



## **Use of hydrochemical studies to identify the recharge sources of karst springs; example of Poçeme springs in Albania**

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Environmental tracers, either stable isotope, chemical or physical can provide important information about the water components that mix in a water system, about the quality of the water, location of recharge areas and their elevation as well as about the source of dissolved salts etc. The best results are achieved when the investigation is based on a reliable hypothesis about the possible formation of the groundwater system and systematic (repeated) analyses of many water sources in the studied area are performed. A particular importance has at every concrete investigation the identification of the so called guide (specific) tracers which for the given water system appear as more indicative.

These principles are successfully applied in the investigation of the origin of Poçemi karst springs, which are located in central-south Albania. Because a connection between the Poçemi springs and Vjosa River was suspected, the determination of the origin of springs had a particular interest for the high dam proposed to be constructed on Vjosa River valley, about 1.5 km south to Poçemi springs. A program of independent isotope and hydrochemical studies was started in June 1986 for a period of two years. Hydrochemical observations were made in five points in the spring area, in Vjosa River and in a locally recharged karst spring.

As the concentration of Cl ion not significantly differ at the three investigated water components, the SO<sub>4</sub> ion served as a guide tracer. This was facilitated by the relatively high SO<sub>4</sub>-concentration in Vjosa River comparing to that of groundwater of the local karst basin. Using the SO<sub>4</sub> ion concentrations-data was found that the Poçemi springs result a mixture of Vjosa River and of the local recharge in the karst basin. It was calculated that about 80 % of the water issuing from the Poçemi springs is recharged

from the Vjosa River and about 20 % is locally recharged. The results obtained by hydrochemistry observations are in a very good harmony with the results obtained from the environmental isotope methods.

The hydrochemical study together with the other applied methods like hydrologic, environmental isotope and karstic flow pattern investigations put in evidence the assumed connection between Vjosa River and Poçemi springs. As a result a new site was chosen for the proposed high dam.