



The alternative concept of global tectonics

Vladimir Anokhin (1,2,3) and Mikhael Kholmyansky (4)

(1) St-Petersburg Science Centre RAS, St-Petersburg, Russian Federation (vladanokhin@yandex.ru), (2) Herzen State University, St-Petersburg, Russian Federation (vladanokhin@yandex.ru), (3) Institute of Limnology RAS, St-Petersburg, Russian Federation (vladanokhin@yandex.ru), (4) Gramberg Research Institute VNIIOKEANGEOLGIA, St-Petersburg, Russian Federation

The existing plate tectonic paradigm becomes more questionable in relation to the new facts of the Earth. The most complete to date criticism of plate tectonics provisions contained in the article (Pratt, 2000).

Authors can recall a few facts that contradict the idea of long-range movement of plates:

- The absence of convection cells in the mantle, detected by seismic tomography;
- The presence of long-lived deep regmatic network in the crust, not distorted by the movement of plates;
- The inability of linking the global geometry of the of mutual long-distance movement of plates.

All this gives reason to believe that correct, or at least a satisfactory concept of global tectonics are not exist now. After overcoming the usual inertia of thinking the plate paradigm in the foreseeable future will replace by different concept, more relevant as the observable facts of the Earth and the well-known physical laws.

The authors suggest that currently accumulated sufficient volume of facts and theoretical ideas for the synthesis of a new general hypothesis of the structure and dynamics of the Earth.

Analysis of the existing tectonic theory suggests that most of their provisions are mutually compatible. Obviously, plume tectonics perfectly compatible with any of classical models. It contradicts the only plate tectonics (movement of hot spots in principle not linked either with each other or with the general picture of the plate movements, the presence of mantle convection and mantle streams are mutually exclusive, and so on).

The probable transfer of the heated material down up within the Earth may occur in various forms, the simplest of which (and, consequently, the most probable) are presented plumes. The existence in the mantle numerous large volumes of decompressed substances (detected seismic tomography), can be correlated with the bodies of plumes at different stages of uplift. Plumes who raise to the bottom of the lithosphere, to spread out to the sides and form a set of lenses partially molten mantle material - asthenolithes previously mistaken for ubiquitous asthenosphere. Interaction between a plumes and their impact on the crust gives rise to all of the observed tectonic processes, including geosynclinal.

This scheme is well complemented by some of the elements of plate tectonics, such as the separation of the crust for large plates across the present seismic belts, regional tension along the "divergence" borders, regional compression and collisions along the "convergence" borders.

It is necessary to reject the dogmatic, contrary to the facts and unnecessary assumptions about the far moving plates, terraines, "hidden" boundaries, etc.

The proposed scheme is contained not so much a new idea as a synthesis of already known ideas.

The authors believe that in this way it is possible to construct a general geotectonic concept that would match the best of our knowledge in the earth sciences.

Reference:

David Pratt, Plate Tectonics: A Paradigm Under Threat - Journal of Scientific Exploration, vol. 14, no. 3, pp. 307-352, 2000.