DREAM CENTER FOR LUNAR SCIENCE: A THREE YEAR SUMMARY REPORT. W. M. Farrell[1,3], R. M. Killen[1,3], and G. T. Delory[2,3], [1]Solar System Exploration Division, NASA/Goddard Space Flight Center, Greenbelt, MD, [2]Space Science Laboratory, University of California, Berkeley, CA, [3]NASA's Lunar Science Institute, NASA/Ames Research Center, Moffett Field, CA.

Abstract. In early 2009, the Dynamic Response of the Environment At the Moon (DREAM) lunar science center became a supporting team of NASA's Lunar Science Institute specifically to study the solar-lunar connection and understand the response of the lunar plasma, exosphere, dust, and near-surface environments to solar variations. DREAM especially emphasizes the effect extreme events like solar storms and impacts have on the plasma-surface-gas dynamical system.

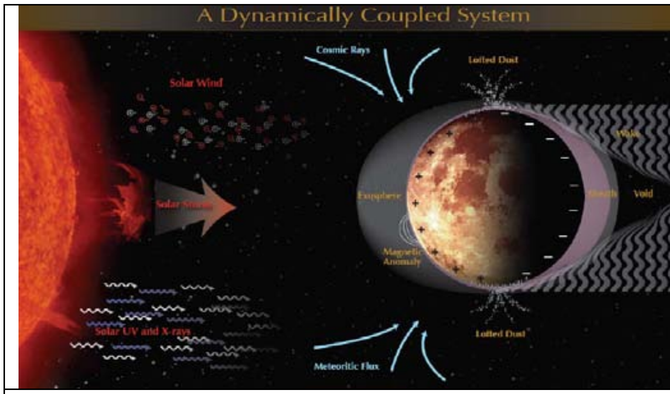
One of the center's hallmark contribution is the solar storm/lunar atmosphere modeling (SSLAM) study that cross-integrated a large number of the center's models to determine the effect a strong solar storm has at the Moon. The results from this intramural event will be described herein.

A number of other key studies were performed, including a unique ground-based observation of the LCROSS impact-generated sodium plume, exo-atmosphere modeling studies, and focused studies on the formation and distribution of lunar water. The team is supporting ARTEMIS lunar plasma interaction studies via modeling/data validation efforts, especially examining ion reflection from magnetic anomalies and pick-up ions from the Moon.

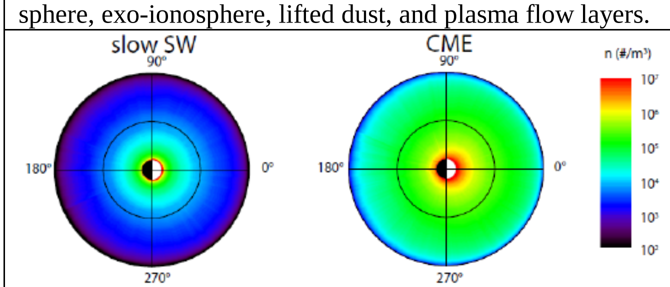
Special emphasis has been on simulating the ambipolar-driven inflow of solar wind into polar craters, and the sputtering effect on any near-surface volatiles. DREAM models predict that this sputtering and impact vaporization may effectively 'dry out' the upper surface – not by submlimation but by the more-violent space weathering process.

The team has also produced a set of works in support of the 2013 LADEE mission. Light scattering models have been developed for predicting the horizon glow expected from high altitude dust in support of the UVS and LDEX instruments. Exospheric models have been developed to estimate the atomic and molecular gas UV florescence values and to bound expected UVS measurements.

DREAM successfully advanced the understanding of the solar-driven lunar environment from the Apollo era to the Altair era and has direct applications to other exposed rocky bodies in our new target-independent, flexible era of exploration.



The Solar-Lunar Connection studies by DREAM. Solar energy and matter stimulate the lunar surface, resulting in an exosphere, exo-ionosphere, lifted dust, and plasma flow layers.



A model of the enhancment expected of the sodium exosphere during the passage of a dense cool CME driver gas. Models like this were key output from the SSLAM study.

DREAM supports E/PO objective, including Maryland Day activities shown here.