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The contribution of new impacts to the degradation of the pre-existing lunar landscape is size-dependent

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The observable cratering record on the Moon is influenced by crater production and degradation processes. In most regions, the primary contribution to crater erasure has been from impact cratering itself [1]. This leads to two distinct states where the measured size-frequency distribution (SFD) does not match the crater production SFD: crater equilibrium, where on average every new impact erases a pre-existing crater of the same size [2] and nonsparseness, where a new impact causes large-scale resurfacing [3]. Crater equilibrium typically affects small simple craters that are subject to diffusive crater degradation. Nonsparseness affects large craters and is caused by the geometric overlap of pre-existing craters by a new impact. We modeled the evolution of a pre-Nectarian surface unit and found that relative to their size, large complex craters are less destructive to the surrounding landscape than small simple craters.

[1] Öpik, E.J. (1960) Mon. Notices Royal Astron. Soc. 120(5), 404-411. [2] Gault, D.E. (1970) Radio Sci. 5(2),

+ 273-291. [3] Kneissl, T. et al. (2016), Icarus 321, 691-704. +

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