Sea Ice Extent from a 2 Year ERS–2 Wave–Mode Dataset in Comparison to SSM/I and Quickscat

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Abstract

Two years (1999 and 2000) of ERS–2 wave–mode data were provided by ESA in the scope of the WAVEATLAS AO project for an analysis of global ocean wave parameters and their seasonal variations. From these data, more than 815000 single look complex images, so called imagettes, were calculated using DLR's SAR processor BSAR. Typically, an imagette covers an area of 5 by 10 km. The pixel spacing is around 4 by 20 meters and the full geometric SAR resolution of nominally 25 m is achieved. Imagettes are available approximately between 84 degrees northern latitude and 79 degrees southern latitude. As the orbits converge towards the polar regions, the coverage is higher in high latitude areas compared to other oceanic regions.

In the scope of the WAVEATLAS project, sea ice affected imagettes have to be located by an automatic procedure in order to exclude them from wave parameter estimation calculations. The results of this ice flagging are compared to the well established SSM/I sea ice dataset of the National Snow and Ice Data Center (NSIDC) and to Quicksat altimeter derived ice extent data to identify problematic cases and to improve the ice detection algorithm with special emphasis on seasonal changes. Special cases are presented together with corresponding AVHRR and MODIS data. During previous projects it has been shown that the appearance of imagettes is related to sea ice model parameters such as ice concentration and deformation energy. In this paper, the potential of the imagette dataset is demonstrated in respect to flow size, leads and ice structures, e.g. due to pressure ridges.