

Tuesday, March 20, 2012

POSTER SESSION I: EXOBIOLGY: FROM WORLDS WE KNOW TO OTHER STARS

6:00 p.m. Town Center Exhibit Area

Thiemens M. M. Moynier F. Thiemens M. H. Shaheen R. Chong K. Koeberl C. Popp F. Gyollai I.
[Zn and C Isotopic Variations Associated with Neoproterozoic Ice Ages](#) [#2499]

Analysis of Marinoan glacial deposits for C and Zn isotopes shows a correlation between heavy $\delta^{66}\text{Zn}$ to characteristic light $\delta^{13}\text{C}$, indicative of heavy biological activity post glaciation. These measurements can be used for exobiological measurements.

Steininger H. Goetz W.

[Pyrolysis-GC-MS Analysis of Antarctic Lake Sediments](#) [#2841]

Antarctic lake sediments were analyzed with Pyrolysis-GC-MS, a method similar to the methods used on board MSL and Exomars. This is the starting point to build a library of data from terrestrial samples to improve the analysis of martian samples.

Marnocha C. L. Dixon J. C.

[Bacterial Community Structure of Sulfate Crusts, Fe/Mn Skins, and Alumina Coatings from Kärkevagge, Swedish Lapland](#) [#2150]

Rock coatings could serve as biosignatures on Mars. In this work, we present the bacterial community structure of rock coatings from Kärkevagge, Swedish Lapland as a first step in assessing their feasibility as biosignatures.

Sheehan R. C. Marnocha C. L. Dixon J. C.

[Bacterial Diversity of Fe/Mn and White Rock Coatings in Kärkevagge: A Potential Mars Analogue](#) [#1013]

Rock coatings from Kärkevagge, a potential Mars analogue, were analyzed for their microbial diversity, yielding distinct bacterial phylogenies of wide-ranging environmental tolerations and physiologies for different rock coating morphologies.

Rodzinyak K. J. Wing B. A. Léveillé R. J.

[Unexpectedly Large S Isotope Fractionation During Natural Sulfide Oxidation at Cold Temperatures](#) [#2067]

If an isotopic enrichment of 10–20‰ can be produced by low-temperature sulfide oxidation, preservation of potential records of microbial sulfate reduction may be incompatible with the present martian surface environment.

McMahon S. Parnell J. Blamey N. J. F.

[Analysis of Volatile Fluids in Basalt: A Possible Source of Martian Methane](#) [#1046]

Terrestrial basalts commonly yield methane when crushed into a sensitive mass spectrometer. Basalts are abundant on Mars, hence may be a source of martian methane, and should be targeted for analysis accordingly.

Webster K. D. Rebholz J. A. White J. R. Douglas B. J. Pratt L. M.

[Using Open-Path Laser Measurement of Atmospheric Methane Concentration Along a Major Shear Zone in Western Greenland as an Analogue for Exploration on Mars](#) [#1514]

An open-path infrared laser was used to measure open air methane concentrations in west Greenland. Nine open air transects were measured across a shear zone valley. Mean measured methane concentrations ranged from 1.4 to 2.3 ppm.

Franchi F. Cavalazzi B. Rossi A. P. Pondrelli M. Barbieri R.

[*Kess Kess Hydrothermal Mounds in Morocco: A Unique Analog for Exploring Possible Fossil or Extant Life on Mars*](#) [#2245]

The recent discovery of mound fields on the surface of Mars gave new inputs to the astrobiological study of the terrestrial mounds. This work compares the Kess Kess conical mound (Earth) and the Firsoff crater mounds (Mars) and reports their affinity with fluids escape.

Fu Q. Socki R. A. Niles P. B. Romanek C. Datta S. Darnell M.

[*The Origin of Carbon-Bearing Volatiles in a Continental Hydrothermal System in the Great Basin: Water Chemistry and Isotope Characterizations*](#) [#2481]

Two processes are proposed for the observed isotope values of carbon-bearing compounds in SVHS: thermogenic production of alkane homologs and formation of CO₂ by AOM. The geological background and fluid chemistry are used to support this scenario.

Socki R. A. Fu Q. Niles P. B. Gibson E. K. Jr.

[*Hydrogen Isotope Measurements of Organic Acids and Alcohols by Pyrolysis-GC-MS-TC-IRMS: Application to Analysis of Experimentally Derived Hydrothermal Mineral-Catalyzed Organic Products*](#) [#2483]

We report results of experiments to measure the H-isotope composition of organic acids and alcohols. These experiments make use of a pyroprobe interfaced with a GC and high-temperature extraction furnace to make quantitative H-isotope measurements.

de Morais A.

[*A Possible Biogeochemical Model for Mars*](#) [#2943]

A possible biogeochemical evolution within martian subsurface using clays catalytic properties might have occurred. Same organisms sources 1) great depths using geochemical energy by sulfur redox; 2) near surface using light emitted from clays.

Thompson D. R. Allwood A. C. Bekker D. L. Cabrol N. A. Fuchs T. Wagstaff K. L.

[*TextureCam: Autonomous Image Analysis for Astrobiology Survey*](#) [#1659]

The TextureCam project will design a "smart camera" that aims to improve scientific return by increasing science autonomy and observation capabilities. An initial test demonstrates automatic recognition of stromatolite structures in outcrop.

Misra A. K. Sharma S. K. Acosta T. E. Bates D. E. Clegg S. Wiens R. C.

[*Standoff Bio-Finder for Planetary Exploration with Fast Detection*](#) [#1666]

A new instrument "standoff bio-finder" is described that uses fluorescence imaging to detect biomaterials. In the fast (<100 ns) gated fluorescence mode the instrument provide live images of biomaterials at 10 frames/s.

Scott V. J. Amashukeli X. Siegel P. H. Fisher A. Bae Y. Toda R.

[*An RF-Powered Micro-Extractor for the Detection of Astrobiological Target Molecules*](#) [#2128]

Sample-processing instruments for the extraction of astrobiological target molecules have been designed as part of potential in situ exploration missions. These instruments have been built and preliminary experiments demonstrate promising results.

Malespin C. A. Glavin D. P. ten Kate I. L. Franz H. B. Mumm E. Bleacher J. E. Rice J. W.

[*Volatile Analysis by Pyrolysis of Regolith in the 2011 D-RATS Field Test*](#) [#2181]

The Volatile Analysis by Pyrolysis of Regolith (VAPoR) instrument is a compact vacuum pyrolysis mass spectrometer designed to detect volatiles released during high temperature (up to 1300°C) heating of crushed or solid samples.

Elliott H. M. Martinez G. M. Halleaux D. G. Braswell S. F. Renno N. O.

[*The Michigan Mars Environmental Chamber \(MMEC\): Determining the Conditions at Which Liquid Brines form on Mars*](#) [#2117]

The MMEC will test the hypothesis that microscopic brine pockets can form and be concentrated into larger pockets by freeze-thaw cycles on Mars. This is relevant to exobiology because these brine pockets have the potential to be habitable.

Papineau D.

[Organic Matter Associated with Apatite in Martian Meteorite Chassigny](#) [#1549]

Associations between organic matter and hydroxylated apatite have been found in the Chassigny meteorite. Data suggest precipitation from a low-temperature hydrothermal fluid and organic matter production from FTT synthesis on Mars.

Pavlov A. A. Vasiyev G. Ostryakov V. M. Pavlov A. K. Mahaffy P.

[Degradation of the Organic Molecules in the Shallow Subsurface of Mars due to Irradiation by Cosmic Rays](#) [#2933]

Degradation of organic molecules by cosmic ray irradiation on Mars is often ignored. We demonstrated that the heavy organic molecules would not survive in the shallow subsurface of Mars if the exposure age of a geologic outcrop would exceed 300 Myr.

Wimmer-Schweingruber R. F. Hassler D. M. Zeitlin C. Böttcher S. Martin C. Andrews J. Böhm E. Weigle G. Brinza D. Posner A. Burmeister S. Epperly M. Seimetz L. Reitz G. Kortmann O. Köhler J. Ehresmann B. Neal K. Rafkin S. Peterson J. Tyler Y. Smith K. Bullock M. Cucinotta F.
[Determining the Martian Radiation Environment — The Radiation Assessment Detector \(RAD\) on Mars Science Laboratory \(MSL\)](#) [#2460]

The Radiation Assessment Detector (RAD) onboard the Mars Science Laboratory (MSL) is performing radiation measurements en route to Mars. On Mars it will measure the broad particle spectrum and determine the dose and dose rate on the martian surface.

Oshima M. Tani A. Kitano K. Sugahara T. Ohgaki K.

[Possibility of Carboxylic Acid Formation by Radiolysis of CO₂ Hydrate on Mars](#) [#1976]

We have analyzed the aqueous solution after dissociation of the gamma-irradiated CO₂ hydrate by ion chromatography. Formic acid and oxalic acid are observed in aqueous solution after dissociation of irradiated CO₂ hydrate.

Sandford S. A. Nuevo M. Materese C. K. Milam S. N.

[Nucleobases and Other Prebiotic Species from the Ultraviolet Irradiation of Pyrimidine in Astrophysical Ices](#) [#1550]

We discuss the results of UV irradiation of ices containing pyrimidine and show that such processing efficiently forms the nucleobases uracil and cytosine, but not thymine, a pattern similar to what is seen in carbonaceous meteorites.

Sinha N. Kral T. A.

[Sensitivity of Desiccated and Liquid Cultures of Methanogens to Ultraviolet Radiation](#) [#1702]

The goal of this study is to determine the sensitivity of desiccated and liquid cultures of some methanogens to UV radiation in an anaerobic condition.

Stromberg J. M. Mann P. Cloutis E. A.

[The Effects of Desiccation Under Mars-Like Conditions on the Spectral Detectability of Gypsum Associated Endolithic Communities](#) [#1224]

Gypsum associated endolithic communities detectable by reflectance spectroscopy were subjected to “Mars-like” conditions for 75 days to examine the preservation potential of their spectral biosignatures.

Kyle J. E. Jahnke L. L. Stedman K. M.

[Preservation Potential of Lipid-Containing Viruses Under Silicifying Conditions](#) [#2228]

The preservation potential of lipid-containing viruses, PRD1 and PBCV1, within silicifying solutions exists. Both viruses are rapidly removed from precipitating solutions, and the lipids within PBCV1 are unique from that of their host.

Figlewski N. M. Beegle L. W. Sollitt L. S.

[Laser Desorption Infrared Spectrometry for Icy Moon Surfaces](#) [#2642]

We present first results of experiments to determine the suitability of laser resonant desorption as a technique to search for astrobiologically interesting molecules in planetary ices.

Aponte J. C. Tarozo R. Hallmann C. Summons R. Huang Y.

[*The Racemic Nature of the Free and IOM-Derived Monocarboxylic Acids in Carbonaceous Chondrites Suggests the Origin of Chirality During Parent Body Modification Processes*](#) [#1032]

The chirality of free and IOM-derived branched monocarboxylic acids present in three carbonaceous chondrites was studied by chemical derivatization and gas chromatography.

Boice D. C. de Almeida A. A.

[*Prospects for Phosphorus-Bearing Molecules in Cometary Comae*](#) [#1887]

Phosphorus is a key element in all known forms of life but searches for P-bearing, volatile species in comets have been unsuccessful. We present model results to identify likely P-species in comets to aid in searches for this important element.

Brock L. S. Melosh H. J.

[*Impact Exchange of Material Between Planets of Gliese 581*](#) [#2467]

Gliese 581 d resides close to the “habitable zone” and has sparked debate on the existence of potential life. We evaluated the possibility for transfer of material between planet d and its sister planets and discovered an exchange was unlikely.