Guillem
Candille
LGGE/CNRS
Jean-Michel Brankart, LGGE/CNRS
Pierre Brasseur, LGGE/CNRS
Poster
The objective of this project is to develop advanced methods suitable for addressing along-track altimetric data assimilation into eddy-resolving ocean circulation models needed for operational and research applications. This work is carried out jointly with the SANGOMA (Stochastic Assimilation for the Next Generation Ocean Model Applications) consortium, funded by EU under the GMES umbrella over the 2012-2015 period. In this framework, a realistic circulation model of the North Atlantic ocean at 1/4° resolution (NATL025 configuration) has been adapted to include effects of unresolved scales on the dynamics. This is achieved by introducing stochastic perturbations of the equation of state to represent the associated model uncertainty (Brankart 2013). Assimilation experiments are designed using altimetric data from past and on-going missions (Jason 1, Envisat but also SARAL/Altika missions) to better control the Gulf Stream circulation, focusing on the frontal regions which are predominantly affected by the non-resolved dynamical scales. An ensemble based on such stochastic perturbations is then produced and evaluated using the model equivalent of along-track altimetric observations. These three elements (stochastic parameterization, ensemble simulation and 4D observation operator) are used together to perform optimal 4D analysis of along-track altimetry over 10-day assimilation windows. In this poster, we will demonstrate the statistical properties of the pdfs : dispersion analysis and reliability rank histogram and RCRV, and global probabilistic properties through CRPS (Candille and Talagrand 2005, Candille et al. 2007). Further, we will discuss the relevance of using such improvements of conventional assimilation methods for re-analyses and real-time operational assimilation systems based on NATL025 or higher resolution configurations.

Brankart J.-M., 2013: Impact of uncertainties in the horizontal density gradient upon low resolution global ocean modelling. Ocean Modelling, 66, 64-76.
Candille G., and O. Talagrand, 2005. Evaluation of probabilistic prediction systems for a scalar variable. Quart. J. Roy. Meteor. Soc. 131, 2131-2150.
Candille G., C. Côté , P. L. Houtekamer, and G. Pellerin, 2007. Verification of an ensemble prediction system against observations. Mon. Wea. Rev. 135, 2688-2699.

OSTS session
Science Results from Satellite Altimetry
Download to PDF