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CONTROL ID: 1488916**TITLE:** Constraints on the recent rate of lunar regolith accumulation from Diviner observations

ABSTRACT BODY: Many large craters on the lunar nearside show radar CPR signatures consistent with the presence of blocky ejecta blankets, to distances predicted to be covered by continuous ejecta. However, most of these surfaces show limited enhancements in both derived rock abundance and rock-free regolith temperatures calculated from Diviner nighttime infrared observations. This indicates that the surface rocks are covered by a layer of thermally insulating regolith material. By matching the results of one-dimensional thermal models to Diviner nighttime temperatures, we have constrained the thermophysical properties of the upper regolith, and the thickness of regolith overlying proximal ejecta. We find that for all of the regions surveyed (all in the nearside highlands), the nighttime cooling curves are best fit by a density profile that varies exponentially with depth, consistent with a linear mixture of rocks and regolith fines, with increasing rock content with depth. Our results show significant spatial variations in the density e-folding depth, H , among young crater ejecta regions, indicating differences in the thickness of accumulated regolith. However, away from young craters, the average regional “equilibrium” value of H (H_{eq}) is remarkably consistent, and is on the order of 5 cm. As expected, near-rim ejecta associated with young craters show lower values of H , indicating a high rock content in the shallow subsurface; for older craters, the average value of H approaches the regional value of H_{eq} . Calculated H values for young craters (Giordano Bruno, Moore F, Byrgius A, Necho, Tycho, Jackson, King, and Copernicus) show a clear correlation with published ages, providing the first observational constraint on the recent rate of lunar regolith accumulation. In addition, this result may help to resolve the apparent discrepancy between ages calculated from small crater counts on melt ponds versus counts on continuous ejecta (e.g., King crater; Ashley et al., 2011, LPSC 42, abstract 2437). This method could, in principle, be extended to other airless bodies (e.g., asteroids), which would in turn constrain the recent impactor flux.

CURRENT SECTION/FOCUS GROUP: Planetary Sciences**CURRENT SESSION:** P012. Lunar Science in the Wake of Human Exploration: Four Decades of Samples and Surface Data**INDEX TERMS:** [6250] PLANETARY SCIENCES: SOLAR SYSTEM OBJECTS / Moon, [5470] PLANETARY SCIENCES: SOLID SURFACE PLANETS / Surface materials and properties, [5420] PLANETARY SCIENCES: SOLID SURFACE PLANETS / Impact phenomena, cratering, [5464] PLANETARY SCIENCES: SOLID SURFACE PLANETS / Remote sensing.**AUTHORS/INSTITUTIONS:** R.R. Ghent, Dept. of Earth Sciences, University of Toronto, Toronto, Ontario, CANADA;R.R. Ghent, Planetary Science Institute, Tucson, AZ;

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