

# Subglacial Landscape in Canadian Tundra Zone - Field Perspective

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- Selected images come from Chris Clark (U. Sheffield) and Liav Olan (Simon Fraser U.)

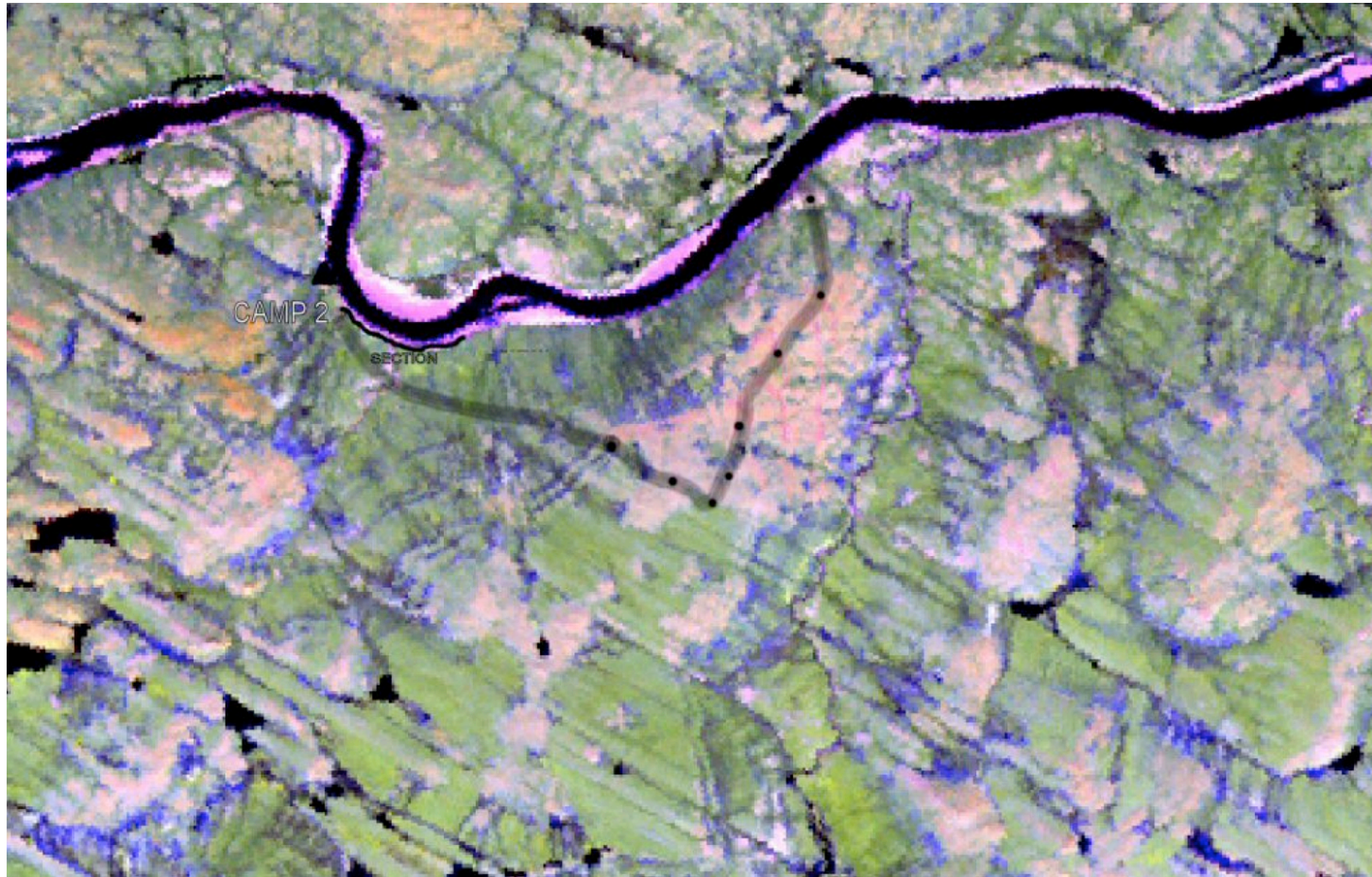
## Objective:

- Illustrate upsides and downsides of using subglacial landscapes in Canadian tundra zone as analogs for modern subglacial environments

## Upsides:

- Topography dominated in many places by subglacial landforms
- Various landscapes exist that can be related to past presence of paleo-ice streams and slow-moving ice

Landsat image of subglacial landscape in Nunavut Province (courtesy of Chris Clark). Pink areas represent bedrock (mostly polished and grooved by ice) and there are many places with streamlined subglacial landforms.





Picture of a large ribbed moraine (Nunavut Province)



## Downsides:

- A number of factors other than subglacial processes has influenced topography, particularly at vertical amplitudes of the order of 0.1 to 10 m:
- Permafrost processes shatter exposed bedrock, perturb sediments, and displace debris and sediments (typically disturbances with amplitudes of the order of 0.1 m)
- Erosion by late glacial meltwater rivers/streams and modern rivers/streams has modified subglacial landscapes (vertical amplitudes of up to ~10 m)
- Many areas have been affected by coastal erosion associated with either proglacial lakes or expanding seawater basins (e.g. Hudson Bay)
- Subglacial landscapes may be obscured by late glacial deposition of englacial or supraglacial debris and by deposition of proglacial lake sediments
- Many closed depressions filled by lakes, which may obscure 1/2 or 1/3 or the landscape
- Sparse bushes or trees may cover parts of the landscape



Subglacial landscape modified by river erosion and coastal erosion (shorelines and lake cliffs here)





Glaciated bedrock shattered and displaced by frost action





Sparse trees in subglacial landscape. River valley cut into a field of elongated subglacial landforms.





Permafrost cracks in glacial sediments. The spacing of these cracks is a few dozens of meters.

