**Stuckberry Valley Lakes**

**Sentinels of Environmental Change at Canada’s Extreme Northern Limit**

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**Introduction**

On the north coast of Ellesmere Island, four lakes were submerged sea floor depressions when glaciomarine environments first appeared following glacial retreat ~11,400 years ago. Isostatic uplift later sequentially separated the lakes from the ocean.

**Project objectives**

- Understand the ecological and microbial evolution of lakes in a remote High Arctic region
- Study past sea-ice dynamics throughout the Holocene
- Develop long-term, high-resolution multiproxy reconstructions of past environmental change

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**Preliminary paleolimnological results**

![Image of core analyses including geochemistry (S,Ti) and optical (Opt) and CT-scan (X-ray) images.](image)

**Paleolimnology**

- Laminated sediments
- Cores in 3 of the 4 lakes reached marine sediments.

**Limnology**

- Greater pigment concentrations and diversity in smaller and younger lakes.

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**Discussion**

- Extend the transect to lower elevations by sampling the bay and the 10 m asl lake
- Develop age-depth models
- More detailed limnological studies

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**What’s up next?**

- Extend the transect to lower elevations by sampling the bay and the 10 m asl lake
- Develop age-depth models
- More detailed limnological studies

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**Multidisciplinary analytical approach**

**Paleolimnology**

- Computed tomography scanning
- Hyperspectral imaging spectroscopy
- Micro XRF analysis
- Diatom assemblage analysis
- Genomic microbial analysis
- Lipid biomarker analysis
- Paleomagnetic analysis
- 14C dating

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**Limnology**

- Water column profiles (dissolved O2, pH, temperature, specific conductivity)
- Phytoplankton analysis (HPLC, microscopy)
- Genomic microbial analysis (bacteria, Archea, protists and viruses)

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**Preliminary limnological results**

![Image of phytoplankton chlorophyll a concentrations.](image)

**Fig. 4.** Phytoplankton chlorophyll a concentrations.

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**Fig. 5.** Major phytoplankton groups according to indicator pigments.