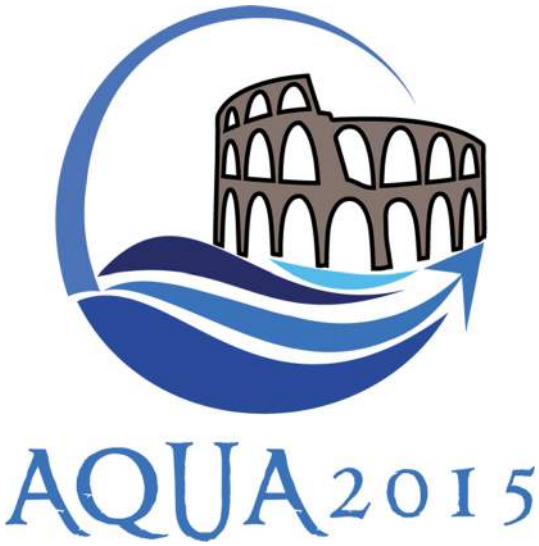
THE INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS



HYDROGEOLOGY: BACK TO THE FUTURE!

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ABSTRACT BOOK

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S2.7 - DISCHARGE AREA: A FINGERPRINT OF GROUNDWATER FLOW CONDITIONS

428 - A FREQUENCY AND TIME DOMAIN APPROACH TO ANALYZE SPRINGS MONITORING DATA: APPLICATION ON POROUS AND SHALLOW AQUIFERS IN MOUNTAIN AREAS (AOSTA VALLEY)

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Aquifers in mountain areas are a strategic resource for the people who live there. To optimize future management, it is vital to understand hydrogeological systems from both geological and hydrogeological perspectives. In these aquifers there are often very few wells which permit hydrogeological observation. In great part, therefore, studies on the functioning and hydrodynamics of aquifers have been based on analyzing the hydrograph (depletion and/or recession) or on the complete hydrograph corresponding to an identifiable rainfall event.

In order to compensate for this lack of data of the aquifer system analysis in time and frequency domain have been applied. The aim of this paper was to apply these methods, usually applied in karst systems, to small mountain springs supplied by porous and shallow aquifers.

The applications of these analysis enable the study of the whole of the hydrographs of the mountain springs and their relationship with the input function (precipitation, essentially), as opposed to many other methods which use only recession or another part of the hydrograph. The methodology proposed treats the series at the time and frequency level, and thus differentiates between short and long periods of rainfall and discharge, which are impossible to differentiate using deconvolution or simple visualization of the unit hydrograph, or with any other method which does not discriminate the spectral variation.

The application of this method to six mountain springs, located in the Italy North-Western Alps in the Aosta Valley Region, has served to test the usefulness of these tools in porous and shallow systems. This analysis offers quantifiable and objective criteria for differentiation and comparisons of aquifer systems.