MARTIAN MANTLE: ITS CHEMISTRY REPEATS A TENDENCY OF THE DICHOTOMOUS MARTIAN CRUST; Kochemasov G.G., IGEM of the Russian Academy of Sciences, 35 Staromonetny, 119017 Moscow, kochem.36@mail.ru

The comparative wave planetology [1, 2 and others] is based on this fundamental thesis: orbits make structures. It means that inertia-gravity forces arising in planetary bodies due to their movements in non-circular (elliptical, parabolic) keplerian orbits with periodically changing curvatures and accelerations produce in planetary spheres undulations. Having standing character and four directions (ortho- and diagonal) these undulations (waves) interfere forming uplifting (+), subsiding (-) and neutral compensated (0) tectonic blocks. These blocks, naturally, are regularly disposed and their sizes depend on wavelengths. The longest fundamental wave 1 (long $2\pi R$) inevitably produces tectonic dichotomy with one hemisphere rising (+) and another falling (-). The rising (continental) hemisphere increases its planetary radius. The falling (oceanic) hemisphere diminishes its planetary radius. As all planetary bodies rotate, tectonically and hypsometrically different levels blocks (hemispheres) must regulate (equilibrate) their angular momenta: otherwise a globe will tend to fall to pieces (destroy itself). As the angular velocity of rotation of all blocks in one body is the same, the equilibration must be done by play between radii and densities. The subsiding blocks thus must be denser than the uplifting blocks. Our observations confirm this: at Earth oceans are basaltic and continents are on average andesitic. Mars also obeys this law: the northern lowlands are Fe-basaltic and the southern highlands are andesitic at least at the dichotomy boundary ('Pathfinder") and must be else less dense further south (we proposed albitites, syenites and granites as candidates to these low density rocks [2]). Ratios between light and dark minerals as well as Fe/Mg in dark minerals play an important role in regulation of basaltic densities. Compositions of crustal basalts having the mantle origin are very sensitive to hypsometric (tectonic) position of planetary blocks. At Earth oceanic depressions are filled with Fe-rich tholeiites, on continents prevail comparatively Mg-rich less dense continental basalts. This tendency for martian basalts becames clear after TES experiment on MGS [3]. The TES data on mineralogy of low-albedo regions show that type 1 spectra belong to less dense basic rocks (feldspar 50%, pyroxene 25%) than type 2 spectra (feldspar 35%, pyroxene + glass 35%). It means that the highland basaltoids are less dense than the lowland ones. Mars with its sharp relief range (~6 km hypsometric difference between the northern lowlands and southern highlands) requires very sharp density difference between composing these blocks lithologies. Earlier predicted [2] alkaline lithologies for continents were found at Columbia Hills highland outlier [5].

A globular shape of rotating celestial bodies means that their tropical and extra-tropical belts have significantly different angular momenta. To level partly this inequality bodies tend to diminish radius and mass in tropics and increase them in extra-tropics. Traces of these destructive and constructive actions are fixed in planetary geospheres. The remote geologic mapping of **Mars** reveals these traces rather obviously. "Mysterious" contact zone of the martian lowlands and highlands with obvious traces of destruction expressed in widespread development of chaotic and fretted terrains is a good evidence of this. So called martian pedestal craters are broadly developed polarward of 40˚ N and S latitudes [4]. Usually they are considered as impact craters but more correctly they should be assigned to normal volcanic features expulsing volatile-rich silicate material (a kind of mud, thus "mud volcanoes'). An intensive volcanism through pedestal craters in extra-tropic belts should be compared with intensive plume-driven basaltic terrestrial volcanism also in extra-tropics – both are constructive events.

The mantle derived basaltic rocks of Gusev crater (near the continent) could be compared with Vikings' basalts ("open ocean"). As it should be, in Vastitas Borealis the basalts are Fe rich or Fe-basalts. They are less siliceous, have less K, Mg and Al. The Gusev crater basalts have higher Mg/Fe, AL/Ca, K_2 0 (up to 0.5%, especially in soils, comparable to 0.7% in Pathfinder andesites also in the contact). Even nepheline-normative rocks were already observed in the first analyses of the Gusev crater basalts [6]. All indicates that approaching highlands basalts become "lighter" (less dense) as it requires physics of a rotating body.

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