Venus, Earth, Mars, Titan: intensity of wiping out volatiles from celestial bodies and building atmospheres

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The comparative wave planetology [1] states that “orbits make structures”. This general rule can be unfolded into 4 theorems of the planetary tectonics: 1. Celestial bodies are dichotomic; 2. Celestial bodies are sectoral; 3.Celestial bodies are granular; 4. Angular momenta of different level blocks tend to be equal [1]. The third theorem connects orbital frequencies and sizes of tectonic granules: higher frequencies – smaller granules. Mars, Earth, Venus with frequencies about 1/2 y., 1/1 y., 1/0.6 y. have granules sizes πR/2, πR/4, πR/6 (R-a body radius) [2]. Otherwise, Venus is tectonically “fine-grained”, Earth “medium-grained”, Mars “coarse-grained”. The wave produced granulation indicates that fine-grained Venus is more thoroughly shaken out and released of its volatiles (degassed) than Earth and Mars. This is proved by its massive atmosphere containing a large amount of nitrogen and having very low ratio of radiogenic to primordial argon (Venus 1, Earth 300, Mars 3000). Compare “sweeping” volatiles out of Venus and Earth [2]. Venus is 3.38 times finer-grained than Earth (in the terrestrial globe there are 16.5 grains of radius πR/8, in the venusian one 55.7 grains of radius πR/12; 55.7 : 16.5=3.38). To the terrestrial wavelength 10000 km (πR/2) corresponds frequency 0.03 khz, to the venusian 6000 km (πR/3) 0.07 khz. Venusian oscillations thus 2.33 times more frequent. If a degassing difference of two planets is the square (degassing goes through surface) of the production of differences in granulation and oscillation frequencies, then Venus is 62 times more outgassed [D_v/D_e= (3.38 x 2.33)^2=62.1]. Actually the venusian atmosphere is 90 times more massive than the terrestrial one. Comparing Mars ($1/10^{th}$ of the Earth’s mass) and Earth by the same method we get 920 times less massive martian atmosphere (actually only about 200 times). The discrepancy probably is due to large amounts of volatiles in soils and crust (ice, aqueous salts, zeolites) exchanging them with atmosphere under changing conditions. The smaller volatile rich Titan with high orbital frequency (1/0.044 y.) has an important atmosphere -probably only remnants of what was totally outgassed during eons. Significant mass loss should has influenced the satellite orbital parameters. Maybe that is why discovered cross-cutting wave warpings of Titan’s surface have spacing $\sim$1 to 2 km (PIA03567), but predicted spacing according to present Titan’s orbit is $\sim$ 12 km[3]. Has Titan earlier a tighter orbit and increased its orbital radius to keep momentum lost with volatiles ?

References

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