

## Geologic context of Mg-Spinel Lithology at Thomson crater on the Moon

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**Abstract:** Detailed geologic context of Mg-spinel occurrences at Thomson crater on the lunar far side is providing new insights about the origin of this newly discovered lithology on the Moon<sup>1</sup>. The global association of Mg-Spinel exposures dominantly with craters and basins resulted in the suggestion that these exposures have a deep crustal origin and have been exposed on the surface by impact event led destruction of the upper-crust.

The Mg-spinel has previously been identified in small and localized occurrences on the crater wall, floor and outside of Thomson crater<sup>2</sup>. However, we report that spinel exposures do not seem to be correlated to a particular stratigraphic horizon which could have provided a constraint on the depth of occurrence. Most of the exposures are restricted to only a few tens of meters scale. The extent and distribution of the spinel exposures at Thomson crater does not unambiguously reveal their origin. We are therefore evaluating the various possibilities including exposed outcrops of deep-seated plutons, small scale melt-crust interactions or impactor debris. Coordinated high-resolution study using M<sup>3</sup>, Kaguya TC and NAC reveals that almost every spinel exposure is associated with the smaller craters of the order of few meters. Detailed studies of the entire crater is underway and part of the global study of Mg-spinel exposures on the Moon. The detailed geologic context is key to understand the formation mechanisms of Mg-spinel lithology on the Moon and possibly elsewhere.

### References:

- [1] Pieters, C.M. et al. (2011) Journal of Geophysical Research, Vol. 116, E00G08.
- [2] Pieters, C.M. et al. (2014) American Mineralogist, 99 (10): 1893–1910.