



Visualizing data on permafrost degradation in a pan-arctic pilot service aiming at a non-scientific audience

Tillmann Lübker, Ingmar Nitze, Sebastian Laboor, Anna Irrgang, Hugues Lantuit, and Guido Grosse

Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Germany (tillmann.luebker@awi.de)

Climate change has led to an increase in permafrost warming and thaw at global scale. Land surface change associated with permafrost thaw include the acceleration of Arctic coastal erosion, increased thaw slumping in hillslope regions, the drainage and formation of lakes, as well as an intensification of disturbances on land, such as forest fires and droughts. Thermo-erosion threatens infrastructure and leads to gullying, slumping, and even landslides. Arctic communities living on frozen ground are strongly affected by these processes and are increasingly forced to adapt their livelihoods. In some areas, the relocation of settlements has become the last resort and is already actively planned for several communities in Alaska.

Remote sensing analyses can be applied to detect and map permafrost disturbances at high spatial resolution across large regions to quantify landscape change, hydrological dynamics, and permafrost vulnerability. In the ERC PETA-CARB, ESA CCI Permafrost, and NSF Permafrost Discovery Gateway projects, a pan-arctic time series covering twenty years was produced using Landsat TM, ETM+, and OLI imagery. Following good scientific practice, this data is published via a digital data library and also available through a cloud-based analysis platform to facilitate re-use by other scientists.

However, the data is not readily designed and presented to be interpreted by non-scientists and non-experts. In order to make the scientific findings more easily accessible, within the EU Arctic PASSION project we designed a tailored web-based portal specifically targeting non-scientific user communities, stakeholders, and rightsholders as part of the projects Permafrost Pilot Service. With the new portal, the Arctic Landscape EXplorer (ALEX), we provide interactive maps for recent information on land surface changes, hot spots of disturbances, and potential areas of active permafrost thaw and erosion. While focusing on the local to regional scale relevant for private users, as well as local, regional, and state-level decision makers, exploring the data up to the pan-arctic scale may open new avenues for understanding permafrost change for the general public.

Recent consultations with local representatives and stakeholders from Alaska aimed to ensure that their actual information needs are met. Having received positive feedback and strong interest in the tool encouraged us to continue our work.