

Tuesday, March 8, 2011

CARBON ON MARS:

SURFACE TO ATMOSPHERE AND IMPLICATIONS FOR EXOBIOLOGY

1:30 p.m. Waterway Ballroom 1

Chairs: Hans Amundsen
James Wray

- 1:30 p.m. Wray J. J. * Murchie S. L. Ehlmann B. L. Milliken R. E. Seelos K. D. Noe Dobrea E. Z. Mustard J. F. Squyres S. W.
[Evidence for Regional Deeply Buried Carbonate-Bearing Rocks on Mars](#) [#2635]
Carbonates are key minerals for understanding ancient martian environments. CRISM orbital spectroscopy reveals a spectral phase consistent with Fe- and/or Ca-rich carbonate exposed from the subsurface by impact craters across a ~1000-km-wide region.
- 1:45 p.m. Niles P. B. * Michalski J.
[Evolution of CO₂ and H₂O on Mars: A Cold Early History?](#) [#2471]
Recent high-precision isotopic measurements of the martian atmosphere and discoveries of carbonates on the martian surface provide new constraints that we use to model the history of the martian climate and test the cold early Mars scenario.
- 2:00 p.m. Shaheen R. * Thiemens M.
[Oxygen Isotope Anomaly in Terrestrial Atmospheric Carbonates: Earth and Mars Linkage](#) [#1677]
Oxygen isotope anomaly in μm sized terrestrial carbonates (0.4–3.9‰) have been identified for the first time and its implications to understand isotopically anomalous carbonates found in the SNC martian meteorites will be discussed using laboratory and field data.
- 2:15 p.m. Ruff S. W. *
[Is Comanche Carbonate Evidence for a Lake in Gusev Crater, Mars?](#) [#2708]
Evidence from Mini-TES spectra and MI images support the idea that Comanche carbonate was produced by the precipitation of mixed Mg and Fe-rich carbonates in Algonquin class rocks, perhaps by evaporation of a brine.
- 2:30 p.m. Blake D. F. * Treiman A. H. Morris R. Bish D. Amundsen H. E. F. Steele A.
[Carbonate Cements from the Sverrefjell and Sigurdfiell Volcanos, Svalbard Norway: Analogs for Martian Carbonates](#) [#2167]
Carbonates from volcanos in Svalbard, Norway are the best analogs for martian carbonates from the ALH 84001 meteorite, the Comanche carbonate at Gusev Crater, and the Nili Fossae carbonate. The mineralogy of these cements is described.
- 2:45 p.m. Morris R. V. * Blake D. F. Bish D. Ming D. W. Agresti D. G. Treiman A. H. Steele A. Amundsen H. E. F. AMASE Team
[A Terrestrial Analogue from Spitsbergen \(Svalbard, Norway\) for the Comanche Carbonate at Gusev Crater, Mars](#) [#1699]
Carbonate from the Bockfjord volcanic complex on the island Spitsbergen (Svalbard, Norway) is a terrestrial analogue for the Comanche carbonate at Gusev Crater.

- 3:00 p.m. Amundsen H. E. F. * Benning L. Blake D. F. Fogel M. Ming D. Skidmore M. Steele A. AMASE Team
[*Cryogenic Origin for Mars Analog Carbonates in the Bockfjord Volcanic Complex, Svalbard \(Norway\)*](#) [#2223]
Carbon and oxygen isotope data on Mars analog carbonates in the Bockfjord Volcanic Complex on Svalbard indicate that they formed by cryogenic processes during freezing of basalt hosted aquifers following subglacial eruptions.
- 3:15 p.m. Halevy I. * Eiler J. M.
[*Carbonates in ALH 84001 Formed in a Short-Lived Hydrothermal System*](#) [#2512]
Clumped isotope thermometry suggests that the carbonates in ALH 84001 formed in shallow hydrothermal systems, at temperatures just below 100°C, from water that was isotopically light and in contact with the ancient atmosphere.
- 3:30 p.m. McKay D. S. * Thomas-Keprta K. L. Clemett S. J. Gibson E. K. Jr. Le L. Rahman Z. Wentworth S. J.
[*Organic Carbon Features Identified in the Nakhla Martian Meteorite*](#) [#2673]
We report, for the first time, the identification of specific carbonaceous phases present within iddingsite alteration zones of the Nakhla meteorite that possess discrete, well defined, structurally coherent morphologies.
- 3:45 p.m. Fu Q. * Socki R. A. Niles P. B.
[*Carbon Isotope Systematics in Mineral-Catalyzed Hydrothermal Organic Synthesis Processes at High Temperatures and Pressures*](#) [#1057]
Experiments involving mineral-catalyzed hydrothermal organic synthesis processes were conducted at high temperatures and pressures. Carbon isotope data of generated organic compounds were used to unravel the reaction pathways.
- 4:00 p.m. Craddock P. R. * Dauphas N.
[*Assessing the Antiquity of Microbial Metal Respiration in the Geologic Record*](#) [#1148]
We present Fe and C isotope data of Fe-carbonates in Archean banded iron formations (Hamersley, Australia and Isua, Greenland) that support their formation in marine sediments by microbial Fe respiration and record evidence of Fe catabolism at 3.8 Ga.
- 4:15 p.m. Schwenzer S. P. *
[*Quantifying Low Temperature Production of Methane on Mars*](#) [#1803]
Potential anorganic production of methane from a range of martian rock compositions is quantified and compared to the concentration of methane observed on Mars. Impact-craters are suggested as potential sites of methane formation and storage.
- 4:30 p.m. Zahnle K. * Freedman R. Catling D.
[*Is There Methane on Mars? Part II*](#) [#2427]
There have been several reports of transient methane in the martian atmosphere at 10–60 ppbv. We review why abundant variable methane on Mars should be seen as an extraordinary claim and show why the published reports fall short of providing extraordinary evidence.