

Thursday, March 20, 2003
POSTER SESSION II
7:00 p.m. Fitness Center

Astrobiology: The New Detectives

Horváth A. Gánti T. Bérczi Sz. Gesztesi A. Szathmáry E.

Morphological Analysis of Annual Recurrence of Dark Dune Spots on Southern Polar Region of Mars [#1380]
The massive annual reappearance of the dark dune spots (DDSs) of Mars in spring at their original sites seems to be compatible with our MSO hypothesis about the biological origin of DDSs.

Gánti T. Horváth A. Bérczi Sz. Gesztesi A. Szathmáry E.

Evidence for Water by Mars Odyssey is Compatible with a Biogenic DDS-Formation Process [#1134]
Mars Odyssey evidence for water in the upper layer of the Southern Polar Region of Mars, is compatible with our MSO (Mars Surface Organism) model of DDS formation, which predicted water supply from this surface and suggested present-day life on Mars.

Schieber J. Arnott H. J.

Nannobacteria as a Byproduct of Organic Tissue Degradation by Bacteria [#1515]
Degradation of plant and animal tissues by bacterial action and by purified enzymes produces rounded structures in the size range from 40–120 nm. Early diagenetic mineralization of such decay byproducts may be the cause for nannobacteria in the rock record.

Flood B. E. Allen C. Longazo T.

Microbial Fossils Detected in Desert Varnish [#1633]
Desert varnish, a mixture of clays, Mn-oxides, and Fe-oxides, is a potential terrestrial analogue to Martian hematite. A scanning electron microscopic examination of samples from Pilbara, Australia revealed evidence of microbial fossilization.

Guidry S. A. Chafetz H. S.

Siliceous Shrubs in Yellowstone's Hot Springs: Implications for Exobiological Investigations [#1091]
Siliceous shrubs are widespread in Yellowstone's hot spring deposits, have a distinctive morphology and are good hot spring environmental indicators. Siliceous shrubs contain abundant evidence of former microbial activity, therefore they could be good microbial biomarkers.

Blackhurst R. L. Jarvis K. Verchovsky A. Grady M. M.

Cryptoendolith Communities in Antarctic Dry Valley Region Sandstones: Potential Analogues of Martian Life-Forms [#1576]
We are studying cryptoendolith-bearing Antarctic sandstones, to determine if the microbes alter the elemental composition of the rocks. If there is an effect, then it might be a tracer for the presence of micro-organisms in martian surface materials.

Farquhar J. Johnston D. T. Wing B. A. Habicht K. S. Canfield D. E. Airieau S. A. Thiemens M. H.

The Effect of Biosynthetic Networks on Mass-dependent Sulfur Isotope Fractionations [#1908]
Biosynthetic reaction networks can influence mass-dependent isotopic fractionations of multiple sulfur isotopes and an understanding of these relationships is necessary in order to use sulfur isotope data as supporting evidence of specific sulfur metabolisms.

Shearer C. K. Hagerty J. J. Papike J. J. Pun A.

Phosphates in Banded Iron Formations (BIF). A Tool for Exploring Ancient Oceans and Life on Mars [#1339]
Our focus is to understand the presence and distribution of phosphates in BIFs and to evaluate the possibility that their major and trace element characteristics reflects conditions of BIF deposition or early diagenesis.

Parnell J.

Mineral Radioactivity Promotes Organic Complexity on Rocky Planets [#1119]

Like cosmic irradiation, energetic particles from heavy radioelements (U, Th) can cause polymerization of organic molecules. Where U/Th are concentrated in minerals, including zircon and monazite present in the early Earth's crust, they could be templates for precipitation of organic compounds.

Wilkins A. D. Parnell J. Wright A. J. Artz R. R. E.

Model Crystals to Test Techniques in Astrobiological Exploration of Evaporites on Mars [#1675]

Model evaporite crystals grown in the laboratory to incorporate organic compounds and/or biomolecules have significant potential to test the various techniques proposed for the astrobiological exploration of Mars.

Gerasimov M. V. Safonova E. N. Paskonova E. A.

Synthesis of Complex Organic Molecules During an Impact [#1580]

Complex organic molecules are efficiently synthesized even at oxidizing conditions during an impact related vaporization of silicates. The possible mechanism can be the Fischer-Tropsch-type of synthesis on the surface of condensing glass nano-particles.

Sekine Y. Sugita S. Kadono T. Matsui T.

Global Methane Production by Iron Meteorites Impacts on Early Earth [#1302]

We suggest an importance of impact-induced methane formation due to Fischer-Tropsch catalysis over the reentering iron condensates in early Earth's atmosphere. In our estimate, the amount of methane may reach to the order of $\sim 10^{12-13}$ kg.

Basiuk V. A. Albarran G. Basiuk E. V. Saniger J. M.

Survivability of Fullerenes Under Gamma-Irradiation in the Interstellar Medium [#1084]

We tried to roughly estimate the capability of ^{60}C to withstand prolonged gamma-irradiation. We exposed ^{60}C to very high irradiation doses exceeding 6 MGy, and analyzed the irradiated samples by high-performance liquid chromatography and infrared spectroscopy.

Fuller M. Huang Y.

Molecular Isotopic Characterization of the ALH 85013.50 Meteorite: Defining the Extraterrestrial Organic Compounds [#1237]

This work demonstrates the utility of compound-specific isotope analysis in determining the extraterrestrial meteoritic organic compounds from terrestrial contaminants.

Chambers J. E.

The Formation of Life-sustaining Planets in Extrasolar Systems [#2000]

A life-sustaining planets lies in its star's habitable zone and contains a significant mass of water and other volatile material. I examine the likelihood that habitable planets in extrasolar systems will accrete significant amounts of volatile-rich material.

Solomatov V. S.

Toward Understanding the Conditions Required for Plate Tectonics to Occur on Earth-like Planets [#1406]

Life may not evolve to higher forms without plate tectonics. Analysis of the conditions required for plate tectonics to occur on a planet points out to a nearly lithostatic pore pressure in the lithosphere and large amounts of water.

Beegle L. W. Terrell C. A. Kim H. Kanik I.

High Resolution Electrospray Ionization/Ion Mobility Spectrometer for Detection of Abiotic Amino Acids [#1295]

We have determined the reduced mobility constants for 11 abiotic amino acids which are found in meteorites. We compared the values of these abiotic amino acids with ones commonly found in terrestrial biology, to determine the benefits of utilizing ESI/IMS as part of an *in situ* mission to Mars.

Wang A. Haskin L. A. Gillis J. J.

Survey for Life-related Species During a Planetary Surface Exploration; System Type I— UV Stimulated Fluorescent Sensor [#1753]

Fluorescent features of the materials of different origins were studied using the breadboard of an UV stimulated Fluorescent imager. It suggests the presence of biogenic materials in Mars regolith can be determined in a rapid survey mode.

Delin K. A. Harvey R. P. Chabot N. A. Jackson S. P. Adams M. Johnson D. W. Britton J. T.

Sensor Web in Antarctica: Developing an Intelligent, Autonomous Platform for Locating Biological Flourishes in Cryogenic Environments [#1929]

In cryogenic settings, biological activity is often limited to brief flourishes. We have tested an intelligent, distributed and autonomous Sensor Web in Antarctica that can monitor microclimate and adjust itself to be “in the right place at the right time”.

Stoker C. R. Lemke L. G. Mandell H. McKay D. George J. Gomez-Elvira J. Amils R.

Stevens T. Miller D.

Mars Analog Research and Technology Experiment (MARTE): A Simulated Mars Drilling Mission to Search for Subsurface Life at the Rio Tinto, Spain [#1076]

MARTE is a Mars analog drilling experiment to search for subsurface life on Mars while also characterizing a sulfide-based subsurface biosphere. MARTE is among the first set of field experiments supported by the ASTEP program.

Waite J. H. Dissly R. W. Sacks R. Block B.

A GCMS Instrument for the In-Situ Detection of Organics on Mars [#2111]

This paper describes an instrument that is designed to measure potential organics on Mars, using a pyrolysis/extraction system coupled to a GCMS.

Glamoclija M. Mitri G.

Europa: Chaos Terrains Formation and Its Exobiological Potential [#1894]

We have started to develop an exobiological model based on the thermal evolution of the icy crust. We selected that the minimum requirements for starting methanogenesis, one of the most favourable process for having life in this harsh environment.