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# Water body delineation from active microwave satellite data for improved modelling of methane emissions at high latitudes in the framework of the ESA project ALANIS

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Boreal soils with underlying permafrost are expected to increasingly contribute to global greenhouse gas emissions under warmer climatic conditions. The ESA STSE funded project ALANIS-Methane (www.alanis-methane.info) aims to assess the potential of a combined land surface modelling and earth observation approach to quantify methane emissions in Northern Eurasia. Necessary model inputs like freeze-thaw and wetlands dynamics are derived from a variety of sensors.

The purpose of this study which contributes to ALANIS-Methane is to demonstrate the potential of medium resolution synthetic aperture radar (ENVISAT ASAR Wide Swath – 150 m resolution) data for the delineation of water bodies in test areas in Siberia. Active microwave sensors have several advantages for the estimation of flooded areas in northern latitudes because of the low effects that clouds and rainfall have on the measurements.

The high potential acquisition rate of ENVISAT in northern latitudes makes it possible to reproduce the temporal dynamics of the inundated areas. Maps can be produced showing flooding after snow melt in spring and subsequent draining. The influence of vegetation on the ASAR measurements can be assessed by comparing them with data from ALOS PALSAR. This sensor is operated in L-band which is less affected by vegetation than C-band used by ASAR. The validation relies on a series of PALSAR scenes acquired during the summers of 2007 and 2008. A further issue is the separation of wet snow from inundated soil. This is addressed by combined use of scatterometer and re-analysis data.

ENVISAT is scheduled to be complemented from 2012 by the Sentinel-1 mission with a higher spatial resolution and regular sampling. This would significantly enhance the capabilities for operational monitoring.