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Investigation of the deposition pattern of radioactive elements in the Glougah river watershed to the Miankaleh wetland in northern Iran

Reza Pourimani, Seyed Mohsen Mortazavi Shahrudi*, and Roushanak Ghorbani

Department of Physics, Faculty of Science, Arak University, Arak, Iran

E-mail: m-mortazavi@araku.ac.ir

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Abstract

In this study, the radioactivity concentration in the soil and sediments of the Galougah River on the southern side of the Miankaleh Wetland in northern Iran, which originates from the northern heights of the Alborz Mountains, as well as the bed wetland sediments of the estuary of that river was studied. The mean specific activities of ^{226}Ra , ^{232}Th , ^{40}K , and ^{137}Cs in the sediments of the Galougah River respectively were 32.12, 32.47, 339.81, and 2.53 Bq/kg, in the soil along the river respectively were 34.20, 38.28, 505.94, and 6.89 Bq/kg, and in the wetland bed sediments near the mouth of the Galougah River respectively were 20.88, 21.22, 287.90, and 2.75 Bq/kg obtained. The average radioactivity concentration in the river sediments was lower than that of the surrounding soil, indicating that radioactive salts were washed away and transported to downstream areas by the river water flow. The high concentration of ^{40}K in the downstream part of the river could be due to contamination from potassium fertilizers used for agricultural purposes in that area. The distribution pattern of ^{226}Ra in the Miankaleh Wetland near the outlet of the Galougah River indicates the rapid deposition of this radionuclide immediately after leaving the river mouth, which settles in sandy-clay sediments. A similar distribution pattern was obtained for ^{232}Th and ^{40}K in the wetland, indicating a similar influence on the diffusion of these radionuclides from the water currents of the wetland, as well as a similar absorption of thorium and potassium salts by the sediments. The distribution pattern of ^{137}Cs in the wetland indicates that this radionuclide is deposited in far from the river outlet in the calm area of the wetland, which is due to the high mobility of ^{137}Cs , which causes it to be transported to distant locations by water flow.

Keywords: Radioactivity Concentration, Miankaleh Wetland, Sediment, Soil, HPGe detector

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