Topography of trough valleys of Claritas Fossae, Mars

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Abstract
Existence of glacial-like formations on the southern mid-latitude highland of Claritas Fossae is postulated and will be presented with details.

1. Introduction
Glaciers and glacial processes were possible on Mars when the obliquity of the rotation axis of Mars was larger than now. At 50 degrees or more, the obliquity allows the southward slopes in the southern mid-latitude areas to be in a winter-time shadow.

2. Valleys studied
The most elevated peak of the Claritas Fossae highland is about 9000 m high and it is almost on the level of the central part of the Tharsis Bulge. Between the high mountain ridges there are several large valleys that have linear borders that may indicate a graben-like origin of some of the valleys. They were formed during the Noachian era and deformed during the Hesperian era. The floors of these wide U-shaped valleys were deformed or resurfaced about 3,4 – 3,6 Ga ago. Later, the flat floors were cut by numerous N-S faults parallel to the Claritas Fossae rift zone.

3. Observables
Topographic contours with 200 m intervals show well the main formations and allow some comparisons to terrestrial glacial formations. The valleys that end at Solis Planum do not show moraine-like formations because the later lava flows cover possible foot formations. Directed to the west and south, there are several additional valleys that show some glacial-type floor formations that are younger than the grabens themselves. The high valley amphitheatre or alcove areas can be compared to terrestrial glacial accumulation areas. Some graben-derived valleys have a common alcove or source area beside the highest 9000 m high peak.

4. Summary
Topographic contours of 100 m or 50 m represent more details of these valley formations that may have a tectonic origin but show some features of certain later glacial activity.