



Accelerating warming and degradation of permafrost in northern Norway

Bernd Etzelmuller (1), Ketil Isaksen (2), Sebastian Westermann (1), Christian Hauck (3), and Christin Hilbich (3)
(1) University of Oslo, Norway, Oslo, Norway (bernde@geo.uio.no), (2) Meteorological Institut, Norway, Oslo, (3) Univeristy of Fribourg, Switzerland

Permafrost is sensitive to climate change, modulating geomorphological process rates and ultimately landscape development. In Norway, since the 1980ies many studies have been carried out to evaluate the permafrost distribution, its changing state and its relation especially to climate and snow conditions. This knowledge has flown into numerical models, calculating ground temperatures in space and time.

At present Norway has an unique data set obtained from bore holes where we measure temperatures along both altitudinal and latitudinal gradients. In addition at all sites geophysical surveys are available using refraction seismic and electrical resistivity tomography, partly multi-temporal. Finally, daily gridded data sets of meteorological parameters such as air temperature, precipitation and associated snow cover are available back to 1957, allowing the evaluation of climate-ground thermal regime relations along regional gradients.

This presentation summarises a c. 10 year record of ground thermal measurements and geophysical surveys from three main sites in northern Norway, along with new evaluations of changes in palsa distribution and size. For the first time we demonstrate the development of talliks in mountain permafrost in northern Norway, and relate and discuss the development of these talliks to changing atmospheric and snow conditions. The observations are also related to long-term change detection observations of palsa mires in the vicinity of the bore holes, highlighting accelerating thaw and degradation of permafrost during the last two decades.