

## Wave granulation in the Venus' atmosphere

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In unique venusian planetary system the solid body rotates very slowly and the detached massive atmosphere very rapidly. However both together orbit Sun and their characteristic orbital frequency  $\sim 1/0.62$  year – places them in the regular row of planets assigning them characteristic only for Venus wave produced granulation with a granule size  $\pi R/6$  [1 & others]. Remind other bodies in the row with their granule sizes inversely proportional to their orbital frequencies: solar photosphere  $\pi R/60$ , Mercury  $\pi R/16$ , Venus  $\pi R/6$ , Earth  $\pi R/4$ , Mars  $\pi R/2$ , asteroids  $\pi R/1$  ( $R$ -a body radius). Three planets have atmospheres with wave granulations having sizes equal to their lithospheric granules. But Venus, unlike Earth and Mars, has the detached atmosphere that can be considered as a separate body with its own orbital frequency around the center of the Venus' system. According to the correlation between an orbital frequency and a wave granule size the venusian wave granule will be  $\pi R/338$  (a scale can be Earth: orbital frequency  $1/1$  year, granule size  $\pi R/4$  or Sun: frequency  $1/1$  month, granule size  $\pi R/60$ ). So,  $\pi R/338 = 57$  km. This theoretical size is rather close to that observed by Galileo SC through a violet filter “the filamentary dark features... are here revealed to be composed of several dark nodules, like beads on a string, each about 60 miles across” (PIA00072). Actually all Venus' disc seen from a distance  $\sim 1.7$  mln. miles is peppered with these fine features seen on a limit of resolution. So, the Venus' atmosphere has two main frequencies in the solar system with corresponding wave granulations: around Sun  $1/225$  days (granule  $\pi R/6$ ) and around Venus  $1/4$  days (granule  $\pi R/338$ ). As was done for the Moon, Phobos, Titan and other icy satellites of Saturn [2, 3, 4 & others] one can apply the wave modulation technique also for the atmosphere of Venus. The lower frequency modulates the higher one by dividing and multiplying it thus getting two side frequencies and corresponding them wave granule sizes.  $(1/338 : 1/6)\pi R = \pi R/56.3 = 342$  km.  $(1/338 \times 1/6)\pi R = \pi R/2028 = 9.5$  km. The larger granules as well arranged network were seen in the near IR Galileo

image PIA00073 (several miles below the visible cloud tops). The smaller granules, hopefully, will be detected by the Venus Express cameras. So, the wave planetology applying wave methods to solid planetary bodies and to surrounding them gaseous envelopes shows their structural unity. This understanding may help to analyze and predict very complex behavior of atmospheric cells at Earth (anticyclones up to 5000 km across or  $\pi R/4$ ), other planets and Titan. Long time ago known the solar supergranules about 30000 km across were never fully understood. The comparative wave planetology placing them together with wave features of planets and satellites throws light on their origin and behavior and thus expands into an area of the solar physics. In this respect it is interesting to note that rather typical for Sun radio emission in 1 meter diapason also was never properly explained. But applying modulation of the solar photosphere frequency 1/ 1month by the Galaxy frequency 1/ 200 000 000 y. one can obtain such short waves [5]. Radio emissions of planets of the solar system also can be related to this modulation by Galaxy rotation [5]. **References:** [1] Kochemasov G.G. (1992) Comparison of blob tectonics (Venus) and pair tectonics (Earth) // LPS XXIII, Houston, LPI, pt. 2, 703-704; [2] Kochemasov G.G. (2000) Orbiting frequency modulation in Solar system and its imprint in shapes and structures of celestial bodies // Vernadsky-Brown microsposium 32 on Comparative planetology, Oct. 9-11, 2000, Moscow, Russia, Abstracts, 88-89; [3] Kochemasov G.G. (2000) Titan: frequency modulation of warping waves // Geophys. Res. Abstr., v. 2, (CD-ROM); [4] Kochemasov G.G. (2005) Cassini' lessons: square craters, shoulder-to-shoulder even-size aligned and in grids craters having wave interference nature must be taken out of an impact craters statistics to make it real // Vernadsky-Brown microsposium-42 "Topics in Comparative Planetology", Oct. 10-12, 2005, Vernadsky Inst., Moscow, Russia, Abstr. m42\_31, CD-ROM; [5] Kochemasov G.G. (2001) Inertia-gravity waves of various scales on celestial bodies surfaces, in vertical section and their relation to radiowaves // 34<sup>th</sup> Vernadsky-Brown microsposium "Topics in comparative planetology", Moscow, Vernadsky Inst., Abstr., CD-ROM.