On the assimilation of SWIM directional wave observations in wave model : A success story from CalVal phase to operational use.

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Résumé

The last two years, several developements within the framework of the Calibration/Validation phase leaded to a substantial improvement of the quality of SWIM wave data. The SWIM wave spectra revealed a relevant interest in the description of wind waves in the growth phase in areas with unlimited fecth conditions such as in the southern ocean (Aouf et al. 2020). The objective of this work is to give an overview of the impact of latest processing (Version 5) on the assimilation of wave spectra in the wave model MFWAM. We analyzed the impact of the new Modulation Transfer Function (MTF) on the assimilation results and also the use of off-nadir significant wave heights from the beams. A long period of reprocessed data from April 2019 to March 2020 is considered for wave model runs. The results are validated with independent altimetry data and buoys data. We analyzed the assimilation results for extreme events such as cyclones in the Indian Ocean and also storms in the North Atlantic Ocean and in the Southern Ocean. We also investigated the impact of the assimilation of SWIM partitions on coupling parameters such as Stokes drift and surface stress. In this work we examined the complementary use of SWIM and SAR wavenumbers components in the assimilation and its impact on the swell forecast generated in the Southern Ocean.
Ongoing performance of the assimilation of directional wave spectra in operational wave model and added value of using SWIM data will be also presented at global and regional scales.

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