

A FOSSIL LINEAR ZONE OF WEAKNESS BENEATH THE KASEI VALLES, MARS?

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A morphointerpretativ analysis of the main linear features along the northern branches of the Kasei Valles leads to the supposition that a large linear zone of weakness exists beneath the Kasei Valles.

Various authors have described and discussed the impressive set of radially arranged linear features in the area of the Tharsis, Noctis Labyrinthus, Valles Marineris (TaNoVa)-Updoming on Mars (1,2). Whereas the Valles Marineris and the Alba Patera-System have been interpreted as linear zones of ascending material (3,4; fossil spreading axes?) a similar zone which could indicate descending of material has not yet been identified finally (5).

According to the spatial distribution of the Valles Marineris and the Alba Patera-System it seems to be self suggesting that the Kasei Valles indicate the course of such a linear zone of weakness:

-) Both northern branches of the Kasei Valles take a linear course and run parallel to each other; hence, they are probably structurally controlled (see Figure);
-) these valleys are arranged radially with respect to the centre of the TaNoVa-Updoming, just as are the Valles Marineris and the main axis of the Alba Patera-System. All other main outflow channels of that area run more or less concentrically with respect to the centre of the TaNoVa-Updoming;
-) exactly in the extension of the course of the northern branches of the Kasei Valles is the volcano Tharsis Tholus situated, the only volcano of the entire area of that updoming which has been cut into sectors by a set of faults;
-) in general, a linear zone of weakness indicating descending material should be situated more or less halfway between the Valles Marineris and the Alba Patera-System; exactly that is the situation of the Kasei Valles (northern branches).

Hence, the supposition seems to be justified that the Kasei Valles indeed indicate the axis of a (fossil?) zone of descending material. That feature supplements the set of huge radial features which is so characteristic for the entire area of the TaNoVa-Updoming.

- References:
- 1) Carr, M.H. (1974), *J.G.R.* 79: 3943 - 3949.
 - 2) Wise, D.U. et al. (1979), *J.G.R.* 84: 7934 - 7939.
 - 3) Lucchitta, B.K. (1989), *Icarus* 86: 476 - 509.
 - 4) Raitala, J. (1988), *Earth, Moon, and Planets* 42: 277 - 291.
 - 5) Jöns, H.-P. (1991), *Geographische Rundschau* 2: 98 - 109.



Fig. 1 Part of the Kasei Valles (K1,2); compare polygons at arrows 2 with linear features at arrow 1. Arrow at Th.Th. points towards Tharsis Tholus.