

ON THE ORIGIN OF THE ETCHED TERRAIN, MARS. Heinz-Peter Joens,
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The Etched Terrain (=Etched Material) which occurs in the immediate vicinity of the martian South Pole Cap is one of the most enigmatic landscapes of the entire planet. However, if one takes into consideration the possibility that the South Pole Cap got thawed at least one time [1], then the origin of the Etched Material turns out to be a logic event.

Thawing of the South Pole Cap would lead to the origin and mobilisation of huge amounts of aqueous slurry because the Polar Cap consists of layers of H₂O and CO₂ ice and dust as demonstrated by the layered material. Moreover, the melting and subsequent collapse of the Polar Cap would lead to the origin of huge lumps of material which probably would have slidden northward over short distances; smaller lumps of material even might have flowed like icebergs. Immediately after such an event evaporation and even sublimation of those lumps of material would have led to the origin of the depressions which typify the Etched Terrain; i.e. these depressions indicate the final position of the „icebergs“. Some of them could have been as large as ice fields as is indicated by the diameter of

the depressions. Later these depressions got somewhat reshaped by eolian activities.

As some of these depressions are embayed by numerous small ridges it is indeed very likely that the „icebergs“ had at least a tendency to move outward, i.e. northward, which led to the origin of the small compressional ridges around them.

The spatial distribution of all these depressions which characterize the entire morphologic unit is very telling: The by far largest depressions occur in the immediate vicinity of the now existing - younger - South Pole Cap. More northward these depressions soon get smaller and shallower but still form large swarms which occur in the vicinity of the largest depressions. Some individual pits even can be detected within the Argyre Planitia into which a part of the mobilized material flowed.

References: [1] Clifford, S.M. (1987): Journ. of Geophys. Res., 92: 9135 - 9152.
[2] Jöns, H.-P. (1996): Publ. der Dt. Ges. fuer Photogr. und Fernerk., 15. Jahrestagung, Hannover 1995, Bd. 4: 49 - 53.