



Comparison of water pollution in two karst springs in the northwest of Zagros, Iran

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Patagh anticline is located in northwest of Zagros in Kermanshah province, Iran. Most of this anticline is composed of limestone-dolomite Asmari formation which is sandwiched between the two impermeable marl and gypsum Gachsaran formation from above and shale and marly Pabdeh-Gurpi formation from below. Because of high elevation of the Pabdeh-Gurpi core, the hydrogeological relationship of two flanks is disconnected in most parts of the anticline.

Two springs namely Gharahbolagh and Marab emerge from the southern and northern flanks of the anticline respectively. Their discharge is 625 and 480 l/s and electrical conductivity (EC) is 548 and 387 $\mu\text{s}/\text{cm}$ correspondingly. Water of both is used for drinking.

Bacterial analysis of water samples of these springs showed that the Gharahbolagh spring has high number of bacteria (43) especially Echerchia (23) and the Marab spring is free from coliform. In order to determine the source of pollution, it was tried to calculate and determine the catchment area. The two weekly physicochemical parameters and discharge of springs were studied for two hydrological years (2000-2002). Using geological setting, water balance and isotope and physicochemical characteristics of the springs, the catchment areas were calculated and probable boundaries of recharge area were separated. Sarpole Zahab city is located in the border of the catchment area of Gharahbolagh spring, near the emergence of spring. In fact, the main conduit(s) which carry water from the catchment area to the Gharahbolagh spring passes below the Sarpole Zahab city. Leakage from septic wells and sewage of Sarpole Zahab city to the karstic aquifer is the main sources for its pollution. There are

no inhabitants inside the catchment area of the Marab spring; therefore, no pollution was detected in the spring.

In order to prevent the pollution of the Gharahbolagh spring, the drinking water can be abstracted from the catchment area through wells before passing below the city, i.e. in the east of Sarpole Zahab.