



Geochemical characteristic of heavy metal contents for Armenia's rivers

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Studying the contents of heavy metals (HMs) for Armenia's rivers is underpinned monitoring data obtained the frame of a NATO/OSCE project "South Caucasus River Monitoring" (2003-2007). This paper covers a period 2004 to 2005. The study HMs - Cu, Mo, Cr, Ni, Mn, Zn, Co, Cd, Pb, Ag, Hg, As – were determined through the atomic – absorption method on PE Aanalist 800 keeping ISO requirements.

As a result, mean annual geochemical series of HMs were defined and geochemical stream intensity for each study river was calculated through averaging data on basic hydrological phases.

For 2004 and 2005 Cu dominated for River Kura basin waters. However, Mo and Hg contents approximated to the background. For 2004 Cd dominated for River Araks basin waters, for 2005 – Cr and Ni.

For 2004 Cu, Cd, Cr contents in River Kura basin were several fold excessive vs, the background; for 2005 Cr was replaced by Ni. For all the study rivers Ni contents for 2004 showed no excess vs. the background; for 2005 Ni concentration showed 4-8 time excess vs. the background. To River Araks tributaries – Rivers Hrazdan, Vorotan, Voghchi – common was a manifold excess of background contents of Cd, Mo, Hg, Cu for 2004, and Cu, Cr, Ni, Mo, Hg, Mn for 2005.

Along with general regularities, differences were revealed for geochemical series of HMs for Rivers Hrazdan and Voghchi. To River Voghchgi peculiar is a ten-fold excess of Cd, Mo, Cu, Cr vs. the background, this resulting from mining activities in the watershed area. River Hrazdan is characterized by substantial concentrations of highly toxic Cd, Ni, Hg, As. Their contents are not excessive vs. MAC, nevertheless the ob-

served stable 8 to 10-fold excess of background contents proves man-made character of pollution.

Maximal intensity of geochemical stream is common to River Voghchi and makes 94.1 and 69.5 for 2004 and 2005, respectively. Evaluating the summary value of geochemical stream intensity for the entire territory proves that the increase in the geochemical stream intensity index for 2005 correlates to the increase in surface runoff and is conditioned by the increase in runoff volume from watershed area, where ore mineralization fields are widely developed.

Thus, in HM runoff formation on Armenia's territory, the process of surface runoff dominates, to which quality and quantity decisive are landscape and geochemical conditions. High local concentrations of separate elements result from operation of mining plants and release of untreated municipal wastewater.