Thermal behaviour of retrogressive thaw slumps over time revealed by ERT – an example from Herschel Island, Canada

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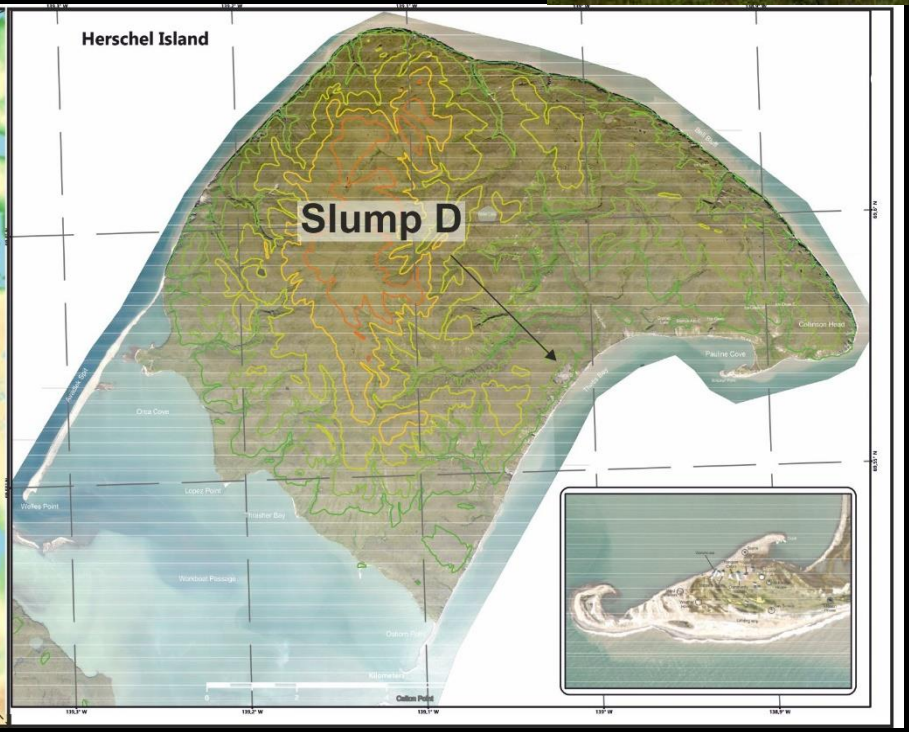
Slump D – Herschel Island

Yukon Territory, Canada

Located between Mackenzie Delta and Alaska in the southern Beaufort Sea. This area is characterized by the largest and highest density of retrogressive thaw slumps in the Canadian Arctic. (Lantuit & Pollard 2008)

Herschel Island is part of the Yukon Coastal Plain, part of an ice-pushed structure formed by the westward advance of a lobe of the Laurentide ice sheet. (Lantuit & Pollard 2008)

Photo: S. Wetterich



Map (left): Openstreetmap

Map (right): AWI

Lantuit, H. & Pollard, W.H. (2008): Fifty years of coastal erosion and retrogressive thaw slumo activity on Herschel Island, southern Beaufort Sea, Yukon Territory, Canada. – Geomorphology 95, 84-102, DOI: 10.1016/j.geomorph.2006.07.040

DEM via laserscanning

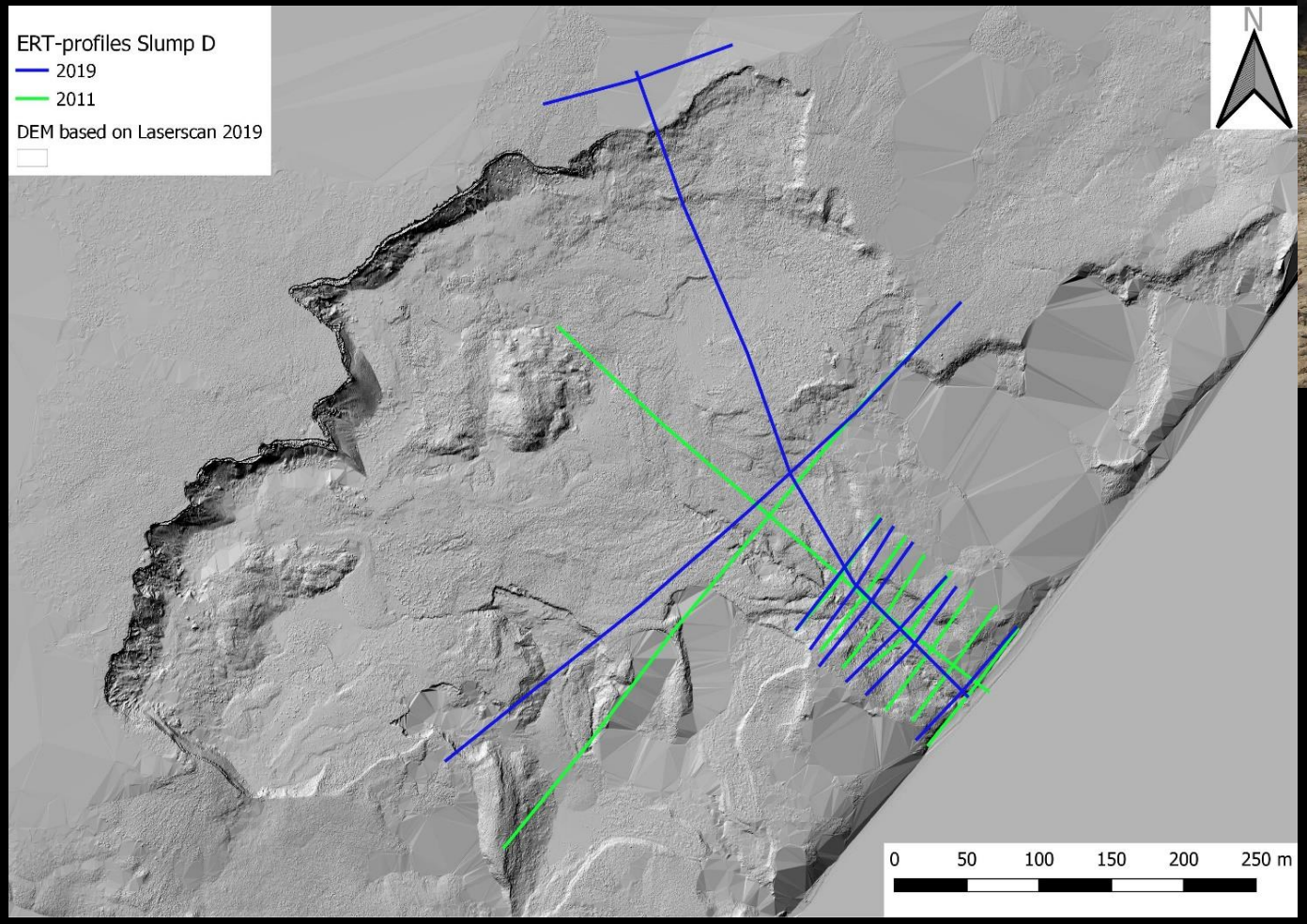
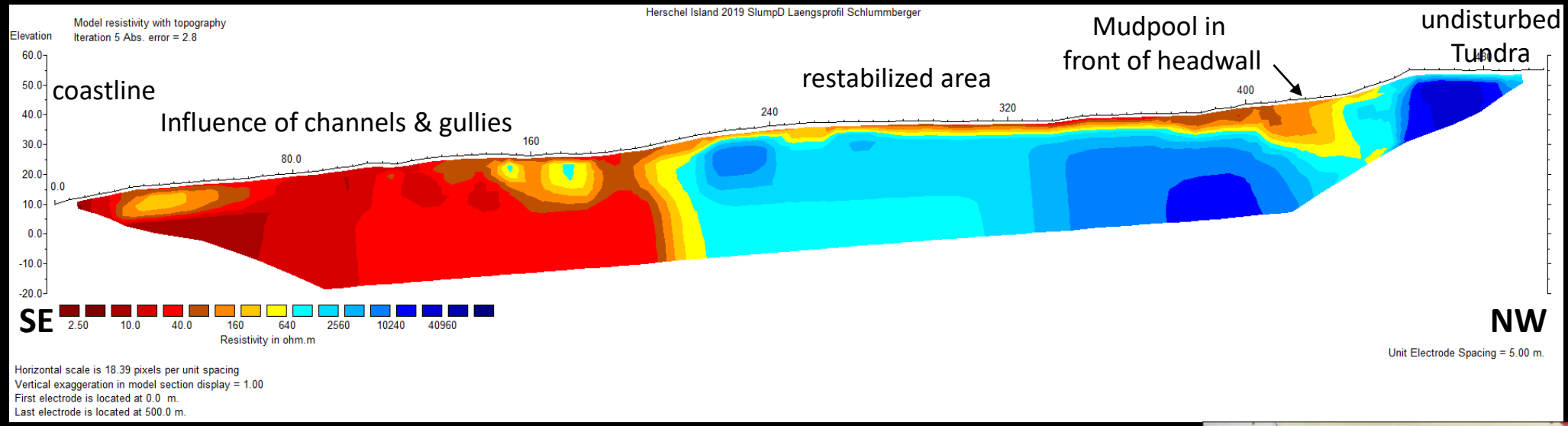


Photo: T. Priest

In 2011 & 2019 Electrical Resistivity Tomography (ERT) was carried out in Slump D on Herschel Island. On the 2019 DEM you can see the location of these profiles. Derivations in these profiles are due to the change in the Slump morphology between 2011 & 2019.

Electrical resistivity tomography (ERT) profile



- Figure above shows the longitudinal profile 2019 through the slump
- the ERT-Data will be temperature calibrated in the lab (Krautblatter et al. 2010)
- After the temperature calibration (delayed due to Corona) it will be possible to interpret the influence of the retrogressive thaw slump on the ground ice

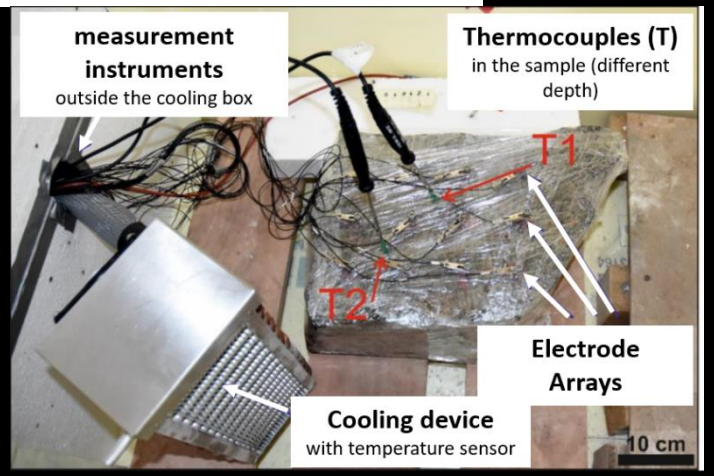


Photo: J. Leinauer

Krautblatter, M. et al. (2010): Temperature-calibrated imaging of seasonal changes in permafrost rock walls by quantitative electrical resistivity tomography. Journal of Geophysical Research 115, DOI: 10.1029/2008JF001209