Arctic expedition will investigate alien-like glacier

June 13 2006

A scientific expedition to a remote glacier field in Canada's High Arctic may help researchers unlock the secrets about the beginning of life and provide insights for future exploration of our solar system.

A team assembled by the University of Calgary's Arctic Institute of North America plans to spend two weeks studying a sulfur-spewing spring on the surface of an ice field not far from the North Pole this summer, after it was discovered by Institute Executive Director Dr. Benoit Beauchamp during his travels in the area. Beauchamp, U of C adjunct professor Dr. Steve Grasby from the Geological Survey of Canada, and two graduate students will conduct the first extensive study of the spring after initial tests showed the geological oddity is home to a unique form of bacteria that has adapted to thrive in a cold and sulfur-rich environment.

"We really want to try and understand the plumbing system for this spring and where all this sulfur is coming from," Beauchamp said. "This is a very unusual feature on the earth's surface and it's an extreme ecosystem that could be a good model for how life first begins in a harsh environment."

The spring has also attracted the attention of the Canadian Space Agency and NASA, which are helping to fund the expedition, because it likely provides the best example on Earth for the conditions believed to exist on the surface of Jupiter's moon Europa. Ice-covered Europa is considered one of the best candidates for finding evidence of life on

other planets within our solar system. Sending a probe to the planet is high on NASA's list of possible projects. Graduate student Damhnait Gleeson from the University Colorado, on a project sponsored by NASA's Jet Propulsion Laboratory, will be taking part in the study to determine if it will be worthwhile testing spacecraft and remote-control rover equipment on the glacier in the future.

"These are exciting times for planetary exploration in Canada, said Dr. Alain Berinstain, Director of Planetary Exploration and Space Astronomy at the Canadian Space Agency (CSA). "With the development of the Canadian Analogue Research Network (CARN) by the CSA, there are more opportunities than ever for Canadian researchers to further our understanding of other planets by studying analogues sites on Earth," Berinstain said. "These sulfur springs in the Arctic may just put us one step closer to answering that age old question: are we alone in the Universe?"

Beauchamp discovered the spring in the mid-1990s when he noticed a yellow stain on the snow while passing over the Borup Fiord Pass in a helicopter. He eventually visited the site and noticed the strong smell of rotten eggs that indicated the presence of sulfur. Grasby then visited the in 1999 and 2001 and collected samples of the water and mineral deposits from the spring, which contained new forms of bacteria and an extremely rare mineral known as vaterite.

Sulfur-loving organisms have been found living in extremely hot water around geothermal vents deep in the ocean floor but are seldom observed living in cold environments.

Beauchamp, Grasby, Gleeson and U of C graduate student Marie-Eve Caron leave for the glacier on June 21. From Ottawa, they will fly to Resolute, where they will be flown to the Eureka research station via Twin Otter airplane. The team will then reach the glacier by helicopter

and set up a small camp near the base of the glacier where they will study the spring and acquire numerous water, mineral and rock samples.

Source: University of Calgary