

First observations of Ceres by DAWN: obvious two-face tectonics, crossing lineaments, strings of “craters”.

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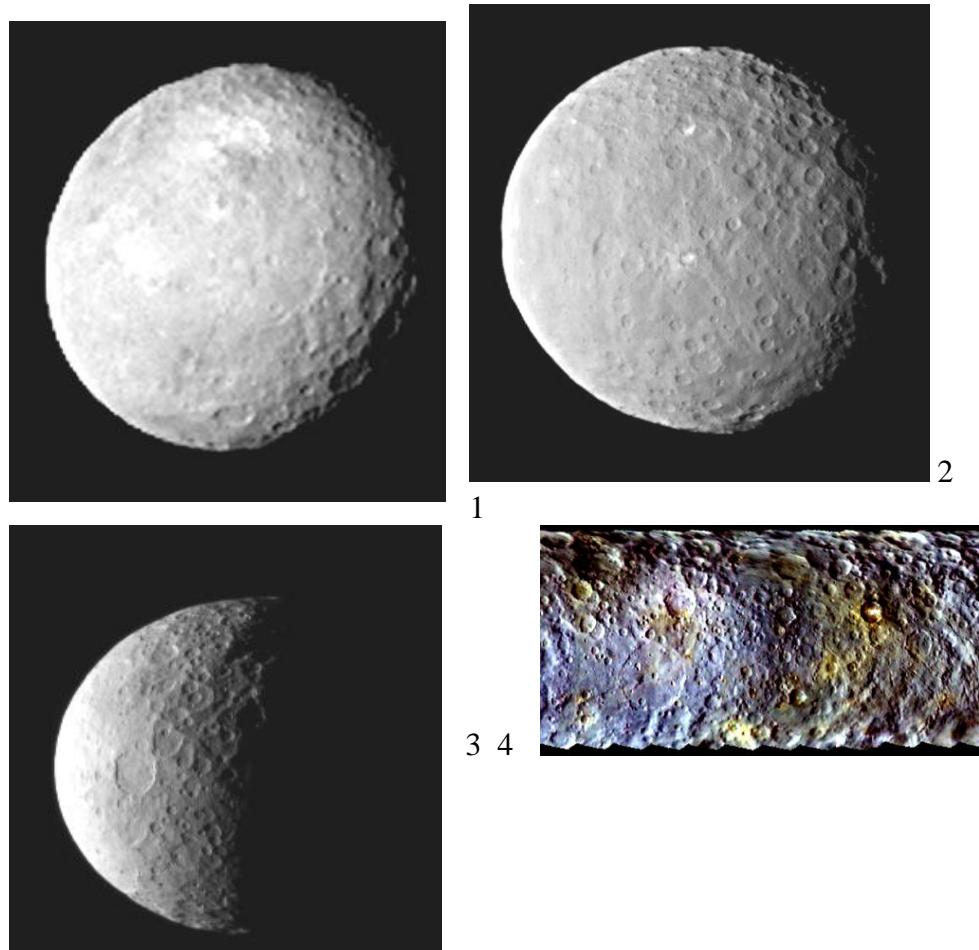


Fig. 1 Ceres from 83000 km distance. February 12, 2015. 150212-PIA19056.jpg.

Fig. 2. Ceres from 46000 km distance, February 19, 2015. CeresBig_LR., PIA18923

Fig. 3. Ceres in half shadow, PIA19310_ip.jpg, Distance 40000 km, February 25, 2015.

Fig. 4. Ceres' global relief. Pia19063

Fig. 5. Ceres' northern hemisphere from 33000 km, April 10, PIA19064. Crosscutting lineations representing global scale waves.



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Credit: NASA/JPL/Caltech/UCLA/MPS/DLR/IDA.

Earlier predicted tectonically dichotomous nature of Ceres is obvious even in the first distant observations of the Dawn SC (**Fig. 1-3**). Two faces of Ceres appear as relatively smooth hemisphere and surrounding it rugged with many crater forms one. Tectonically and chemically dichotomous cosmic bodies are due to their movement in keplerian non-circular orbits with periodically changing accelerations. Arising inertia-gravity forces warp the bodies by standing waves. Among them the fundamental wave 1 inevitably presses in one hemisphere and bulges out the opposite one. Thus, two faces adorn any cosmic body.

Other waves, whose lengths are inversely proportional to orbital frequencies of bodies, produce tectonic granulation [1, 2]. A scale is Earth: $1/8760$ hours fr. – $\pi R/4$ granule size. Ceres' frequency is $1/106440$ hr. This means too large granule- $12.2\pi R$. Making modulation of two Ceres' frequencies (rotation $1/9.07$ hr and orbiting $1/106440$ hr) one gets two side frequencies: $1/85212$ hr & $1/965410$ hr. Them correspond two granule sizes: 38.4 and 3.4 km. They both are observed in the figures: as \sim lineation spacing (Fig. 1-3, 5) and strings of small circles (Fig. 5).

References: [1] Kochemasov, G.G. Tectonic dichotomy, sectoring and granulation of Earth and other celestial bodies // Proceedings of the International Symposium on New Concepts in Global Tectonics, "NCGT-98 TSUKUBA", Geological Survey of Japan, Tsukuba, Nov 20-23, 1998, p. 144-147. [2] Kochemasov, G.G. Theorems of wave planetary tectonics // Geophys. Res. Abstr. 1999. V.1, №3, p. 700. [3] Kochemasov, G.G., 2014. From Vesta to Ceres: predicting spectacular dichotomous convexo-concave shape for the largest mini-planet in the main asteroid belt //Vesta in the light of Dawn: first exploration of a protoplanet in the Asteroid Belt, Febr. 3-4, 2014, Houston, Texas, LPI Contribution # 1773, Abstract # 2003. pdf. [5] Kochemasov G.G. Ceres' two-face nature: expressive success of the wave planetology // New Concepts in Global Tectonics Journal, v. 3, # 1, March 2015, 63-64.