PROJECT SUMMARY REPORT - 2014 CAMBRIDGE BAY CAMPAIGN

Subproject: Temporal trends in relative biomass composition of key ice algae species determined through Fourier Transform Infrared (FTIR) spectroscopy

Actual field dates: March 1-21; April 14-June 1, 2014
Field site: Dease Strait, Nunavut, Canada
Number of man-days in the field: 69

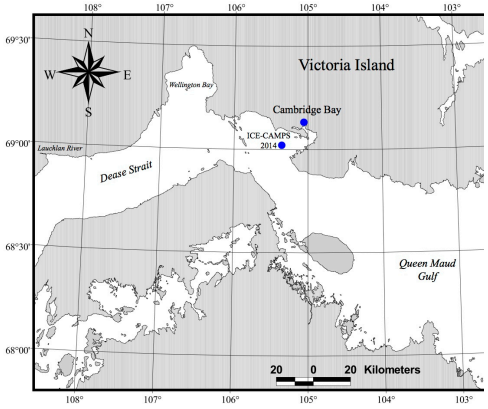

Figure 1

Summary:

Data collection for this project has been an astounding success, thanks to all of the field participants and laboratory assistants back home. We were able to collect ice algal samples from thin and thick snow cover sites spanning 11 March through 30 May, encompassing pre-bloom, bloom, and post-bloom conditions. Samples for FTIR imaging were filtered onto polycarbonate filters and stored at -80 degree Celsius. To analyze the samples, cells were transferred onto a barium fluoride crystal window where they can be imaged with an FTIR microscope. The detector used on the microscope is able to discern a 1.1 x 1.1 µm pixel dimension, permitting quantification of individual cell biomass composition. In fact the development of the technique using data collected here has already contributed to a published manuscript (Findlay et al. 2015). Last summer, a BSc student, Nicole Pogorzelec, analysed half of the samples, focusing in on key diatom taxa. She is now successfully writing up some very strong results for her honours thesis, demonstrating the power of this technique to investigate ice algae ecological processes at the species level. Standby for future publications...

Findlay, C., Wiens, R., Rak, M., Sedlmair, J., Hirschmugl, C., Morrison, J., Mundy, C.J., Kansiz, M., & Gough, K. (2015). Rapid biodiagnostic *ex vivo* imaging at 1 µm pixel resolution with thermal source FTIR FPA. *Analyst.* 140, 2493-2503, doi:10.1039/c4an01982b.

Figure 2

Photos:

Fig.1: Map of the ICE-CAMPS 2014 field site. Credit: CJ Mundy
Fig. 2: Aurelie Delaforge (CEOS) starting the extraction of an ice core. Credit: C. Findlay
Fig. 3: (A) *N. frigida* colony microscope image and false color images, corresponding to integrated CH2+CH3 (All CH), Amide I, and Si-O bands. (B) A typical IR spectrum of a *N. frigida* cell highlighting CH2+CH3 (All CH), Amide I, and Si-O band peaks. Credit: N.Pogorzelec.

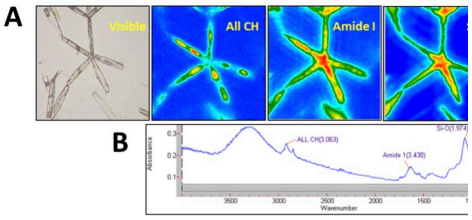

Figure 3

Participants:

CJ Mundy (CEOS), C.Findlay (UofM), N.Pogozelec (UofM), K. Campbell (CEOS), A. Delaforge (CEOS), Kathleen Gough (UofM).

Acknowledgements:

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