



Sea level ECV quality assessment via global ocean model assimilation

Martin Scharffenberg, Armin Köhl, and Detlef Stammer

University of Hamburg, Institute for Marine Research, Remote Sensing, Hamburg, Germany (martin.scharffenberg@zmaw.de)

In the ocean modeling community satellite data, especially SSH fields, are assimilated on a regular basis. SSH fields are very important in this context because of their dynamical relevance for constraining the ocean's flow field. However, assimilating SSH data into an ocean model does not only improve the quality of model but in addition, can also help testing the quality and the consistency of the input data as well.

In our work we aim to quantify improvements in Sea Level (SL) data through the ESA - Climate Change Initiative (cci) effort and we aim to test the consistency of the Essential Climate Variable (ECV) of Sea Level (SL_ECV) with other ECVs through the assimilation process and to investigate where remaining inconsistencies exist and why.

For this purpose the GECCO₂ assimilation approach assimilates SSH jointly with in situ data over the ocean. The dynamically consistent ocean state estimation adjusts only uncertain model parameters to bring the model into consistency with ocean observations. Improvements in data products can be investigated by studying the residuals between the different data products and the constrained model.

PHASE 1: With this approach we could demonstrate, that in many regions the SL_ECV has been improved from version V0 (AVISO product) to version V1 (SL_cci product). However, there are regions where SL_ECV_V1 is further away from the model "truth". In that sense it is important to understand that the model assimilated SL_ECV_V0 (original AVISO product) and therefore has tried to adapt to the SL_ECV_V0. Therefore, inconsistencies existed when comparing the synthesis results to the updated version SL_ECV_V1! These deviations between the model "truth" and the improved data product (SL_ECV_V1) increased mostly in low energetic areas.

PHASE 2: Two GECCO₂-assimilation-runs (5 additional iterations) have been performed to date: 1) assimilating the original AVISO SL-product (V0) and 2) assimilating the updated-improved sea level estimate from the SLcci effort (V1.1). With this approach we will be able to explain the deviations from the model "truth" for the version V0 assimilation run. Especially in the low energetic regions we expect improved residuals after the new assimilation runs that are using SL_ECV_V1.1.