



Aquifer characterization through an integrated GIS-based tool

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Hydraulic parameters of the subsurface (transmissivity, hydraulic conductivity, storativity and specific storage) are important to achieve hydrogeological studies such as environmental impact assessments, water resources evaluations or groundwater contamination remediation, among others. There are several methods to determine aquifer parameters but pumping test is the most commonly used method to obtain them and generally leads to reliable hydraulic parameters. These parameters and other hydraulic data available for integration into the hydrogeological studies (which currently are supported by groundwater numerical models) usually has a very diverse origin and format and, therefore, a chance of bias in the interpretations. Consequently, it becomes necessary to have effective instruments that facilitate the pre-process, the visualization, the analysis and the validation (e.g. graphical analysis techniques) of this great amount of data.

To achieve this in a clear and understandable manner, the GIS environment is a useful instrument. We developed a software to analyze pumping tests in a GIS platform environment to support the hydraulic parameterization of groundwater flow and transport models. This novel platform provides a package of tools for collecting, managing, analyzing, processing and interpreting data derived from pumping tests in a GIS environment. Additionally, within the GIS platform, it is possible to process the hydraulic parameters obtained from the pumping test and to create spatial distribution maps, perform geostatistical analysis and export the information to an external software platform. These tools have been applied in the metropolitan area of Barcelona (Spain) to tests out and improve their usefulness in hydrogeological analysis.