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An prediction and explanation of “climatic swing” of N/S hemispheres of the Earth

Yury Barkin

Sternberg Astronomical Institute, celestial mechanics and gravimetry, Moscow, Russian Federation (barkin@inbox.ru, 07-495-9328841)

Introduction. In works of the author [1, 2] 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 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 interannual 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 [4] 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 [5]; in determination of a secular trend of a sea level, as global, and in northern and southern hemispheres [6, 7]; in redistribution of air masses [6, 8]; in geodetic measurements of changes of average radiuses of northern and southern hemispheres [9]; 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.

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 [2] 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.

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.

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.

"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. 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 [10]. 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 [10]. 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.

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