NEW RESULTS FROM THE CHANG'E-3 OPTICAL INSTRUMENTS. Y. Z. Wu[1], Z. C. Wang[2], Y. Lu[3], [1]Key Laboratory of Planetary Sciences, Purple Mountain Observatory, Chinese Academy of Sciences, Nanjing 210008, China (wu@pmo.ac.cn). [2]Department of Earth Sciences, Nanjing University, Nanjing 210023, China, [3]School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing 210023, China.

Introduction: The Chinese CHANG'E-3 (CE-3) spacecraft landed in northern Mare Imbrium, east of the rim of a ~110 Ma crater currently named Zi Wei (44.12°N, 19.51°W). The *in situ* detection was performed by various instruments on the "Yutu (Jade Rabbit)" rover which travelled for ~114 m within 2 months. Here we present the results from four optical instruments on the rover and lander. The two optical instruments onboard the rover are the VIS/NIR Imaging Spectrometer (VNIS) and the Panoramic Cameras (PCAM), and the other two onboard the lander are the terrain camera (TCAM) and the descent camera.

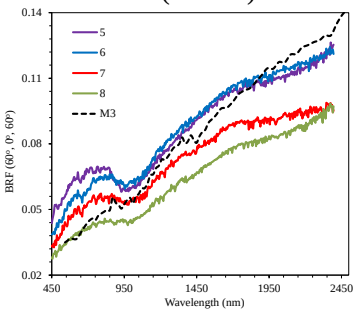

Fig. 1. The VNIS spectra of 4 sites. Site 5 is the closest to the lander and Site 8 is the furthest away.

Space weathering revealed by the VNIS: Four measurements of the regolith (sites 5, 6, 7 and 8; Fig. 1) were made by the VNIS. Reflectance increasing after spacecrafts landed have been observed for CE-3, Apollo, Luna, etc [1-4]. These studies suggest that smoothing of surface roughness is the main cause of the observed increase in reflectance and exposure of less mature soil was rejected because the maturity of core samples within the first tens of centimeters of regolith depth do not change significantly. The four spectra show that the reflectance, absorption strength, visible slope, and optical maturity (OMAT) all increase for sites closer to the lander, it suggests that:

1) brightness increases after the spacecraft landed are due to removal of the finest, highly weathered particles, not smoothing of the surface.

2) the uppermost surficial regolith is much more weathered than the regolith immediately below.

3) the finest fraction is much more mature than the coarser fraction.

4) the effects on the spectral slope caused by space weathering are wavelength-dependent: increasing the near-infrared continuum slope (VNCS) while decreasing the visible slope. That is, the *in situ* spectra reveal an opposite trend in the visible slope with respect to space weathering to the previously known trend. It is consistent with the ultraviolet observations for the Moon [5] and asteroids [6] and extends to the visible bands.

Young tectonism around CE-3 landing site: Recent studies found a lot of young tectonic activities on the moon [7-9]. The descent camera, PCAM, and LROC NAC all show small wrinkle ridges passed the Zi Wei crate (Fig. 2). To the north of Zi Wei, a younger crater (~50 Ma) was disturbed by the ridge, indicating the ridge is younger than 50 Ma.

By our global survey [10], the youngest ridges are mostly distributed inside Mare Imbrium, suggesting this area experienced more protracted thermal and structural evolution. The youngest wrinkle ridges also imply that the moon is probably active today.

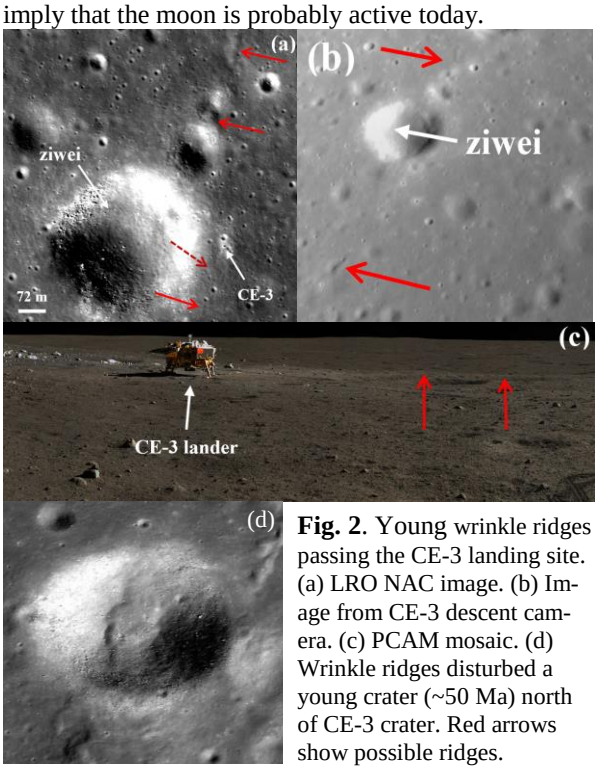

Fig. 2. Young wrinkle ridges passing the CE-3 landing site. (a) LRO NAC image. (b) Image from CE-3 descent camera. (c) PCAM mosaic. (d) Wrinkle ridges disturbed a young crater (~50 Ma) north of CE-3 crater. Red arrows show possible ridges.

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