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Alfredas Radzevičius; Rimantė Zinkutė

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ELEMENTS ASSOCIATIONS IN NEVĖŽIS SEDIMENTS

ALFREDAS RADZEVIČIUS, RIMANTĖ ZINKUTĖ,
Institute of Geology, Vilnius

In active hydrodynamical and geochemical medium of river along with mechanical dispersion hydration of mineral particles goes on. It activates sorption and desorption processes that are the main mechanism transferring the greater part of heavy metals and other chemical elements from water to sediments. These processes are especially active in river segments with emission of pollutants where quantitative and qualitative composition of element associations in sediments essentially differs from that of natural ones. The influence of complex geochemical barriers and diverse technogenical load on trace element composition of river sediments is well reflected in Nevėžis within the limits of Panevėžys. Three associations of positively correlated elements-pollutants are distinguished there.

The elements of the first association (Zn, Ce, La, Sr, Ba, Pb, Y, Zr) get to sandy sediments as colloids, fine particles or true solutions. The sources of Sr, Ba, Pb, Zn emission are located on the whole territory of the town. "Ekranas" plant is the most active among them. Sr, Zn, Pb, Ba come to Nevėžis with rain sewage of this plant and are deposited with coagulating hydrocarbon colloids or fine carbonate particles. This sewage is the main and probably the only source of rare earth elements in the sediments forming in this place. Concentrations of elements from this association have great variability in the longitudinal profile of Nevėžis and have considerable increase in the zones of geochemical barriers.

Distribution in river sediments of the second element association (Mo, Cu, Sn, Ag, P) is related with quantity of chloroform bitumoid and organic matter. The main suppliers of Cu and Sn to modern river sediments are runoff products from territories of electrotechnical engineering enterprises. Carbonate-organononous mud forms at rain sewage outlets of these enterprises. Cu and Sn accumulate in its neutral-slightly alkaline medium (pH 6,93-7,10). Distributions of other elements of this association (Mo, Ag, P) in longitudinal profile of Nevėžis are very similar to that of Cu and Sn.

The fifth element association including Cr, Ni and Nb is less distinctly expressed (8% of total variance). Its behavior is related with Sr and Ba - members of the first association. Essential positive correlation of Cr and Ni shows the identity of their origin, migration and accumulation in river sediments. They are typical pollutants of galvanic shops in metal processing enterprises and get to Nevėžis as true solutions, sometimes as colloidal particles. In the upper reaches of the Nevėžis Cr and Ni concentrations in sediments are close to those determined in other rivers, while downstream of active pollution sources and especially in the zones of alkaline barrier their main part coagulates and precipitates. The neutral medium (pH 7,1) of sediments suppresses their diffusion to river water. For example, their greatest concentration in sediments has formed downstream of rain sewage outlets of "Metalistas" plant (in sample No.7 Cr=4274, Ni=1795 ppm). Only part of Cr and Ni migrates farther downstream and slightly enriches sediments. However, a new emission of pollutants from "Tiksloji mechanika" and other industrial enterprises of western district again enriches sediments of Savitiškis dam (Cr=166,3, Ni=44, 1 ppm). with these elements.

The third and the fourth element associations reflect trace element composition of clay minerals forming river sediments.