



## **Karst spring real time monitoring to identify the groundwater circulation in the feeding aquifer**

Giuseppe Sappa, Flavia Ferranti, Francesco M. De Filippi, and Giulia Cardilo

Sapienza, University of Rome, DICEA, Department of Civil, Building and Environmental Engineering, Rome, Italy  
(giuseppe.sappa@uniroma1.it)

About one quarter of the world's population is largely or entirely dependent on groundwater from karst systems. However, karst aquifers have specific hydraulic and hydrogeological characteristics that render them highly vulnerable to pollution from human activities.

Intrinsic vulnerability of a karst aquifer takes account of the inherent geological, hydrological and hydrogeological characteristics of an area; however, it is independent of the nature of contaminants.

Groundwater circulation is usually very rapidly as a function of high rainfall input. As consequence, in case of contamination, these systems are characterized by limited attenuation processes in the unsaturated zone.

The analysis of karst spring responses to rainfall events, at the catchment scale, is one promising approach for groundwater flow characterization. Karst springs are, in fact, an important source of information in order to understand the circulation characteristics in such complex systems.

The karst Pertuso Spring, located in the Upper Valley of Aniene River, is the main outlet of a large aquifer which is one of the most important water resource in the southeast part of Latium Region, Central Italy, used for drinking, agriculture and hydroelectric supplies.

This paper deals with Pertuso Spring data collected from December 2014 to March 2016, using a multiparametric probe which directly interfaces with a data logger for real-time recording of hourly data. This instrument simultaneously measures up to 6 parameters (pH, groundwater level, temperature, electric conductivity, redox and dissolved oxygen). In particular, water temperature, electrical conductivity and rainfall data coming from meteorological stations have been studied to identify the groundwater circulation in the aquifer feeding Pertuso Spring. The study of the lag time between peak rainfall and peak of T and EC allow to highlight the seasonal vulnerability of this aquifer.