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Hydrogeochemistry of Ukraine's groundwater system and its impact on public health

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For a long time problems that emerged during drinking groundwater research were considered only at the level of its conformity to drinking water standards. At the same time, topical is the impact of regional (local) qualitative composition of drinking groundwater on public health. Thus, the existence of biogeochemical provinces requires application of corresponding complex measures to reduce the impact of groundwater on health parameters and to minimize the risk of population disease.

Geological structure and climatic conditions of hydrogeological regions determine the uneven distribution of reserves and groundwater resources used to meet the needs of the country. The main aquifers (complexes) in Ukraine, which are characterized by various qualitative and quantitative factors and are used for drinking-household water supply, belong to [1]: the Quaternary sedimentation, the Neogene, Paleogene, Cretaceous, Jurassic, Triassic and Permian sedimentation, coal deposits, sediments of the Devonian, Silurian and Ordovician, Cambrian, Riphean period in crystalline rocks and their weathering products.

During the evaluation of the impact of groundwater chemical composition on public health, formation features of the chemical composition of groundwater in natural and technonatural conditions have to be examined. It is helpful to consider factors (physical-chemical, chemical toxic substances, chemically needed compounds) and sources of environmental hazards (natural and technogene).

The area of Ukraine is traced by quite clear areal zoning of groundwater chemical composition, determined by climatic zonation. Northern and western parts of the country are rich mainly on bicarbonate calcium waters that are typical for territories of excessive moisture. South-eastward they are changed gradually by bicarbonate-sulfate, sulfate-bicarbonate and sulfate waters. At the same time their cationic structure changes as the magnesium and sodium content increases. Southward, at the territory of Black Sea and pre-Azov crystalline massif, groundwaters acquire sulfate-chloride and chloride-sulfate structure, and sodium dominates among other cations. Finally, sodium chloride waters are common at the territory of Presyavshia and at narrow coastal strip of the Azov Sea.

Territory of Ukraine can be divided into regions by the quality of groundwater, each of which has a corresponding specification, determined by geological factors. Regional natural specification is controlled by natural conditions as well as by their technogene changes.

Each region should develop accessible and transparent information system for consumers on the quality of drinking water, its suitability for consumption, so that they could make conscious choices. Depending on the region of residence and social status, consumers have to choose the type of water (tap water, mineral and bottled). Social inequality and lack of information may lead to an uncontrolled flow of minerals into the organism, especially children's.

References:

[1] Medical-hydrogeochemical factors of geological environment in Ukraine/ edited by Doctor of Geology and Mineralogy Sciences, Doctor of Geography Sciences, Doctor of Technical Sciences, Professor, G.I. Rudko. – Kyiv – Chernivtsi: Bukrek, 2015.

