Preliminary Analysis of a Retrogressive Thaw Slump Multi-Source Database for the West Siberian Arctic

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Background & Study area

Retrogressive thaw slump (RTS) is a cryogenic landform due to ice-rich permafrost thawing or massive ground ice melting:
- Significantly altering the environment: vegetation, topography and carbon emissions
- Vulnerable to the temperature fluctuations
- Polycyclic nature: active or stabilized (or ancient)
- Complex features: multiage zones within one landform

West Siberian Arctic: Continuous permafrost + tabular massive ground ice close to the surface → widespread RTS occurrence

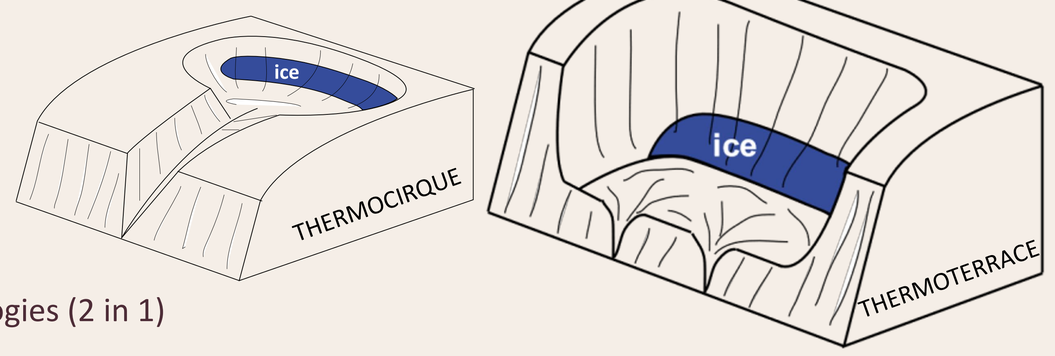
The aim

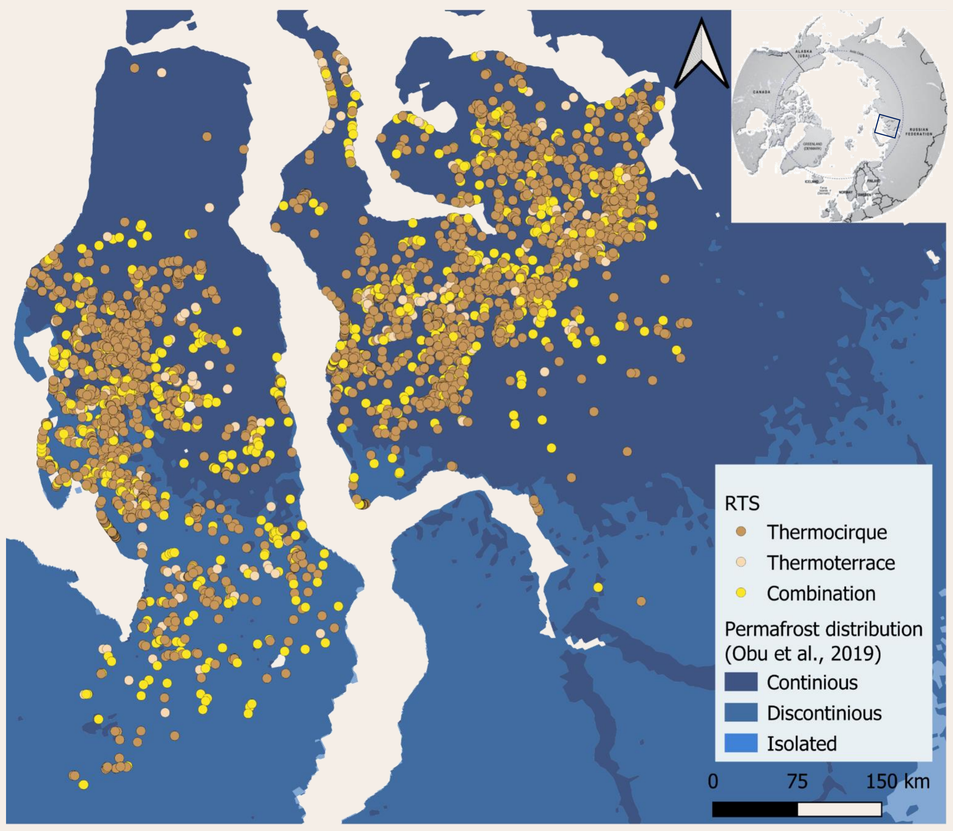
Further detailed investigation of RTS occurrence and environmental factors

Materials & Methods

- Mapped RTS points by Nesterova et al. 2021, Nitze et al., 2018 and Yang et al., 2023
- Manual collection of RTS points based on: ESRI satellite base map, Google map satellite, Yandex map satellite
- Classification

How does RTS look in West Siberia?





Results

4390 points collected
- 3150 are morphologically Thermocirques
- 828 combined morphologies and only 160 Thermoterraces
- 2139 complex and 1999 single forms

Most common RTS: single thermocirque at the lakeshore (with thermokarst subsidence and thermoerosion)

Central Yamal, UAV photo: Nina Nesterova, 2019

Source: OpenAI

AI thoughts on RTS in West Siberia

Outlook

In relation to data on:
- Geology
- Ground ice content
- Climate
- Landcover
- Other environmental parameters

More figures, statistics & References

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