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Assessing the impact of SWOT in a global high-resolution data assimilation system

This study describes the global Observing System Simulation Experiments (OSSE) system developed to assess the impact of the future Surface Water and Ocean Topography (SWOT) mission for global ocean analysis and prediction. The 1/12° global ocean circulation model and the data assimilation system (SAM2) are described. The data assimilation system differs from the one used operationally by Mercator Ocean for the Copernicus Marine Service. The main updates are related to the use of a 4D version of data assimilation scheme and a different parametrization of the model error covariance. These improvements are detailed and their contribution quantified. The Nature Run used to represent the "truth ocean" is validated through the comparison with altimeter observations. The Nature Run is used to simulate pseudo-observations (Sea Surface Height from three nadir altimeters and SWOT, Sea Surface Temperature from satellite observations, Temperature and Salinity profiles from the CORA data base) required for the OSSEs. Observation errors (noise) are added to all these simulated observations. The simulated data set is then assimilated in an Assimilated Run that uses a different model with different initial conditions and forcings. The OSSE design is validated through the comparison of OSSEs results with OSE results for conventional nadir altimeters.

Which theme does your abstract refer to?

Assimilation of novel observations (i.e. under-utilized observations and upcoming missions)

Primary authors: Dr BENKIRAN, Mounir (Mercator-ocean.fr); Dr LE TRAON, Pierre-Yves (Mercator-ocean); Dr RÉMY , Elisabeth (Mercator-ocean)

Presenter: Dr BENKIRAN, Mounir (Mercator-ocean.fr)

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