

HAUGHTON CRATER AND SURROUNDINGS, DEVON ISLAND, NUNAVUT, ARCTIC CANADA:  
SIGNIFICANCE TO ASTROBIOLOGY

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The Haughton impact structure and surroundings in the polar desert of Devon Island, Canadian High Arctic, exhibit a variety of geologic features and biological attributes that may shed insight into the evolution of Mars, in particular the history of that planet's water and the possibilities of life. The Haughton site also lends itself to investigations of the effects of impacts on Earth and of biological recovery following impact events. Field studies are currently underway at Haughton Crater under the auspices of the NASA Haughton-Mars Project (HMP), a Mars analog field research program based at NASA Ames Research Center.

To date, findings on the HMP of significance to Astrobiology include: 1) evidence (from the observed selective linear erosion of the landscape on Devon Island) that many channels and valleys on Mars might have formed from the melting and/or flow of former transient ice covers, suggesting that Early Mars might have been climatically colder than commonly believed (Lee et al. 1999 LPSC XXX, Lee and Rice 1999, 5th Mars Conf.) ; 2) evidence that there was a transient phase of hydrothermal activity in the immediate aftermath of the Haughton impact event (Osinski et al. 2000, LPSC XXXI); 3) the observation of a variety of adaptations of life to the Arctic's relatively extreme environment and, recently, the discovery of impact-generated microbial habitats in this setting (Cockell and Lee, This Conference). Other features of possible significance to Astrobiology and currently under characterization at Haughton include: a) the crater's ground-ice-rich impact breccia formation, in some respects a potential physical analog for the martian regolith ; b) the periglacial features at Haughton and in its surroundings and their possible implications for the distribution of and search for ground-ice on Mars; c) the well-preserved paleolacustrine record (of early miocene age) inside Haughton crater and its relevance to the search for similar records on Mars.

The ongoing science program on the HMP is also providing an opportunity to further studies in exploration research in areas of relevance to the future exploration of Mars by robots and humans. This program also considers issues of importance to Astrobiology, for instance planetary protection and Mars sample collection and processing.

The focus of the meeting is on

scientific results that illustrate the broad multidisciplinary nature of astrobiology. As such, this conference will complement other, more narrowly focused meetings that deal primarily with one or two subdisciplines of astrobiology. Selection of oral contributed papers will be on the basis of exciting new results of interest to the whole community. Our goal will be to have good overviews of the science, broad representation of the component disciplines, and integration across disciplines <http://astrobiology.arc.nasa.gov/>

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