



Defining of metals critical levels in Arctic waters

Moiseenko Tatyana and Marina Dinu

Institute of Geochemistry and Analytical chemistry by Vernadsky, geochemistry, Moscow, Russian Federation
(marinadinu999@gmail.com)

The problem associated with determination of critical levels of metals is one of the most complexes in the environmental science. Metals are always present at some concentration in the environment and in trace quantities are necessary for organisms.

The critical levels determining of metals in water is important for two reasons: 1) the direct toxic effect and 2) remote effects due to long term exposure, which can be displayed in future generations.

The industrially developed Arctic region - Russian Kola - is characterised of technogenic migration of metals in high latitude surface water. European Russia is characterized by substantial industrial sulphur emissions. In the northern part of ER two large copper-nickel smelters (“Pechenganikel” and “Severonikel”) have polluted the environment for more than 50 years by the emission of sulphur dioxide and metals. Dramatic situation of Arctic latitudes is revealed i) during flood period due to impulse of ionic forms of metals; ii) during long Polar winter in lower water layers due to involvement of a wide spectrum of metals in the redox-cycle under eutrophication conditions and oxygen deficiency.

At present it is difficult to estimate toxicological property of all metals and contribution of each of them in development of pathologies in fish, as it has been shown in our works, in geochemical or technogenic anomalies the wide spectrum of metals simultaneously influence on alive organisms. It can also be questioned if transferring the data on guideline concentrations, received in experiments, on natural water bodies is correct. As the development of the science and perfection of analytical measurements change the representations about behavior of the metals and their toxicity will vary, the methodology of critical levels and loads determination will develop respectively.

It is obvious that in other regions the occurrence of a spectrum of metals, their behavior and toxic property might probably be different. However, the methodological approach developed on example of Kola North can be used in substantiation of critical levels of metals in other regions with advanced mining and metallurgical industry.

Financing – grant RFBR 18-05-60012