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Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B) Lunar Science and Exploration (B3.1) Either poster or oral presentation (no preference).

MATURATION BY SOLAR-WIND PARTICLES AND REFRESHMENT BY METEORITE IMPACTS ON THE LUNAR CRATER WALLS

Kilho Baek, kilho.baek@gmail.com
Kyung Hee University, Yongin, Korea
Sungsoo Kim
Kyung Hee University, Yongin, Korea, sungsoo.kim@khu.ac.kr
Chae Kyung Sim
[Korea Astronomy and Space Science Institute (KASI)], [Korea National University of Science and Technology (UST)], Daejeon, Korea, cksim@kasi.re.kr

Lunar regolith undergoes maturation through space weathering and refreshment through impact gardening simultaneously. Space weathering on the Moon is primarily caused by solar wind particles and micrometeorites, while impact gardening arises from meteoroids and interplanetary dust particles incident to the surface. However, it remains unknown which of these agents predominantly contributes to the evolution over time. In the present work, we measured the latitudinal and longitudinal trends of flux variation with wall quadrants of $\sim 30,000$ lunar craters, distributed across latitudes within $\pm 50^{\circ}$. In addition to the previous work that discovered the longitudinal asymmetry induced by the combination of solar wind particles and geomagnetosphere, the flux differences between the opposite walls revealed two findings: a longitudinal offset and hemispheric asymmetry. We suggest that the first is related to the uneven distribution of sporadic meteoroids on the Earth-Moon system, while the second might be attributed to meteor showers entering from a specific narrow region in the northern hemisphere sky.