

EGU21-14455

<https://doi.org/10.5194/egusphere-egu21-14455>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## Multi-scale remote sensing observations of a palsa in degradation phase

**Heather Reese**, Mats Olvmo, Sofia Thorsson, and Björn Holmer

Univ. of Gothenburg, Dept. of Earth Sciences, Gothenburg, Sweden (heather.reese@gu.se)

The Vissátvuopmi palsa complex (N 68°74'50", E 21°11'30") is the largest coherent palsa complex in Sweden (ca 274 ha). Aerial photo-interpretation over an area covered by plateau palsas showed a 30% decline in lateral area -- from ca 70 to 49 ha -- that occurred between 1955 to 2016 (Olvmo et al., 2020). Within Vissátvuopmi, we have more closely studied two single palsas, one dome-shaped and one ridge-shaped, for changes in extent, height and vegetation composition. Manual interpretation of aerial photography between 1955 and 2016 show lateral degradation of 35% and 54% for the dome and ridge palsas, respectively. Since 2018 we have monitored the palsas using images from drones as well as analysis of Planet Dove and Sentinel-2 satellite imagery. Photogrammetry is used to produce orthophotos as well as digital surface models (DSMs) from the drone images, and compared to earlier LiDAR and aerial photo DSMs, to study lateral and vertical degradation.

The drone-generated DSMs from 2018, 2019 and 2020 show further lateral degradation of the two large palsas. In 2020 a rapid change in vegetation composition was seen on the dome-shaped palsa, where a 250 m<sup>2</sup> area of *Betula nana* and *Empetrum hermaphroditum* transitioned to lichen. This vegetation change could be seen in spectral data from both drone and satellite platforms. The future development of this palsa, monitored annually using both fine and medium spatial resolution data, will give insight into the timing and signs of the individual palsas in stages of degradation.