

The mechanism and regularities of heat planets and satellites due to the excitation of their shells by external celestia

BARKIN, Yury^{1*}

¹Sternberg Astronomical Institute

Mechanism, providing a high endogenous activity of the Earth and other celestial bodies, was proposed by the author in 1996-2002 (Barkin, 2002). Its essence lies in the fact that the external celestial bodies are not only deform the Earth's mantle layers and excite the system itself, its shells, primarily the core and mantle. The gravitational attraction of non-spherical shells of the earth by external celestial bodies, occupying, generally speaking, the eccentric positions relative to each other, inevitably causes a small relative displacements of the shells and their relative rotations (swinging) and as a consequence deformations, additional to the classical tidal deformations, and new dissipation processes.

In this paper we study the deformations, changes of the elastic energy, of the energy of dissipation in a viscous-elastic mantle as a result of the polar drift and oscillations of the core, both globally across the planet, and in relation to the northern and southern hemisphere. The basis of study is a solution of problem of elasticity theory of deformation of the mantle at the polar displacements and oscillations of the core under certain boundary and initial conditions (Barkin, Shatina, 2005). It is assumed that the core and mantle separated by a thin viscous-elastic layer, similar to the corresponding layers of zone D", whereby it becomes possible the small oscillations of the core and its secular drift, which have been confirmed with modern data on space geodesy about the displacements and oscillations of the mass center of the Earth. That is, the core-mantle system is considered as not rotating. In the unperturbed state the mantle is characterized by concentric density distribution. The excess (superfluous) mass of the core by its displacements and due to its gravitational attraction causes the deformation of all layers of the mantle. Deformations of the planet are described by the linear model of a viscous - elastic Kelvin-Voigt body. As the basic parameters the appropriate parameters of elasticity and viscosity of the Earth and their average values in accordance with the classical model of the Earth (PREM) have been taken (Dziewonski, Anderson, 1981). For these deformations the elastic energy of the planet and energy of dissipation is determined and estimated.

The northern hemisphere plays dominant role, and (at the northern drift of the core) obtains the elastic energy and thermal energy by about 30% more than in the southern hemisphere. Thus, the geomodel explains the observed in present the natural phenomena: activation of volcanic and seismic activity in the northern hemisphere, more active increased warming and catastrophic events in the northern hemisphere compared to the southern hemisphere and oth. On the basis of this model an explanation of fundamental geodynamic phenomena of tidal acceleration of Earth's axial rotation, the secular drift of the Earth's pole in the present epoch, the global rise in sea level and contrast of secular changes in mean sea level in northern and southern hemispheres has been given.

An explanation of the phenomenon of dichotomy of geological structures and geophysical phenomena and natural processes on Mercury, the Moon, Mars, Vesta, Titan, Enceladus, Pluto, Charon and other bodies of the solar system has been given. Similar phenomena of inversion, contrast, asymmetry, cycling, curling of hemispheres and polar regions, ordering, synchronization, etc. will be opened in the near future for celestial bodies in others exo-planetary systems and for pulsars (Barkin, 2007-2011).

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