Wednesday, March 3, 2010
PLANETARY ATMOSPHERES
1:30 p.m. Montgomery Ballroom

Chairs: **James Lyons**
Aymeric Spiga

1:30 p.m. Zahnle K. * Freedman R. Catling D.
Is There Methane on Mars? **[#2456]**
Variable methane on Mars at ~10 ppb is an extraordinary claim. Published reports rely on spectral lines where potential for confusion with telluric lines is most severe, while reports for more favorable wavelengths are consistent with no methane.

1:45 p.m. Ishimaru R. * Komatsu G. Matsui T.
Solar Insolation-induced Destabilization of Subsurface Clathrates on Mars: Implications for the Martian Atmospheric Methane **[#1580]**
We consider the destabilization of subsurface clathrates due to solar insolation as a release mechanism of CH_4 on Mars. Factors (e.g., latitude distribution and composition of clathrates) controlling the destabilization of clathrates are discussed.

2:00 p.m. Chizek M. R. * Murphy J. R. Kahre M. A. Haberle R. M. Marzo G. A.
A Short-lived Trace Gas in the Martian Atmosphere: A General Circulation Model of the Likelihood of Methane **[#1527]**
We use the NASA Ames General Circulation model to explore trace gas production, transport, and destruction in the martian atmosphere in order to study the required production magnitude and destruction lifetime of the recently published methane observations.

2:15 p.m. Pankine A. A. * Mischna M. A. Tamppari L. K.
Simulated Water Vapor Transport During Martian Northern Summer and Interpretation of the MGS TES Observations **[#2545]**
Water vapor transport in martian northern polar summer is simulated with GCM and compared to MGS TES results. Plumes of vapor are driven by off-cap circulation, but meridional circulation appears weak to explain vapor increase in midlatitudes.

2:30 p.m. Wordsworth R. * Forget F. Millour E. Madeleine J.-B. Eymet V. Haberle R.
Three-Dimensional Modelling of the Early Martian Climate and Water Cycle **[#1913]**
We perform GCM modelling of the early martian climate. CO_2 condensation, cloud formation, and a water cycle are included. New CO_2 continuum opacity data predicts reduced warming, but this is partially compensated by local water vapor feedbacks.

2:45 p.m. Soto A. * Richardson M. I. Newman C. E.
Global Constraints on Rainfall on Ancient Mars: Oceans, Lakes, and Valley Networks **[#2397]**
We investigate the patterns of precipitation for the types of climates that might have existed during ancient Mars.

3:00 p.m. Kite E. S. * Rafkin S. C. R. Michaels T. I. Manga M.
Mesoscale Simulation of Atmospheric Response to Chaos Terrain Formation **[#1171]**
We report preliminary results from MRAMS (Mars Regional Atmospheric Modeling System) simulations intended to test the hypothesis that localized precipitation during chaos terrain formation formed inverted channel networks on the plateau adjacent to Juventae Chasma.

3:15 p.m. Spiga A. * Lewis S. R. Forget F. Millour E. Montabone L. Madeleine J.-B.
The Impact of Katabatic Winds on Martian Thermal Inertia Retrievals **[#1533]**
Maps of apparent thermal inertia exhibit spatial structures, which we show are not related to soil properties but to the nighttime warming of the surface by the atmosphere adiabatically heated by katabatic winds.

3:30 p.m. Hirschmann M. M. *
Oxidized or Reduced Early Atmospheres of Terrestrial Planets? Magma Ocean Atmosphere Control and the Importance of Metal-Magma Equilibration **[#1260]**
Early terrestrial atmospheres are influenced by interactions with magma oceans, which could impose either oxidizing or reduced conditions. Key variables include the depth of magma reaction with Fe, and the effect of pressure on Fe^{3+}/Fe^{2+} in magmas.

3:45 p.m. Suckale J. * Elkins-Tanton L. T.
The Possibility of Catastrophic Degassing and Implications for the Formationof Early Atmospheres **[#1678]**
We hypothesize that solidification of magma oceans proceeds in two stages: Initially, degassing is negligible and solidification rapid. Later, volatile enrichment triggers catastrophic degassing and sudden formation of a significant early atmosphere.

4:00 p.m. Valencia D. * Ikoma M. Guillot T. Nettlemann N.
Composition and Fate of Short-Period Super-Earths: The Case of CoRoT-7b **[#1872]**
With structure and evolution models, we show that exoplanet CoRoT-7b can either be rocky (although depleted in iron relative to Earth), or volatile-rich with at most 10% of vapor by mass. Its mass loss is $\sim 10^{11}$ g/s, and its origin unconstrained.

4:15 p.m. Walker A. C. * Goldstein D. B. Moore C. H. Varghese P. L. Trafton L. M. Stewart B. D.
Modeling the Sublimation-driven Atmosphere of Io with DSMC **[#1548]**
Io's sublimation-driven atmosphere is modeled using the Direct Simulation Monte Carlo (DSMC) method. The effects of plasma heating, planetary rotation, inhomogeneous surface frost, molecular residence time, and surface temperature distribution are investigated.

4:30 p.m. Moore C. H. * Goldstein D. B. Varghese P. L. Trafton L. M.
Io's UV-V Eclipse Emission: Implications for Pele-type Plumes **[#2353]**
Simulations of Io's NUV-V emission in eclipse show that S_2-rich giant plumes' S_2 concentrations and activity levels effect the absolute brightness and the east/west intensity ratio across Io allowing for plume activity to be determined from observed spectra.