

- **Project Title**

Formation and preservation of elemental sulfur in springs relevant to Mars and Europa

- **Researcher's Name and Affiliation**

Alexis Templeton, University of Colorado

- **Project Location**

The project will be conducted in a remote region of northern Ellesmere Island, at Borup Fiord

- **Timeframe**

- A six person field camp will be established for 12 days in June 2014.

- **Project Description**

The purpose of this study is to learn what controls the source and chemistry of a spring that discharges water with sulfide gas from a glacier at Borup Fiord. A key question is what microbes live in the water and in the minerals next to the spring. We are also interested in mineral deposits that have formed from ancient springs hundreds to thousands of years ago in almost the same location. Knowledge gained at Borup Fiord will help understand the interaction between water, rocks and life on Earth and other planets such as Mars and Jupiter's moon Europa.

The site will be reached by Twin Otter from Resolute Bay. Our small team of 3 researchers and 3 students from Colorado (Templeton, Spear, Lau and Trivedi), and the Geological Survey of Canada, Natural Resources Canada (Grasby and student), will land at a pre-existing strip. Then a helicopter will be used to transport the field team to a camping location. All flights will be conducted above 2000 ft altitude and care will be taken to avoid overflight of any wildlife that may be present. Field work will be conducted entirely on foot. A temporary tent camp will be established more than 30 m from any waterway. Grey water and human waste will be disposed in sumps pits more than 30 m from any waterway. All other waste will be packed out for disposal. At the end of the field season all field and camping equipment and garbage will be removed from the temporary camp.

- **Methodology**

Two types of samples will be collected, water and rocks. Water samples will be collected from the spring, as well as nearby streams and surface melt on the glacier. Each sample will be 500 ml and a total of 20 litres of water will be collected. For mineral samples, small hand size samples will be collected by hammer or scoop from a variety of locations. Small cores of samples will be collected up to 0.25 meters below the surface. In total 100 kg are anticipated for collection.

- **Data**

The data collected will include the chemistry of the water, the chemistry of the minerals, and the organisms found in the water and the minerals. This data will be used for two Ph.D. theses being conducted by the students. The results will be made publically available for other researchers or interested people through online access and through publication in the literature.

- **Reporting**

A plain language summary will be sent to the communities that express interest (in English and in Inuktitut), as well as the NRI. The results will be published in several peer reviewed science journals. We will also provide reports of our activities to the NASA Exobiology Funding Agency.