

## DIGITAL TERRAIN MODEL RECONSTRUCTION AND PRELIMINARY SCIENTIFIC EXPLORATION PLANNING OF THE CHANG'E 3

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### ABSTRACT:

Introduction: At 13:11 (GMT) December 14, 2013 Chang'e 3 (CE-3) successfully landed at 19.51°W, 44.12°N northwestern Mare Imbrium on the Moon, making it China's first planetary mission to land on a celestial body other than Earth. Approximately seven hours after landing, the Yutu rover separated from the lander at 20:35 GMT of December 14.

CE-3 explore comprises a lander and a rover. It carries eight scientific instruments onboard, including the descent camera on the lander, and the panoramic camera on the rover. These cameras imaged the topographic features around the landing site.

Employing images obtained by the descent camera and stereo images by the panoramic camera, we have located the lander on 1.5 m/p Chang'e 2 (CE-2) images and constructed 3D terrain models of the landing area. The preliminary scientific exploration planning of the Yutu rover is presented in this paper.

Preliminary Results: During its first lunar day observation (December 15–25), the Yutu rover traversed from the lander-rover separation point to make a semi-circle around the lander, allowing the panoramic camera onboard Yutu to obtain color images of the lander. Subsequently the panoramic camera obtained 112 and 56 image pairs of the surrounding terrain at observation points E and S3, respectively. Based on these image pairs, we have reconstructed 3D Digital Terrain Models of 0.02 m resolution near points E and S3(Fig.1), and made the preliminary scientific exploration planning of the Yutu rover based on these data.

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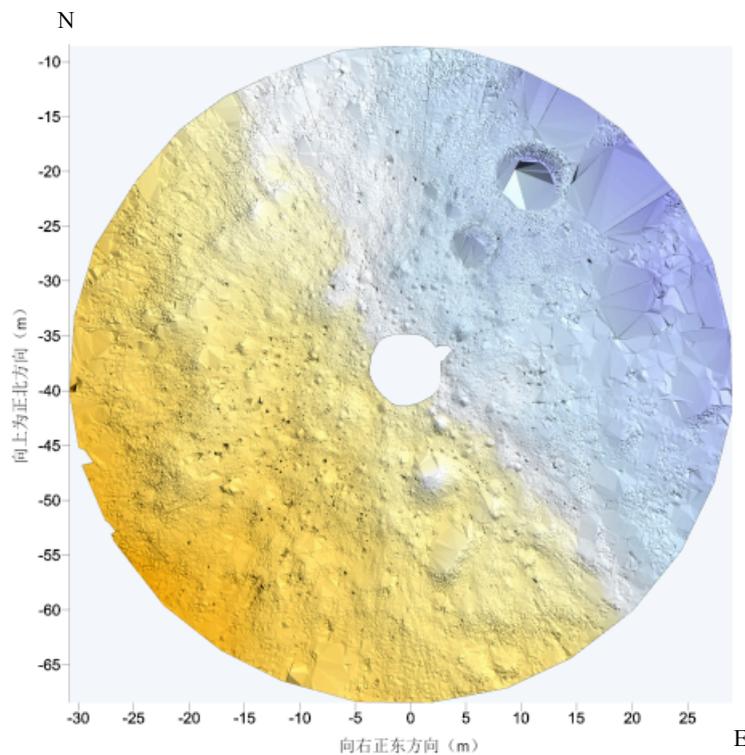


Figure 1. Reconstructed DTM near points S3.