The main laws of the dynamics of the elemental compositions of the hydrosphere and lithosphere as parts of the biosphere

KORZH V.D. [1]*

[1] P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences (IORAS), Moscow, 117997, Nahimovskiy pr. 36, Russia. (*correspondence: okean41@mail.ru)

Stability of substance migration and transformation on biogeochemical river-sea and ocean- atmosphere “barriers”, i.e. in sites of “life condensation” [1-3] is the main prerequisite of the hydrosphere ecosystem stability. The use of a methodology of empirical generalization has created the system of chemical elements’ distribution in the hydrosphere which possess great predictive potentials [2].

A comparison of elements’ composition of different phases on the global level within the hydrosphere-atmosphere-lithosphere systems revealed non-linear character of redistribution of different elements between these phases which reflects a general relative increase of concentration of trace elements in the environment of living organisms due to biogeochemical processes [2, 3]. The revealed nonlinearity index exhibits definite stability of the processes for the following geochemical barriers: 1) 0.75 for proto lithosphere - sediment system; 2) 0.67 for river – ocean system; 3) 0.7 for ocean — atmosphere system [2, 3]. The obtained value is believed to present a universal constant of biosphere reflecting biogenic stabilization of elements’ global cycles in the biosphere in the course of its evolution and corresponds to the biosphere concept of V.I. Vernadsky [4]. The obtained values may be used as a reference values in estimation of the biosphere stability and anthropogenic contribution to transformation of the global biogeochemical cycles.

[1] Korzh V.D. (1974) Some general laws governing the turnover of substance within the ocean-atmosphere-continent-ocean cycle. Journal de Recherches Atmospherioques. France. **8**. 653-660. [2] Korzh V.D. (2017) Biosphere. The formation of elemental compositions of the hydrosphere and lithosphere. Saar-Brucken: Lambert Academic Publishing, (in Russian). [3] Korzh V.D. (2019) Transfer of trace elements in the ocean-atmosphere-continent system as a factor in the formation of the elemental composition of the Earth’s soil cover. Environmental Geochemistry and Health. **41**, 1-7. [4] Vernadsky V.I. (1994) Living Matter and Biosphere. Moscow, Nauka, 672p. (in Russian).