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The optical maturity near lunar magnetic anomalies

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Abstract

The Lunar Magnetic Anomalies (LMAs) may protect the lunar surface from the bombardment of solar wind (SW) charged particles through the formation of mini-magnetospheres (e.g., Hood & Schubert 1980). One of the most prominent features of such a shielding effect is the potential change in the optical maturity of lunar surface materials (e.g., Blewett et al. 2007). To investigate this, we correlate the magnetic field measurements made by the Magnetometer (MAG) and the Electron Reflectometer (RF) of the Lunar Prospector (LP) with the multi-band imaging data obtained with the Imaging Interferometer (IIM) of Chang'E-1. We specifically choose several regions near well-known LMAs including the Crisium antipode and the Orientale antipode (Mitchell et al. 2008, see also Figure 1). By comparing the distribution of the spectral slope over the 600-840 nm wavelength range in regions with varying levels of magnetic field intensity, we find that the surface materials in magnetized regions tend to be significantly redder than nearby regions. However, such a feature is not necessarily to be universal, consistent with the apparent diversity in the association of albedo patterns with magnetic features found by Blewett et al. (2011).

1. Figures

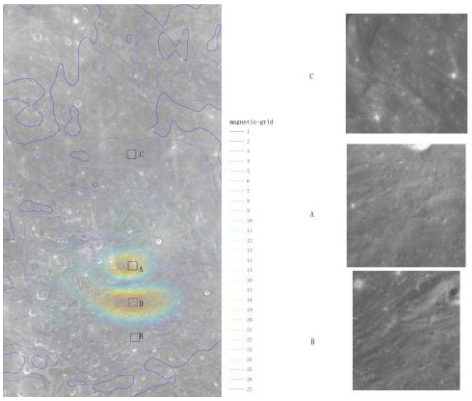

Figure 1: The left panel gives the general correlation between the LP magnetic field mag and the Chang'E-1 CCD image near the Crisium antipode, with the marked regions enlarged in the right panels.

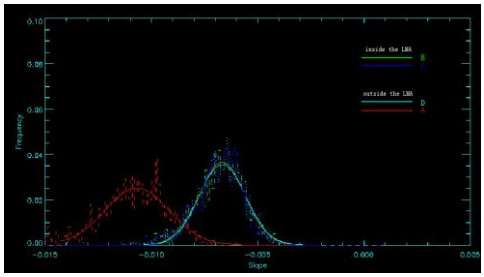

Figure 2. The distribution of the spectral slope over the 600-840 nm wavelength range for locations indicated in Figure 1.

Acknowledgements

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