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Altimetry Data acquired by the CryoSat-2 in SAR Mode in the interval 2011-2012 are processed and validated in the area of the German Bight at distance to coast larger than 10 Kilometers.

Instantaneous sea surface height (SSH), significant wave height (SWH) and wind speed (U10) from altimetry are compared to in-situ measurements at platforms, buoys and tide gauges and to results from an operational circulation model run by the German Federal Maritime and Hydrographic Agency (BSH). The in-situ data are available from a network of stations having a good geographical distribution, which allows considering three relevant zones: (1) open sea, (2) coastal zone and (3) inland water. The network is maintained by the Waterway and Shipping Administration (WSV) and by the German Federal Institute of Hydrology (BFG, http://www.bafg.de). The relevant in-situ data are sea level, GPS coordinates and wave data. Wave and wind model data are compared to the SWH and Wind speed derived from altimetry.

The CryoSat-2 Data have been Delay-Doppler processed from the FBR (Full Bit Rate) Level 1A to Level 1B and subsequently re-tracked using the SAMOSA's SAR Echo Model and a fitting scheme based on Levenberg-Marquard Least Square Minimization Algorithm. Sea surface height, significant wave height and wind speed at 20 Hz and 1 Hz have been derived. The Delay-Doppler processing (L1B) and the re-tracking processing (L2) has been carried out by the EOP-SER Altimetry Team at ESA/ESRIN. Pseudo pulse-limited (PLRM) data derived from CryoSat-2 in SAR mode and provided via the RADS database are compared with parameters derived from the CryoSat-2 SAR Data to estimate possible biases and trends between SAR mode and LRM mode and tune up the SAR re-tracking scheme.

The low sea state conditions in this area are suitable to assess the capacity of the SAR Altimetry to retrieve wave heights also at low sea state part of the sea spectrum.

The wind speed is derived using the same wind model used in Envisat mission and correcting for a little sigma nought bias to align CryoSat absolute backscattering to Envisat absolute backscattering.

Performance metrics to measure the quality of the results, scatter plots, cross-correlations, standard deviations, regression slopes and biases between the in-situ and the CryoSat-derived measurements (SSH, SWH, U10) will be presented.

A very good agreement has been achieved between both PLRM and SAR processed altimeter and in-situ data for the SSH (mean bias 2 cm, standard deviation 20 cm, slope 0.94) and SWH (mean bias 2 cm, standard deviation 30 cm, slope 0.97) set.. In the comparison with two wave models, the best agreement is obtained with the regional LSM model of the Deutsche Wetterdienst (DWD) (9 cm /34 cm 0.98)
OSTS session
Instrument Processing
Meeting name
Ocean Surface Topography Science Team (OSTST) Meeting

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