

PhD Opportunity in high-Arctic energy balance studies at White Glacier, Axel Heiberg Island, Canada

It is a pleasure to announce a fully-funded 4-year PhD opportunity in the Snow and Ice Research Laboratory (SIRL) at Queen's University in Kingston, Ontario (Canada) to study energy balance and glacier mass balance regimes in the Canadian high-Arctic (~80°N), specifically in the Expedition Fiord region of Axel Heiberg Island, NU. Set to start in September 2019, the position includes 4-years salary, fieldwork costs (travel, equipment, data services), and funding for required training (first aid, crevasse rescue), as well as attendance to conferences and workshops.

The glaciers of Expedition Fiord have been the focus of intensive research since 1960 when the McGill Arctic Research Station was founded by Dr. Fritz Müller. As a result, there is a rich archive of invaluable meteorological and glaciological data here that predate the satellite era. This project will revisit and build upon the seminal work of Dr. Atsumu Ohmura who produced the first high-Arctic energy balance model in Canada. In addition, the 60-year mass balance record from White Glacier (official reference glacier to the World Glacier Monitoring Service) will provide important validation for melt magnitude and extent across this region.

PROJECT DESCRIPTION: With support from the SIRL team, the successful candidate will upgrade and integrate a network of four automatic weather stations (AWS) in the Expedition Fiord region, which currently spans a length of 25 km and elevations from 50 to 1,825 meters above sea level. Using radio-frequency relays between stations and an iridium satellite-link from a central base station, the network will provide near/real-time regional climate data (weekly uplinks). Using this rapid-access climate data, alongside 15 years of existing AWS records, the successful candidate will: (1) Test empirical, semi-empirical, and energy balance melt models for White Glacier, and validate/calibrate the models using sonic depth-sounders, ablation stake measurements, and remote sensing observations of surface melt extent; (2) Assess the accuracy of the new ERA5 climate reanalysis product against AWS records, and derive a mass balance model for the region incorporating ERA5 climate variables; (3) Apply the mass balance models across Axel Heiberg Island, validating against the long-term mass balance record and existing geodetic mass balance data, to estimate the magnitude of freshwater contributions from glacier-covered watersheds.

This opportunity is best suited for a candidate holding an MSc in meteorology, glaciology, (geo)physics, applied mathematics, or analytical physical geography. Demonstrated experience with Campbell Scientific systems and climate data analysis (in situ and RCM) are considered highly beneficial, though not mandatory. Candidates should show evidence of analytical skills in anything beyond Excel (Python, R, Matlab, etc.). Priority will be given to Canadian applicants.

You will be joining the growing Snow and Ice Research Laboratory situated at Queen's University, which hosts a strong and highly interdisciplinary Arctic research community. Kingston is a vibrant, welcoming city that experiences all four seasons (including a very Canadian winter), and is a short (2-3 hour) train ride from the metropolitan centres of Montreal, Toronto, and Ottawa.

If you are interested in applying, please send a cover letter describing your motivation and suitability for the position along with your curriculum vitae to L.Thomson@queensu.ca with the subject title "PhD at Expedition Fiord."

Looking forward to hearing from you,
Laura Thomson

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