

3-D GEOMETRICAL MODELING OF AQUIFER SYSTEMS AS BASIS FOR AN EFFICIENT WATER RESOURCES MANAGEMENT

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Water shortage is one of the major problems modern human society has to face in the near future. It is basically connected to climatic changes and the increase of the world's population. Since we are going through a draught period, known as the Sahel draught, water shortage problems are expected to be exacerbated in the coming years. The only way to cope with the problem is to develop and apply combined management techniques for the existing surface water and groundwater resources. An important issue in this framework is artificial recharge of groundwater. It offers the possibility to optimize the spatial and temporal availability of water using existing infrastructure. Computer models describing groundwater flow through soil and rock must be set up for planning effective artificial recharge measures. The first step in building such a model is a delineation of the aquifer geometry using 3D CAD techniques. Afterwards, the aquifer properties can be estimated employing methods of spatial statistics. At this point, it is possible to make an assessment of the overall capacity of the groundwater system under study. This provides vital decision support for geologists and engineers to investigate a project's feasibility and to select appropriate recharge strategies. Then the groundwater model can be set up. Working with integrated software packages, allows the modeler to use all available information (geological, hydrogeological, geophysical etc.) acquired before the start and during the project. A pilot study for the artificial recharge of karstic aquifers in the basin of the Enipefs river in Thessaly (Central Greece) is presented.