

Validation of the satellite-based landfast ice mapping

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Landfast sea ice is distinctive feature of Arctic and Antarctic coastal zones. It is contiguous with the shore and relatively immobile ice cover that has fastened along the coast or to the sea floor. The role of landfast ice in the climate system was highlighted in numerous studies. However for most of the marginal seas of the Arctic Ocean information on the seasonal variability and extent of the fast ice are not existent or strongly limited in time and space. Recent studies revealed that deficient representation of fast ice in coupled sea ice-ocean models affects the accuracy of the modeled processes. A permanent consideration of fast ice in coupled sea ice-ocean models requires an automatic procedure to derive fast ice extent for the entire Arctic at a reasonable spatial and temporal resolution.

This study presents an investigation of a method for automatic fast ice mapping by means of passive microwave satellite data. Commonly used for fast ice detection correlation technique was performed on Advanced Microwave Scanning Radiometer (AMSR-E) brightness temperature data with spatial resolution 6.25 km. The method was implemented for southeastern Laptev Sea. Different settings were applied to produce fast ice maps for the region in order to investigate the sensitivity of the presented method. Also the derived fast ice maps were compared with high resolution ASAR data. Validation reveals that the method is capable to reproduce the fast ice changes and map fast ice edge accurately. However, some seasonal limitations for the method application occur.