



## Thermokarst lake dynamics on the Yamal Peninsula, Siberia

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Monitoring Arctic permafrost environments has become increasingly important in a changing climate. Rising air temperatures are resulting in permafrost degradation, which in turn is associated with biogeochemical and hydrological changes. In particular, surface water bodies are undergoing changes in areal extent. Thaw lakes have been found to be in states of expansion as well as rapid drainage. However, these dynamics are not yet well understood and in order to account for them further investigation is necessary.

Changes in areal extent of thermokarst lakes in the Siberian Ob estuary region on the Yamal Peninsula are investigated with the aid of ENVISAT ASAR active microwave data over the course of the summer months of 2007 and 2008. ENVISAT ASAR is a C-band instrument (centre frequency 5.331 GHz) that operating in wide swath (WS) mode has a spatial resolution of 150 m. Previous research has shown this sensor to provide sufficient information on Arctic water bodies despite its coarse resolution. In addition, the instrument's temporal resolution allows for frequent monitoring, which is essential for this research.

Regions of strong seasonal dynamics are identified by means of a GIS lake surface analysis. Numerous lakes are found to be shrinking regularly during the snow free period, some even disappearing. The radar backscatter values of the banks of shrinking lakes, as well as the drainage basins of disappearing lakes, are investigated in order to examine local soil moisture conditions. This multi-annual analysis may give some insight into whether these lake dynamics are seasonally rather than climatic dependent events.

This study is undertaken in cooperation with the Institute of Photogrammetry and Remote Sensing of the Vienna University of Technology and contributes to the ESA DUE Permafrost project ([www.ipf.tuwien.ac.at/permafrost/](http://www.ipf.tuwien.ac.at/permafrost/)).