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Groundwater resources assessment of the Sicilian region, Italy

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Abstract

Recently, the Sicilian Government, according to the national dispositions, started with a project focused to evaluate the groundwater resources of the Region. The project is going on through complete studies regarding the hydrostructures hosting the main aquifers and their hydrogeological characterization.

Geological informations have been utilised for the definition of the hydrostructural pattern, consisting of geological, geophysical, structural and well data.

Geophysical data mostly consists of available deep seismic reflection profiles„ carried out from very recent petroleum explorations. They have revealed the underground geometry of the chain units, mostly composed of Mesozoic-Lower Tertiary carbonate platform and basin deposits, overlie by foredeep clastic successions of Miocene-to-Quaternary age.

The structural analysis has been utilised for evaluate how the rock fracturing and the geometrical setting of the highly deformed tectonic units may determinate the large-scale groundwater flows.

The well data, mostly deriving from hydrogeological and mining studies, represents an useful tool for integrate the geophysical and the outcrop geological informations, allowing to elaborate a lot of cross sections and then to define an attempt of 3D hy-

drostructural setting for some segments of the Sicilian chain.

The main aquifers are localized in carbonatic structures, the volcanic Etna edifice and several coastal planes. The urbanization and the intensive overexploration of groundwater for civil, irriguous and industrial purposes caused extensive phenomena of seawater intrusion and anthropic contamination.

From a geochemical point of view, water analysis have been carried out on sampling sites on the base of the hydrogeological features. They have regarded, besides the major and minir constituents, even trace metals and plant protection products due to anthropic contribution.

The hydrogeological models are developed in G.I.S. platform.

In this study was prepared a specific hydrogeological G.I.S. which includes the main aquifers of Sicily, their type, aquifer top evaluation, aquifer characteristic and discharge and recharge data. It collected data extracted from spatially defined measurements and data extracted from point measurements.

The study, performed up to now, gives a general frame of the water situation in Sicily.