

The lunar topography observed by the laser altimeter aboard KAGUYA and data assessment

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The Laser ALTimeter(LALT) aboard Japanese lunar explorer KAGUYA(SELENE) is a ranging instrument which measures the distance between the satellite and the lunar surface with accuracy of 1 m by detecting the timing delay of the reflected laser light. The aim of the LALT is to obtain the lunar global topographic data including polar regions for the study of the origin and the evolution of the Moon. The normal operation of the LALT began on 30th, December 2007 after two months' commissioning phase. By the end of the normal operation phase in October 2008, the LALT measured more than 10 million range data. As KAGUYA is in a polar orbit, the first global and precise topographic map was obtained (Araki et al., 2009).

Due to the synchronous rotation of the Moon, a realistic farside gravity field has not been available. As KAGUYA obtained farside tracking data by using satellite-to-satellite tracking method, our knowledge of the farside gravity field has been greatly improved. As a result, the satellite orbit was also determined precisely. This paper shows the latest topographic map by using all LALT data, including precise maps of the both polar regions. We also present an assessment of topographic accuracy, especially of the data at polar regions, and Apollo and Lunokhod landing sites.

References:

Araki et al. (2009), Science, in press.