Simultaneous Envisat ASAR and MERIS monitoring of lake ice on lake Ladoga

E. Malnes (1), H. Hindberg (1), Ø. Rudjord (2), and R. Solberg (2)

(1) Norut, Earth Observation, Tromso, Norway (eirik.malnes@norut.no, +47 77 62 94 01), (2) Norwegian Computing Centre, P.O.Box. 114 Blindern, N-0314 Oslo, Norway

Synthetic aperture radar data is useful for detection of lake ice at high latitudes, in particular during the polar night period and during cloud cover when optical sensors are useless. The lake ice observations can be assimilated in numerical weather prediction models, regional climate models or hydrological modelling as parameterizations and will increase the accuracy of such models. We have developed processing chains for lake ice retrieval based on Envisat ASAR wide-swath data and Envisat MERIS optical data, with cloud detection based on the AATSR sensor. Optical data has the advantage of more straightforward interpretation/classification, but cannot be used during cloud cover and darkness. SAR data has good temporal coverage, but due to overlapping backscatter signatures between ice and waves on the lake surface there is a higher probability for misclassification.

In this work we present a time series of ice maps over the lake Ladoga in western Russia during the ice season 2008/2009, including several simultaneous results from ASAR and MERIS. The Ladoga Lake is large enough to have a significant impact on the regional climate in the neighbouring regions of Finland and Russia. We also show that simultaneous optical and SAR imagery has significant advantages since it can facilitate interpretation in cases where SAR classification has problems due to ambiguities (overlapping signatures between waves on the lake and lake ice.