

Estimating Specific Capacity from Piezometric Level Autocorrelation Function: A Case-Study in the Murgia Karst Coastal Aquifer (Southern Italy)

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Abstract

Spatial reconstruction of hydraulic characteristics in aquifers affected by seawater intrusion is one of most important factors influencing groundwater resource management in karst coastal area. In fact, in trying to define the conceptual hydrogeological model, the main problem is basically linked to the presence of strongly anisotropic hydrostructures, which can substantially influence the hydrodynamics of the entire groundwater system [Maggiore et al., 1999].

An accurate spatial reconstruction of specific capacity domain greatly depends on the necessity of testing a sufficiently high number of measuring points. Hence the time-consuming use of experimental functions able to correlate direct and indirect information (i.e. specific capacity and piezometric level). However, it is well known that practical limitation concerns the dependence of these functions from local factors, such as geolithology or fracture systems [Mace, 2001].

In a typical study-area of Murgia coastal aquifer (Southern Italy) and with the aim to verify suitability of existing correlations [Mace, 1997, 2001; Fabbri, 1997], ten wells have been drilled, tested and finally equipped with multiparametric probes able to record piezometric head variations. The study-wells have been chosen according to the general hydrostructural features of the study-area, already described in previous papers [Maggiore et al., 2001] and on the basis of further considerations about the specific value of the saline intrusion potential, which can be assumed as the main indicator of hydrogeological districts with a locally governed hydrodynamic [Tulipano & Fidelibus, 1999].

The present work has established an experimental correlation between specific capacity and piezometric level autocorrelation function. This correlation, validated for the Murgia karst coastal aquifer of Fasano, could also allow for the indirect testing of private agricultural wells, otherwise not easy to be taken into account. It should finally be observed that the correct use of this methodological approach can lead to less expensive surveying actions finalized to the computation of anisotropic aquifer hydraulic parameters.

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