Distribution of retrogressive thaw slumps in West Siberia: the database of spectacular permafrost feature driven by climate change

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Photo credits: Artem Khomutov

What is a retrogressive thaw slump (RTS)?

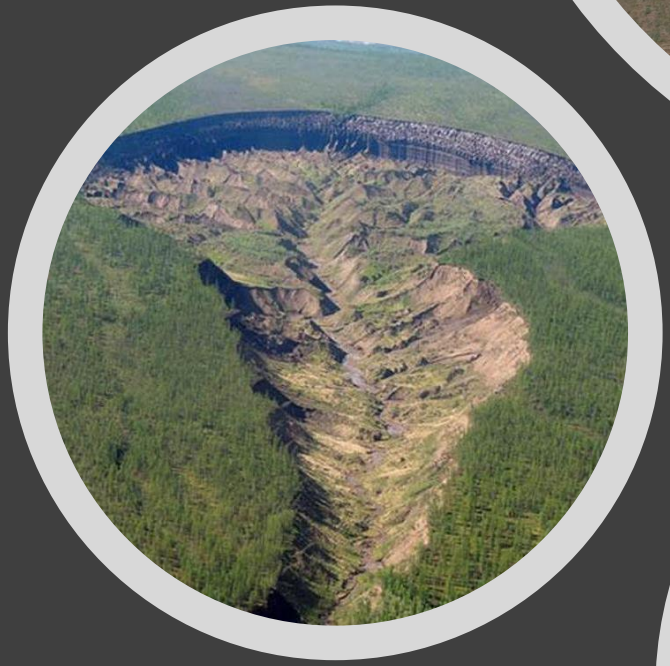
- permafrost feature occurring due to tabular ground ice melting in the upper permafrost
- horseshoe-shaped (or cirque-shaped) landslide, with a steep headscarp
- polycyclic behavior
- thermocirque – the term in Russian describing the landform as a result of slumping process

Photo credits: Artem Khomutov

Why is it important?

- Terrestrial surface disturbance (can be as huge as 1 km * 0,8 km)
- Exposing ground ice
- Carbon emissions to the atmosphere
- Carbon emissions to the water
- Air temperature dependent

Photo credits: Artem Khomutov



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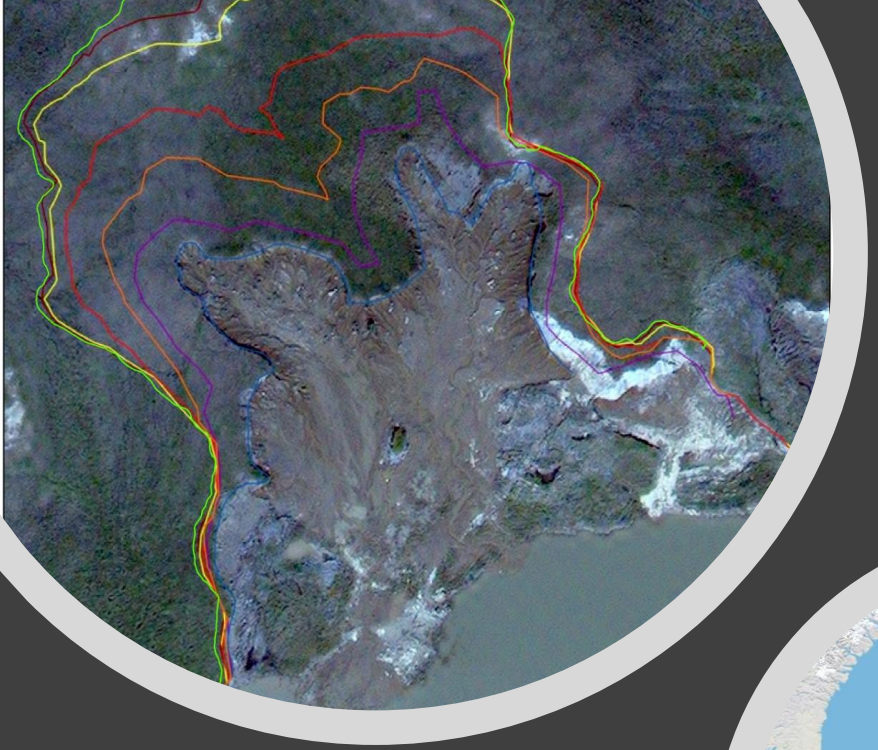


How is it studied in West Siberia?

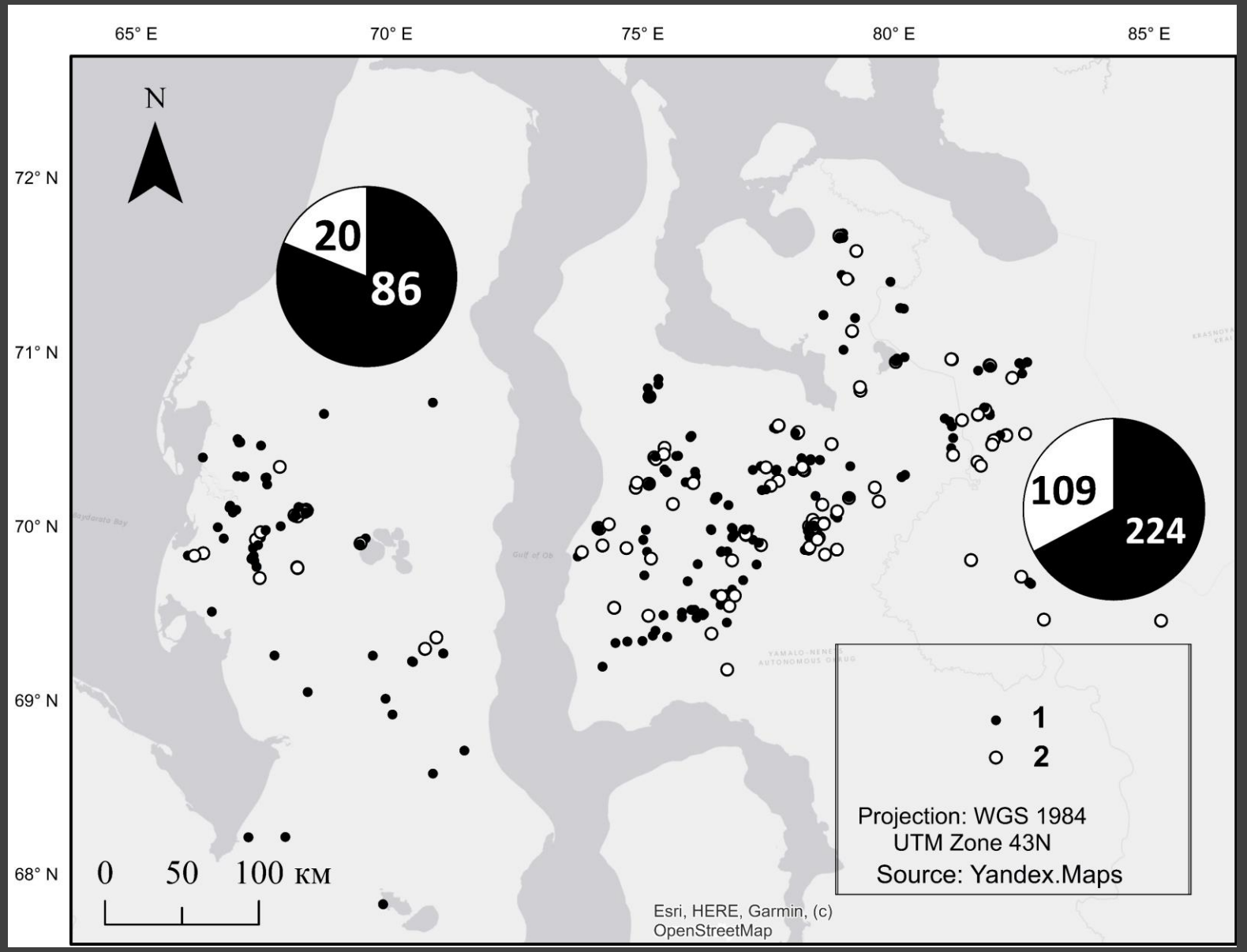
- Long-term field monitoring
- Research station in Central Yamal
- Multidisciplinary studies

Source: Earth Cryosphere Institute

What about spatial distribution of RTS?

- No published map / spatial database of RTS in Russia (nor for the entire Arctic)
- Set of visual characteristics on satellite images
- Mapping in West Siberia by manual identification using free satellite imagery of Yandex.Maps service

Source: Yandex.Maps



- Status of RTS:
  1) active
  2) stabilized
- Orientation information

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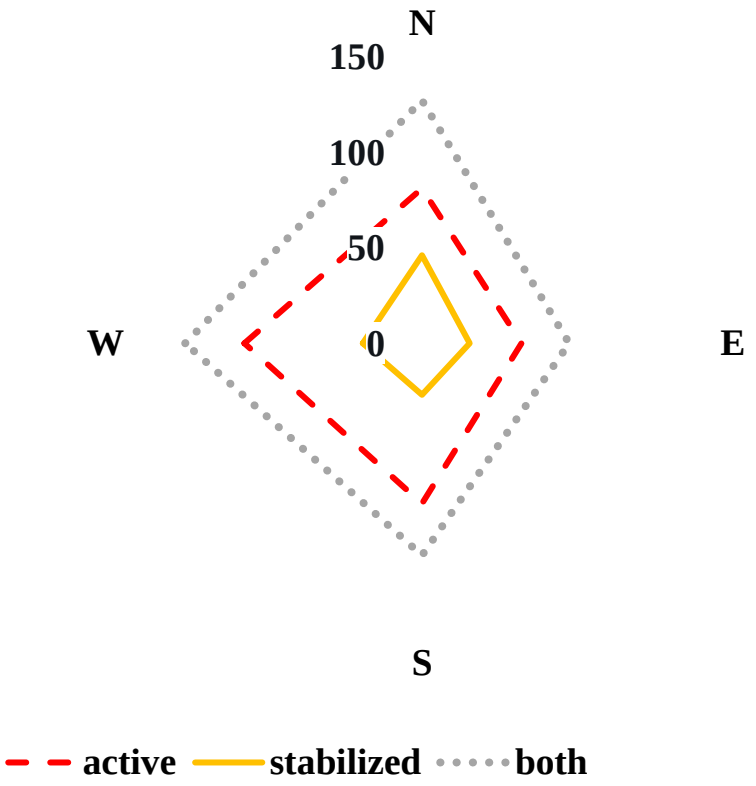
First statistical studies

- Dominance of active RTS over stabilized on both peninsulas
- RTS orientations are not randomly distributed
- No statistically significant prevalence of one orientation over all



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Further studies

- Collecting more environmental and cryolithological data
- Collecting data on the chronology of RTS activity
- Statistical analyses to determine driving factors of RTS distribution and activity

Thank you!

We welcome all ideas and possible collaborations

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