

Development and Application of Validated Geophysical Ocean Wave Products from ENVISAT ASAR and RA-2 Instruments

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Abstract: With the launch of the ENVISAT satellite, significant improvements in measuring global ocean wave and wind climate is expected. Major improvements regarding instruments, processing, and products are achieved for both the Synthetic Aperture Radar (SAR) and the Radar Altimeter (RA) instruments compared to the previous ERS missions. The EnviWave project has contributed to this by means of: (a) performing new developments in terms of calibrated and validated geophysical products from the SAR and the RA instruments, (b) developing the use of these products in numerical wave and weather forecasting and nowcasting systems, (c) developing the use of these products in high-level ocean wave climate products. Major deliverables to the user community are dissemination of routinely updated calibration and validation data sets (range of validity, bias, RMS errors) by means of a web service. A data base is established allowing users to access co-located in-situ buoy, numerical model (WAM), and different satellite observation of ocean wind and wave field globally. Global, regional and seasonal validation are as well performed on a monthly basis. Operational forecasting wave models with assimilation schemes are set-up for Atlantic coast of Spain, North-Atlantic, Mediterranean Sea, and Indian Ocean, and impact on forecast of assimilation of altimeter and SAR wave information are studied. A regional version of the integrated software package Worldwaves is established for the EnviWave project. This is a software package that integrates offshore satellite and buoy wave data with appropriate coastal numerical wave models, and geographical and bathymetric information, providing a means for successful downscaling of the wave conditions and a detailed wave analysis in various nearshore/coastal areas. Existing global wave and wind atlas has been enhanced by adding Envisat and Jason-1 wave and wind data directly or as integrated with model using a novel wave simulator.