

Relationship between formation age and the degree of degradation of the lunar craters

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Impacts of micro projectiles erode the lunar surface. Unraveling the time-scale for topographic degradation on the lunar surface is fundamental for understanding processes of the migration of regolith and the bombardment history and developing new dating method for the lunar surface. In this study, I performed crater morphologic analysis based on a topographic diffusion model to reveal the relationship between formation age and the degree of degradation for lunar craters and to evaluate the topographic diffusivity on the lunar surface. Digital Terrain Model (DTM) derived by Kaguya/Terrain Camera was used to investigate the crater shapes and the optical maturity parameter (OMAT), which characterizes the immaturity of lunar soils, was used as an indicator of the formation age for craters. The shapes of craters with fresh ejecta show that crater depth is affected by the local subsurface structure, while there is no difference of the slope of inner wall among fresh craters. Therefore, I evaluated the degree of degradation using the slope of inner wall. I found that there is a negative correlation between the degree of degradation and OMAT. Using the relationship the topographic diffusivity was estimated to be 13-31 m²/Myr.

Keywords: crater, crater degradation, impact, Moon