



How can Surface Water Ocean Topography (SWOT) satellite better reconstruct horizontal and vertical velocities?

Babette Christelle Tchonang (1,2), Pierre-Yves Le Traon (1), Mounir Benkiran (1), and Giovanni Ruggiero (1)
(1) Mercator Ocean, Toulouse, France, (2) Centre National d'Etude Spatiale (CNES), Toulouse, France

The impact of Surface Water Ocean Topography (SWOT) satellite on the ocean horizontal and vertical velocities is investigated by means of OSSEs (observing system simulation experiments). These experiments are performed with a regional data assimilation system, implemented in the Iberian–Biscay–Ireland (IBI) region, at $1/12^\circ$ resolution using simulated observations derived from a fully eddy-resolving free simulation at $1/36^\circ$ resolution over the same region. The objective of the experiments is to assess the ability of SWOT to constrain the ocean analyses and forecasts with respect to conventional nadir altimeters (Jason 1, Jason 2 and Envisat). Previous analysis of these experiments conducted in Benkiran et al. (2016) have shown a great improvement (when using SWOT-like data rather than conventional altimeters) of the root-mean-squared-error (rmse) of the Sea Surface Height (SSH) calculated with respect to the true ocean. This Work further explores these results including the analysis of the horizontal and vertical velocities fields and their vertical structure. Preliminary analysis shows that SWOT data allows a better positioning of eddies on frontal zone and thus a better control of the horizontal and vertical velocities. Assimilation of SWOT data does not only improve the surface velocity; it also improves velocity field at the depth. There is a clear positive impact of the assimilation of SWOT up to 1000m of depth.