



## The Lunar Borehole Experiment

(1) **R. Cahalan**, (2) A. Ohmura, (1,3) G. Wen, (4) H. Miyahara

(1) NASA/Goddard Space Flight Center, (2) ETH Zurich, (3) UMBC/GEST, (4) University of Tokyo

A lunar borehole experiment, designed to retrieve a highly precise measurement of the temperature profile of the upper 10 meters of the lunar regolith, that is sensitive to deviations from a linear profile of the order of 1-10 mK, a challenging prospect, would have significant payoff to our present understanding of Earth's climate change, as it would allow a relatively direct determination of the likelihood of various proxy estimates of the solar irradiance extending back to pre-industrial times. We will discuss a proposal responding to the LASER call, entitled "The Lunar Borehole Experiment: A Thermal Model Applied to the Experimental Design," that is now in review. A related paper "Deriving Historical Total Solar Irradiance from Lunar Borehole Temperatures" is in press with GRL, and available now (<http://climate.gsfc.nasa.gov/viewPaperAbstract.php?id=1098>). The concept described there is also discussed in the recent NAS report on lunar science (posted on the LESWG site under Pubs/Presentations) both in "science goal 7b" and also in a paragraph headed "in situ observations of the variable Sun." We'll present results from the published thermal model, and then discuss some of the proposed model improvements and their use in optimizing the borehole experimental design.