



2018 Annual Report: from the Université de Sherbrooke research group (GRIMP) – Research license 04 010 15R-M

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The group from the Université de Sherbrooke was in Cambridge Bay 22 days in April and 10 days in July of 2018. Seven researchers took part in snow measurements around Greiner Lake, following the same transects established in the first 4 years of the project. The project is motivated by the increase in extreme weather events in the Arctic such as rain-on-snow (ROS) events, which change snow characteristics. Those events lead to the formation of ice layers that affect travel on the land and caribou grazing conditions. Several events killed many animals, not only in Canada. The year 2018 was also a first year of UAV flights for us. Flights occurred both during the winter and summer periods, from which snow depth maps can be derived from UAV photos.

The main objective of this project is three-fold: 1) to develop rain-on-snow and ice detection methods using satellite image, 2) use a snow model to simulate caribou grazing conditions and 3) characterize snow from satellites. The short term use of the data allowed us to validate the snow model. In the long-term, the data collected on the field will be compared to satellites in order to see if they can detect changes in snow conditions (especially those during ROS events).

2018 sites surveyed (50 sites) with the following staff on the field: Daniel Kramer (PhD); Julien Meloche (MSc); Caroline Dolant (PhD); Chloé Martineau (MSc); Alain Royer (Prof); Vincent Sasseville (PhD); Simon Levasseur (MSc) and Guillaume Couture (MSc). **2019 plans (6 people, 3 weeks in April; 3 people, 2 weeks in July):** Repeat the surveys from the map above and include snow microwave measurements using our radiometers; Fly our unmanned aerial vehicle (UAV) in the Intensively Monitored Area (IMA; blue square in flowing map).

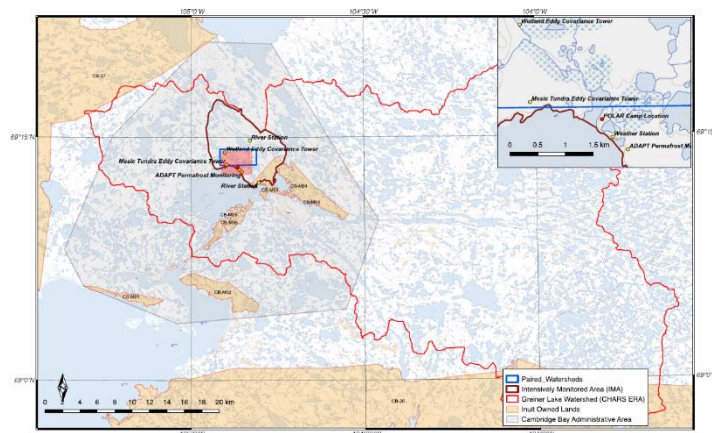


Figure: UAV flight zone near Greiner Lake

2018 UAV flights details

April: Flights using fixed-wing planes; *July:* Flights using quad-copter

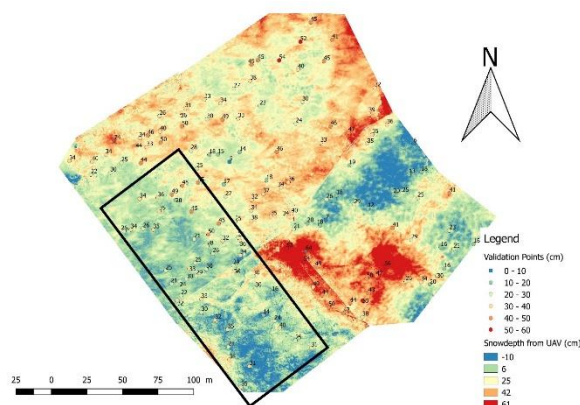


Figure: Snow depth map derived from UAV data



Figure: Summer image from the quad-copter