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Poster
The SAR-mode altimeter differs from the conventional radar altimeter in that it uses notably an along-track processing for increasing the spatial resolution of the measurements. On board the Cryosat-2 mission, the synthetic aperture processing creates doppler bins as narrow as 300 meters in width. This allows to achieve high-resolution (but also high-accuracy) altimetric mapping of the ocean surfaces, and might potentially enable to detect submesoscale structures (from 0.1 to 1km) that are unresolved from low-resolution mode observations, in particular the ocean surface waves (swell). For example, it is currently unknown how the retrieved sea surface height elevations and other surface parameters derived from the SAR-mode are impacted and at what accuracy these data are in the presence of directional ocean waves, especially those whose wavelengths are close to the SAR along track sampling. Very few studies have investigated the sensitivity of the SAR-mode altimeter data to the swell, which is of high importance for the next missions (Sentinel-3 and Jason-CS). Similar questions are likely to come up with the LRM mode data.

CLS has been conducting a study, under CNES funding, to characterize these effects through both simulation and flight data analysis. First, this paper presents the numerical study based on the use of an end-to-end simulation tool including a SAR simulation capability with a generator of realistic models of long ocean surface waves and a SAR retracking algorithm. In particular, we will examine the effects of different swell spectrum characteristics (in direction and frequency) on the surface geophysical estimated parameters. Second, the paper will address a methodology to track some Cryosat-2 SAR-mode data related to swell features and some examples. These first results will be useful in the near future to develop specific retracking algorithms or improve the current ones for the specific cases where SAR mode altimeter data affected by swell.
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