

Mapping ground movement and permafrost temperature case studies from Nunavut and Nunavik

Anne-Marie LeBlanc

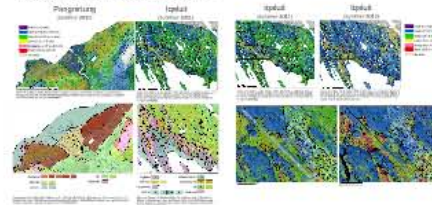


Natural Resources Canada

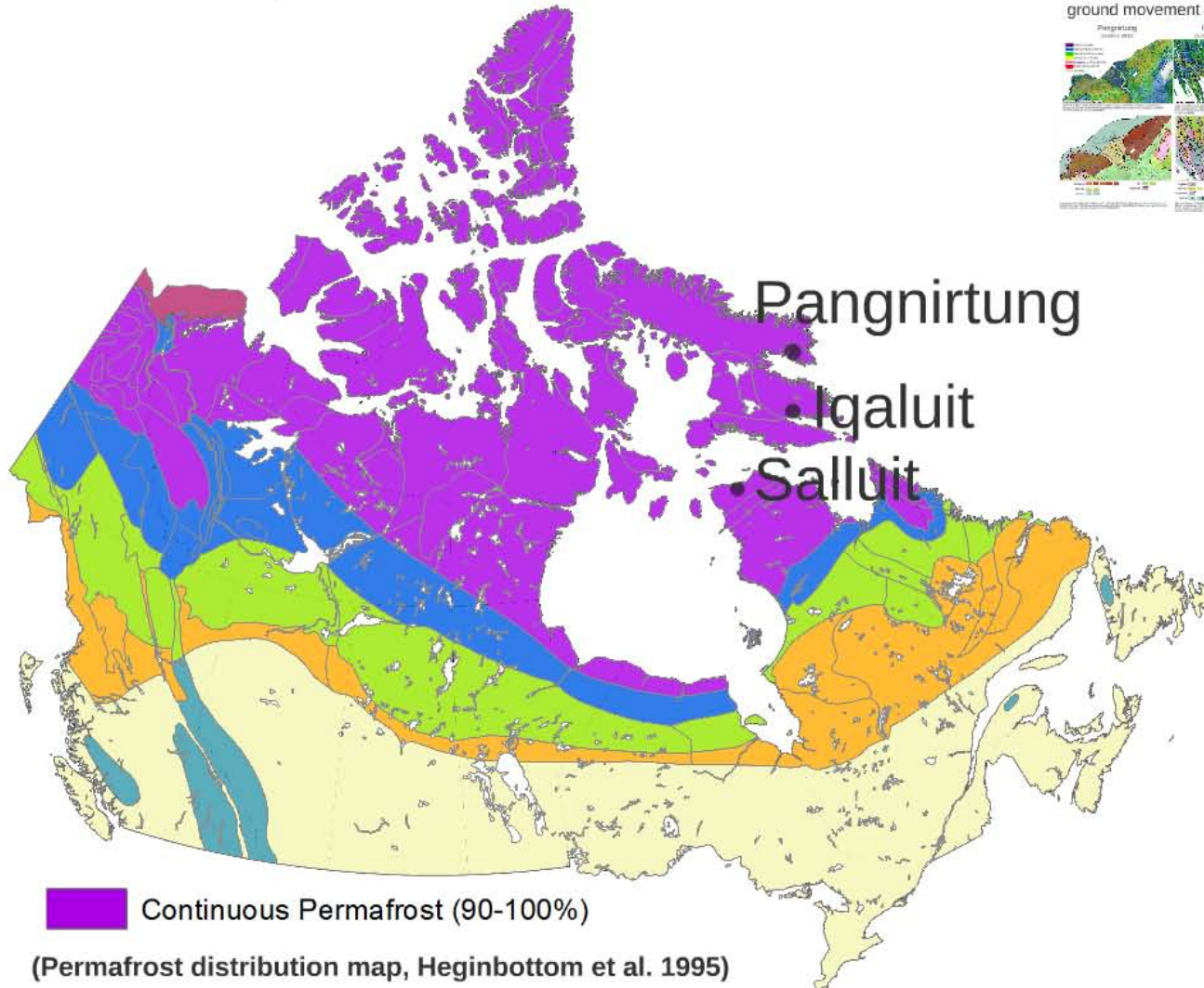
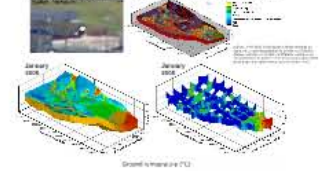
Naomi Short, CCMEO

Contribution to permafrost knowledge
Answers to engineering questions

InSAR mapping for ground movement



Thermal modeling for permafrost temperature distribution and CC impacts



Continuous Permafrost (90-100%)

(Permafrost distribution map, Heginbottom et al. 1995)

Key recommendations

Key messages, recommendations

- InSAR maps useful tool to identify those unstable areas and their extent
- Use as a first order prediction for spatial patterns of long-term terrain instability
- Results should be interpreted according to field observations to deduce possible causes of settlement
- make the adaptation (action) officers

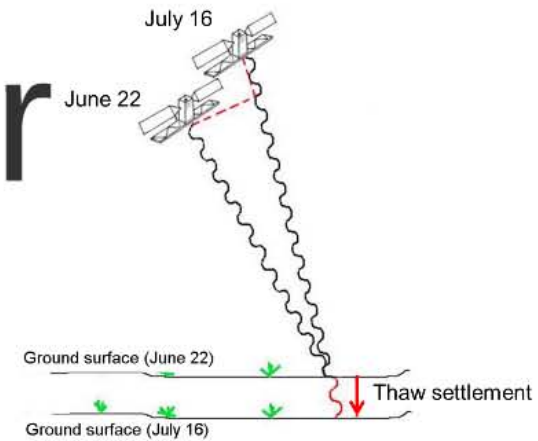
Key messages, recommendations

- Results highlights the high variability in ground temperature at a community scale
- Reveal the importance to establish monitoring sites for permafrost temperature to support decision
- Thermal modeling & climate change scenarios to understand the consequences of permafrost activity, when degradation occur need to duration

Knowledge transfer and adaptation

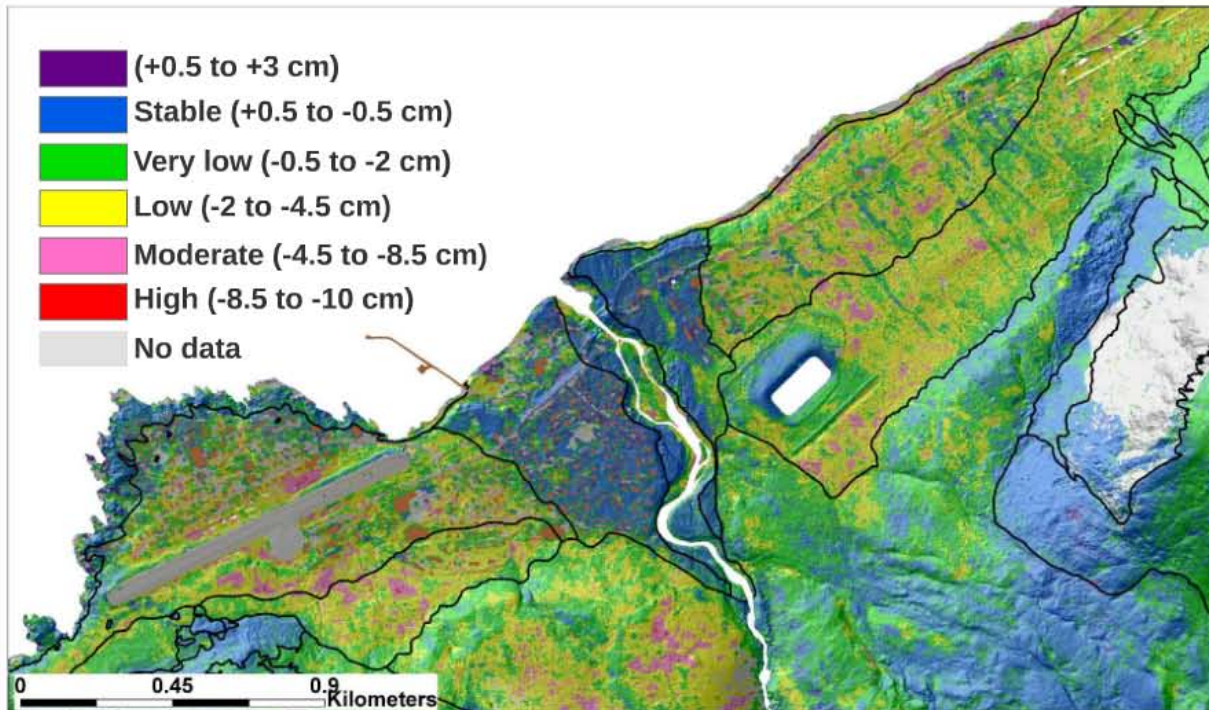


InSAR mapping for ground movement

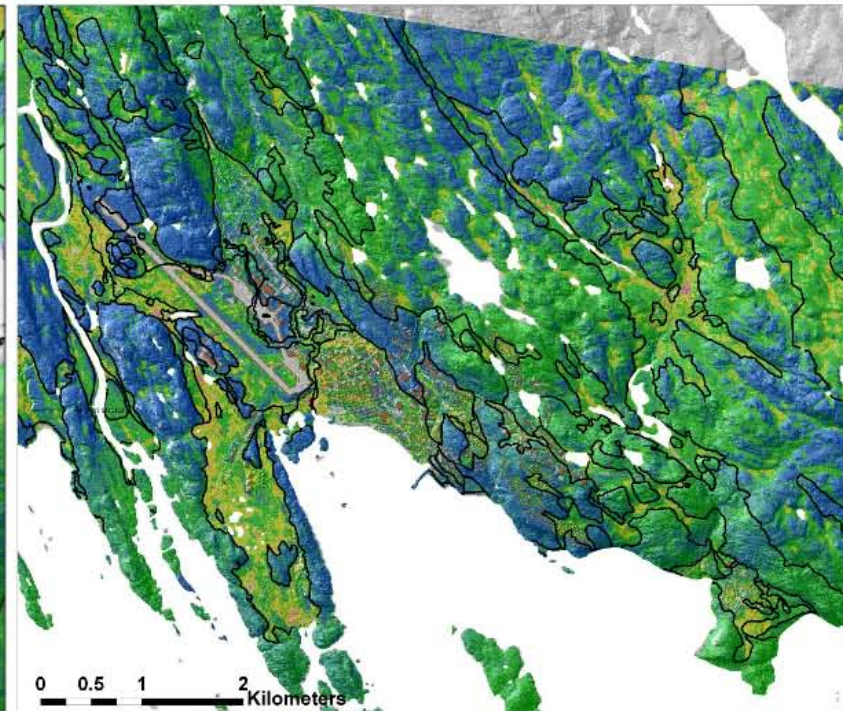


Pangnirtung
(summer 2011)

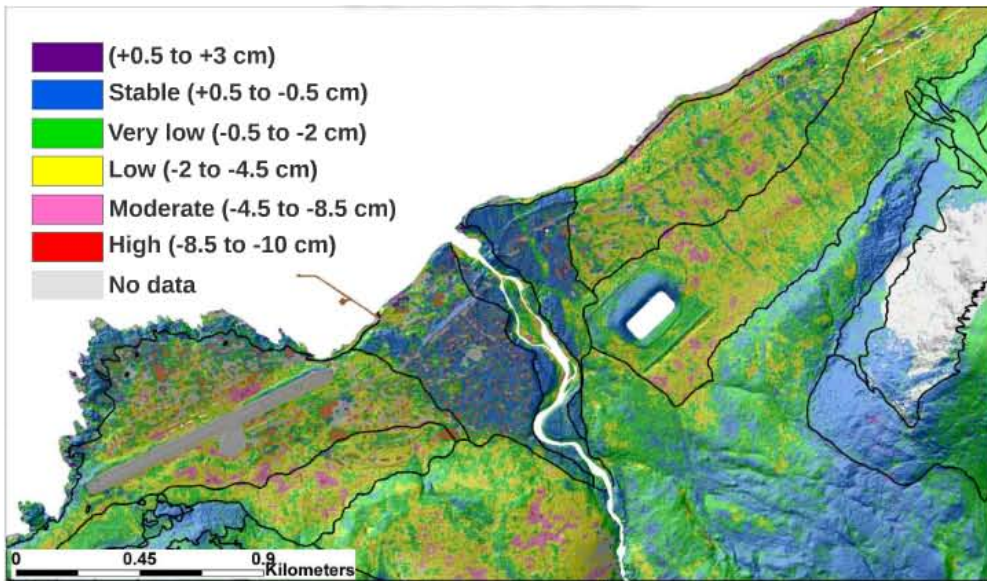
Iqaluit
(summer 2011)



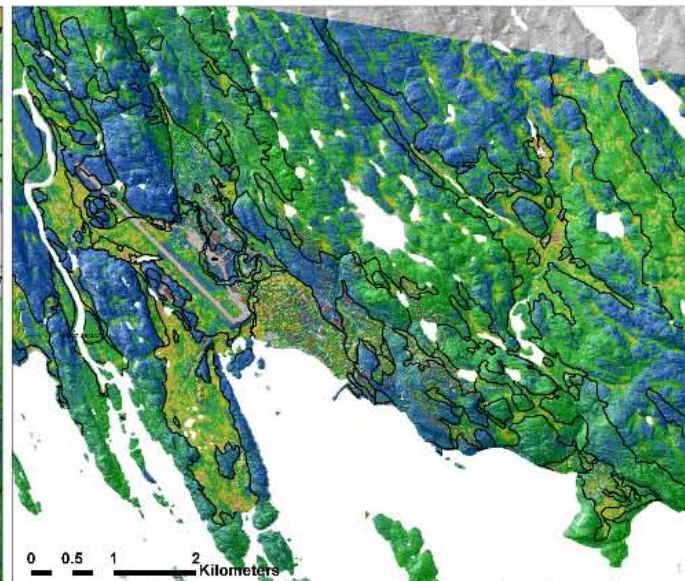
Short, N., LeBlanc, A.-M., Sladen, W.E., Carbonneau, A.-S., and Allard, M., 2012. Seasonal Surface Displacement Derived from InSAR, Pangnirtung, Nunavut; Geological Survey of Canada, Canadian Geoscience Map 67, doi:10.4095/289607.



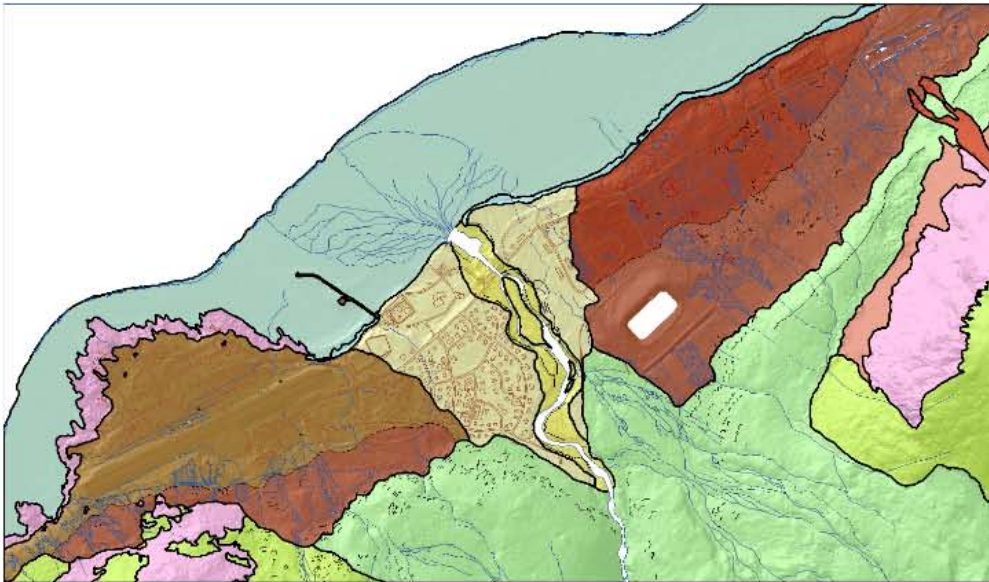
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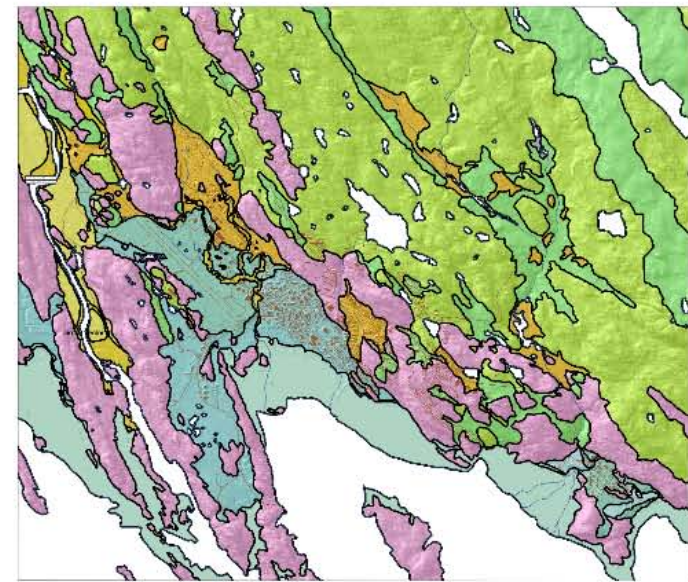
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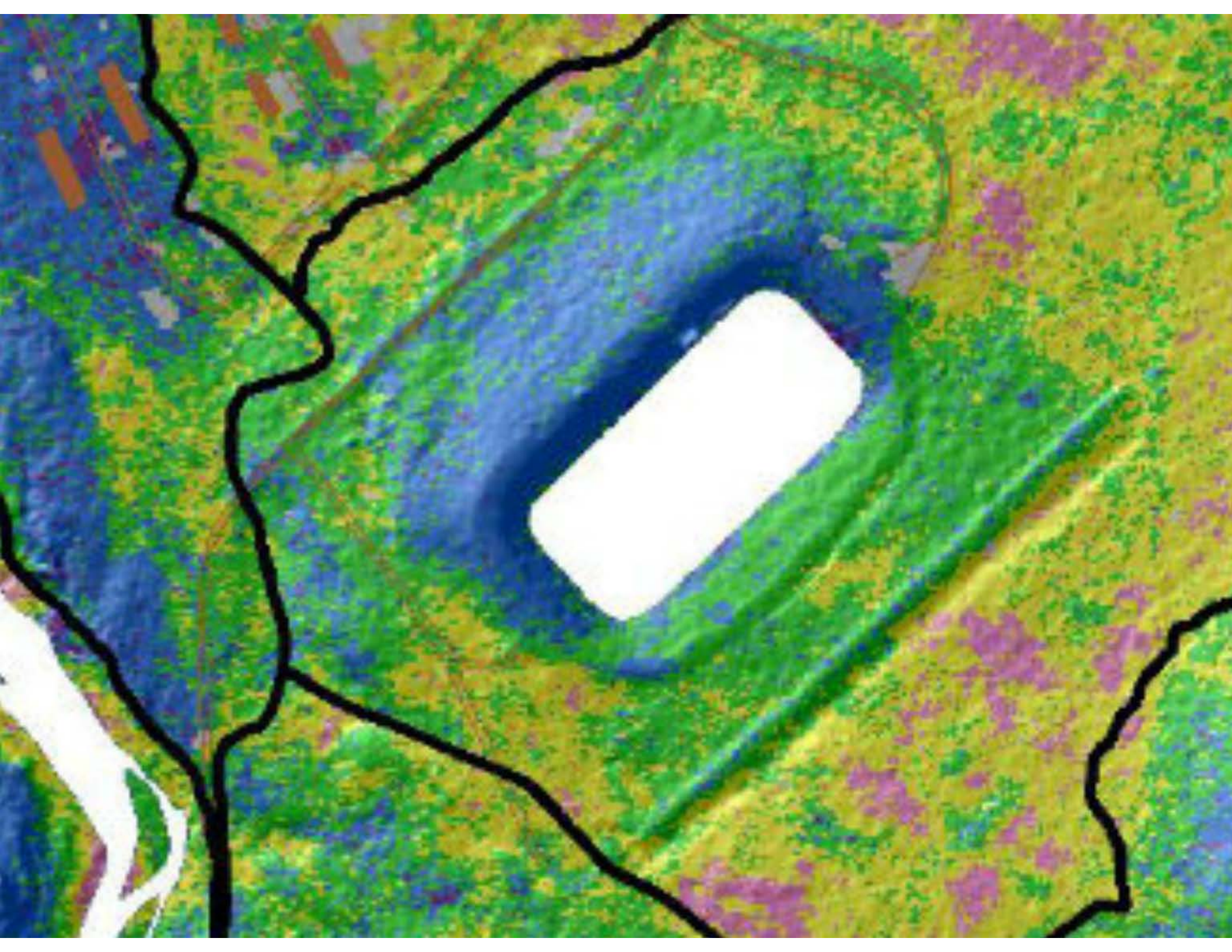
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Carbonneau, A.-S., Allard, M., LeBlanc, A.-M., L'Hérault, E., Mate, D., Oldenborger, G.A., Gosselin, P., and Sladen, W.E., 2012. Surficial geology and periglacial features, Pangnirtung, Nunavut; Geological Survey of Canada, Canadian Geoscience Map 65, doi:10.4095/289504.

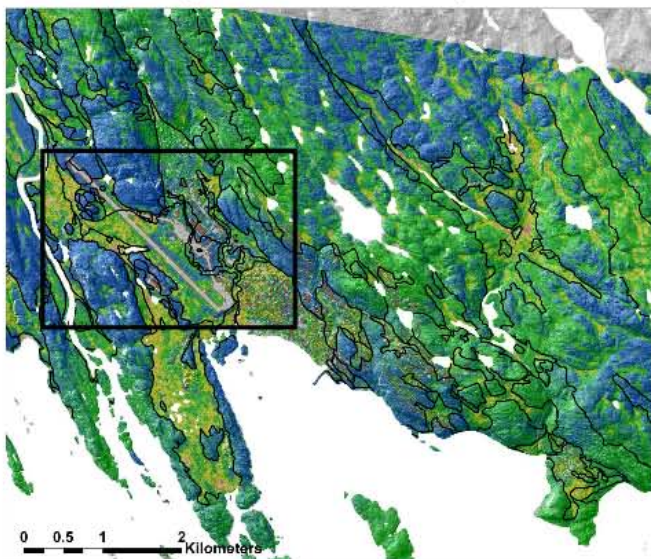


Allard, M., Doyon, J., Mathon-Dufour, V., LeBlanc, A.-M., L'Hérault, E., Mate, D., Oldenborger, G.A., and Sladen, W.E., 2012. Surficial geology, Iqaluit, Nunavut; Geological Survey of Canada, Canadian Geoscience Map 64, doi:10.4095/289503.



Iqaluit

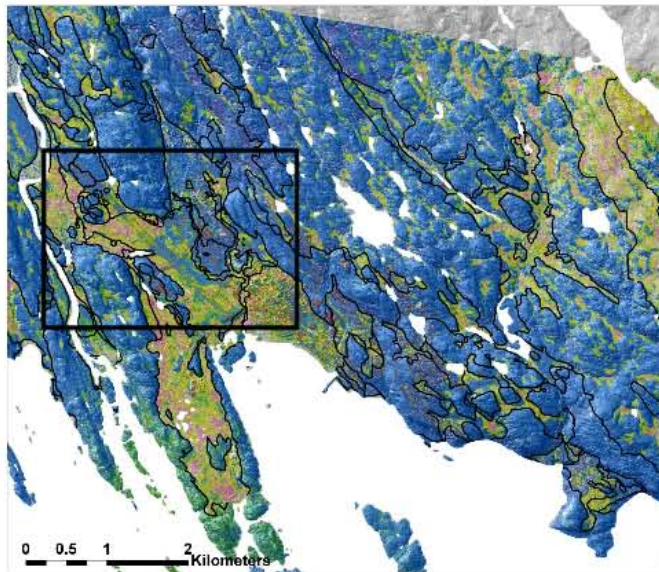
(summer 2011)



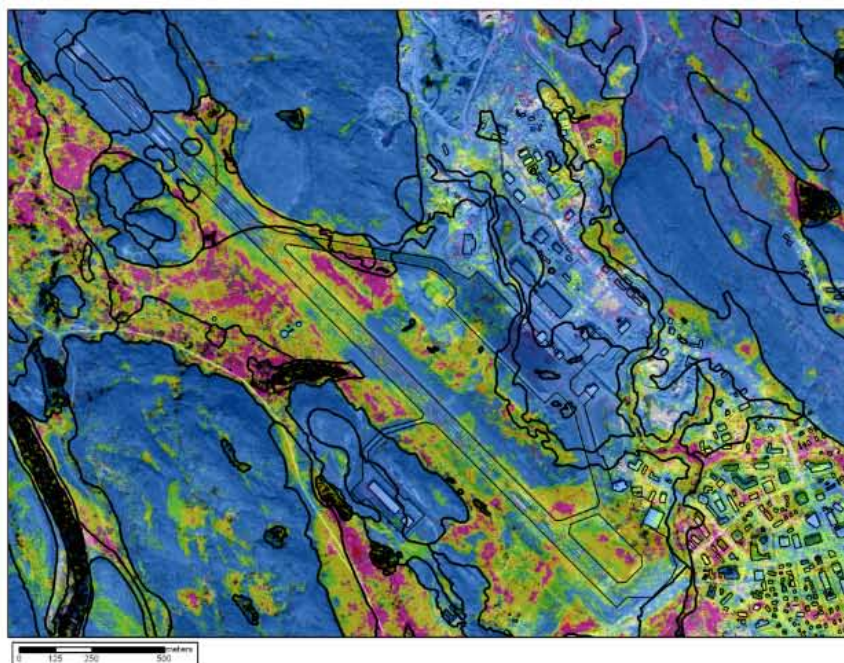
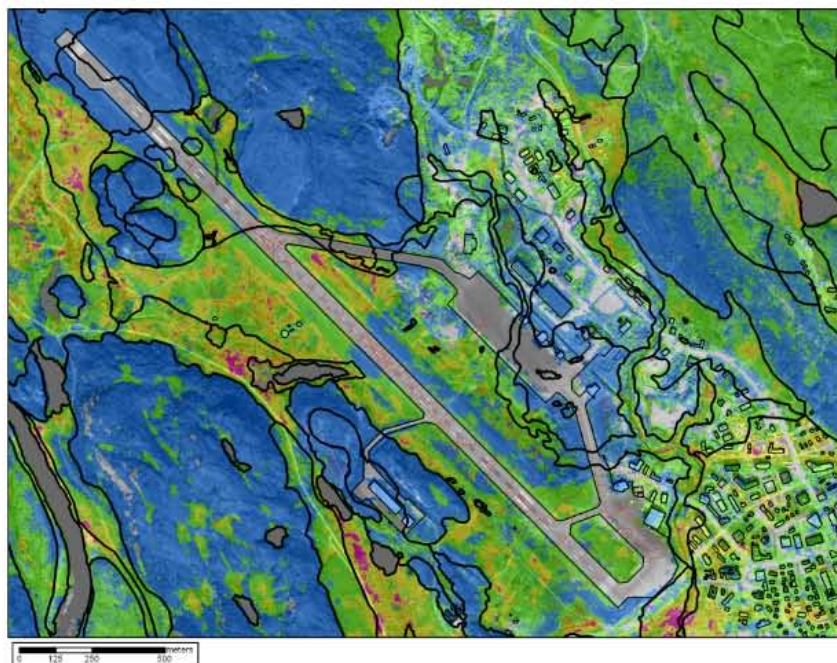
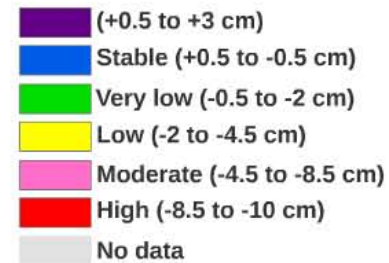
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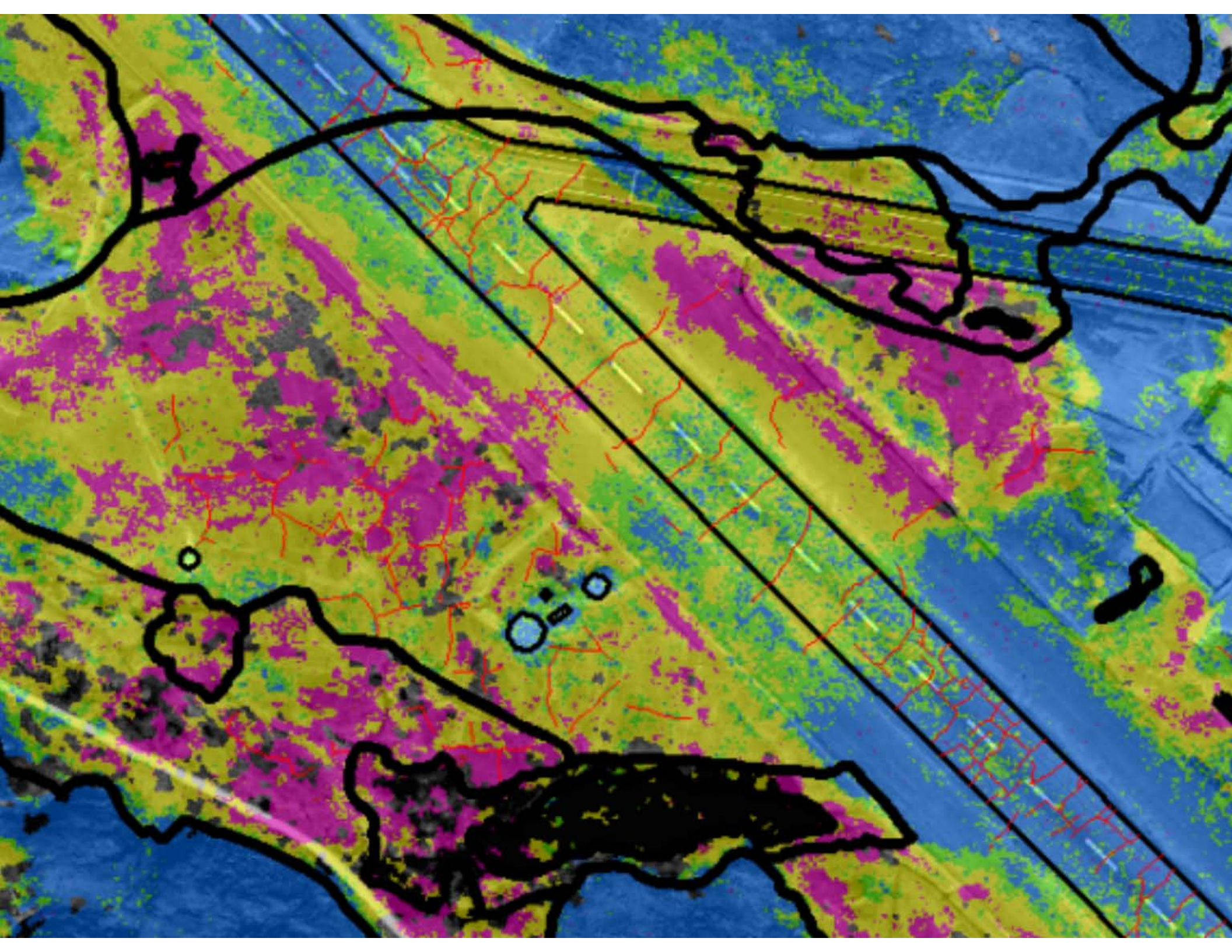
Iqaluit

(summer 2012)



Short, N., LeBlanc A-M, Sladen W.E., Oldenborger, G.A. Mathon-Dufour V. and Brisco, B. Accepted. Remote Sensing of Environment. RADARSAT-2 D-InSAR for ground displacement in permafrost terrain, validation from Iqaluit Airport, Baffin Island, Canada.

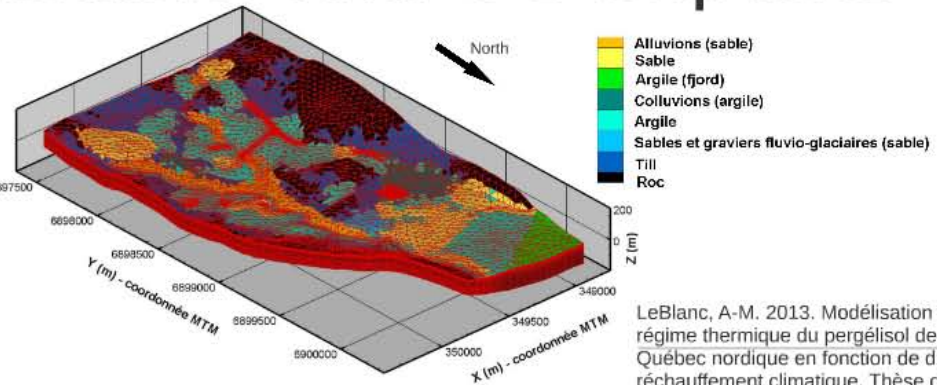




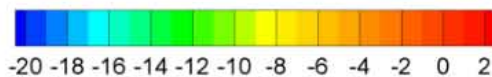
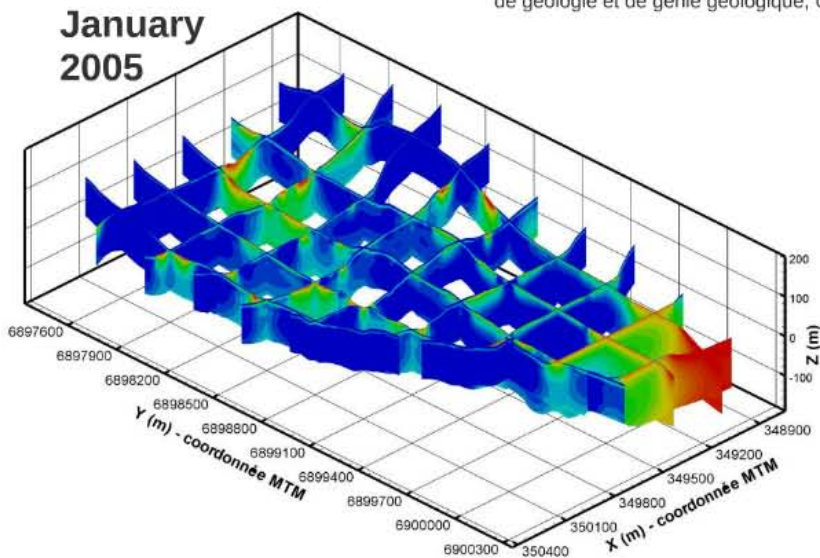
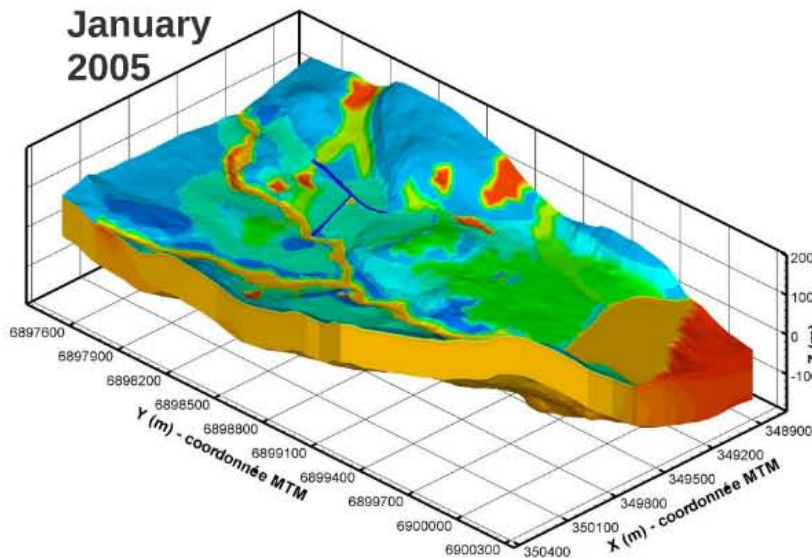
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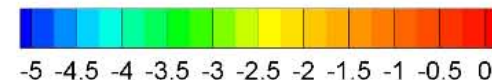
Thermal modeling for permafrost temperature distribution and CC impacts



LeBlanc, A-M. 2013. Modélisation tridimensionnelle du régime thermique du pergélisol de la vallée de Salluit au Québec nordique en fonction de différents scénarios de réchauffement climatique. Thèse de doctorat, Département de géologie et de génie géologique, Université Laval.



Ground temperature (°C)



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Knowledge transfer and adaptation

