

# Implementazione di un modello di flusso per la gestione della falda profonda carbonatica del Salento Adriatico mediante applicazione della piattaforma FREEWAT integrata in GIS

## Implementation of a flow model for managing the deep, karst aquifer of the Adriatic part of the Salento peninsula by means of the application of the GIS-integrated FREEWAT platform

*Claudia Branca – Università del Salento, Lecce, Italy*

*Year: 2018*

*Tutor(s): Prof. Sergio Luigi Negri – Università del Salento, Lecce, Italy*

*Dr. Giovanna De Filippis – Scuola Superiore Sant'Anna, Pisa, Italy*

### Abstract

The Salento peninsula is characterized by poor surface water resources, due to the karstic nature of its territory. On the other hand, important groundwater resources are located in the deep, karst, coastal aquifer, which is of strategic importance for the economic and social development of the area. Such aquifer, indeed, is the major freshwater resource in the region able to satisfy the increasingly widespread demand related to productive activities. The increasing water demand, however, if not properly managed, may pose serious problems to the hydrogeological equilibrium of this aquifer, which is highly susceptible to natural and anthropogenic changes. Because of the karstic nature of this coastal aquifer, such changes result in the occurrence of the saltwater intrusion phenomenon, which is a matter of concern as it has, in turn, negative implications on freshwater availability and quality.

In this framework, the European and National regulations on coastal aquifers management foster the use of modelling tools to assess the quantitative and qualitative status of these natural systems, and to predict the evolution of their hydrogeological equilibrium as a result of overexploitation and climate change.

Taking steps from previous works, the present paper focuses on the Adriatic portion of the Salento peninsula and describes a modelling approach for the assessment of the saltwater intrusion phenomenon. As a result of the implementation of a density-dependent flow model, the lateral extent of such phenomenon and the vertical depth of the transition zone between fresh- and salt-water were inferred. The model was also applied to design a Managed Aquifer Recharge facility for management and protection of the hydrogeological equilibrium of the aquifer under exam. The model results allowed also to identify areas where the lack of data prevents a proper comprehension of the hydrogeological processes investigated, thus representing supporting tools for planning further monitoring campaigns.

The thesis is written in Italian language.

The thesis can be consulted upon request.

Author's contacts: Claudia Branca – [claudia90branca@gmail.com](mailto:claudia90branca@gmail.com)