

South Pole Aitken compensation mechanisms based on gravity and topography data

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The crustal structure and possible compensation mechanisms at the lunar polar regions can be investigated based on gravity and topography data. The limitation in the lunar science community's understanding of these regions is due to incomplete data returned from exploration missions. The most comprehensive topography dataset is derived from altimetry from the Clementine mission yet the most comprehensive gravity dataset is derived from Doppler tracking of the Lunar Prospector mission. Clementine's topography data are not available from the polar regions and the Lunar Prospector gravity data are not available from the farside. This work augments the current topography dataset of the polar region. Specifically, radio occultation data specially acquired from the Lunar Prospector Mission for the purpose of generating radii measurements at the polar regions have been processed, a new lunar shape model generated, and a crustal thickness map will be produced. Possible compensation mechanisms at the polar regions are examined, with particular attention to the South Pole Aitken, along with the implications for the formation and evolution of these regions and the moon.