Lunar gravity field from LP LOS data: (2) terrain correction with the Clementine altimetry data

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We used Clementine laser altimetry grid data (0.25 x 0.25), to directly perform terrain correction for the line-of-sight (LOS) gravity data in the extended low altitude mission of the Lunar Prospector satellite. Altimetry data are given as the height difference from the reference surface with equatorial radius 1738 km and flattening 1/323. We integrated the gravitational acceleration by the excess mass (mass deficit) associated with the topographic high (low) over the whole Moon, at the points in the orbit where LOS accelerations are measured, assuming the average crustal density of 2.9 g/cm**3, and subtracted such topographic contribution from the observed accelerations. To save computation time, we used coarse 1 x 1 grid data for the regions sufficiently far from the satellite.

Gravity anomaly inverted from the corrected LOS data following Sugano and Heki (2002), is equivalent to that of the Bouguer gravity anomaly. The positive gravity anomalies in the mascon basins are enhanced in the Bouguer anomaly map. Bouguer anomalies are negatively correlated with topography where Airy isostatic compensation is achieved, while Bouguer anomalies disappear where

no isostatic compensation took place. We investigate the state of isostatic compensation in medium to large sized craters, and compare them between groups with different ages, sizes and regions.