References

Chen P. F., Fung P. C. W. Time Changes in Geomagnetic Transfer Functions at Lunping before and after the 1986 Hualian Earthquake [Ms=7.6] // J. Geomag. Geoelectr. — 1993. — № 45. — P. 251—259.

Kharin E. P. Changes in transfer functions with time // Geophys. Surveys. — 1982. — № 4. — P. 455—466.

Klymkovych T. A., Horodyskyy Yu. M., Kuznetsova V. G., Maksymchuk V. Yu. Results of continuous investigations of induction vectors time changes in the seismoactive Transcarpathian trough // Geodynamics. — 2007. — № 1. — P. 41—48 (in Ukrainian).

Klymkovych T. A., Horodyskyy Yu. M., Kuznetsova V. G., Maksymchuk V. Yu. Studies of temporal changes of induction vectors parameters in the Transcarpathian seismically active trough // Geophys. J. — 2009. — **31**, № 6. — P. 147—152 (in Ukrainian).

Rokityansky I., Klymkovich T., Babak V., Savchenko T. Periodic variations of induction vectors // Geophys. J. — 2010. — **32**,№ 4. — P. 139—143.

Zeng X., Liu J-Y., Lin Y., Xu C. The evolution of dynamic images of geomagnetic field and strong earthquake // J. Atmospher. Electr. — 2002. — **22**. — P. 191—205.

Zhamaletdinov A. A., Mitrofanov F. P., Tokarev A. N., Shevtsov A. N. The influence from lunni-solar tidal deformations on results of control source EM monitoring for the seismic activity // Presentation at 32 Intern. Geological Congress (Florence, August 2004). — 2004.

New system of views on the Earth structural evolution: beyond plate tectonics

© ***V. Kobolev, Yu. Orovetsky, 2010***

Institute of Geophysics, National Academy of Sciences of Ukraine, Kiev, Ukraine
kobol@igph.riev.ua

For the past years a necessity has arisen to revise principles of the Earth's tectonic evolution due to increasing dissatisfaction with the modern geodynamic paradigm — concept of plate tectonics. Plate tectonics is viewed to be absolute truth although this approach violates the major dialectic principle of competiting scientific ideas. In our opinion:

1) palaeomagnetic data, which are a main basis of mobilism, were subjectively interpreted;

2) plate tectonics did not become a universal global theory of the Earth.

In developing plate tectonics the major gnosiological mistake was isolating the Earth from surrounding cosmic environment where the Earth is an integral and active part. Such an approach artificially eliminated a dynamic rotational effect. However, this effect seems to be the only factor capable of providing endogenic energy of the planet according to a scheme: rotation-gravity-pressure, pressure-frictional temperature. Only at the end of this generalized sequence of events the second active factor of developing the Earth was triggered under super high thermodynamic regimes of the future core. It was the liquid phase of initial planetesimal material in the form of magmatic melt, which is authentic to selective composition of accretional substratum. It automatically follows that:

1) the inner core of the Earth is matrix of solid refractory phase under high pressure;

2) a model for accretion is heterogeneous whose components are characterized by individual composition, including radioactive thermal generators.

Melting in closed environment is accompanied with autoclave effect resulted in increase of pressure in the liquid outer core. This mechanism is responsible for transformation of dynamic gravitational energy into kinetic thermally active one in the central part of the planet. Despite the different physical nature both types of energy proved to be functional. The metastable system can be set free from this situation only when its lid is distorted by tectonic rapture, which represents a low viscosity channel. The equatorial bulge of the planet controls the place of distortion. Here rotation of the Earth has formed a radial zone of the most intensive tensional stress of rotating rifting. This zone serves as a path-

way for vertical migration of melt from the outer core, the melt upwelling being caused by maximum centrifugal acceleration, high inner pressure and decompressional increase in a melt volume. The combination of these factors creates a long living wedge-shaped rupture and precludes the closure of a low viscosity tube. This situation creates persistent magmatism in the form of mantle plumes of complex composition including present-day potentially riftogenic equatorial zone. Similar ancient equatorial tensional features also are rotational rifting middle ocean ridges. Hence, the Earth dynamic rotational effect ignored by plate tectonic concept is capable of giving internally consistent interpretation of the nature of global tectonic elements of the Earth — MOR — without the mechanism of the mantle convection.

Using mantle convection in plate tectonics is predetermined by driving mechanism in this concept. Due to the absence of another plausible mechanism of plate moving mantle convection is used as driving force that propels plates, the convection is being caused by mostly radioactive heating the mantle material. However, in a classical sense this widely known physical phenomenon can occur only in gas and gas-liquid environment. In the case of the Earth an extremely large viscosity of the mantle material the estimation of which is based on indisputable seismological observations precludes from convention. To avoid this critical situation the convection is considered to occur at geological scale of time. The flows of the mantle materials are taken as principal cause for migrating lithospheres' plates. Although there exist many schemes of mantle convection, all of them resulted from numeral theoretical modeling. Therefore scales, rates and even reality of mantle convection are still a matter of contentious debates. To describe this phenomenon in mathematical terms, boundary conditions are imposed. As particular details of physical process are not known, these conditions are sometimes simplified and distort a true sense of phenomenon. Therefore erroneous results effect ultimate geophysical conclusions. The criticism of mantle convection is mainly based on the observation that a solidus temperature of the mantle material practically coincides with its gradient that precludes from thermal convection in the lower mantle. Taking into considerations this pluralism of opinions of mantle convection one must interpret the problem as not solved or even not adequately put forward.

Based on the study of rocks composition, isotopic-geochronological heterogeneity of the oceanic upper mantle has been definitely determined. The mantle was generated 3—1 billion years ago synchronously the main stage of forming the continental Earth's crust. It follows that it cannot survive in the convecting mantle. So, insisting on mantle convection would not be a correct approach.

However, one cannot reject convective heat-mass transport in the form of local magmatic bodies, which are characterized only upward flows of material. These bodies are collectively termed as "plume tectonics". They have occurred since the Prephanerozoic serving as thermal valve for getting away of extra heat outside the Earth.

Having abandoned large-scale mantle convection, we don't consider a subduction — obduction mechanism of plate moving derived from it because this mechanism is rather artifact than a subject of constructive scientific discussion.

Vertical transporting magmatic melt to the upper layers of the Earth in the form of mantle diapirs or plumes leads to the equivalent deficit of mass in the subcore according to the universal law of mass conservation. This deficit is compensated by subsidence the Earth's surface resulting in negative morphological features. This process seems to manifest itself in a worldwide increase in a depth of the World Ocean with time as inferred from sea drilling as well as in fivefold excess of subsidence over uplift in the geoid and M surface.

Horizontal movements are related to the change in the principal moment of inertia of the Earth: $J=mR^2$ (m — mass, R — radius) and derivative from it fluctuations of angular velocity in its rotating. In describing a physical sense of the equation we must emphasis that the only variable parameter proving a necessary effect is the radius of the Earth. Its change seems to be related to phase transformation of the first kind (fusion and crystallization) — in other word to genesis of magma. This inference is rather reliable because magma genesis as derived from the present-day seismic tomography sometimes occurs at the mantle depths up to the core resulting in mantle diapirs or plumes. In fusing material the local Earth's radius increases while crystallization leads to its decrease. These transformations appear to change an angular velocity of the Earth (ω) due to the principle of inertia moment.

According to seismological data there are two asthenospheres in our planet. The upper asthenosphere underlays the lithosphere and is spatially discrete. Despite this fact supporters of plate tectonics consider that over it lithosphere plates move. The lower asthenosphere is a liquid spherical layer E (outer core or subcore of the Earth) without any sufficient horizontal and vertical disruptions. There-

fore the highly dense inner core of the Earth inertially continues its rotation in the spherical layer of low viscosity when the Earth changes a rotating velocity. In a case of acceleration ω, the rotation of the core will retard relative to displacement of the Earth's shell (westward drift). On the contrary a decrease in ω will lead to an increase in a rotation velocity of the core relative to a rotation velocity of the shell (eastward drift). In other words the outer core is characterized by spherical symmetry in a rotational field that provides optimal conditions for lateral gliding of the solid shell over the liquid upper layer E. The Earth must inevitably react to these deep inertial disturbances by appropriate horizontal movements of masses relative to the axis of the magnetic dipole that will be clearly documented by the palaeomagnetic method. To the contrary of plate tectonics such a dynamics is free from constraints concerning spatial discreteness of the upper asthenosphere.

Palaeomagnetic poles of the planet migrate together with the moving mantle. To tell more accurate poles themselves don't migrate: displace their former locations on the Earth's revealed by palaeomagnetic measurements. Small eccentricity of palaeomagnetic and geographic poles is averaged out for 10^4 years. Therefore it can be neglected at geological time. Palaeomagnetic equators change their positions following migration of palaeomagnetic poles as they are coupled.

Our system of views of a structural evolution of the Earth relies on a dynamic rotational-gravitational mechanism and subcore magmatism accompanied it. A lateral migration of the Earth's surface occurs not along the basement of lithospheric plates but over the basement of a solid shell of the Earth, over the liquid surface of the outer core, which is not spatially discrete. This mechanism produced the equatorial bulges of rotational riftoges on the planet. These features of planetary tectonic divergence forming with time the dense network of divisibility in the tectonosphere favour its long conductive heat by rising overheated subcore material. As a result a temperature regime is created for selective fusing primary heterogeneous accretional substratum. In the mantle large regions of inertially reactive seismic wave-guides are formed and separation of fusible ingredients is complete. In a case of their abundance the thick continental crust is originated their deficit produces the oceanic crust. It is not excluded a similar autometamorphic mechanism of building discrete regions in the asthenosphere with entire spectrum of magmatic melts in them. Deep processes of the global rifting seem to be common from the formation of the liquid outer core. However, subsequent tectonic events sometimes transformed old rifts to such an extent that they are now not recognizable. Nevertheless even their remaining features are of paramount interest for a tectonic analysis. Therefore we consider that the study of this problem only starts. In future it will be needed to actively develop the quantitative aspect of palaeomagnetism (including oldest rocks) to first shed light into deep rotational, essentially riftogenic divisibility of the Earth.

Depending on morphologic hierarchy deep magmatogens rise to the outer shell of the planet in the form of diapirs or plumes producing above themselves positive relief including old platform areas and compatible with them compensating lows up to building oceanic depressions.

As a consequence we arrive at a fundamental conclusion: a rotational- gravitational mechanism of the Earth accompanied with deep magmatism maintains its complex unstable mechanical system of permanent structure-forming on the surface of the integral continuous liquid subcore. In this context a derivative rotational rifting is the principal mechanism for structural transformations of the Earth's tectonosphere.

As for the plate tectonic paradigm our forgoing discussion shows inefficiency of its basic dynamic premise — mantle convection. The statement is based on non-uniqueness of solving the convection problem that rule out it of the plate tectonic mechanisms. In the absence of mantle convection there are no migration of lithospheric plates, subduction and obduction — the principle elements of neomobilism. The progressive role of the plate tectonic paradigm is indisputable only in one aspect: it is based on a huge piece of the present-day geological and geophysical information mostly on the oceanic tectonosphere. Nevertheless its criticism without suggesting something else is captiousness. An alternative system of views is briefly presented in this paper. Its major elements are of physical nature: they rely on basic oscillating processes which in turn rest on the universal law of conservative of energy. Due to its merit it is presented as a missing link between two antipodal geological ideologies of fixism whose historically formed canons remain inviolable and mobilism of its new version.