

Assessment of Groundwater Quality in the Sereflikochisar Basin (Turkey)

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Abstract: Water is one of the indispensable elements of life. The rise in world population and growth of industry over the last century has put an increasing pressure on the demand for water. However, water sources are contaminated as a result of natural and anthropogenic effects. This pollution of water resources damages the ecosystem and can cause or contribute to a variety of diseases. Water pollution is a result of negative changes to the physical, chemical and ecological characteristics of water. Salinity and high concentrations of heavy metals in water are among the most important types of pollution. This study investigates water quality and pollution potential of the freshwater aquifers surrounding the Lake Tuz (LT), one of the world's largest salt lakes. The aquifers near the LT display features of NaCl facies. The facies features of the groundwater changes to NaHCO₃ and CaHCO₃ farther away from the lake. Heavy metal concentrations (Al, Fe, Ni, As, Se, Mn, Cr) in the aquifers near the LT were observed over the limit. Electrical conductivity, salinity, Cl⁻, Na⁺ values also increase closer to the lake. The quality of all the water samples exceeded the limit given in the World Health Organization (WHO) standards in terms of Electrical Conductivity (EC). LT causes obvious sources of groundwater contamination. The sandstone, gypsum and marl in the region contain heavy metal elements in varying rates (Co= 24.2 - 47.2 µg/g; Ni= 43.4 - 316.5 µg/g; Sr= 45.8 - 361.1 µg/g; Ba= 396.1 - 151.1 µg/g). The groundwater is contaminated with Al, As, Fe, Cr, and Ni elements which result from the contact with mafic - ultramafic rocks or sedimentary rocks which were formed due to sedimentary processes of ultramafic rocks. This study presents suggestions for more efficient uses of the LT and the protection of the available clean groundwater aquifers. Information is also given concerning the health-related risks caused by contact with heavy metals. Thirty samples showed that the water was not suitable for potable and agricultural irrigation due to very high sodium and salinity levels. The conclusion is that there is a high concentration of ions in the lake, which negatively affects the quality of the freshwater aquifers. These aquifers were also mainly contaminated by the groundwater that has a high salt content as a result of water-rock interaction.

Keywords: *Water quality; Water contamination; Heavy metal; Lake Tuz; Hydrogeology; Turkey*

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