

ASCAT-B OCEAN CALIBRATION AND WIND PRODUCT RESULTS

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ABSTRACT

The Metop-B satellite with onboard the Advanced Scatterometer (ASCAT) has been launched on 17 September 2012. The ASCAT-B instrument is a C-band vertically-polarized fan antennae beam radar. It is identical to the successfully operating scatterometer ASCAT-A, onboard Metop-A, launched in 2006.

Within the framework of the EUMETSAT Ocean & Sea Ice (OSI) Satellite Application Facility (SAF), KNMI is operationally producing ASCAT-A Level 2 wind data at both 25-km and 12.5-km grid spacing, including a 12.5 km coastal product in pre-operational status. The ASCAT-B 25-km product and 12.5-km coastal product are available in development status.

Within the OSI SAF, KNMI has also developed an ocean calibration method, based on Numerical Weather Prediction (NWP) wind inputs, called NOC. The NOC method resides in direct comparison of measured backscatter data with simulated backscatter data from NWP winds using a forward model or Geophysical Model Function (GMF). For ASCAT the CMOD5.n GMF is used. The averaged NOC residuals over a longer period are used to calculate correction factors that are shown to improve the wind retrieval. A big advantage of the NWP ocean calibration with respect to other calibration methods like rain forest calibration is that it only needs six hours of data to produce accurate results. It is therefore also very suitable for monitoring purposes.

Interbeam calibration issues can be shown and a direct comparison between ASCAT-A and ASCAT-B is made by means of visualization of radar backscatter triplets in the 3-dimensional measurement space. For a given Wind Vector Cell (WVC), i.e., position across the swath, the measured triplets are distributed around the GMF, a well-defined conical surface that depends on wind speed and wind direction only. Systematic displacements of the cloud of triplets in any direction of the 3D space are mainly due to absolute beam biases, which are adequately removed by the results of the NOC. Following the successful launch of Metop-B, the results of ASCAT-B ocean calibration and its wind products will be presented. ASCAT-B winds have been calibrated and available from the OSI SAF since 14 November 2012, i.e., within 2 month after the MetOp-B launch. Further validation with ocean buoys is being performed after which the MetOp-B wind products will be operationalized.

The morning and evening coverage of MetOp winds has increased since the launch of MetOp-B. However, large overlap regions exist and remaining coverage gaps. The latter would be globally minimized with a 25-minute orbit phase difference of MetOp-A and MetOp-B, rather than the current 48 minutes. This would allow much improved tropical cyclone forecasting for example.

In the overlap regions, the same winds are measured after about 50 minutes (tropics) or 100 minutes (extratropics). Fast developments such as deep convection or polar low development can be depicted with unprecedented dynamical detail in this way. Some examples will be presented.