

Task Force Questionnaire

Changes in Permafrost Detected with Remote Sensing Methods

Permafrost dynamics during periods of global change are increasingly recognized as an important factor in biogeochemical cycling, topographic and hydrological change, and in northern engineering and infrastructure development. The possible rapid changes in permafrost during climate warming or after surface disturbance can be monitored directly with a broad variety of remote sensing techniques. Of highest interest for the permafrost and climate change research community are quantitative analyses of change, matter and energy fluxes, and the physical properties of permafrost.

We request and encourage that the permafrost community submits information on past and ongoing studies that generated data on change in permafrost as observed with remote sensing methods, including ground-based remote sensing techniques (see [Table 1](#) below and attached Excel-file). The main goal is to show a more coherent picture of observed changes in permafrost, get an overview of the remote sensing methods currently used, and explore the focus of interest in our research community. Relevant observations include, but are not limited to, the thermal erosion and abrasion of coasts, lake shores, and stream banks, thermokarst subsidence, thermo-erosion, frost heave and thaw subsidence, sink hole formation, thaw slumping, solifluction, and rock glacier movement.

The information collected will be used for outreach activities of the IPA and the IPA Task Force on Remote Sensing, and likely will get wide attention by researchers outside the permafrost science community and by the media. Data from this questionnaire will be entered in a database and submitted to the IPA Standing Committee on Data, Information, and Communication for future publication on the next Circumpolar Active Layer-Permafrost System (CAPS) – DVD. The dataset will also enter the database of the National Snow and Ice Data Center (NSIDC) in Boulder, Colorado, USA. We eventually envision approaching space and funding agencies action to acquire further high-quality imagery over selected key sites contained in this new database. If successful, imagery will then be distributed to the local PIs to continue change detection studies and to gather highly important information on changing permafrost landscapes.

We encourage submitting complete datasets of finished and published research. However, if you would like to highlight ongoing research with unpublished data that cannot be released at this point, please feel free to omit relevant fields and complete them at a later point. All entered information should be short and concise.

Any comments and suggestions are highly welcome.

Please contact Guido Grosse (UAF): ffgg1@uaf.edu

Table 1: Database fields and descriptions

Database field	Description	Examples
Site name	Unique identifier (name or ID#) of study site	
Region	Location of the study site	Alaska North Slope, North Yakutia, N.W.T.
Country	Location of the study site	USA, Russia, Canada, China
Lat	Geographic latitude in decimal degrees	66.5456; optional you can submit a Google Earth kmz-file
Long	Geographic longitude in decimal degrees	-164.5365; optional you can submit a Google Earth kmz-file
Observed parameter	Which parameter is observed?	Land elevation; coastline position; retrogressive thaw slump volume; thermokarst lake area
Observed process	What is the underlying process studied?	Surface subsidence; coastal erosion; retrogressive thaw slumping; thermokarst lake expansion; sink hole formation
Observation period	For which period were observations made?	1950-2009
Remote sensing data used	What type of remote sensing data was used?	Landsat-1 MSS and Landsat-7 ETM+; b/w aerial imagery and airborne LIDAR
Observation methods	What methods were used to analyze the remote sensing data?	Supervised image classification; DEM subtraction; manual feature mapping
Temporal resolution	What is the temporal resolution of the data used?	10 years; yearly; bi-annual; irregularly ca. 10 years
Spatial resolution	What is the spatial resolution of the data used?	1 m; variable 1-15 m
Observed rate of change	What is the observed rate of change over the monitoring period?	Linear: m/yr; Area: m ² /yr; Volume: m ³ /yr; Percentage: 10 % increase
References	References for more detailed information or that should be cited when referring to the data	
Comments	Free comments	Study is ongoing; study finished in 2007
Database contributor	Contributor who submitted the data to this database	Your name