

Rivers Do Not Act As Barriers For Groundwater Flow

2 The research team from the Geodynamics Department at the University of Granada and the Spanish Institute of Geology and Mining (which is part of the Spanish Ministry of Education and Science) has studied the hydrogeology of the karst aquifers in the Mediterranean climate. It has been found that, contrary to popular belief, rivers do not act as insurmountable barriers for groundwater flow.

This pioneering study was carried out by Antonio González Ramón and directed by doctors Manuel López Chicano and Juan Carlos Rubio Campos. They based their research on the karst aquifer situated in the Pegalajar and the Mojón Blanco ranges. It occupies the northern side of the Betica mountain range and was provisionally declared overexploited in 1992 because of the complete drying up of the La Reja spring - whose source is situated in the centre of the village of Pegalajar - due to the exploitation of the water resources in order to supply the villages of Mancha Real, Pegalajar and La Guardia, which are all situated in the province of Jaén, Spain.

These scientists have proven that important rivers such as Guadalbullón are not insurmountable barriers for groundwater flows, as previously believed. The analysis of piezometric, hydrochemical and isotopic data from groundwater flows revealed that they cross the Guadalbullón River from one bank to the other due to a certain geological structure which prevents the groundwater from being influenced by the river flow.

The analysed data This research is based on the analysis of environmental isotopes, and both piezometric and hydrochemical data collected from the aquifers located in the Pegalajar and the Mojón Blanco ranges and from others nearby, in addition to the piezometric information available and the information added by previous studies carried out by several administration bodies. The analysis of all this information has made it possible to create a new hydrogeological model which explains most of the current mysteries. It has also made it possible to accurately identify which water resources depend on these aquifers and to design a new exploitation model which does not affect important springs such as the one at La Reja.

“The hydrogeological model which results from this research has been a useful basis for the development of a programme which controls the exploitation of the Mancha Real – Pegalajar aquifer. This programme aims to solve the social problems related to the exploitation of the groundwater in that area,” according to the author of this study.

After having proven their success, some measures included in this programme have already been put into practice. Also, other measures are being implemented in order to restore the spring of La Reja. The research carried out at the University of Granada has shown the importance of accurate knowledge of geological structures to explain the stages of storage and circulation of **groundwater** in karst aquifers severely folded and fractured.-Universidad de Granada

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