

Klimatag, Universität für Bodenkultur, 07.05.2012

Title: Remote Sensing and Multi-scale Integration for studies of Changing Permafrost in the Arctic and its Global Effects in the 21st Century.

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Official webpage for PAGE21: <http://page21.arcticportal.org/>

Abstract: The Northern Hemisphere, where 24% of the land is underlain by permafrost, is expected to experience significant warming. Since permafrost is sensitive to climate change and constitutes a major carbon and nitrogen storage, positive feedbacks on climate through greenhouse gas emissions is of great concern. PAGE21, Changing Permafrost in the Arctic and its Global Effects in the 21st century, was initiated in the end of 2011 with the intention to enhance our understanding of the Arctic permafrost vulnerability to climate change, as well as its implications for global greenhouse gas emission. The project makes use of a unique dataset from sites spanning over the full range of Arctic bioclimatic zones and brings together scientists from Europe, Canada, Russia, the USA and Japan. It combines and integrates studies from process scale to remote sensing at multiple scales, and holds a pan-arctic perspective. The output should support global and regional climate models and feed into global assessments, as well as international monitoring programs.



Figure 1: Overview of the 12 study sites issues of PAGE21. Background map: Brown *et al.* 1998.

TUW takes part of this project, with the role of supporting modellers and providing improved land surface information by addressing specific lacks of information on arctic environment, notably 1) to develop downscaling schemes for permafrost-relevant parameters, 2) to carry out site investigations for model validation and site representativeness for up-scaling, 3) enable up-scaling by integrated analysis of land surface with respect to dynamics and heterogeneity. Further partners involved in the remote sensing work package of PAGE21 are the Alfred Wegener Institute (Potsdam) and the University of Joseph Fourier (Grenoble).