



The Climate History of Mars: Contributions from Gerhard Neukum and the Mars Express High-Resolution Stereo Camera (HRSC)

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Mars is currently a cold, hyper-arid global desert and water is sequestered in the regolith-cryosphere, with the major surface reservoir residing in the extensive polar caps, and very small amounts in the atmosphere. In its past history, Mars has been characterized by significant variations in its spin-axis/orbital elements (obliquity, eccentricity and precession) and these variations have led to the redistribution of water in the polar ice deposits to lower latitudes to create ice ages and their related deposits. HRSC data have been instrumental in the documentation of the presence of glacial deposits and landforms due to the global coverage, high-resolution stereo capability and the resulting DEM products, and the complementarity of HRSC products with data from other instruments. HRSC data have been one of the most important contributors to the newly derived understanding of glacial processes. We describe the general deposits and relationships that have been established for glacial units and features and focus on several specific examples to illustrate the compelling evidence for their interpretation as glacial landforms. We treat these chronologically, starting with the Amazonian and working back to earlier Mars history, examining evidence for Late Noachian glaciation and meltwater processes to produce valley networks and open-basin lakes.