

New findings in Earth's sciences

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An excitation mechanism and forced relative translational oscillations, swing and rotation of the Earth shells (and other planets and moons) under the gravitational action of external celestial bodies is a powerful source of endogenous activity with pronounced cyclical manifestations at different time scales endogenous energy of the planet as an open thermodynamic system (represented by the scheme with threads of different types of energy, the entropy and others) made it through gravitational interaction of external celestial bodies. The energetic of this mechanism allows to specify the energy budget of the Earth in comparison with contributions of another acting mechanisms. The estimates of the power dissipation for a viscous-elastic deformation of the Earth's mantle caused by the relative displacements of the center of mass of the mantle and core have been obtained. The inversion phenomenon of the Earth's climate changes with respect to Northern and Southern hemispheres its contemporary manifestations are analyzed and discussed.

For analysis the general global astrophysical factor - Earth's rotation rate (ERR) was used. The important role of the lunar-solar gravitational tides for weather, climate and geophysical processes in the atmosphere, oceans, and other geospheres and in the biosphere has been shown. The role of tides by using the ERR has been demonstrated on the base of observational data on precipitation in the Indian monsoon period, in the formation of tropical depressions and typhoons, in the perturbations of Earth's magnetosphere and during strong earthquakes, as well as in medical terms cardiovascular system patients and other diseases. Earth's rotation rate is so high compared to the speed of the proper motion of the tidal waves in the solar system of reference, we are dealing only with quasi-diurnal waves and their sub-harmonics. At spectral or harmonic analysis measuring low frequency waves of gravitational tides also merge with the harmonics of daily or annual thermal tides and become virtually invisible to learn. To low-frequency tidal waves are not lost in the spectral analysis, it is necessary to exclude the effects of rotation and revolution of the Earth, that is demodulated time series measurements. It is enough to fix the period of measurement (one measurement: for a day, to prevent rotation of the Earth, or the year to avoid the annual revolution of the Earth). Even before it was established that the weather changes during the lunar month is synchronized to within 0-2 days from the extremes of the EER, describing the motion of the Moon and the Earth around the barycenter. We have detected and studied a week and semi-month lunar tidal waves in the spectrum of the angular momentum of the atmosphere. Estimates have shown that classical gravitational tidal forces can not explain the tremendous energy associated with variations of the angular momentum of the atmosphere. We discuss possible role of the resonance effects in origin observed cyclicities in natural processes. Big prospects here open in dynamical and empirical studies of new tides the nature of which is connected with action of mechanism of forced oscillations of the Earth shells in gravitational field of the Moon, the Sun and all another bodies of solar system. In particular it was shown that mechanism of new tides for discussed in report frequencies and periods of oscillations generates phenomenal power of dissipations (and variations of planetary heat flow) of the order 10 (15) Wt. This energetic is sufficient for explanation of observed activity and cyclicities of all planetary processes.

Keywords: angular momentum, atmosphere, magnetosphere, tidal waves, climate changes