

Groundwater contamination and human health risk assessment in the main karst areas of Romania

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Abstract

Long-term monitoring reveals the temporal evolution of groundwater chemistry and the potential human health risk posed by the use of contaminated waters (Giri and Singh 2015). Groundwater aquifers are an important source of drinking water in Romania. This study was conducted to appraise the groundwater chemistry and the potential non-carcinogenic risks for human health associated with the groundwater consumption through oral and dermal pathways. In order to achieve this aim, 193 samples were collected from 29 groundwater sources in the main karst areas of Romania during 2019-2021. A total of 15 parameters were analyzed (F^- , Cl^- , SO_4^{2-} , NO_3 , Ca, Na, K, Mg, Fe, Mn, Cu, Zn, Ni, Cr, and As) and compared with the World Health Organization standards for drinking water (WHO 2017). The heavy metals pollution index showed that no groundwater samples had detectable levels of metal contamination, while the heavy metal evaluation index revealed that 4 out of 29 groundwater sources were classified as contaminated: 3 sources with a medium level of pollution and 1 source with a high level of pollution, indicating a potential risk for human health. The human health risk for oral exposure indicated a potential non-carcinogenic risk only in the karst area from South Dobrogea. The non-carcinogenic risk posed by nitrates is higher than that posed by metals in the aquifers from South Dobrogea. Therefore, control and remedial actions should be taken to ensure appropriate water quality for the locals using the contaminated water sources.

Keywords

karst water, health risk assessment, groundwater chemistry

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Conflicts of interest

None declared

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