ACTA SCIENTIFIC MICROBIOLOGY (ISSN: 2581-3226)

Volume 2 Issue 6 June 2019

Short Communication

Hypothesis about the Nature of Climatic Oscillations

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Received: April 22, 2019; **Published:** May 13, 2019

DOI: 10.31080/ASMI.2019.02.0234

In the framework of global carbon cycle model [1] it was shown that in the past there had been long-term geological cycles, called orogenic ones. They manifested themselves in the form of recurring volcanic eruptions and tectonic activity, periodic warming and glaciations, mass extinction of organisms and formation of rocks rich in organic matter as well as in form of other periodic climatic and biotic events. These events correlated with each other and made a certain sequence. They were spread all over the globe at the same time.

Along with them there had been short-term periodic geological processes, called climatic oscillations. They covered in some different regions, but not the whole globe at once. In the sedimentary strata of the same age the climatic oscillations might be met several times [2,3]. The most surprising thing is that the orogenic cycles as well as climatic oscillations are characterized by an almost identical set of signs. Indeed, both cycles begin with volcanism. In both cases, the signs indicate the onset of the "greenhouse effect" and anoxia in the environment, at the same time mass extinction and the formation of sediments rich in organic matter takes place, besides organic carbon shows the enrichment with isotope ^{12}C (negative excursion) [4].

The above sequence of traits has a logical explanation in the framework of the global carbon redox cycle model. There is a temptation to use this explanation in case of climatic oscillations. We will return to this attempt later, but for now we note that, according to existing representations, these two types of cycles are not connected and are considered as independent.

Orogenic cycles are believed to be generated by irregular lithosphere plates' movement transmitted through convective magma movement. Magma movement, in turn, is associated with the orbital movement of the Earth around the Sun [5]. Nobody knows the exact nature of the orbital forcing, that makes magma fluctuates, but some researchers regard it as result of gravitational interaction [6].

At first, we thought that the fluctuations had occurred when the carbon cycle reached the ecological compensation point and the orogenic cycles turned into climatic oscillations. But it was found that they appeared in the Triassic, i.e. much earlier than a point of compensation arose (in the Miocene).

The other researchers assumed that climatic oscillations are associated with the changes in orbital motion, including the change in the eccentricity of the orbit and the changes in the angle of inclination orbital plane. The assertion was based on the observed coherence of the astronomical spectrum and the characteristics of the "greenhouse" phase of climatic oscillations. Huang and Hesselbo [7], analyzing the astronomical power spectra have disclosed coherence between negative $\delta^{13}C$ excursions (CIE), and distribution of spectral components. They pointed out that the pre-and post-CIE intervals correspond to the strong precession-eccentricity-forced climate change, whereas the CIE intervals are caused by dominant obliquity forcing, i.e. they are all the result of cosmo-physical interactions and are directly related to the global carbon cycle. This idea was supported in [8].

Thus, to understand the nature of climate oscillations it is necessary to answer three questions.

1. What is the frequency of occurrence of climatic oscillations?
2. Why orogenic cycles and climate oscillations are characterized by almost identical set of features.

We assume that the answers may be as follows. The repeatability, as in case of orogenic cycles, is explained by the fact that climatic oscillations, as well as orogenic cycles, are associated with the movement of the Earth around the Sun, i.e. in both cases, cosmo-physical interactions, apparently of gravitational nature, are responsible for the occurrence of both fluctuations. To answer the second question, two more assumptions are required. 1. Interactions, associated with the Earth's movement along the orbit

is greater by magnitude, than the interaction responsible for the changes in eccentricity and for the inclination of orbit plane. 2. All interactions are transmitted through the convective motion of magma, which affects the lithospheric plates' movement. Thus this movement has irregular and complex, which is under the guidance of different cosmo-physical interactions in strength and frequency of oscillations. To what extent these assumptions are valid further natural observations will show.

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