

GIS-BASED ANALYSIS IN SUPPORT OF FUTURE RUSSIAN LUNAR MISSIONS. A. A. Kokhanov¹, I. P. Karachevtseva¹, A. E. Zubarev¹, N. A. Kozlova¹ and M. A. Kreslavsky², ¹Moscow State University of Geodesy and Cartography (MIIGAiK), MIIGAiK Extraterrestrial Laboratory (MExLab), Gorokhovskiy per., 4, of. 155, 105064, Moscow, Russia, ²University of California - Santa Cruz, 1156 High Street, Santa Cruz, CA, 95064, USA

Introduction: The Russian space agency Roskosmos approved a new space program, which includes Lunar landing missions to the South polar region of the Moon. For accurate and safe landing it is necessary to carry out full and detailed study of the properties and characteristics of the surface of selected landing sites. The main task of our work is to develop photogrammetric technique and geo-analyses methods for lunar landing site characterization. With this purposes we produced high resolution DEMs and orthomosaics based on LRO NAC images [1].

Products: To quantify critical indicators for safety and suitability of potential landing sites [2] for future missions we carried out the following work:

- Calculation and analysis of surface roughness using different techniques at various scales including high resolution LRO NAC DEMs (1-5 m/pixel). A special GIS-based technique of roughness calculation was created. It is based on the calculation of the interquartile range of different surface parameters [4]. Fig.1 shows its application to global DTM GLD100 [3].

- Morphometric analysis of small lunar craters [5].

- Mapping of boulder distribution to determine landing hazard [6].

- Mapping of slopes distribution at different levels of detail [7].

- Estimation and analysis of the distribution of craters density at different part of lunar surface [8].

Moon craters catalogs. We started geomorphological and morphometric analysis of lunar craters in the southern polar region. For these purposes, the catalog of craters by SAI [9] is being checked and updated. Initial examination showed, that the characteristics of some craters in the catalog do not accurately reflect their status, which can be estimated on the new data set based on LRO WAC [3]. Also we are creating a cata-

log of lunar craters (D>500 m up to 10 km), which now contains about 120 000 features. We plan to apply automated GIS tools to DEMs for detailed morphometric measurements (relative depth, inner slopes, estimation of crater degradation) on a large set of impact craters.

All our results will be stored at data server with free unrestricted Internet access via Geo-portal [10] at <http://cartsrv.mexlab.ru/geoportal/>. Currently, a pilot version of Geo-portal contains the results of photogrammetric processing of archived lunar panoramas.

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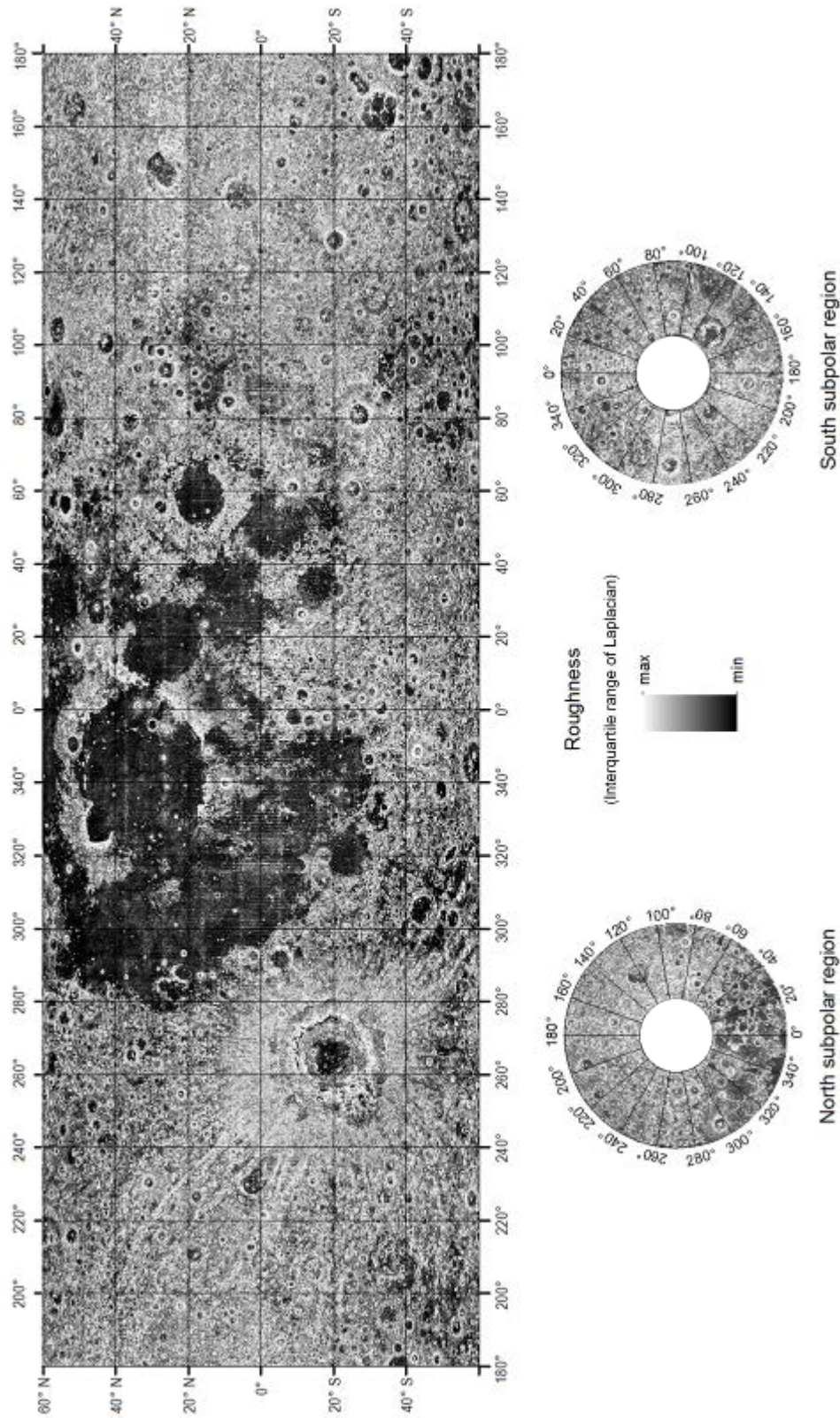


Figure 1. Map of lunar surface roughness, calculated from GLD-100 as interquartile range of Laplacian.