



Hydrochemical characteristics of karst water of Kruja-Dajt dolomite massive in Albania

R. Eftimi

ITA Consult, Tirana, Albania

Kruja-Dajt Mountain is located in central Albania and is one of the most important dolomite massifs of the country. Morphologically this massive represents a longitudinal monocline structure about 2 km wide and about 40 km long, steeply deepening to the east and having a northwest-southeast orientation. The Kruja-Dajt massive is mainly constituted by dolomite and limestone dolomite and subordinately by limestone. Some important springs issue in the gorges deeply cutting the massive. A hydrochemical investigation is applied to highlight the relation of the karst water quality to the rocks of the studied massive and to identify which geochemical processes control the character of the water. The water quality parameters are used also to characterize the karst flow system of the springs. Physical and chemical data were collected at 14 big and small springs. A total of 22 water samples from these springs were analyzed for major dissolved components. The water temperature of the springs varies from 11.7 to 18.8 °C; the pH varies from 7.20 to 7.70 and the average specific conductance is about 542 µS/cm. The ion relation of the spring water general follow: $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{Na}^+$; $\text{HCO}_3^- > \text{SO}_4^{2-} > \text{Cl}^-$, and the sulfate ion concentration varies from 10 to about 300 mg/l. The sulfate ion may come from the oxidation of the trace pyrite and marcasite and of trace gypsum, which are present in the studied dolomite massif. These processes are time dependent and concentration of the dissolved solids and of sulfate is an indication of the groundwater transit time. The average total hardness of the investigate springs is 5.5 mg/eq/l, and the percentage of the magnesia hardness related to total hardness mainly vary within 25.0 to 45.0 %, indicating that the aquifer is represented mainly by limestone dolomite. The average Ca:Mg varies from 1.38 to 3.38 and increase with the dissolved solids and sulfate. The calculation of groundwater saturation with calcite and dolomite was made without considering the effect of ion pairs. Within the uncertainty of the chemical analyses practically

all the springs resulted saturated or nearly saturated with calcite and dolomite, the average values of S_{ic} and S_{id} are respectively +0.07 and -0.10. Although the aquifer is a dolomite one, the water resulted more saturated of calcite than of dolomite. All the waters contain more than one order of magnitude more CO_2 than they would if they were in equilibrium with the atmosphere ($PCO_2=10^{-3.5}$ atm). The equilibrium CO_2 pressure in the water averaged to 10^{-2} atm. The CO_2 source is at the humus material at recharge areas of springs where the infiltration of the precipitation occurs. The introduction of CO_2 into the water allows solution of the carbonate rocks. The variation of some physical and chemical characteristics (the coefficient of variation -CV %, which equals 100 times the standard deviation) is applied for characterizing the physical aspects of the karst aquifer (Shuster & White, 1971; Jacobson & Langmuir, 1974). Pellumbas spring, the biggest of the area, is characterized mainly as a diffusive spring.