



Analysis of Ice-Related Intra-Crater Facies in Promethei Terra, Mars

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On Mars ice-related landforms have been identified at mid-latitudes between 30° and 50° in both hemispheres including the areas of Tempe Terra, Deuteronilus-Protonilus Mensae, Phlegra Montes and the rims of the southern-hemispheric impact basins Argyre and Hellas [1-7].

Our study area – informally termed hourglass-shaped crater [8] – is located near Reull Vallis on the eastern rim of the Hellas impact basin (39.0°S, 102.8°E). Impact-crater infill was described as debris-covered piedmont-type glacier [8] based on analysis of High Resolution Stereo Camera (HRSC) data, and implies a glacial origin with precipitation of ice during higher obliquity phases. Recent, higher-resolution image data such as data of the High Resolution Imaging Science Experiment (HiRISE) and the Context Imager (CTX) provide a more detailed picture of the lateral distribution of different small-scale surface features indicative of periglacial and/or glacial origin.

The aim of this study is to identify qualitative and quantitative characteristics of these ice-related landforms and to separate sources of water ice and related processes. Initial age determinations based on impact-crater size-frequency statistics indicate an age of 3.4 Gyr for the impact-crater and an age of approximately 75 Myr for the infill [8]. In order to identify a possible sequence of surface-feature evolution we calculated the age distribution of four major surface units which span ages between 1-47 Myr. Along with detailed age information and a separation of different processes at this confined type location of Mars young-Amazonian landscape evolution and potential cyclic signals are being reconstructed to constrain climate evolution.

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