

An Analysis of Lobate Debris Aprons East of Hellas, Mars: Implications for Ground Ice Distribution

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Mars exhibits a variety of landforms in select areas that appear to have been deformed by viscous creep of ground ice. Debris aprons, thick, gently sloped masses of material surrounding some mountains, are one of the landforms thought to be shaped by this process. We have analyzed mountain peaks and ranges for the presence or absence of these debris aprons to constrain the distribution of ice in the Martian regolith. Our study area lies in the Southern hemisphere of Mars, east of the Hellas impact basin, and encompasses a region from 240° to 280° West longitude and from -40° to -50° latitude. Mars Orbital Camera (MOC) images from the Mars Global Surveyor spacecraft were scanned visually and their features cataloged. The latitude and longitude of each mountain were measured, as were peak altitude and base level, using Mars Orbital Laser Altimeter (MOLA) data. The data were then analyzed for correlations. We found that debris aprons do not exist around mountains with base elevations lower than 2000 meters below the datum. These mountains are all located west of 265 ° West longitude, within the Hellas impact basin. We are currently analyzing the region outside of Hellas, where mountains both with and without debris aprons are found, to look for further correlations.