

# Remote Sensing

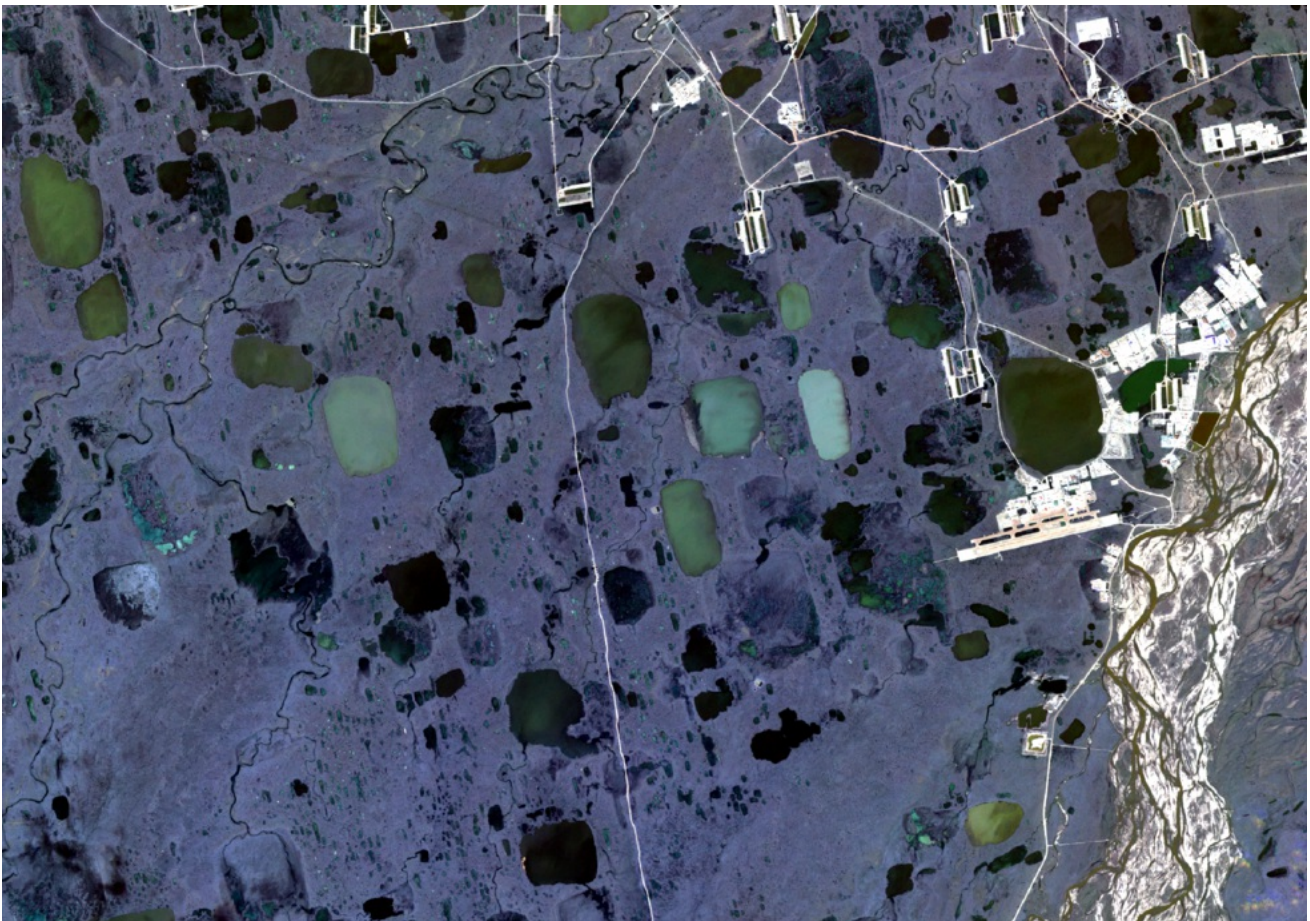
A close monitoring of past and recent landscape changes is necessary in order to identify and quantify potential risks for ecosystems and infrastructure emerging from permafrost degradation. Many landforms throughout the Arctic such as thermokarst lakes, thermoerosion gullies, and thaw slumps display the highly active erosion and mass wasting processes that increasingly shape the Arctic.

In remote and vast Arctic areas satellite and aerial imagery provide insights into permafrost thaw processes on a regional scale which we would not gain from measurements at the surface. Remote sensing is, thus, an important tool for improving our process understanding that helps us to advance our land surface model CryoGrid.

The remote sensing component of the project, therefore, addresses the following research questions:

1. How do permafrost erosion features respond to changes in meteorological conditions?
2. What are the factors controlling the erosion rates (vegetation cover, soil composition, topography, thermal regime, size etc.)?
3. Do the erosion processes follow a spatial pattern?

In order to answer these central questions we apply multiple remote sensing tools, sensors, and platforms. Radar data (SAR) are used to retrieve information on the thermal state of waterbodies, digital elevation models from photogrammetry are used to infer topographic parameters, and multispectral imagery is used to acquire information on surface characteristics and shoreline erosion rates.



RapidEye Imagery of Deadhorse, AK and its surroundings. The right part of the image shows Lake Coleen and the Deadhorse airport (Photo: Firma Planet (Labs Inc.))