

A Study on Asymmetric Space Weathering with an Updated Lunar Crater List

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The lunar craters are good tools for analyzing asymmetries of space weathering caused by solar wind particles or micro-meteorites. The wall quadrants of a lunar crater provide the advantages of being exposed to space weathering for the same duration and being affected by different fluxes by slope of a crater wall. Previous studies have found latitudinal and longitudinal dependencies of optical properties on the lunar surface. Following Sim et al., who studied the space weathering asymmetry inside lunar craters, we make use of the extended lunar crater database to consider a total of 26,802 craters, ~15 times more numerous craters than the previous study. In the present work, we reproduce the previous results with improved techniques in outer-rim finding, inner-structure defining, and wall-quadrants dividing. Furthermore, we find that northern and southern hemispheres seem not to be symmetrically affected along the ecliptic plane. In our speculation, this result is caused by asymmetric impacts of meteoroids in the northern and southern hemispheres on the Moon.