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# SUSTAINABLE WATER RESOURCES MANAGEMENT IN NEOTECTONIC BASIN SYSTEMS

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## EXTENDED ABSTRACT

Facing the threat of water scarcity, numerous techniques and methods have been introduced, aiming at more effective water resources exploitation. A well promising way to cope with water shortage is to develop and apply combined management techniques for the existing surface water and groundwater resources. Natural resources management requires thorough **understanding** of the **natural processes** controlling each resource and **human activities** affecting and being affected by it. Vital for the success of this approach is a comprehensive knowledge of the hydrological budget and the geometrical and physical properties of the aquifer systems under investigation. It is very important to examine the interaction between surface water and groundwater, present in every natural or artificial physiographic setting, determining the system's biological health and ecological function, including urbanization and agriculture. The regional **social** and **financial infrastructure** are human induced factors which affect water demand and hence resource availability. Especially in neotectonic active regions, the hydraulic relations between hydrological basins can be very complex, because the aquifer geometry is controlled by tectonic surfaces (faults and thrusts).

A prerequisite in realizing management programs is the assessment of the overall capacity of the groundwater system under study. To achieve this goal, first the aquifer geometry must be modelled, using 3D-CAD techniques. This step is extremely important in the case of tectonically controlled geometry. In the next step, the aquifer properties can be estimated by employing methods of spatial statistics. The basis for the development of realistic management scenarios is the thorough knowledge of all social, economical and geoenvironmental attributes of the area, integrated in a dynamic temporal and spatial model. At this time, this knowledge is only partial and fragmented.

In this work we investigate the hydrogeological system of two hydraulically connected hydrogeological basins, the Ano Messinia basin and the Kato Messinia basin. In this interactive hydrogeological – urban – agricultural regime, water needs are met by exploitation of the porous aquifer and discharge of the major karstic aquifers either by major karstic springs or pumping (see Figure 5). Exploitation of the porous aquifer has lead to degradation of its properties, while pumping of the karstic aquifers may also lead to such problems, or even hazard the spring function – not to mention the disturbance of the dynamic balance between these two water bodies.

**Key words**: water shortage, sustainable management, hydrogeology, neotectonic basins, 3D-CAD, GIS, Messinia.