

# Hydrogeochemical processes of Azigza Lake (Middle Atlas, Morocco) inferred from monthly monitoring

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## Abstract

The High Oum-Er-Rbia basin, located in the Moroccan Middle Atlas, is a karstic region with very significant water sources that have essential functions regarding agriculture, hydropower production, industrial and drinking water. The region holds abundant wetlands, especially springs, rivers and natural lakes. These systems are very sensitive to the effects of climate change, experiencing considerable lake level, water chemistry, and biological fluctuations in response to regional hydrological balances. This study presents an investigation of the hydrogeochemical processes that control the chemical composition and variability of Azigza Lake, a typical tectono-karstic lake system in the Moroccan Middle Atlas region. A monthly monitoring and sampling water has been implemented from July 2013 to October 2014. Azigza Lake system waters show relatively low salinity due to the fresh water input from the Liasic karst formation. Lake waters are slightly alkaline and are calcium-magnesium-bicarbonate type. The water geochemistry is mainly controlled by carbonate weathering by Water–Rock interaction and is further modified by cation exchange and precipitation of carbonate minerals. The hydrochemistry of the lake showed obvious responses to seasonal changes in precipitation and evaporation, with elevated conductivity during the wet period. During the beginning of the wet season, groundwater evolution could be explained by a simple first flush stormwater. The rapid response of lake water to subsurface and underground waters confirms the dominance of an underground conduct flow regime. These changes and behaviours highlight the sensitivity of Azigza system to regional hydrological and climatic changes.