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# Hydrogeological studies in high mountains karst environment: the example of Picos de Europa (Spain)

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Karst aquifers are very vulnerable to contamination due their high infiltration coefficient, elevated hydraulic conductivity, high speed of circulation, and very low self-purification capacities. The functioning of that type of aquifer is quite complicated by the high heterogeneity and anisotropy of the karst and the presence of three different types of porosity. It is necessary to understand the functioning of a karst aquifer in order to protect and manage them properly. Therefore, it is necessary to develop working methods to establish the aquifer hydrodynamics, especially in high mountain areas with many methodological constrains (e. g. difficulty to access). The Picos de Europa karst aquifer, located in theNational Park of Picos de Europa (North Spain), presents a high environmental, geomorphological and hydrogeological value; it is included in the "Spanish geological contexts with global relevance" by the Law of Natural Heritage and Biodiversity of Spain, being considered as a Global Geosite by the Geological and Mining Institute of Spain. In addition, the karst massif is included in several figures of environmental protection, both at global and national levels. Hydrogeological and geomorphological research is developed together in this area under the GEOCAVE project (MAGRAMA-580/12 OAPN) and the "Investigación hidrogeológica en las masas de agua subterránea 012.014 Picos de Europa-Panes y 012.018 Alto Deva-Alto Cares. (IGME-73.3.00.41.00/2013)". The aim of this study is to characterize the hydrodynamics of the karst aquifer, considering the snow as an important component of the aquifer recharge. The proposed methodology includes the installation of an integrated pressure sensor and data logger for level and temperature measurement in two karst spring related to two groundwater bodies (GWB) with 86 and 14 km2 extension. The store of data to regular intervals with punctual values of discharge measures has provided, at least, an annual series of data in which level water differences varies from 4.5 m in the largest GWB to 1 m in the smallest one. The comparison of this data series with precipitation data allows to study the aquifer response to precipitation and to stablish the importance of the snow melting in the recharge of the aquifer.