



## “Climatic swing” in N/S hemispheres of the Earth, Mars, Titan and another Solar system bodies

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**Resume.** In some my works it has been shown, that a fundamental role in observed variations of climatic conditions of northern and southern hemispheres of the Earth the mechanism of the swing of the core-mantle system of the Earth and their relative oscillations plays important role in various time scales [1].

In the work variations of a climate of inversion character, occurring on the Earth briefly are stated and are explained. Preliminary researches, however, testify, that the mechanism of the swing of shells of a celestial body under action of a gravitational differential attraction of external celestial bodies actively proves on other bodies of solar system (the Sun, Mars, Io, Titan, Enceladus, Triton, Pluto et al.) [2]. The specified mechanism serves as the powerful generator of thermal flows and their variations in time which result of dissipation of the elastic energy reserved and changeable inside of celestial bodies, due to the gravitational viscous-elastic deformations. We believe, that additional sources of thermal energy developed as a result of action of this mechanism, allow us to explain high tectonic activity of Io with interest, Enceladus, the Europe, Titan, etc. Moreover the offered mechanism allows to explain observable laws and features of thermal flows on planets and satellites (their orientation, inversion changes and asymmetry of flows in opposite hemispheres of celestial bodies, high activity in allocation of heat near to poles, etc.). For understanding and an explanation of the listed phenomena not enough classical representations about tidal heating, and are necessary researches by means of the mechanism of the forced swing of shells of celestial bodies [1 - 3].

**Introduction.** In [1, 3] the mechanism has been offered and the scenario of formation of congelations and warming of the Earth and their inversion and asymmetric displays in opposite hemispheres has been described. These planetary thermal processes are connected with gravitational forced oscillations of the core-mantle system of the Earth, controlling and directing submission of heat in the top layers of the mantle and on a surface of the Earth. It is shown, that action of this mechanism should be observed in various time scales. In particular significant changes of a climate should occur to the thousand-year

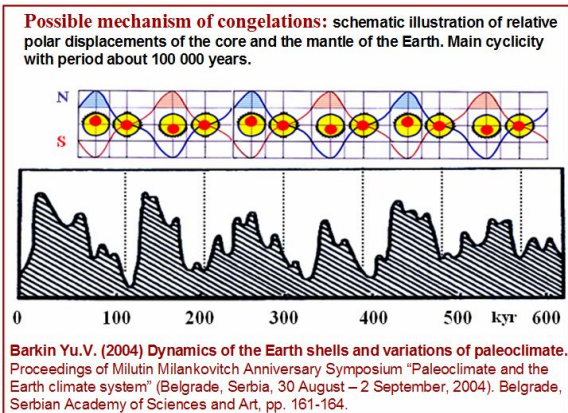
periods, with the periods in tens and hundred thousand years. Thus excitation of system the core-mantle is caused by planetary secular orbital perturbations and by perturbations of the Earth rotation which as is known are characterized by significant amplitudes. But also in a short time scale the climate variations with the inter annual and decade periods also should be observed, how dynamic consequences of the swing of the core-mantle system of the Earth with the same periods [3]. The fundamental phenomenon of secular polar drift of the core relatively to the viscous-elastic and changeable mantle in last years has obtained convincing confirmations various geosciences. 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. 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.

**1. 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.

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 [2] consists (Slide 1).

**Slide 1.**



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 accruing 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.

**1.1. Mechanisms of warming.** 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 action of the external celestial bodies on core-mantle system and also has cyclic nature.

**1.2. "A climatic swing".** In work [2] it was emphasized, that the climatic changes caused by the mechanism of forced oscillations of the core-mantle system, occur to a wide spectrum of frequencies. In particular annual, monthly and even daily fluctuations of the core will inevitably cause thin, but appreciable, climatic changes with the specified periods and it multiple. Similar sort of a variations, for example, are seen in variations of average atmospheric pressure in northern and southern hemispheres.

**1.3. Contrast secular warming of Northern and Southern hemispheres of the Earth in present epoch.** 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). Really, the trend of increase of temperature in northern hemisphere is characterized by greater rate, than a trend of temperature in a southern hemisphere.

We shall emphasize, what even in these thin variations of climatic conditions on the Earth also should the phenomenon of inversion and asymmetry in relation to corresponding opposite hemispheres of the Earth, in particular in relation to northern and southern hemispheres is precise be shown. New important confirmations of developed geodynamic model, to theoretical results [2, 3] and told above have been obtained by scientists from the Great Britain, Germany, France and the USA [4]. On ice cores they had been studied changes of a climate in area of Greenland and Antarctica and have been obtained confirmations to the phenomenon of inversion changes of a climate in southern and northern hemispheres of the Earth. There was even a name to this phenomenon – "**a climatic swing**". As authors of clause have established, sharp downturn of temperature in northern hemisphere during last glacial age (100-15 thousand years ago) was accompanied by simultaneous warming of a climate in a southern hemisphere [4]. Scientists have found out this fact, analyzing isotope structure of sedimentary breeds of Atlantic. The phenomenon of

contrast (inversion) tendencies in changes of a climate (secular and cyclic, including with the thousand-year periods and periods of Milankovitch) has been predicted in works [1, 2]. The contrast and opposite directed tendencies in change of a climate should be observed first of all in relation to northern and southern hemispheres of the Earth due to polar character of the core displacements. Thus, the nature of "**a climatic swing**" when one hemisphere gets warm, and the second is cooled, is connected with cyclic polar oscillations of the core-mantle system of the Earth in a corresponding time scale, in particular in a scale of cycles of Milankovitch. The amplitudes of the swing of the core-mantle system and their changes in the time have an important role and value for style and intensity of warming and cooling.

**2. Warming of Solar system bodies: Mars.** A recent study shows that Mars in present epoch is warming four times faster than the Earth. Surface air temperatures on Mars increased by 0.65° C from the 1970s to the 1990s. Some scientists believe that Mars is warming due to increased Sun activity, which increases dust storms. The dust makes the atmosphere absorb more heat causing a positive feedback. Residual ice on the Martian south pole, they note, has steadily retreated over the last four years. The dust promotes absorption of heat by an atmosphere, as results in heating an atmosphere. Residual ice in area of the South Pole has steadily receded for last four years. On our model the planet becomes more active as a whole due to the mechanism of the forced swing and oscillations of the core-mantle system of Mars in uniform rhythms and with identical secular changes. Thermal spectrometer images of Mars taken by NASA's Viking mission in the late 1970s were compared with similar images gathered more than 20 years later by the Global Surveyor. Predicted secular trend of the core of Mars to the north gives additional arguments for warming up of the top layers of Mars and its atmosphere. Displacement of the core of Mars should result in the north to redistribution of atmospheric masses in northern hemisphere (just as it takes place on the Earth). Thus dust making atmospheres in northern hemisphere it is increased, that promotes the greater warming up of northern hemisphere. It means, as northern cap of Mars also should secularly decrease. **The Jupiter.** Formation Red Spot Jr. in 1998-2000 years and increase of height of this storm relatively a cloudy level testifies to rise in

temperature which in different zones of the Jupiter can reach 10 degrees on Fahrenheit. **The Neptune.** Ground infra-red observations of the Neptune testify, that this planet since 1980 began brighter and was steadily heated up during 1980 - 2004. The weather on the Neptune, the eighth planet from the Sun, is a riddle from the very beginning of researches. The mechanism which raises its almost supersonic winds and huge storm, should be specific. It is rather natural to assume, that hyperactivity of the Neptune is dictated by the mechanism of displacements of its shells under action of its big satellite Triton and other celestial bodies. For the Neptune we have specified importance of action of this mechanism even in work [1]. **Triton.** The same mechanism determines endogenous activity of the large satellite of the Neptune - Triton. There are confirmations of global heating of the Triton from times of visiting of satellite by spacecraft Voyager in 1988. The tendency of warming up forces nitrogen to turn on the frozen surface of the Triton to gas, thus, making its atmosphere of more dense [2].

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