



Permafrost Infrastructure

7D - Permafrost Engineering, Geomorphology, Hydrology for Northern Linear Infrastructure Resilience and Safety

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Northern linear infrastructure such as roads and airstrips are vulnerable to natural processes and geohazards. Climate change is contributing to more frequent and intense geohazards which translate to increased maintenance and repair costs, as well as potentially dangerous travelling conditions.

In northern environments, geohazards result from permafrost thaw and permafrost hydrology and commonly cause damage to, or lead to failure of, transportation infrastructures. Some of these geohazards initiate due to thermal disturbances induced by construction of the infrastructures themselves. Other processes that eventually reach and impact infrastructures occur naturally or as a function of climate change, sometimes hundreds of meters away.

In this context, engineering, permafrost geomorphology, permafrost hydrology, and related disciplines are non-exclusively well suited to efficiently assess permafrost thaw-related geohazard risks. By assessing the above- and below-ground preconditions, the processes responsible for the geohazards can be identified. This knowledge supports decision-making about how best to invest in transportation networks in a time when climate change will continue to generate unprecedented extreme conditions associated with permafrost processes.

This session is dedicated to studies using those disciplines to generate new knowledge applicable to improving the resilience and safety of existing northern transportation infrastructure. Transportation infrastructure managers can use this information to augment remediation strategies, develop risk-management procedures and policies to enhance disaster preparedness, and mitigate disaster by implementing appropriate rehabilitation and reconstruction.

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