

The results indicate an overall good agreement between the two interpolation methods. The 15 years of historical data seems large enough to encompass most of the prominent dynamics of the system. The root mean squared error of the SSH between the true observations and the pseudo-observations is 0.12 meters. These encouraging results open new possibilities of using collocated SST/SSH information to improve the surface currents retrieval or replace the along-track SSH measurements when they are not available (for instance, during the period 1981-1997 where only SST measurements were available).

References