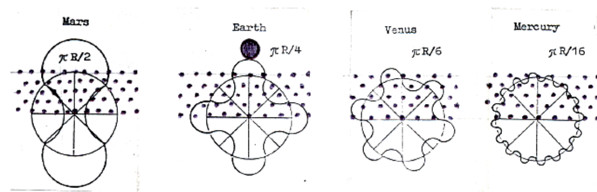
**A MOON ORIGIN SCENARIO JUSTIFYING THE PERCEPTIBLE PRESENCE OF VOLATILES IN ITS BODY AND MOON'S RELIEF RANGE.** G. G. Kochemasov, IGEM of the Russian Academy of Sciences, 35 Staromonetny, 119017 Moscow, Russia, kochem.36@mail.ru.

The comparative wave planetology [1-3 & others] demonstrates graphically its main conceptual point: orbits make structures. The structures are produced by a warping action of stationary waves induced in bodies by non-circular orbits with periodically changing bodies' accelerations. A geometric model of tectonic granulation of planets is a schematic row of even circles adorned with granules radii of which increases in direction from Sun to the outer planets. It was shown that the granule radii are inversely proportional to the orbital frequencies of planets. Thus, there is a following row of these radii: Mercury $\pi R/16$, Venus $\pi R/6$, Earth $\pi R/4$, Mars $\pi R/2$, asteroids $\pi R/1$. It was also shown that these radii well correlate with planetary surface "ruggedness" (Fig.). This observation led to a conception of the "relief-forming potential of planets"[2]. So, this potential is rather weak in Mercury and Venus, rather high in Mars and intermediate in Earth. Certainly, orbital eccentricities were even higher at the earlier stages of planetary formation, in debris zones of their accretion causing scattering debris material. This scattering was small at Mercury' and Venus' zones, large at the Mars' zone and intermediate at the Earth's zone. Consequently, gravity kept debris in the first zones, allowed them escape in the martian zone, and allowed to separate an outer sub zone in the vicinity of the Earth's zone or around not fully consolidated (accreted) Earth.

Rejecting the giant impact hypotheses of Moon formation as contradicting the fact of the universal wave induced tectonic dichotomy of celestial bodies (Theorem 1 [3]) we consider a formation hypotheses from primordial debris in a near-Earth heliocentric orbit or in a circumterrestrial orbit. Wave scattering of primordial material from an accretion zone is a normal process traces of which we observe now as satellites around all planets except Venus and Mercury (both with smallest granules). So, Venus during its formation was not able to throw away enough solids to form a satellite. Earth with the larger amplitude of its granule forming waves produced enough solids to make a satellite. Mars with still larger granule forming waves threw away a lot of material but its small gravity keeps now only two tiny satellites. And what is important in this wave debris scattering process, the outer zones become inreached in less dense and volatile satiated material.

The martian body itself warped by huge waves lost a lot of its mass and is semi-destructed. In the asteroid belt still larger wave (granule size $\pi R/1$, and in the 1:1 resonance with the fundamental wave!) scattered away almost all primary material and there was no chance to accrete any decent planetary body. In the outer Solar system large planets with important gravities keep "exuberant" satellite systems and debris rings. The comparative wave planetology, thus, introducing the conception of structurizing warping waves, is not surprised by the Moon appearance. What is needed, just to recognize a special position of Earth in the planetary sequence determining its orbital frequency and thus a size of its tectonic granulation.




Lunar relief range is about 16 km. It is less than the terrestrial one - 20 km. In the row of terrestrial planets there is a rather well correlation between radii of tectonic granules and surface relief ranges [2]. The relief ranges also increase with solar distances of planets. They are: Mercury ~1-4 km, Venus 14, Earth 20, Mars ~30 km. But the Moon being a satellite has two orbits: around Sun and Earth. Two orbits, thus, influence its relief-forming potential. Induced by the terrestrial orbit (1/1 year frequency) 20 km range has to be diminished (smoothed) by the fast 1/1month fr. photosphere orbit producing rather negligible relief range. A more substantial smoothing, however, can be done by one of two modulated fr-s. Moon has 2 main fr-s (around Earth and Sun) and 2 modulated side fr-s (division and multiplication of the higher fr. by the lower one). It appears that the lunar crater size-frequency curve has anomalously high numbers of craters exactly at ranges calculated by the wave approach, namely, at 80-140 and more than 600 km in diameter (corresponding to the main orbital fr-s) and 10-30 and 300-400 km in diameter (corresponding to the modulated side fr-s). The main fr-s produce granule (crater) sizes $\pi R/4$ and $\pi R/60$; side fr-s give sizes $\pi R/240$ and $\pi R/15$. The radii of the $\pi R/60$ and $\pi R/240$ granules produce very weak surface roughness to significantly smooth the 20 km $\pi R/4$ relief. But tied to the $\pi R/15$ granule (almost similar to the $\pi R/16$ Mercury granule) relief has rather important roughness (relief range) diminishing 20 km to sought for about 16 km (20-4=16).

**References:** [1] Kochemasov, G.G. (1992) 16$^{th}$ Rus Am. Microsymp. on Planetology, Abstr., Moscow, Vernadsky Inst., 36-37. [2] Kochemasov G.G. (2009) New Concepts in Global Tectonics Newsletter, #51, 58-61. [3] Kochemasov G.G. (1999) Geophys. Res. Abstr., V.1, #3, 700.