



## **AN Overview of the Arctic Mars Analogue Svalbard Expedition 2007**

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**Introduction:** The Arctic Mars Analogue Svalbard Expedition (AMASE) in 2006 was the latest of a series of expeditions that have as primary goals to test portable instruments for their robustness as field instruments for life detection (for robotic and future human missions to Mars), to assess the Mars analogue environments for signs of life, to refine protocols for contamination reduction and to understand the effects of transport on sample integrity by assessing bioloads immediately in the field and then comparing these with laboratory measurements made after transportation. There have been three previous expeditions that were run in by the Department of Physics of Geological Processes at the University of Oslo in collaboration with the Carnegie Institution of Washington (CIW), NASA-JPL, NASA-Ames, the Lunar and Planetary Institute, University of Leeds, University of Burgos, Penn State University, MacQuarie University (GEMOC) and the Smithsonian Institution, and with invaluable help and support from the Norwegian Space Centre, the University Centre on Svalbard (UNIS) and the Norwegian Polar Institute.

A wide variety of science instruments and platforms was deployed on AMASE 06, including the two instrument prototypes for the Mars Science Laboratory (MSL) mission, namely the Sample Analysis at Mars (SAM) GCMS and the CheMin XRD/XRF instruments. Other instruments included a portable Raman spectrometer, a UV excitation spectrometer (laser induced native fluorescence), a digital color microscope, portable Lab-on-Chip test systems and a complete polymerization chain reaction (PCR) system. A rover carrying a camera and a microscopic imager and a non-pressurized MkIII prototype spacesuit with a portable computer system were the primary platforms.

This years expedition exceeded expectations. Highlights of the achievements are as follows:

- Rover deployed at 4 sites, taking 4 samples that were analyzed by all instruments on board.
- Microscopic imaging was achieved on all deployments including variable focus and image montaging. Lichen species were positively identified by the color camera.
- Raman and LiNF instruments were integrated with the Rover sample arm and preliminary analysis of peridotite xenoliths was undertaken.
- Analysis was conducted on 16 common samples and 4 Rover collected samples.
- Chemin performed over 60 analyses and was deployed in the field for the first time.
- SAM performed ~60 analyses.
- Over 60 ATP, 50 LAL and 300 PCR reactions were conducted on the collected samples.
- A field cleaning protocol was successfully verified to ensure sample sterility during collection by both the Rover and during ice coring.
- The science teams began to integrate successfully with the Rover crew in making science decisions based on Rover imagery of suitable sites.
- Discovered samples containing ~300 million year old beach sand concretions within sandstones that were harboring a small modern microbial community. Successfully assessed mineralogy, organic and microbial inventory of these samples.
- Completed several “habitability transects” of BVC area constraining parameters to evaluate the chemical and environmental conditions for life to survive.
- Identified 2 new sites for exploration on AMASE 07.

Results of the analysis conducted on both the rover and human collected samples by all instrumentation will be presented as well as an assessment of the habitability parameters of each sample. Integration of science instruments with a rover crew for life detection purposes will also be evaluated.