

MSc Projects available – Saglek and Hopedale blocks of the North Atlantic craton

Positions are available for enthusiastic, motivated students to undertake M.Sc. thesis projects in the Hopedale and Saglek blocks in Nunatsiavut, Labrador, starting in May 2018.

These projects address the tectonothermal evolution of two major Archean blocks on the Eastern margin of Canada; the ca. 3.2-3.9 Ga Saglek and ca. 2.8-3.2 Ga Hopedale blocks, both detached fragments of the North Atlantic craton which is centered in southern Greenland. The two blocks were assembled during the Neoproterozoic, although the extent and nature of their mutual boundary is yet to be accurately explained, and is largely obscured by the Mesoproterozoic-age Nain plutonic complex.

Moreover, the Saglek and Hopedale blocks were structurally and thermally affected by the Paleoproterozoic-age Torngat orogen along their western flanks. The overarching goal of the project is to investigate the individual metamorphic histories of these two blocks, the tectonothermal effect of their apparent Neoproterozoic assembly, as well as the distribution and nature of Paleoproterozoic tectonothermal overprint. The proposed M.Sc. projects would tackle aspects of this complex and very exciting tectonometamorphic puzzle.

Project 1: Metamorphism and geochronology

The Hunt River belt in the Hopedale block is a well-preserved, ~3.1 Ga volcanic belt metamorphosed to upper greenschist facies. This project will aim to construct a detailed structural and lithostratigraphic section of the volcanic belt, and the immediately underlying Archean basement rocks. Work will include detailed bedrock mapping, structural analysis, U-Pb dating of metamorphism using zircon and monazite, and thermobarometric modelling to constrain the timing and conditions of metamorphism. Previous field experience is required and student must be capable of working in remote mountainous areas. Student should have a good background in structural geology as well as metamorphic and igneous petrology.

Project 2: Low-temperature thermochronology

This project aims to constrain and quantify the timing, rate and amount of crustal denudation associated with rifting processes, which have separated the North Atlantic Craton from Greenland during the Mesozoic. It combines an integrated approach including fieldwork along a transect across the Nunatsiavut region, low-temperature thermochronology with (U-Th)/He apatite and zircon dating and numerical thermal modeling to reconstruct the upper crustal thermal and exhumational history of this area. The candidate needs to be meticulous and motivated to spend time in the laboratory to prepare the samples for dating. The student needs to have a good background in structural geology, and solid fundamentals in chemistry and physics.

Supervised by: Dr. Deanne van Rooyen (Cape Breton University), Dr. Isabelle Coutand (Dalhousie University), and Dr. Chris McFarlane (University of New Brunswick).

Students should be available to start their programs by May of 2018. Field work will take place in the summer of 2018, with possible follow-up work in 2019. Students can apply for summer employment with the GSC through FSWEF. The field work, analytical work, and student support for this project is fully funded by a Grants and Contributions Award to D. van Rooyen through the GEM-2 program. Students will enroll at Dalhousie University or UNB. Students are expected to apply for external and internal scholarships.

Interested students should contact deanne_vanrooyen@cbu.ca as soon as possible, additional projects can also be considered depending on individual interests.