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Warming: mechanism and latitude dependence

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Introduction. In the work it is shown, that in present warming of climate of the Earth and in style of its display a fundamental role the mechanism of the forced swing and relative oscillations of eccentric core of the Earth and its mantle plays. Relative displacements of the centers of mass of the core and the mantle are dictated by the features of orbital motions of bodies of solar system and nonineriality of the Earth reference frame (or ot the mantle) at the motion of the Earth with respect to a baricenter of solar system and at rotation of the planet. As a result in relative translational displacements of the core and the mantle the frequencies characteristic for orbital motion of all bodies of solar system, and also their combination are shown. Methods of a space geodesy, gravimetry, geophysics, etc. unequivocally and clearly confirm phenomenon of drift of the center of mass of the Earth in define northern direction. This drift is characterized by the significant velocity in about 5 mm/yr. The unique opportunity of its explanation consists in the natural assumption of existence of the unidirectional relative displacement (drift) the center of mass of the core and the center of mass of the mantle of the Earth. And this displacement (at superfluous mass of the core in 16.7 % from the mass of full the Earth) is characterized still more significant velocity in 2.6 cm/yr and occurs on our geodynamic studies in a direction to Taimyr peninsula. The dynamic explanation to century drift for today does not exist. It is possible to note, however, that data of observations of last years, indirectly testifying that similar drifts of the centers of mass in present epoch occur on other bodies of Solar system have been obtain: the Sun, Mars, the Titan, Enceladus, the Neptune, etc. We connect with mentioned phenomena the observed secular variations of natural processes on this celestial bodies. I.e. it is possible to assume, that observable eccentric positions of the centers of mass of some bodies of solar system and attributes of secular displacements of their centers of mass are universal and testify to relative translational displacements of shells of these bodies (such as the core, the mantle and others). And it means, that there is a highly effective mechanism of an active life of planets and satellites [**1**, **2**]. This mechanism is distinct from the tidal mechanism of gravitational interaction of deformable celestial bodies. Its action is shown, for example, even in case if the core and the mantle are considered as absolutely rigid gravitating bodies, but separated by a is viscous-elastic layer. Classics of celestial mechanics did not consider gravitational interaction and relative translational displacement of the core and the mantle of the Earth. As our studies have shown the specified new mechanism is high energetic and allows to explain many of the phenomena earlier inaccessible to understanding in various geosciences, including climatology [**1**] - [**5**]. It has been shown, that secular changes in activity of all planetary processes on the Earth are connected with a secular drift of the core of the Earth, and are controlled by the core and are reflections and displays of the core drift [**5**]. It is naturally, that slow climatic changes are connected with drift of the core, with induced by this drift inversion changes in an atmosphere, ocean, with thermodynamic variations of state of layer D ", with changes and variations in mantle convection and in plume activity of the Earth. The drift of the core controls a transmission of heat in the top layers of the mantle and on a surface of the Earth, organizes volcanic and seismic activity of the Earth in planetary scale.

The mechanism of a warming up of layers of the mantle and cyclic inversion changes of a climate. According to a developed geodynamic model all layers of the mantle at oscillations and motions of the core under action of its gravitational attraction test wide class of inversion deformations [**1**]. Thus the part of energy of deformations passes in heat by virtue of dissipation properties of the mantle. Than more intensively oscillations of the core, the more amplitudes of these oscillations, the occur the specified thermal transformations more intensively. As relative displacements of the core have cyclic character, because of cyclic influences on the core-mantle system of external celestial bodies also a formation of heat flows and warmed plume materials (substances) will have also cyclic character. In particular orbital perturbations with Milankovitch's periods in **100 kyr**, **41 kyr**, etc. will

be precisely reflected in variations of the specified thermal flows and, accordingly, a planetary climate. In it the essence of occurrence of cycles of congelations on the Earth [**3**] consists. If during any period of time the core behaves passively, amplitudes of its oscillations are small the thermal flows to a surface of a planet will be decrease. This geodynamic conditions corresponds to the periods of a cold snap. And on the contrary, if the core and mantle interact actively and make significant oscillations the thermal flows to a surface of a planet accrues. This geodynamic state corresponds to the periods of warming. At drift of the core to the north and its oscillations with accrueing amplitude (for example, in present period) submission of heat in the top layers of the mantle will accrue. It is warmly allocated in all layers of the mantle deformed by an attraction of the drifting and oscillating core. But a base layer is the layer **D"** (**"kitchen of plume-tectonics"**). As we know the two mechanisms work for warm redistribution into the Earth. First is a mechanism of convection. In our geodynamical model it has forced nature and is organized and controlled by gravitational action of external celestial bodies and as result has cyclical character. Second mechanism is a plume mechanism which organizes the warmed masses redistributions in higher levels of the mantle, on a bottom of ocean and on a surface of the Earth. In accordance with our geodynamical model mentioned redistribution of warmed mass also has forced character. It is organized and controlled by gravitational cyclic action of the external celestial bodies on core-mantle system.

N/S inversion of the natural processes. Reliable an attribute of influence of oscillations of the core on a variation of natural processes is their property of inversion when, for example, activity of process accrues in northern hemisphere and decreases in a southern hemisphere. Such contrast secular changes in northern and southern (**N/S**) hemispheres have been predicted on the base of geodynamic model [**1**] and revealed according to observations: from gravimetry measurements of a gravity; in determination of a secular trend of a sea level, as global, and in northern and southern hemispheres; in redistribution of air masses; in geodetic measurements of changes of average radiuses of northern and southern hemispheres; in contrast changes of physical fields, for example, streams of heat, currents and circulation at ocean and an atmosphere, etc. [**5**]. The geodynamic mechanism [**1**] also unequivocally specifies, that the secular trend in global climatic characteristics of the Earth, and also inversion and asymmetric tendencies of change of a climate, in its northern and southern hemispheres in present period should be observed.

The hemispherical asymmetry of global heat flows. In the paper [**6**] authors have shown that the mean heat flow of the Southern Hemisphere is 99.3 mW/m^2, significantly higher than that of the Northern Hemisphere (74.0 mW/m^2). The mantle heat loss from the Southern Hemisphere is 22.1×10^{12} W, as twice as that from the Northern Hemisphere (10.8×10^{12} W). The authors believe that this hemispherical asymmetry of global heat loss is originated by the asymmetry of geographic distribution of continents and oceans. In accordance with our geodynamical model discussed assymmetry of heat flows distribution with respect the Earth's hemispheres in first caused by eccentric position of the Earth core with respect to the mantle (displaced in present geological epoch in direction to Brasil). Of course the asymmetric distribution of heat loss is a long-term phenomenon in the geological history. But in present epoch due to drift of the core to the North we must observe some increasing of the heat flow of the Northern hemisphere and decreasing of the heat flow of the Southern hemisphere. In reality mentioned changes of heat flows are contrast (asymmetrical) and can have general tendency of increasing heat flows in both hemispheres (due to activization of relative oscillations of the core and mantle relatively polar axis).

Contrast secular warming of Northern and Southern hemispheres of the Earth in present epoch. Dependence of warming from latitude. And warm flows are asymmetrically, more intensively warm is redistributed in northern hemisphere of the Earth and less intensively in a southern hemisphere. From here it follows, that the phenomenon of more intensive warming up of northern hemisphere, rather than southern in present period should be observed. Data of climatic observations (in first temperature trends for various latitude belts). More detailed analysis shows, that the phenomenon of warming in different form is shown in various latitudinal belts of the Earth. This phenomenon is more clearly shown in latitudinal belts further situated on latitude from South Pole, i.e. in high northern latitudes. Really, the trend of increase of temperature in northern hemisphere is characterized by greater rate, than a trend of temperature in a southern hemisphere. And not only trend components of temperatures increase with increasing of latitudes from southern pole to northern pole, but also amplitudes of decade fluctuations of temperature in high northern breadthes are more bigger than in southern hemisphere. Thus again it is necessary to expect a contrast and asymmetry in decade variations of temperatures in northern and southern hemispheres (smaller variations in a southern hemisphere).

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