

Approccio modellistico per l'analisi delle interazioni tra gli acquiferi costieri del versante Adriatico della Penisola Salentina

Modelling approach for the analysis of interactions among the coastal aquifers of the Adriatic portion of the Salento Peninsula

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Abstract

The multi-layered aquifer system of the Salento Peninsula is characterized by shallow aquifers hosted in sediments belonging to recent hydrostratigraphic units, and a karst, deep aquifer mainly exploited for drinking and irrigation purposes. Since several decades, the overexploitation of groundwater resources in the region caused the aquifer system to be affected by saltwater intrusion and the shallow aquifers hosted in Pliocene sediments to get dry. This last phenomenon allows to make hypothesis about a potential hydraulic connection between the shallow Pliocene aquifer and the deep, karst aquifer along the central part of the Adriatic portion of the Salento Peninsula. Such connection probably caused a vertical recharge to the deep aquifer, reflected by high hydraulic head levels detected at the coastal area near Otranto.

Taking steps from previous modelling studies on the Salento Peninsula, a groundwater flow model was set up using the FREEWAT platform. Two versions of the model were developed, in order to explain the above mentioned phenomenon occurring near Otranto. The following conceptual models were tested:

- the first conceptual model allows to guess that the hydraulic contact between the deep aquifer and the sea occurs off-shore, far from the coastline;
- the second conceptual model allows to guess a hydraulic connection between the shallow Pliocene aquifer and the deep, karst aquifer along a coastal strip between Lecce and Otranto.

Both versions of the model were calibrated against the available hydraulic head values measured between 1950 and 1987. Both models are able to reproduce the high hydraulic head values detected near Otranto, except for two wells, whose values cannot be fully justified by the second conceptual model. This could be due to local phenomena, which cannot be represented by the numerical model. As such, this sets the stage for further investigations of the complex hydrodynamics of the deep aquifer of the Salento Peninsula, with important implications on saltwater intrusion.

The thesis is written in Italian language.

The thesis can be consulted upon request.

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