AN ADDITIONAL ALBA PATERA - STRUCTURE IN TEMPE TERRA, MARS ?

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A morphologic investigation of the relief of the Tempe Terra uplands on Mars reveals the possibility that an additional Alba Patera - like feature exists in that area.

The Alba Patera - system on Mars is characterized by its countless lava flows, its central complex caldera which both together form a central shield volcano which is surrounded by a complex fracture system (countless shallow grabens). The whole system is nested in a larger fracture system, the Ceraunius Fossae which probably indicate a (fossil?) embryonic spreading system (1,2,3, 4). The diameter of the central part of the much larger general structure is appr. 400km.

Detailed investigations of the Tharsis Sutur in the area of the Tempe Terra uplands reveal a similar but much smaller structure in that area which is still unnamed. In the latter case a small volcano with numerous individual flows but without a caldera is nested in a set of countless grabens of the Tharsis Sutur which roughly surround the western half of the volcano. Its eastern flank is surrounded by numerous small arcuate lineations (very narrow grabens and fractures) which cut the grabens of the Tharsis Sutur (arrows 1-3). Hence, the activity which led to the origin of thoses smaller grabens and fractures has been younger then the last tectonic activity of the Tharsis Sutur.

Both features, the Alba Patera - system as well as the Tempe Terra - volcano, are remarcably flat. Alba Patera is roughly 7 000m high, whereas the unnamed Tempe Terra - volcano is not detectable in the pattern of the 1 000m contour lines of the U.S.G.S. maps. That fact seems to be very important because martian shield volcanoes normally reach elevations between 18 000m and 27 000m. The central part of the Tempe Terra - structure has a diametre of roughly 100km; see Fig. 1.

It should be pointed out that the features mentioned above show many similarities with venusian coronae with many respects. Venusian coronae are very flat features with or without a flat volcano in their centre as well. In many cases they are surrounded by numerous concentric features (grabens and/or fractures). Hence, there might be a relation between martian and venusian concentric features which probably have been affected by endogenic forces (upwelling mantle plume?,5); whereas similar features have not jet been identified on Earth.

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Fig. 1
Alba Patera - like volcano (V) with surrounding large grabens of the Tharsis Sutur and with smaller, younger grabens and fractures (arrows 1 - 3); North at top.

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