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## Effect of Talus Deposit Excavations on Hydrogeochemical Characteristics of Kuvars Spring Water, Maltepe, Istanbul, Turkey

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### ABSTRACT

Spring waters consumed for drinking purposes should be clean and quality. These waters with balanced mineral distribution, which do not contain organic substances, whose physical and chemical characteristics comply with certain quality parameters and which do not negatively affect human health are identified as healthy water. Kuvars water is a spring water which is pumped out from the draw well at the Camurluk stream basin of Maltepe province of Istanbul and filled into bottles. The Camurluk stream basin is approximately 4.5 km<sup>2</sup>. The Camurluk stream basin is sedimentary rocks and talus deposit outcrops. Reaching of trace elements, which is found more in the talus deposit samples than outcropping quartzarenite at the basin, to underground aquifer as ions under effect of rains, water rock interaction, leakage and filtration, is prevented by illite type clay levels existing within the talus deposit stack, which have upto 20 cm thickness. However, negative effects of the excavation that were made at the talus deposit reflect on the hydrologic cycle and chemical compositions of well waters. This effect was at first negatively affected the physical characteristics of the well waters. During the rainy periods, the water in the excavated area which was enriched with respect to the suspended sediments was percolated into the groundwaters from the joints and cracks of the quartzarenite. The turbidity value measured in the well waters of K2 and K3 were determined as 40.3 NTU and 34.2 NTU respectively. Although at the basin, the aquifer of underground water and the well waters being managed are quartzarenite, the fact that water types belonging to well waters differ (they are not same) according to the Piper diagram and when the heavy metal content of the water of well numbered KS1 is taken as basis, that some heavy metals such as Al<sup>3+</sup>, Fe<sup>2+</sup>, Ni<sup>2+</sup>, Mn<sup>2+</sup> and Cu<sup>2+</sup> be enriched 3 to 40 times in KS2 and KS3 well waters, are caused by talus deposit—water interaction at the excavation area. After a rainfall, in the water that became turbid with the water-talus deposit interaction at the excavation area, the water-mineral interaction has caused the limit value for drinking water suggested by World Health Organization (WHO) to be exceeded with the Al<sup>3+</sup> concentration of 189 ppb detected in KS2 well water and Fe<sup>2+</sup> concentration of 185 ppb has caused to approach the drinking water limit value of 200 ppb permitted by World Health Organization (WHO), United States Environmental Protection Agency (EPA), European Union (EU) and Turkish Standards (TS). Therefore, at the water basins where bottled spring waters consumed for drinking purposes are produced, technical undertakings that shall disturb the stability of geological units should not be permitted.

### KEYWORDS

Hydrogeochemistry; Kuvars Water; Talus Deposit; Excavation; Water Quality; Turkiye

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