

## **Response of metals in the lunar exosphere during meteor showers and intervals of high solar wind flux**

Sarantos (1,2), Colaprete (3), Szalay(4), Halekas (5), Wooden(3), Horanyi(6), Janches (2)

(1) Goddard Planetary Heliophysics Institute, University of Maryland, Baltimore County, Baltimore, MD, USA.

(2) NASA Goddard Space Flight Center, Greenbelt, Maryland, USA

(3) NASA Ames Research Center, Mountain View, CA, USA

(4) Southwest Research Institute, San Antonio, Texas, USA

(5) Department of Physics and Astronomy, University of Iowa, Iowa City, Iowa, USA

(6) Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, Colorado, USA

Two processes that have been hypothesized as sources for metals in the lunar exosphere are micrometeoroids impact vaporization and solar wind sputtering. Measurements of exospheric potassium, titanium and magnesium line emission, obtained by the Ultraviolet and Visible Spectrometer (UVS) on the Lunar Atmosphere and Dust Environment Explorer (LADEE) spacecraft between November 2013 and April 2014, allow us to quantify the relative roles of these processes in vaporizing lunar soils. We used information provided by the Lunar Dust Experiment (LDEX) on LADEE to seed a Monte Carlo model of exospheric transport, while the solar wind flux impinging on the lunar surface throughout the LADEE mission was observed by the Acceleration, Reconnection, Turbulence, and Electrodynamics of the Moon's Interaction with the Sun (ARTEMIS) mission. Time-dependent simulation of the evolution of the atmosphere before, during, and following the Geminids meteor shower were used to constrain the roles of these two sources. We also studied the response of the exosphere to two intervals during which  $\sim 20\%$  alpha-to-proton ratios were observed by ARTEMIS.