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Low H/V and its volume dependency of landslides on the lunar crater rims

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The Selene lunar orbiter which was launched by JAXA in 2007 brought about a lot of topographical data using laser altimeter (LALT), terrain (wide-view) camera, and HD TV camera. This mission obtained detailed topographic data of lunar terrain with highest spatial resolution of about 10 m. Evaluated precision is about 4 m, and the positioning precision is about 80 m (1 Standar deviation). Most of the obtained topographic data are implemented in Google Moon, which are available in the public for free of charge. JAXA revealed that there are numerous landslide topography especially along the lunar crater rims. In order to compare the mobility of those in Mars, we have examined the apparent friction (H/T) in major craters. Apparently, those landslides are distributed on rather older and dissected crater rims. It means their occurrence must be much later than the crater formation. In most cases, the H/T values of those landslides are around 0.1, like long-runout landslides on the Mars and Earth. Rough estimation of the volume of those landslides implies H/V dependency on volume, i.e. larger landslides shows smaller H/V. The trend is very similar to the ones published by Scheidegger and Hsu. Past studies proved that ground water might have taken most important role in the presence of such low H/L landslide events on the earth and Mars due to excess pore water pressure generation under undrained loading condition of saturated ground soils. However, there have been no evidence nor implication reported, of past water existence on the moon. Possible mechanisms of these low H/T on the crater are (1) moon quake due to nearby meteor impact; (2) shear resistance reduction due to long-term physical/chemical weathering and existence of little ground water; (3) exotic mechanism including tectonic function.