

Geoenergogenerated dynamic cataclysms as the launch mechanism of the origin and evolution of the terrestrial life

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The author proposes a new conception for the mechanism of the origin and evolution of the terrestrial life in the energetic Earth-Space interactions [Drozdovskaya, 2009]. This conception (named geoenergetic) has been developed in the process of the analysis of the Earth's biological and dynamical history from the viewpoint of the author-made studies of the geochemical evolution history [Drozdovskaya, 1990] that was carried out using geological, physical-chemical, geoecological and eniological methods.

The problem of the mechanism and time of the terrestrial life origin was solved in connection to the physical-chemical and geostructural specifics of the

Early Proterozoic Krivoy Rog-type Jaspilite Formation (JFKT) termed in English as the Banded Iron Formation (BIF). BIF is considered as the unique geological phenomenon due to a number of specific features peculiar only to it. The main ones amongst them are *the single-act and geologically short time of the BIF's global origination in the range by isotopic data 2.4—2.2 billion years with accumulation in it about 90 % of iron ore reserves of the Earth's crust in simplified elemental form, predominantly iron-silicon-oxygen.*

The computer physical-chemical experiments demonstrated [Drozdovska] Proceeding from this chemogenic-sedimentary

evolution which origination is thermodynamically limited by redox-barrier parameters of chemical interactions between three external shells of the Earth — water (*hydrosphere*), gas (atmosphere) and solid (*lithosphere*) composing the planet **exosphere**. It means that the temporal development of geochemical evolution was predicted by the steady-directed transformation of the terrestrial exosphere from the primary reduced state into recent oxidized one with single-act overcoming of the redox-barrier at the geological time interval of 2.4—2.2 Ga. Accounting this statement, the author's opinion is that BIF is a geological reference point of geochemical evolution that confirm that *during the BIF genesis time* coming into the exosphere free oxygen completed the oxidization of reduced polyvalent elements occurring there. But, in the moment when *BIF finished its development*, free oxygen for the first time became able to remain in the exosphere in a thermodynamically steady state pointing in this way the moment of oxygen era dawn on the planet Earth.

Proceeding from this conclusion, an appearance of one else distinguishing feature of BIF became understand: *a mass burial of blue-green algae appeared in directly covering sediments for the very first time in the history of the Earth crust. That biological phenomenon showed that, as the BIF generation stopped, the first in the Earth's history global and mass origin of unicellular organisms took place, which was initiated by the first occurrence in the exosphere of the thermodynamically stable free oxygen.* It means that 2.2 Ga the structuration of the pre-cellular organic matter finished also.

In these links, an attempt was made to determine the time period where that structuration passed — therefore, to recognize the moment of the First Global Life Appearance. Solving those problems, the original explanation of one more BIF's feature was in hand: *all its global ingredients were located in morphologically uniform, fracture-like faults of the coeval global tectonic structure.*

Accounting the planet rotation, we may to presuppose that *before the start of the BIF origination*, an surplus amount of geogenic energy (torsion, most of all) was accumulated in the Earth which, trying to leave this close space, provoked a blast-like geodynamical cataclysm with lithosphere splitting by a number of fracture-like faults, and (geologically, in the one moment) penetrated trough to the day surface. It was a very hard energetic strike onto the exospheric matter world.

At this notion about geodynamical evolution, we can see by "the morning eyes" that before the BIF origination that the results of today biological experiments have shown: some DNA fragments were found after energetic impacts into a mixture of biophilic combinations (including hydrocarbonic). In this connection, we can to assume a massive pulse outburst of geogenic energy in the Early Proterozoic exosphere was able to initiate forming of the primary living matter forms from existing chemical combinations (their important parts were in that time the combinations of reduced biophilic elements including carbon, nitrogen, and sulfur). Therefore, the time of global appearance of initial live matters forms (i. e. the life appearance time) can be reasonably dated with lower BIF's age as 2,4 billion years.

From these positions, the author analyzed and re-comprehended the history of step species composition transformations in the biosphere and complication of its organisms' matter organization that is fixed in the Earth's crust at the lower boundaries of geological epochs (Vendian, Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Permian, Triassic, Jurassic, Cretaceous, Paleogene, Neogene) which are termed as transformation frontiers of biological evolution. It is proved that at each the frontier some organic species with more simple organization exited and new, more complicated appeared. It means that the biosphere developed through the time by the step complication of its organisms' matter organization in the chain: *Unicellulars*→*Multicellulars*→*Corals*→*Crustacea*→*Fishes*→*Arthropoda*→*Quadrupedantae*→*Amphibians*→*Reptiles*→*Mammalia*→*Hominidae*.

In the comparisons of the biological evolution and geodynamic phenomena histories a mutual relation in time became understood between the biospherical transformations at the frontiers mentioned and formation of global tectonic structures of fluidogenic type in those geological times. An idea appeared that those structures also formed in the origin moments of blast-like dynamic cataclysms which at each transformation frontier maintained the pulse outbursts of geogenic energy to the surface. Its impacts lead to jumps in the species composition and matter organization level of the organisms' in the biosphere. Proceeding from those notions, we should to refer those structures as geoenergogenic ones and to consider them as a kind of fluidogenic structures.

So, we postulate a universal geoenergogenerated mechanism both for the origination and evolution of the terrestrial life. Its action is maintained due three casual-concession geoenergogenerated phenomena (mutually subordinated, which periodically appeared through the geological time due the rotational existence of the Earth and its energetic interaction with the Space:

- 1) generation and accumulation of geogenic energy surplus amounts in the Earth, which provoke attempts of its liberation from the closed space outward;
- 2) origination as a concession of it the blast-like dynamic cataclysms with global origination of numerous fracture-like faults in the lithosphere;
- 3) pulse breaks of geogenic energy surpluses onto the surface through those faults and its powerful impacts into the matter world of the exosphere. It is stated that through action of this mechanism, 2,4 billion years ago the global transformation of the exosphere's organic combinations into primary forms of terrestrial live matter took place in the first time at the Earth; and jump-like changes of species composition and organization complication of biosphere organisms' matter were carried out at the transformation frontiers of biological evolution.

References

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