

On the range measurement error of LALT aboard KAGUYA

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The Laser Altimeter (LALT) aboard lunar explorer KAGUYA (SELENE), which was launched in September 2007 and operated until June 2009, measured the distance between the satellite and the lunar surface, and achieved the first accurate lunar topographic map including polar regions (Araki et al 2009). Originally it was designed so that range measurements could be done for slope terrain with 30 degrees from 100 km orbit with the laser energy of 100 mJ. However, decrease of the laser energy down to 70 mJ occurred in the beginning of the nominal mission phase. In addition, due to a sudden decrease in the laser energy on 14, April 2008, the observation was suspended for a while, and intermittent observation was carried out until the end of the nominal mission phase (October 2008) for the investigation. In the nominal mission period, range measurement sometimes failed in the slope regions because the light bounced on the surface was not detected with sufficient intensity. In this report we investigate such situation by using laser energy telemetry, distance between the satellite and the lunar surface, slope, and reflectance of the surface.

references: Araki et al. (2009) Science 323, 897-900.

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