

EVIDENCE FOR IMPACT INTO ICE RICH TERRAIN AND MELTING TO PRODUCE GLACIATION AND VALLEY NETWORKS IN THE AEOLIS/ZEPHYRIA REGION, MARS. J. W. Nußbaumer¹, ¹Johannes Gutenberg University, Mainz, Germany.

Introduction: Paleochannels have been identified, which are interpreted to be the result of melting of ice. A 30 km diameter impact basin (Fig. 1) in the Aeolis/Zephyria region near the dichotomy boundary is characterized by small valley networks (Fig. 2) that are partly located radial to the crater rim. Large glacial deposits, interpreted to be the remains of debris covered glaciers, have been identified in the area surrounding the crater. The spatial association between the crater and the paleochannels suggest that the impact was responsible for their formation.

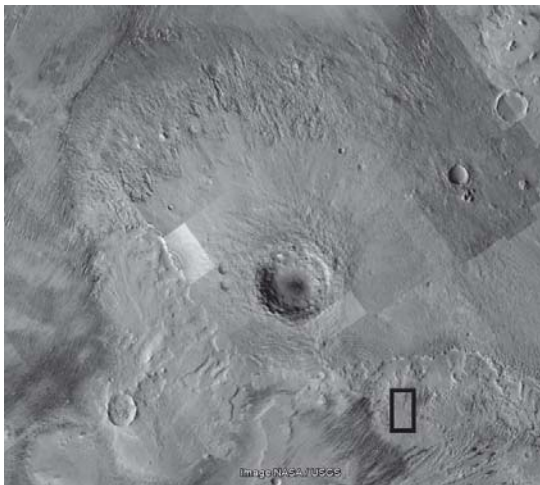


Fig. 1: CTX Image mosaic of an impact crater in the Aeolis/Zephyria region. Black box marks position of Fig. 2.

Ejecta deposit: The release of water is initiated by the melting of ice from the deposition of hot ejecta deposits over its surface. Such a mechanism would generate fluvial features in the absence of a climatic regime favorable for fluvial activity.

Conclusions: I propose that the valley networks originated from the release of water due to the deposition of hot ejecta over ice deposits present in the area during the impact event. Glacial deposits have been identified elsewhere on Mars [1-6]. Water sources originate from the melting of snow/ice deposits, extensive fluvial features in close proximity to the large crater in a region interpreted to have experienced significant glacial activity.

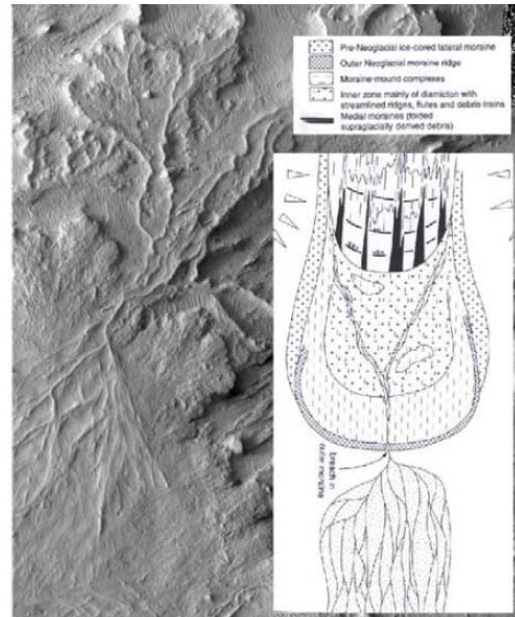


Fig. 2: Themis Image V05875001(left) and terrestrial analog (right, glacier and drainage system, Svalbard, adapted from [7]), suggesting the action of glacial meltwater as a water source for fluvial channels.

The spatial relationship between the valleys and the main crater suggest, that they are related. The hot ejecta deposit associated with the impact provides an explanation for the melting of ice deposits that were present on the plateau at the time of impact.

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