

## **Sulfur oxidation and biomineralization processes in sulfidic ice ecosystems**

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Microbial S oxidation is a common process in hydrothermal systems, sulfidic springs and suboxic zones. In addition, we have recently interrogated a unique microbial habitat generated by the formation and thawing of ices that contain mM levels of sulfide, giving rise to the precipitation of km-scale deposits of elemental sulfur in the Canadian High Arctic.

We will discuss recent field and laboratory observations of elemental sulfur (bio)mineralization in association with pure cultures and complex consortia of S-cycling microorganisms detected at Borup Fiord Pass on Ellesmere Island. In particular, we will discuss new observations on the exsolution, oxidation, mineralization and preservation of S derived from sulfidic ices and cold spring fluids.

Our investigations integrate a combination of aqueous geochemistry, voltammetry, Raman and FTIR spectroscopy, FE-SEM, sulfur K-edge X-ray absorption spectroscopy and 16S rRNA high-throughput sequencing to identify the interrelationships between microbial community dynamics and fluid/ice geochemistry as well as to determine the controls on sulfur speciation, including biologically-mediated extracellular sulfur mineralization.

We will also explore how the sulfidic ice biogeochemical system is interconnected with the subsurface environment, and how biosignatures of such S dominated ecosystems can be recognized on Earth or other icy bodies.