

Understanding karst hydrodynamics using hydrograph analysis

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Abstract. Karst aquifers are complex hydrogeological systems with strong heterogeneity originating from the presence of karst conduits. Direct information on conduit network geometry is rarely available, and classical geological, geophysical and hydrogeological methods provide only limited information on the spatial configuration of hydraulically active conduit networks. However, in most cases spring and/or well hydrograph data, together with well test results are available, or relatively easily obtainable. Novel hydrograph analytical methods establish links between aquifer properties and hydrograph characteristics. Both spring and well hydrographs contain important information about the hydraulic functioning of karst systems. A conceptual model with two permeability classes adequately describes the hydrodynamic behaviour of karst. Generally, spring hydrograph analytical techniques can provide information on the characteristic hydraulic parameters and conduit spacing of a karstic catchment, while well hydrograph analysis usually provides information on the hydraulic and geometric characteristics of individual matrix blocks. The combination of spring and well hydrograph analytical techniques provides a powerful tool for the characterization of the structure and hydraulic functioning of karst systems, as demonstrated on various test sites.