PRELIMINARY PHOTOMETRIC ANALYSIS OF THE CHANG'E-3 LANDING SITE. Jiang Zhang[1] , Zongcheng Ling[1] and Bo Li[1], [1]School of Space Science and Physics & Shandong Provincial Key Laboratory of Optical Astronomy and Solar-Terrestrial Environment, Shandong University at Weihai (180 Wenhua Xilu, Weihai 264209, China, zhang_jiang@sdu.edu.cn).

Introduction: The Chang'E-3 lunar lander/rover landed at 44.12° N and 19.51° W (Fig. 1) on the Moon on December 14th, 2014, a site located within young titanium-rich lava flows in the northern part of Mare Imbrium. The VNIS imaging spectrometer aboard the Chang'E-3 rover, covering 450-950 nm (100 bands) and 900-2400 nm (300 bands, non-imaging) in spectral range, was designed to obtain mineralogic compositions over the traverse surface [1]. Besides, photometric study of the Chang'E-3 landing area can provide information on regolith properties such as roughness and disturbances by landing descent [2-3]. Our goal of this work is to analyze the photometric behavior of the possible traverse area so as to investigate its regolith structures and support further photometric modeling of the VNIS spectral data.

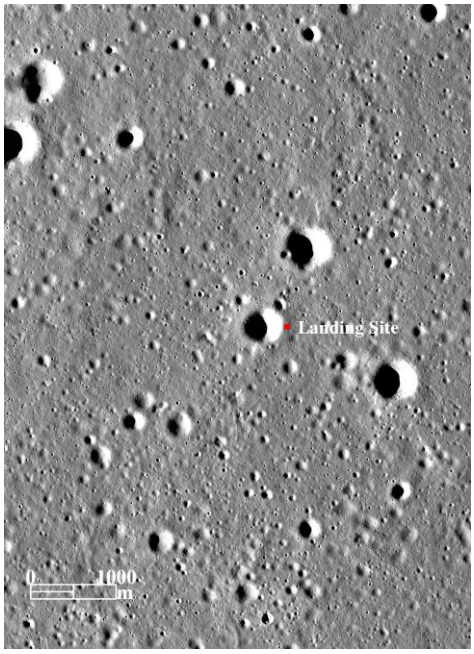

Figure 1: Chang'E-3 landing site. LROC NAC M102285549LE

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Methods: The high spatial resolution images obtained by the Lunar Reconnaissance Orbiter (LRO) Narrow Angle Camera (NAC) were used in this study, including M102285549LE, M1127248516RE, and M1129602407LE. These NAC images were calibrated into radiance factor (RADF), and corresponding illumination and viewing geometries for each pixel were calculated, both using the USGS ISIS software [4]. Then M1129602407LE was coregistered with and divided by M1127248516RE to derive phase-ratio image (Fig. 2), and this ratio was correlated with RADF in scatter plot (Fig. 3) as described by [5].

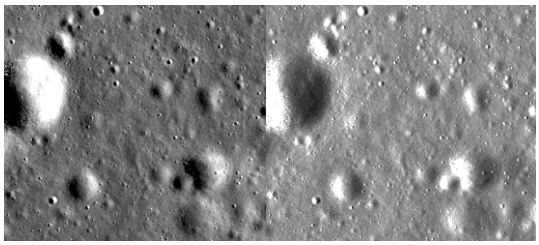
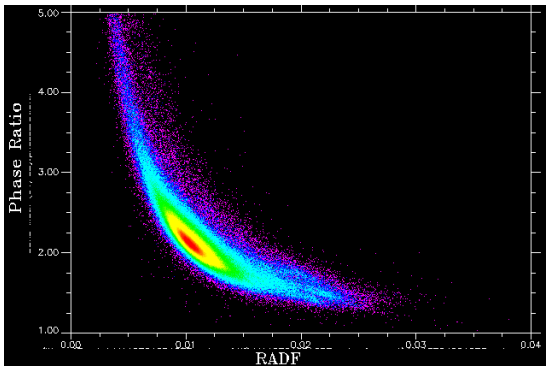


Figure 2: Phase-ratio image for the Chang'E-3 landing site. Left: LROC NAC M1127248516RE (phase angle 60.0°). Right: M1129602407LE (phase angle 74.5°) divided by M1127248516RE

Results and Discussions: The red/yellow data points shown in the scatter plot cover most of the Chang'E-3 landing area, except for impact craters and their vicinities (Fig. 3), indicating that this area has relatively homogenous photometric properties.

Previous works suggested that lunar surface might be disturbed by rocket exhaust during landing descent [2-3]. Therefore, it is desirable to analyze photometric properties of surface regolith in detail after the Chang'E-3's touchdown, once new LROC NAC data are available.



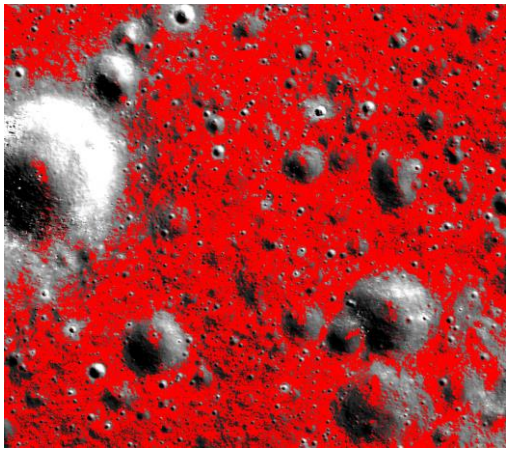


Figure 3: Above: Scatter plot for LROC RADF vs Phase-ratio. Below: LROC NAC M1129602407LE image overlaid by red color are from the red/yellow points shown in the scatter plot.

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References:

[1] Liu B et al. (2013) *RAA*, 13(7), 862-874. [2] Kaydash V. et al. (2011) *Icarus*, 211, 89-96. [3] Clegg R. N. et al. (2014) *Icarus*, 227, 176-194. [4] Anderson J. A. et al. *LPSC XXXV*, Abstract #2039. [5] Shkuratov Y. et al. (2012) *Icarus, 218*, 525-533.

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