Geophysical Research Abstracts, Vol. 7, 02355, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02355

Understanding Mercury's surface mineralogy and exosphere by using the Moon as a test-bed

P. Dobnikar (1,2), C. Kolb (2), H. Lammer (2), P. Wurz (3), V. Mangano (4,5), A. Mura (4), K. Torkar (2), A. Millilo (4),W. Baumjohann (2) and S. Orsini (4)

(1) Institute for Geophysics, Astrophysics, and Meteorology, University of Graz, Universitätsplatz 5, A-8010 Graz, Austria, (patrizia.dobnikar@stud.uni-graz.at), (2) Space Research Institute, Austrian Academy of Sciences, Schmiedlstrasse 6, A-8042 Graz, Austria, (christoph.kolb@oeaw.ac.at, helmut.lammer@oeaw.ac.at, klaus.torkar@oeaw.ac.at, baumjohann@oeaw.ac.at), (3) Physics Institute, University of Bern, Sidlerstr. 5, CH-3012 Bern, Switzerland, (peter.wurz@soho.unibe.ch), (4) Istituto di Fisica dello Spazio Interplanetario, Consiglio Nazionale delle Ricerche, Roma, via Fosso del Cavaliere 100, I-00133 Italy, (valeria.mangano@ifsi.rm.cnr.it), (5) CISAS, University of Padova, Italy

Planetary obstacles with no or thin gaseous envelopes are a kind of cosmic laboratory for planetologists. Energetic solar wind protons, heavy ions, electrons, X-rays, extreme UV, together with galactic and extragalactic cosmic rays bombard constantly the surface environments of such bodies, like Mercury or the Earth's Moon. Because, a better understanding of particle release processes from Mercury's surface soil is needed for planned exospheric and remote surface mineralogical studies by the Neutral Particle Analyzer Ion Spectrometer sensors ELENA, STROFIO, MIPA and PICAM of the SERENA instrument on board of ESA's BepiColombo planetary orbiter MPO, we present a study, which uses laboratory studied Lunar surface regolith (soil) as an analogue for Mercury's surface. The formation of the exosphere depend on various parameters, such as regolith porosity, binding energies and elemental fractionation of the surface minerals. In the first step in our study we use the known Lunar mineralogical soil composition, new experimental results for photo stimulated desorption (PSD) and proton sputtering on Lunar soil samples [Yakshinskiy and Madey, Icarus 168, 53, 2004], space based solar wind proton flux observations and the sophisticated TRIM sputter code for the estimation of the binding energies of various sputtered heavy elements (Na, K, Ca, O). Further, we compare the expected main Lunar exo-

spheric source processes PSD, solar wind sputtering and micrometeoroid evaporation with Earth based exospheric observations and discuss the implications of out obtained results for Mercury's exosphere.