Insulative Effect of Regolith on Lunar Sub-surface Temperatures

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Abstract

Mapping of the lunar environment for the existence of water ice has relied on many indirect measuring techniques. One such technique is determining the maximum surface temperatures of the Moon. Temperatures determine the possibility of water ice, with the maximum temperature threshold for long term stability of water ice being 112K [1]. The maximum surface temperatures alone does not influence the possibility of lunar water ice existing in a region, instead the annual lunar thermal cycle and the insulating effect of the lunar regolith are able to sustain buried cold trap conditions less than 112K. The insulating effect of the lunar regolith is able to shield and insulate buried cold traps in a location with surface temperatures exceeding 200K.