



A dissymmetry of tectonic processes of Northern and Southern hemispheres as dynamical consequence of relative forced polar displacements of the core and mantle of the Earth

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The empirical data testifying the dissymmetry of the Earth in cyclic (400 million years) process of assembly and breakup of supercontinents (Bozhko, 1992) obtain a natural explanation from the statements and base positions of developed geodynamic model (Bozhko, Barkin, 2009). The base of model makes the mechanism of the forced relative translational displacements (and turns) of the Earth's core and mantle due to external gravitational influences and internal interactions in system of shells of the Earth (Barkin, 1999, 2002). In the report we discuss phenomena observed in present epoch and caused by action of a mentioned mechanism and give a preliminary schematic explanation to cyclic formation of supercontinents.

In the present epoch the broad audience of secular changes of geodynamic and geophysical processes is observed, which have obtained an explanation from positions of developed model - as dynamic consequences of secular drift of the centre of mass of the core of the Earth (with superfluous mass about 20 % of mass of the Earth) relatively to the centre of mass of the mantle in northern direction. In result the phenomena are observed: an expansion of a southern hemisphere and compression of northern hemisphere; secular increase of a gravity in northern hemisphere and its decrease in southern; contrast changes of mean levels of ocean in N/S hemispheres; decrease of average atmospheric pressure in a southern hemisphere and its increase in northern; contrast superrotations of atmosphere of the Earth in southern and northern hemispheres and their secular changes; N/S secular inversion oceanic tide; a secular variations of global circulation of ocean and waters of northern and southern hemispheres; N/S asymmetry of anomalies of a magnetic field and their variations; N/S asymmetric decontamination and its increase in a southern hemisphere and the similar phenomena in all other planetary processes.

In a series of reports of Yu. Barkin on General Assembly of IUGG (Perugia, Italy, 2007), and also on General assembly EGU (Vienna, Austria, 2008), the specified phenomena and other predicted phenomena have obtained mechanical interpretation and an explanation. A wide number of the inversion phenomena on planets and satellites which now obtained all new and new confirmations in the given space missions to bodies of solar system and in ground supervisions is predicted. The basic conclusion which the specified researches allow to make, here is the following. In present period it is observed versatile displays of action of the mechanism of the forced relative swing (in particular slow relative drift) of the core and mantle of the Earth. This mechanism is universal and working in all geological epochs. Therefore those results which we have caught in modern geodynamic and geophysical processes, on the full bases can be distributed on long-periodic variations of processes in different time scales, including geological.

If we have found out slow expansion of a southern hemisphere and compression of northern hemisphere in present period through millions years this proceeding process can result in essential change of dynamic oblateness of the Earth and it pure-like form. Structure of a surface of geoid and recent result about compression of northern and expansion of southern hemispheres of the Earth precisely confirm it (Barkin, Shuanggen, 2007). We observably a similar picture on Mars with its precise bipolar structure. On our model the dynamic structure of Mars is result of action of the mechanism of displacement of the core in the geological periods of time which in present period is estimated in 15-20 km. This displacement is so great for rather small Mars, that basically it can be revealed as a result of the appropriate seismic researches on a surface of Mars.

With plume tectonic cyclic activity we connect the thermodynamic mechanism which results not only in formation of plumes, but also to the contrast phenomena of melting of fusion of a frontier layer of a sole of a mantle (in

northern hemisphere in present) to which the core is forced to be displaced, and solidification of zones of a liquid core in the opposite side (in a southern hemisphere). This mechanism is hypothetical, but it rather logically explains observably contrast temperature modes of hemispheres in present and the last geological epoch, the source of a plume material which is redistributed to the top layers and a surface of the Earth. A plume - tectonic activity of the core drifting and oscillating with a wide spectrum of frequencies relatively to the mantle, in a long time scale results in contrast variations of geodynamic states in N/S hemispheres. The specified polar oscillations of the core and the mantle during geoevolution have left after themselves geological certificates on a surface of the Earth about polar inversion and cyclicity in formation of supercontinents which were found out and for the first time are in details described by N. Bozhko (1992).

Such huge bodies as the core and mantle of the Earth as a result of oscillations, deformations and relative displacements easily transformed a face of the Earth: formed N/S focused rifting structures, resulted in the directed and organized motions of lithosphere plates, warmed up a southern hemisphere more intensively, operated ocean, deforming its bottom and raising or lowering its average level due to inversion tide from a displaced core. In present period we observably the tendency of displacement of continental blocks of plates in northern hemisphere. This phenomenon is conformable (though and different scales) with observably redistribution of oceanic and air masses from a southern hemisphere in northern hemisphere. I.e. the specified processes are long and occur, including, in a geological time scale. The fundamental tectonic process of formation of supercontinents means also has a polar orientation, is cyclic. That is in the full consent with the results described in first our report (Bozhko, Barkin, EGU GA, 2009). On our geodynamic model in tectonic processes all astronomical cyclicities connected to the periods of perturbations in orbital motions of bodies of solar system, and also caused by galactic motion of solar system should be shown.