

## Vita

Candidate's name: Kelsey Amber Koerner

Universities  
Attended: University of New Brunswick (2018)  
Bachelors of Science Honours  
Earth Science

University of New Brunswick (2020)  
Masters of Science  
Earth Science

### Publications/Presentations:

Atlantic Geoscience Society 46th Colloquium – Oral Presentation: Late Holocene sea surface cooling in the North Water region, northern Baffin Bay – Truro, NS – Feb. 7th to 8th, 2020

Girls STEM Up: Discovery – Poster Presentation: Changes in sea surface conditions and dinoflagellate cyst productivity in the North Water (NOW) polynya over the last ca. 4000 years – Fredericton, NB – Nov. 23rd, 2019

ArcTrain Annual Student Meeting – Poster/ Oral Presentation: Changes in sea surface conditions and dinoflagellate cyst productivity in the North Water (NOW) polynya over the last ca. 4000 years – Rimouski, QC – Sept. 16th to 20th, 2019

Annual Geotop Student Meeting – Poster Presentation: Changements dans la productivité des kystes de dinoflagellés dans la polynie des eaux du Nord, au cours des derniers 4000 ans – Orford, QC – March 22nd to 24th, 2019

Atlantic Geoscience Society 45<sup>th</sup> Colloquium – Oral Presentation: Changes in dinoflagellate cyst productivity in the North Water (NOW) polynya during the past ca. 4000 years – Fredericton, NB – Feb. 7<sup>th</sup> to 9<sup>th</sup>, 2019

## Late Holocene changes in sea-surface conditions in the North Water Polynya, northern Baffin Bay, using organic-walled dinoflagellate cysts

UNIVERSITY OF NEW BRUNSWICK  
THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of  
Master of Science

by

**Kelsey Amber Koerner**

in the Department of Earth Science

U.N.B., Fredericton, N.B.

**Tuesday, August 25<sup>th</sup>, 2020  
10:00 a.m.**

Via MS TEAMS

Examining Committee

Dr. Audrey Limoges  
Dr. Chris McFarlane  
Dr. Les Cwynar  
Dr. Joseph C. White

Supervisor  
Internal Examiner  
External Examiner  
Chair of Oral Examination

## Abstract

The North Water (NOW) polynya, located in northern Baffin Bay, is the largest recurrent polynya in the Arctic. This area of open water or low sea-ice concentrations in a region otherwise characterized by high sea-ice concentrations, fosters primary production that helps sustain a large and diverse food web and provides resources to the surrounding human communities. The NOW owes its formation to i) the presence of ice arches in Nares Strait that define its northern boundary, ii) strong northerly winds that blow newly formed sea ice southward out of the polynya region, and iii) the upwelling of relatively warm water masses. Due to recent climate warming and Arctic amplification, the factors promoting the formation of the polynya are changing rapidly. This is notably evident from the recent observed instability of the Nares Strait ice arches.

One way to better understand how the NOW may respond to future climate change, is to investigate its response to past climatic variations. This thesis aims to understand the long-term sea-surface variability of the NOW polynya using

dinoflagellate cyst (dinocyst) assemblages from a marine record spanning the last ca. 3800 years. This study also offers long-term baseline data on the natural variability of the polynya's dinocyst composition and fluxes to which recent changes can be compared.