

**O 6. GEOLOGY AND HYDROCHEMICAL CHARACTERISTICS OF THE AKHÜYÜK
SPRING (EREĞLİ-KONYA) AND ITS HOT MINERAL WATERS**

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ABSTRACT: The Akhüyük Spring is located 150 km from Konya province and 9 km from the Ereğli district. In 2023, it was registered as a Natural Site, and investments made by the Ereğli Municipality aim to develop it for thermal tourism and contribute to the regional economy. The study area comprises Tertiary and Quaternary rock formations. The base is formed by the Oligocene-aged Tapir Formation, overlain unconformably by Quaternary alluvium and travertine deposits consisting of dolomitic limestone, anhydrite, gypsum, alluvial gravel, sand, clay, and silt. The hot and mineral waters of Akhüyük emerge along the Akhüyük Fault, with temperatures ranging from 21-28°C and discharge rates between 0.16 - 0.45 L/s. Waters from boreholes have temperatures of 10 - 13°C and discharge rates between 0.05 - 0.32 L/s. These hot mineral waters have a meteoric origin. When they reach the surface along the Akhüyük Fault, the decrease in pressure causes CO₂ gas to escape, leading to the precipitation of CaCO₃. Carbonate deposition occurs in both directions along the fault, resulting in the formation of a travertine cone with two pointed ends in the NW-SE direction. Two artesian wells are drilled on the axis of the travertine cone. However, these artesian wells have depleted many springs along the Akhüyük Fault. The aquifer for hot mineral waters consists of limestone from the Tapir Formation. The hot mineral waters are saturated with calcite, dolomite, aragonite, anhydrite, and gypsum minerals. According to the semi-logarithmic Schoeller diagram, hot mineral waters and borehole waters have different origins. Based on the Piper diagram, the waters fall into the Zone 5 category, characterized by waters with over 50% carbonate hardness, mainly CaCO₃ and MgCO₃. According to the Wilcox diagram, Akhüyük spring waters are unsuitable for drinking, while borehole waters are of good quality and suitable for use. According to the U.S. Salinity Laboratory diagram, hot mineral waters fall into category C4S1, indicating they are highly saline and low in sodium.

Keywords: Spring, Hot Mineral Water, Geothermal Gradient, Travertine Cone, Akhüyük Fault