Identifying Erosional Hot Spots around Thermokarst Lakes using RapidEye Imagery

Motivation

- Abundant and dynamic periglacial landform
- Formed by settlement of the ground due to excess ice and permafrost thawing
- 25 to 40% of the Arctic's land surface are covered by Thermokarst Lakes with their number steadily growing

**Due to their lateral thermal and mechanical erosion they shape their surrounding topography and hydrological network and can affect anthropogenic infrastructure**

Results

Subsampled lakes show...

- Net Shoreline Movement from -7 to -10 m
- Southeastern part of shoreline prone to erosion or
- Regular expansion

But...

- Spatial pattern not dominant in the Prudhoe Bay area: some lakes even show no change at all
- Detailed Quantification limited by spatial resolution
- Estimation insufficient along drainage channels, gullies

Conclusions

✔ Identification in remote and restricted areas
✔ Fast and cost effective
✗ Quantification of shoreline erosion rates
✗ Capture of complexity of erosion

Improve Analysis by using datasets with a spatial resolution on a sub-meter scale (UAV, field data, Lidar) and a classification method that also considers complex erosional processes (gully formation etc)

Outlook

Identification of driving factors
- (Micro)-Topography
- Lake size
- Lake ice type
- Vegetation
- Soil
- Seasonal changes in meteorological conditions