

RECENT SELENODETTIC PROGRESS IN CHANG'E LUNAR MISSION. J. S. Ping¹, X. L. Su¹, Q. Huang¹
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Abstract: Chang'E-1 lunar orbiter measured the surface characteristics of the Moon using CCD camera and laser altimeters. Lunar DEM of global coverage and high resolution has been obtained. Also, based on the DEM, some middle scale geological features, basins and volcano have been identified. The new results will benefit the study of the lunar evolution.

Introduction: China's lunar exploration program features three milestones, "orbiting", "landing" and "returning". In 1st phase, Chang'e-1, a lunar orbiting spacecraft, will be launched to mapping the global Moon. In 2nd phase landing mission, a spacecraft will be launched to deploy a lunar lander for surface exploration in a limited area on the moon. In 3rd phase, on the basis of the lander mission, a lunar sample return mission will be implemented. The Chang'e-1 lunar orbiting was launched in October, 2007, and impacted on the surface of the Moon March 1st, 2009. Spacecraft platform is based on the DFH-3 communications satellite. Mature technologies and experiences from related satellite missions have been fully inherited and utilized. In terms of technical configuration, Chang'e-1 is actually a new spacecraft. (Ref: <http://www.clep.org.cn>).

The Chang'e-1 orbiter has four science objectives: to obtain three-Dimension (3D) stereo images of the lunar surface, to analyze the distribution and abundance of elements on the surface, to investigate the thickness of lunar soil, evaluate helium-3 resources and other characteristics, and to detect the space environment around the moon. To cover these four tasks, Chang'e-1 carries six kinds of payloads:

- 1) Optical Imaging System
 - CCD Stereo Camera
 - Interferometer Spectrometer Imager
- 2) Laser Altimeter
- 3) Gamma/X-Ray Spectrometers
- 4) Microwave Detector
- 5) Space Environment Monitor System
 - High-Energy Solar Particle Detector
 - Low-Energy Ion Detector
- 6) Payload Data Management System

A lunar topography model was obtained based on laser altimeter data. From this model, middle scale volcano and basins have been discovered.

In day time, the strong illumination from high altitude and high albedo rate radical craters will introduce the illumination effect on observing the nearby low altitude, low albedo rate and shallow

small slope rate area seriously, and even can "hide" the later area from the light. Based on the lunar global topography model obtained by Chang'E-1 mission, and by comparing with the lunar gravity model, a volcano named "YUTU Mountain" has been identified. It is a volcano with diameter of ~300km and height of ~2km located at (14°N, 308°E) in Oceanus Procellarum. Besides, the DEM of another volcano named "GUISHU Mountain" in the same area has been improved. See Figure 1.

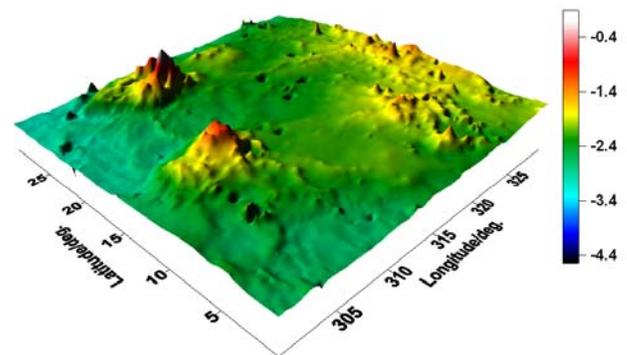


Figure 1, Two Volcanos in Lunar Nearside

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