Geophysical Research Abstracts
Vol. 16, EGU2014-10109-1, 2014
EGU General Assembly 2014

Boguslawsky crater, Moon: Geology of the Luna-Glob Landing Site

Harald Hiesinger (1), Mikhail Ivanov (2), Jan Hendrik Paskert (1), Karin Bauch (1), and Carolyn Howes van der Bogert (1)

(1) Westfälische Wilhelms-Universität, Institut f. Planetologie, Münster, Germany (hiesinger@uni-muenster.de), (2) Vernadsky Institute Moscow, Russia

The floor of crater Boguslawsky (∼95 km in diameter, centered at 72.9S, 43.26E) was selected as the primary landing site for the Russian Luna-Glob mission. Two landing ellipses, 30x15 km each, were chosen on the floor of the crater: Ellipse West is at 72.9S, 41.3E; Ellipse East is at 73.3S, 43.9E. Using high-resolution LROC images, we identified six geologic units within Boguslawsky crater, including smooth plains sp, rolling plains rp, secondary craters sc, a hilly unit hu, the crater wall cw, and the ejecta blanket eb of the 24-km sized crater Boguslawsky D. Units sp, rp, sc, hu, and possibly cw are accessible within the western landing ellipse. The eastern landing ellipse contains units sp, rp, eb, and sc. Based on our crater size-frequency distribution (CSFD) measurements and using the lunar production function and chronology of [1], we find Boguslawsky crater formed approximately 4 Ga ago. Because this age was derived from a count area on the western crater wall, which might have been modified by mass wasting, it represents a minimum age, i.e. the crater might be older. Applying the stratigraphy of [2], Bouguslawsky is pre-Nectarian in age, consistent with the age assignment of the geologic map [3]. Our CSFD results indicate that the rolling plains have an absolute model age of about 3.96 Ga old, thus being indistinguishable within the error bars from the CSFD of the Boguslawsky wall. The smooth plains and the ejecta blanket of Boguslawsky D exhibit very similar absolute model ages of 3.77 and 3.74 Ga, respectively. Thus, our ages for the crater floor are somewhat younger than the ages in the geologic map of [3] while Boguslawsky D appears to be older, i.e. it is Imbrian in age and not Eratosthenian as shown in [3]. To assess the safety of the landing ellipses, we studied the distribution of slopes and boulders. Within the two proposed landing sites, we find that the slopes at ∼30m base-length are generally less than 5-10 degrees. However, local slopes associated with small impact craters (mostly <500 m diameter) can be up to 45 degrees. Using LRO Diviner data, our thermal model [4] indicates several areas with higher thermal inertia and, thus, rock abundances. However, many of those areas likely can be attributed to temperature differences caused by insufficient topographic correction. However, we found several areas with high rock abundances that are clearly not affected by topography and are associated with the morphologically freshest craters. Manual boulder counts for those areas on LRO NAC images confirm a large number of boulders on the surface. For example, in an area of about 4 km2, we counted more than 16,000 boulders between ∼0.5 m and up to 13 m in size around a small crater at the eastern edge of the western landing ellipse.

References:
[1] Neukum et al. (2001), Space Sci. Rev. 96; [2] Wilhelms (1987) USGS Prof. Paper 1348; [3] Wilhelms et al. (1979) USGS I-1162; [4] Bauch et al. (2014), Submitted to PSS.