

The Variance of Regolith Depth in the Lunar Highlands Versus the Maria in the Mare Crisium

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Regolith is the unconsolidated fine-grained substrate that covers the lunar surface. Regolith depth is important because it is related to the geologic history of the lunar surface. Below regolith, there is rock. The main process currently altering the lunar surface is impact cratering: the process of impacts forming craters in the lunar surface. Cold spot craters are a relatively newly discovered category of craters, which are distinguished by their relatively young ages and the low thermal inertia (low night-time temperatures) material surrounding the craters.

In the past, research has been done using crater sizes to determine regolith depth, but the use of cold spot craters is relatively new. Cold spot craters' young age leads to crater ejecta that has not yet been homogenized, allowing for inspection of blocks around craters. By comparing the size of craters that did and did not excavate blocks, regolith depth can be estimated. We found that the highlands surrounding Mare Crisium had significantly deeper regolith than Maria Crisium itself through the use of this relationship. Due to this difference in regolith depth, the Maria's surface is significantly rockier than the highlands due to a higher frequency of craters excavating blocks. This is consistent with the more recent volcanic resurfacing of the maria. These findings help endorse the use of cold spot craters in future research.