

Comparison of active microwave and optical imagery over the Yamal Peninsula as a validation technique for radar lake classification

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The Yamal Peninsula in northwestern Siberia is a typical permafrost thaw lake landscape. It is a ground-ice-rich, poorly drained lowland that covers an area of approx. 122 000 square km. There are numerous streams and rivers that meander through this Arctic landscape.

Active microwave imagery has become an important method for monitoring the hydrosphere. For this study the European Space Agency's ENVISAT Advanced Synthetic Aperture Radar (ASAR) instrument, operating in wide swath (WS) mode is used to classify water bodies on the Yamal Peninsula. Many thaw lakes lie below ASAR WS's spatial resolution of 150 m. The applicability of using this radar sensor for lake classification is investigated.

The ability of ASAR WS imagery to detect lakes is tested using simultaneously acquired optical imagery from the Japan Aerospace Exploration Agency's ALOS Panchromatic Remote-sensing Instrument for Stereo Mapping (PRISM) instrument. PRISM data have a much higher spatial resolution, with a pixel spacing of 2.5 m.

This comparison shows that ASAR WS datasets are a useful tool in monitoring Arctic thaw lakes, despite their rather coarse resolution.