Gravity aspects suggest that Isidis basin is buried volcano.

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Introduction: We use the gravity aspects (descriptors) to study features on Mars. They are derived from the gravity field models of Mars (sets of spherical harmonic expansion of disturbing gravitational potential in terms of harmonic coefficients, also known as Stokes parameters) [1].

Results: Gravity aspects revealed significant local observation near large basins and volcanoes of Mars. Specifically, around Syrtis Major/Isidis there are positive parameters related to first and second derivatives of gravity potential (Δg and T_{zz}, respectively, see [1] for exact definitions), Fig. 1 shows dilation crustal state in parameter virtual deformation (*vd*, for definition see [1]) inside and compressional state outside, and positive invariants of the Marussi tensor (see [1] for definition), altogether symptoms of significant volcanic expression (e.g. Olympus Mons or Elysium).

Discussion: While Isidis is a topographical low; it displays the gravity signature consistent with a volcanic structure. Topographically higher zone is located west of the low part of Isidis and this has pattern of a shield volcano. This is in contrast with general view that Isidis structure is an impact basin [3,4].

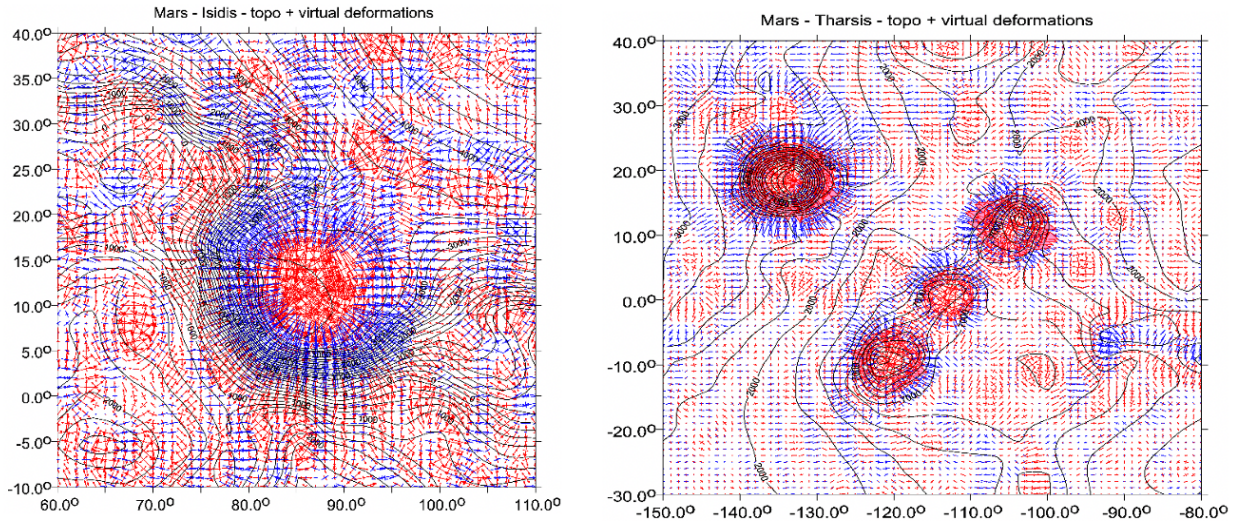

Fig. 1: The virtual deformations *vd* [dimensionless] in the area of Isidis Planum (IP) and Tharsis major volcanos. Plots are based on the global gravity field model JGMRO_120F [2] (red dilatation, blue compression). Countours are from the MOLA MGS topography (black contours in [m] above reference surface) for Isidis Planum. Note significant dilatation inside the IP, surrounded by area reflecting compression state, combination typical for volcanoes.

References: [1] Klokočník J. et al. (2020), ISBN (10): 1-5275-4948-8; ISBN (13): 978-1-5275-4948-7. [2] Konopliv A. et al. (2020) *Geophys. Res. Letts*, 47.. doi: 10.1029/2020GL090568. [3] Mustard et al. (2007) J. Geophys. Res.-Planets 112, 14, doi:10.1029/2006JE002834. [4] Neumann G.A. et al. (2004), J. Geophys. Res.-Planets 109, 18, doi: 10.1029/2004JE002262.

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