

## Regional Heterogeneity of Mid-Latitude Glaciers in Deuteronilus Mensae, Mars

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Lobate debris aprons (LDA) are features in the middle latitudes of Mars which show evidence of flow. Their origin and history has been debated for decades. Using orbital radar sounding data, they have been shown to be debris-covered glaciers, with a thermally insulating cover that protects massive water ice [Holt *et al.*, 2008; Plaut *et al.*, 2009]. Pressure and temperature conditions on Mars' surface today do not allow ice to flow; therefore understanding the conditions under which lobate debris aprons formed can offer insight into paleoclimate on Mars. LDA are clustered in three main locations in the northern mid-latitudes of Mars: Deuteronilus Mensae, Tempe/Mareotis, and Phlegra Montes. LDA do not appear to have much internal structure, but those in the Deuteronilus Mensae region of Mars show variations in radar subsurface reflectors that change with longitude. From west to east in Deuteronilus Mensae, radar detections of a subsurface interface (i.e., the base of the deposit) become less common. This longitudinal trend could represent a change in the internal composition of LDA, or properties of the protective layer. These variations may help us distinguish between end-member hypotheses on the origin of mid-latitude glaciers. If most LDA have very similar characteristics, they may have formed as part of a single, regional ice sheet which has since mostly retreated, leaving these LDA as remnants. On the other hand, if the LDA are dissimilar, they may have formed non-contemporaneously as individual piedmont-like glaciers. These end members have quite different implications for models of paleoclimate. We present the geographic patterns of variability and how this may inform us regarding which formation scenario is most likely.

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