Analysis of photometric function for selected lunar areas by SMART-1 AMIE data.

V. Kaydash (1), M. Kreslavsky (1), Yu. Shkuratov (1), S. Gerasimenko (1), P. Pinet
(2), S. Chevrel (2), J.-L. Josset (3), S. Beauvivre (3), M. Almeida (4), B. Foing (4)

(1) Astronomical Institute of Kharkov Natl. University, Sumskaya 35, Kharkov, 61022
Ukraine, (2) UMR 5562/CNRS/ Toulouse III University, Midi-Pyrenees Observatory, 14 Av. E.
Belin, 31400 Toulouse, France. (3) Space Exploration Institute (Case postale, CH-2002
Neuchâtel, Switzerland) (4) ESA/ESTEC (Keplerlaan 1, 2201 Noordwijk, The Netherlands)
kvg@vk.kh.ua

We use images obtained by Advanced Moon Micro-Imager Experiment (AMIE) camera onboard SMART-1 spacecraft to access photometric properties of selected lunar areas. To characterize photometric properties we use an approximation of photometric function proposed by Akimov [1]. An adjustable parameter of phase function part of this formula (i.e. the dependence of photometric function solely on phase angle) is the steepness η of phase function. We use this description to map the η parameter. Knowing the reflectance and photometric angles, we apply least squares fit procedure to find the parameter η. We studied two lunar areas: 1) Gruithuisen domes and surrounding mare in the western part of Mare Imbrium, 2) the cracked-floor crater Lavoisier. We found true photometric variations associated with small craters characterized by high η values and craters with diffuse extended halos of low η; these halos have no albedo expression. We explain low η anomalies for distal ejecta areas as modification of the "fairy-castle" microstructure of the regolith by the impact event and producing a less porous layer [2] The high η values for craters might be caused by an increase of mesoscale roughness in the proximal ejecta zone. We found the large negative anomaly of η parameter in the center of crater Lavoisier. It might be explained by pyroclastic deposits associated with tectonic fractures across the floor. This work is partially supported by CRDF Grant #UKP2-2614-KH-04 and by CNES.

References. [1] Akimov L. A. *Sov. Astron.*, 23, 231 (1979). [2] Kreslavsky M. A., Shkuratov Y. G. *JGR* 108, 5015 (2003).