

Geology of the Grimaldi Basin on the Moon: Shreds of evidence for volcanism and tectonism during the Copernican period

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Abstract:

The Grimaldi Basin, centered at (5.2° S, 68.6° W), is a ~ 400 km diameter highly degraded, Pre-Nectarian double-ring impact structure on the Moon located near the western edge of the Oceanus Procellarum. Hyperspectral data from Moon Mineralogy Mapper (M³), Kaguya Lunar Multiband Imager (MI) derived FeO weight percent map [1] and TiO₂ weight percent map derived from WAC 321/415 nm ratio [2] have been used to study the mineralogical composition of the Grimaldi mare basalt. Morphological studies and crater chronology have been carried out using moderate to very high-resolution images from Lunar Reconnaissance Orbiter (LRO) to decipher the geological evolution of the Grimaldi Basin. Grimaldi mare basalts have been found to be composed of clino-pyroxenes with lateral as well as depth-wise variations in the Fe content. Cross-cutting of small Copernican craters by fresh wrinkle ridges and lobate scarps have been observed at several places in the basin suggesting occurrence of tectonism within the past ~100 Ma. Also, it has been found that the Basin experienced Copernican volcanic resurfacing in the lower central part resulting in the formation of basalts with high FeO and TiO₂ content. Thus, similar to the adjacent Oceanus Procellarum region [3], Grimaldi Basin was also geologically active during the Copernican period. The results will be presented and discussed in detail.

References:

[1] Lemelin, M. et al. (2016) *47th LPSC*, abstract #2994. [2] Sato, H. et al. (2017) *Icarus*, 296, 216-238. [3] Braden, S. E. et al. (2014) *Nature Geoscience*, 7, 787-791.