CFOSAT data and their synergy with in-situ measurements and model simulations at regional and coastal scales

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Résumé

SWIM (Surface Waves Investigation and Monitoring) instrument carried by CFOSAT (China France Oceanography Satellite) data will be used in a comparison with in-situ measurements and simulations from a spectral wave model coupled to an ocean circulation model. The focus will be on the regional and coastal areas, where the satellite observations are of lower quality than in the open ocean. The model is a part of the Geestacht COAstal model SysTem(GCOAST) and the study area is the north-east Atlantic, North Sea and Baltic Sea. While in the open ocean, satellite data are of good quality and used routinely, their quality tends to deteriorate in coastal areas, which results in systematic flagging of up to a few ten kilometres from the coast. Therefore, the advantage of improving the sea state by assimilating altimeter data into the wave model is not evident at regional and coastal scales. Directional wave spectra describe the complexity of sea state and give access to directional parameters (mean direction and directional distribution of energy) and frequency parameters (peak frequency, frequency spread). Different processing tools are applied for the 2d ocean-waves spectra evaluation supporting a combined analysis of high-resolution remote sensed data, buoy observations and model simulations for multipole validations of coastal processes. Directional wave spectral data over the European Seas is very rare - SWIM CFOSAT is the only satellite mission providing spectral information and also most of the available in-situ observations are near the coast. Inter-comparisons between remote sensing and in-situ observations over the study area are done to demonstrate the overall performance of SWIM directional wave spectra for several beams (6○, 8○, 10○} during the CFOSAT. This study aims to compare the SWIM directional wave data set with the GCOAST outputs and buoy observations. This comparison aims first at assessing the performances on main wave parameters (significant wave height, mean direction at the peak, peak frequency) retrieved from SWIM over our study area in different conditions (wind sea, swell, mixed seas), as well as to look at parameters characterizing the shape of the wave spectra, (the frequency and the directional spread). The assimilation of satellite data in the wave models will provide a new level of understanding and increase the predictability of the regional and regional ocean scales phenomena that differ from the better-studied conditions for open seas.

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