Ragged Phobos and coated Deimos: two satellites with various relations to the Roche limits

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As all cosmic bodies in Universe move in several periodic orbits of wave nature with very different orbiting frequencies, they are affected by modulated waves. They appear as predicted by radio wave physics. The modulation is division and multiplication of the higher frequency by the lower one. As a result, along with main frequencies appear two side frequencies with corresponding them tectonic granules. Examples are on surfaces of Saturn, Jupiter (cloudy covers), Pluto, the Moon, Titan, Ceres, Churyumov-Gerasimenko comet core [2, 3]. Now we show the modulation effects on Phobos and Deimos.

On Phobos a series of crossing troughs and crater chains is well presented. They cover the entire satellite surface by a kind of wavy cloak – a drying apple (Fig. 1). This shrinkage of the gaining speed falling on Mars satellite is due to necessity to keep the angular momentum [4]. Thus, the body's radius must diminish and the body shrinks and abundantly degases (numerous craters witness this). This occurs not chaotically but in form of regular crossing in four directions waves inscribed in a drying diminishing its surface sphere. Smallest wave forms concordant with the highest orbital frequency of the satellite (1/7.65 hours) still are not visible. However, modulated side waves and corresponding them forms (troughs and "craters «chains) are visible. 1/7.65 : 1/16488 (circummartian frequency) gives the side frequency 1/2155 and corresponding granule size 16.5 m (the scale is the Earth with the orbital frequency 1/1 year and the corresponding wave length $\pi R/2$ or the granule size $\pi R/4$).The smallest visible features (troughs and "craters") in Fig.1 are about 15 m. Along with them also are numerous wider troughs marking earlier more distant orbits of the satellite with the lower frequencies.

Two modulated frequencies of Deimos are interesting in that the corresponding them granules are: for the smallest (0.038 m), too fine and making smooth surface and, for the large (34.6 m), hardly visible as grids under the soft damping cover of fine dust material and blocks (Fig. 2, 3, 4). These grids are better visible along brinks of the image (Fig. 2-4). Presence of mainly two sizes of fragments (dust and blocks-bifurcation of sizes) also proves an action of two distinct modulated structuring frequencies. The dust cover is mainly discarded on shrinking Phobos and grows on Deimos. The first diminishes orbit radius, the second, in contrast, keeps it or slowly increases (different tendencies of angular momenta development).

Phobos diminishes the radius of its orbit eventually crossing the Roche limit for the "liquid" (actually porous dusty) cover and losing it. The squeezed folded peeled bedrock outcrops (Fig. 1). Deimos, on the contrary, far from the limit, keeps its dusty cover (Fig. 2-4) [6].

Striped off Phobos dispersed (dust) material finds its way towards Mars making a part of the planet atmosphere dust and the surface regolith. A significant part of the martian dust is replenished by eroded highly standing continents but a certain part could derive from the Phobos' dust. A thin coat of light (not dark) material on the martian surface is revealed due to impacts from inside (degassing) or hits of meteorites (less possible) (Fig.5). In any case, a dark basaltic(?) inside material uncovers itself (spiders, Fig. 5). Contrasting composition of the bedrock (dark probably basaltic) and aeolian lighter in color dusty coat is obvious. This lighter surface material is made mainly of eroded highlands with some participation of disappearing dusty cover of Phobos. Formation of bifurcated (blocks-dust) surface materials is observed also on the Churyumov-Gerasimenko comet core [3] and on Deimos.

References:

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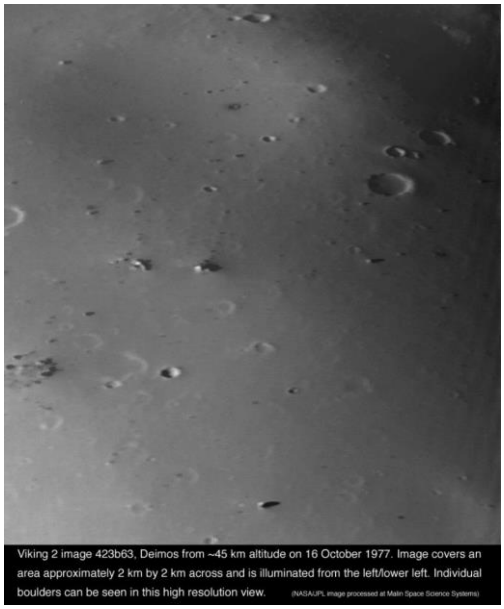

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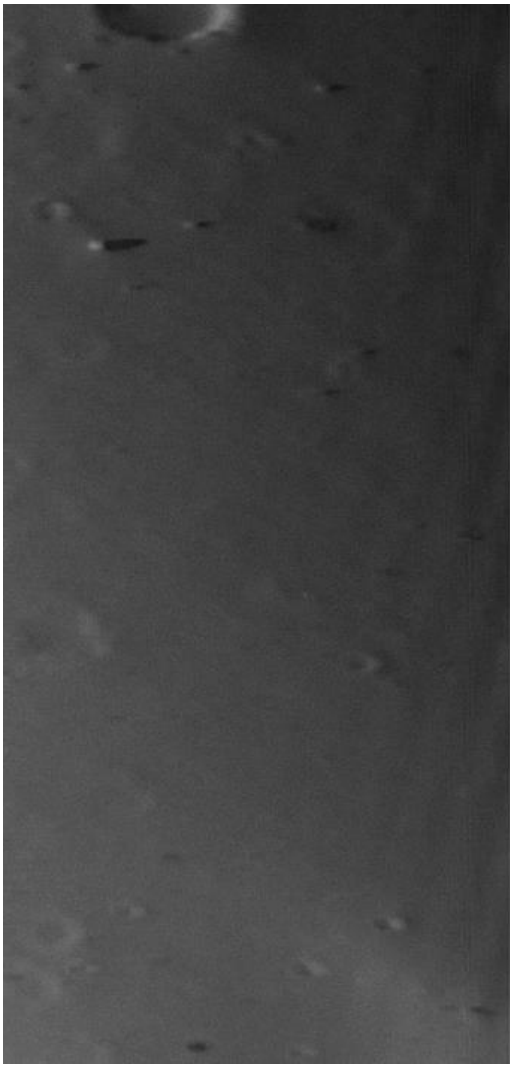
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Fig.1. Phobos. ESA/DLR/FU Berlin (G. Neukum). Radii 14 x 11 x 10 km.
Fig.2. Deimos. PIA11826-Deimos.jpg. Radii 8 x 6 x 6 km.
Fig. 3-4.Deimos (Fig. 4-an enlarged portion of Fig. 3).
Fig. 5.Mars-spiders.jpg.