



## **A geomorphic examination of the Hebes Chasma valley walls; a study of escarpment retreat processes on Mars**

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The Hebes Chasma is a 6 km deep, ~300 by ~130 km long depression lying just to the north of the Valles Marineris on Mars. Together these chasma constitute the deepest canyons in the Solar System. Impact cratering densities suggest that the chasma walls (escarpments) formed in the Noachian ( $> 3$  Byr) although most of the material in the valley floor is thought to be Amazonian ( $< 1.8$  Byr) in age. Thus processes that affect their valley walls have existing since early in the history of Mars. Understanding these processes is an important part of understanding the relationship between major landforming events in Martian history and the evolution of its climate, in particular the role of water.

The walls of the chasma are characterised by two distinctly different morphologies: (1) spur and gully and (2) smoothly convex landscape scars. Previous work has demonstrated that the spur and gully morphology predates the formation of landscape scars. These two distinct morphologies are closely juxtaposed, a situation which is apparently not encountered in analogous forms on Earth. Here we use a high resolution (~50m) DTM derived from HRSC data to explore in more detail the formation of these two distinct terrains, and consider possible controls on their development. Such an analysis of variations in escarpment morphology should elucidate the relative role of environmentally-controlled surface processes as opposed to variations in substrate properties.