

Correlation of LEND and Diviner Data

Correlated results from the Lunar Reconnaissance Orbiter's (LRO) Lunar Exploration Neutron Detector (LEND) and Lunar Orbiting Laser Altimeter (LOLA) suggest insolation effects influence the spatial distribution of Lunar H poleward of 60° latitude [1]. Diviner results indicate an insolation induced thermal contrast between pole-facing and equator-facing slopes of crater walls [2]. Our research shows that the contrasting thermal conditions observed in pole-facing vs equator-facing slopes and epithermal neutron rates from LEND are positively correlated.

Numerical transformations of LOLA topography facilitated a systematic decomposition of LEND epithermal maps as a function of insolation effects. The results suggest a significantly positive local epithermal contrast in these regions. Comparing pole-facing and equator-facing slopes, we find that the pole-facing slopes show epithermal neutron suppression ranging from ~ 0.005 to 0.02 cps relative to the equator-facing slopes..

We further investigate insolation effects on epithermal neutrons by comparing the predicted insolation contrast derived from the 3-D LOLA topography model with the LEND results. We also investigate and discuss the possibility of slope mass wasting effects being correlated with our insolation-effect hypothesis.