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Radar Detection of a New Glacier Site In Mars Phlegra Montes Region

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SHARAD radar sounder has provided new evidence pointing to the presence of large bodies of buried pure ice in both the northern and southern mid-latitude of Mars. The radar evidence pointing to the presence of glaciers on Mars was reported by Holt et al. (2008) and Plaut et al. (2008). Data from earlier missions such as the Viking orbiter images had raised the possibility of the presence of interstitial ice in a set of features called Lobate Debris Aprons (LDAs) on the basis of their flow-like patterns. Head and Marchant summarized examples (in the 30-60° latitude band) illustrating an alternative hypothesis, that these features represented debris-covered glaciers instead of ice-assisted creep of talus. Hauber et al. identified geometric evidence for the past presence of LDA in the expected glacial latitude band. However, before SHARAD data became available, it was difficult to more accurately estimate the amount of ice present in the LDAs, with models of ice-lubricated talus flow predicting as little as 15% ice. SHARAD was designed to probe down to 1 km at Mars. The data have shown that it has penetrated as deep as 3 km in polar terrain.

The radar data very definitely rule out the presence of a major rock or dust component in the interior of the LDA features examined thus far. On this basis, we interpret many of the LDAs as containing a very high concentration of water ice, covered by a relatively thin blanket of dust and rock debris on the surface. This surface cover is a sublimation lag and has been an ef-fective thermal insulator that has preserved most of the ice since it was deposited in place during eras of active debris-covered glaciers.

During this talk we will present a new glacier that we have recently identified in the northern hemisphere of Mars (~36.3º N; 162.3º E) that is among the southernmost of the mid-latitude glacial deposits identified to date.