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Health risk assessment of dissolved heavy metals in surface water in a subtropical rivers basin system of Giresun (north-eastern Turkey)

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ABSTRACT

Rivers have an extremely important role in providing drinking water to humans and animals. However, metal pollution in the water can endanger human health depending on the aquatic ecosystem. In this study, the status of 13 elements (Al, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Cd, Hg, Pb, U), which pollute waters in seven streams of north-eastern Turkey (Giresun) basin and the contamination level were investigated. Besides, waters were evaluated in terms of public health. In most cases, it was identified that the levels of Al element in the rivers exceeded the WHO acceptable limits. Furthermore, as Al elements' results of Nemerow index (P_n) and Contamination index (C_d) were examined, contamination was found according to both indexes. In terms of arsenic, risk of cancer (CR) for children and adults was low only in Aksu River. When water quality index (WQI), heavy metal pollution index (HPI), heavy metal evaluation index (HEI), hazard quotient, and hazard index were investigated. WQI, HPI, and HEI values were determined in the range of 14.26–21.57, 59.68–69.44, and 1.94–2.76, respectively. The water quality of the streams was determined as good quality and there was no potential hazard. However, due to the intensive anthropogenic activities in the river basins, it is considered that drinking water resources should be continuously evaluated and monitored.

Keywords: Environmental monitoring; Heavy metal; Water quality index; Health hazard index; Heavy metal evaluation index; Cancer risk

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