

**THE PRELIMINARY ANALYSIS OF THE CRATER X NEAR CHANG'E-3 LANDING SITE.** X. D. Zou<sup>1</sup>, C. L. Li<sup>1</sup>, J. J. Liu<sup>1</sup>, L. L. Mu<sup>1</sup>, X. Ren<sup>1</sup>, X. Y. Gao<sup>1</sup> and X. X. Zhang<sup>1</sup>, <sup>1</sup>Key Laboratory of Lunar and DeepSpace Exploration, National Astronomical Observatories, Chinese Academy of Sciences, A20 Datun Road, Chaoyang, Beijing 100012, China. zouxd@nao.cas.cn

**Introduction:** The Chang'E-3 spacecraft achieved her soft landing on the moon on 14th, December. After landing at the 19.51° W, 44.12° N site, rover Yutu separated from the lander and start working. There is a big Crater to the west of lander about 30m away. Since we didn't have the name information of this crater, in follow analysis we just refer it as Crater X.

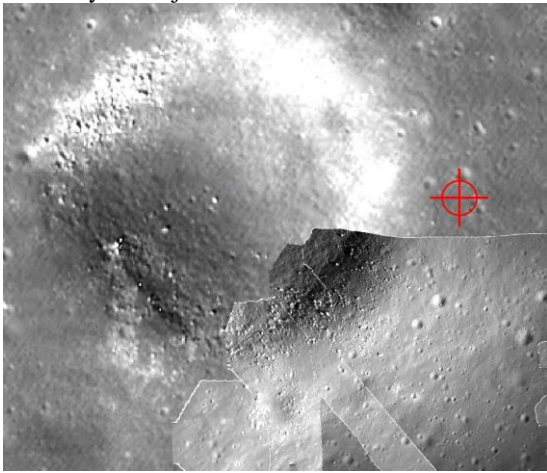


Figure 1 The image mosaic of Crater X with CE-2 1.5m and LCAM image of CE-3, we measure and analysis both crater and boulders based on it. and the red target sign is the landing site of CE-3.

**Measurements:** With the 1024×1024 image data from the LCAM (Landing Camera) and the DEM data by CE-2 we obtain measurements of Crater X: the center coordinates of Crater X is 19.5243W, 44.1200N, the diameter is  $450 \pm 15\text{m}$ , depth is  $51.5 \pm 10\text{m}$ , and diameter/depth is about 9:1. There are a huge amount of boulders and rocks with diameter less than 12m pile up inside the crater. The outside wall of Crater X is rather flat and with much less rocks (they are also smaller) than the inside.

**Boulders in the area:** We measured the diameter of the boulders from the LCAM image mosaic (Fig. 1 and 2).

.With the method of using lunar boulders to distinguish primary from distant secondary craters[1], we calculated k using the equation  $B=KD^{(2/3)}$ (where B is the diameter of the largest ejecta, D is diameter of the crater), if k is about 0.29, the crater is a primary, and if k is 0.46 or more, the crater is more possible a secondary crater.

Our results shows the  $k_{\max}$  from the biggest boulder outside Crater X is 0.26, and the average k value of the largest five stones is about 0.18, so Crater X may be a primary crater.

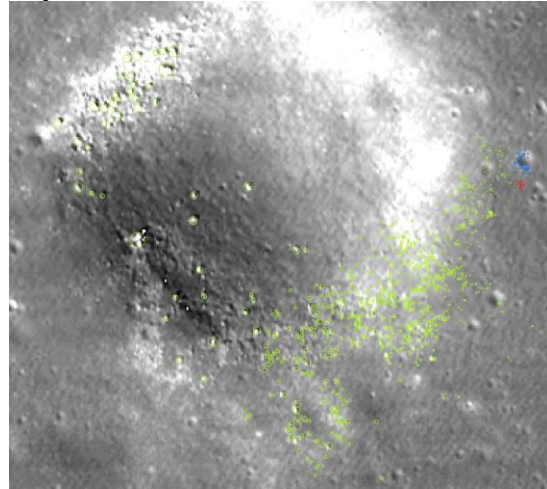


Figure 2 The results of Boulder measurements. The green polygons are boulders we measured around Crater X, and the blue polygons are boulders of the small crater very near the Yutu's separate point.

We also used the same method to analyze a small rocky crater near the north of CE-3 (center coordinates: 19.512° W, 44.120° N, diameter:  $16.0 \pm 0.5\text{m}$ , distance to CE-3: 16.7m). The result k is about 0.47, the results shows that it may be a secondary impact crater. And its primary crater is unable to confirm.

**Future Work:** To complete this work, we will analysis the size and velocity of the ejecta[3,4], measure and calculate the thickness of the regolith[2], estimate the relative age of Crater X, and the possibility of Yutu going near its rim and explore it with PCAM.

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**References:** [1] Bart G. D. and Melosh, H. (2007) Geophysical Research Letters. 34. [2] Bart G. D. and Melosh H. J.(2010) Icarus. 209, 337-357. [3]Housen, K.et al.(1983) JGR. 88, 2485-2499.[4] Vickery, A.(1986) Icarus. 67, 224-236.