



Monitoring Surface and Subsurface Change in Permafrost Landscape in Northern Alaska with In-situ and Remote Sensing Methods

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Much of Northern Alaska ecosystems is underlain with permafrost that is experiencing a sustained warming trend. Measuring environmental changes including permafrost thawing is difficult due to logistic reasons in the boreal and Arctic conditions. Over four years (2014-2017), we used in-situ geophysical instruments to collect permafrost measurements including depth of active layer, moisture content, and change in subsurface structure as the result of permafrost thaw and refreezing. The geophysical methods we used included electrical resistivity tomography (ERT), nuclear magnetic resonance (NMR), and manual probing (MP). The data were collected at sample sites in both north and south of Fairbanks, Alaska, each of the sample site was a transect approximately 100 meters in length. Of the sample sites, 20 of them included all of the above methods (ERT, NMR, MP). In this study, we linked land surface observations (such as surface temperature, albedo, water cover) derived from Landsat at the similar time windows as the subsurface data on the 20 sample sites. The analysis characterized above-surface landscape changes in relation to the below-surface measurements.