

Monday, March 14, 2005

ASTROBIOLOGY I: MARS, METHANE, MINERALS, AND MISSIONS

8:30 a.m. Salon A

Chairs: C. C. Allen
J. Parnell

- 8:30 a.m. Des Marais D. J. * Clark B. C. Crumpler L. S. Farmer J. D. Grotzinger J. P. Haskin L. A. Knoll A. H. Landis G. A. Moersch J. Schröder C. Wdowiak T. Yen A. S. Squyres S. W.
Astrobiology and the Basaltic Plains in Gusev Crater [#2353]
Basalts and soils on the plains contain both nutrients and sources of redox energy needed for life as we know it. Liquid water has been scarce recently, however, obliquity-related climate variations perhaps created favorable subsurface conditions.
- 8:45 a.m. Oehler D. Z. * Allen C. C. McKay D. S.
Impact Metamorphism of Subsurface Organic Matter on Mars: A Potential Source for Methane and Surface Alteration [#1025]
Methane generated from Martian kerogen by impact metamorphism may seep to the surface, accounting for some of the methane recently detected in the Martian atmosphere as well as the bright crater rings seen in MOC images from Meridiani Planum.
- 9:00 a.m. Allen C. C. * Oehler D. Z.
Thinking Like a Wildcatter — Prospecting for Methane in Arabia Terra, Mars [#1398]
Enhanced concentrations of methane have been observed over Arabia Terra. We are investigating surface indicators of methane, geological/geophysical indicators of basins and hydrothermal areas, and potential methane release paths to the atmosphere.
- 9:15 a.m. Thomas-Keprta K. L. * Clemett S. J. Bazylinski D. A. Kirschvink J. L. McKay D. S. Vali H. Gibson E. K. Jr. Romanek C. S.
Focused Ion Beam Microscopy of ALH84001 Carbonate Disks [#2341]
Our aim is to understand the mechanism(s) of formation of carbonate assemblages in ALH84001. We present here analyses by transmission electron microscopy (TEM) of carbonate thin sections produced by both focused ion beam (FIB) sectioning and ultramicrotomy.
- 9:30 a.m. Parnell J. * Osinski G. R. Lee P. Cockell C. S.
Microbial Preservation in Sulfates in the Haughton Impact Structure Suggests Target in Search for Life on Mars [#1031]
Microbes occur within transparent gypsum crystals in the Haughton crater. The crystals transmit light for photosynthesis, but protect from dehydration and wind. Sulfates on the Martian surface should be a priority target in the search for life.
- 9:45 a.m. Stoker C. R. * Stevens T. Amils R. Gómez-Elvira J. Rodriguez N. Gomez F. Gonzales-Torri E. Aguilera A. Fernández-Remolar D. Dunagan S. Lemke L. Zavaleta J. Sanz J. L.
Characteriation of a Subsurface Biosphere in a Massive Sulfide Deposits at Rio Tinto, Spain: Implications for Extant Life on Mars [#1534]
This paper describes the first results of geobiological drilling at Rio Tinto Spain which has discovered a subsurface biosphere living in a massive pyrite formation. We focus on the strategy for selecting drilling locations, sample handling, data acquired from cores, and biological results.
- 10:00 a.m. Schieber J. *
Granular Microbial Habitats Built from Iron Sulfides: Alternative Microbial Lifestyles? [#1972]
Concentrically zoned pyrite grains grew as granular microbial colonies. They stayed in the surface layer during long history of reworking and accretion and consist of marcasite and pyrite cortices with sulfide mineralized microbial remains.

- 10:15 a.m. Bowden S. A. * Parnell J. Cooper J.
The Extraction of Organic Compounds from Sulphate Minerals for Astrobiological Exploration [#1325]
We have used sulphate crystals, which were precipitated from a parent solution containing organic molecules of astrobiological interest, to develop a micro-extraction method. The method was successfully applied to a geological sample and will be used as a template for a lab on a chip system.
- 10:30 a.m. Stivaletta N. * Barbieri R. Marinageli L. Ori G. G Bosco M.
Fossil Endolithic Cyanobacteria in Evaporites: Implications for the Astrobiological Exploration [#1354]
The study focuses on the microbial activity in dry and saline conditions of southern Tunisia. We have investigated the preservation potential of endolithic microbes in continental evaporite deposits.
- 10:45 a.m. Sakon J. J. * Burnap R. L.
A Further Analysis of Potential Photosynthetic Life on Mars [#2120]
This project researched the possibility of photosynthetic life on Mars. Antarctic nitrogen-fixing cyanobacteria were used as potential analogs and were subjected to various Martian-simulated conditions.
- 11:00 a.m. Link L. S. * Jakosky B. M. Thyne G. D.
Potential for Life on Mars from Low-Temperature Aqueous Weathering [#1477]
Simple reactions involving water and rock at low temperatures (as low as 0°C) are sources of geochemical energy that are able to support metabolism for potential martian microbes.
- 11:15 a.m. Maule J. * Toporski J. Wainwright N. Steele A.
An Integrated System for Labeling and Detection of Biological Molecules in Mars Analog Regolith Using an Antibody Microarray [#1921]
This study describes an integrated method for the labeling and detection of biological molecules in Mars analog regolith with an antibody microarray, indicating its potential as an *in situ* life detection tool.
- 11:30 a.m. Weinstein S. Pane D. Ernst L. A. Minkley E. Lanni F. Wettergreen D. S. Wagner M. Heys S. Teza J. Waggoner A. S. *
Fluorescent Imager for Biological Imaging in Daylight [#1488]
We have developed an imaging system for detecting fluorescence signals from sparse microorganisms and biofilms during autonomous rover exploration. To overcome significant obstacles, we incorporated a novel approach to accommodate daytime imaging.