



Assessment of groundwater degradation and potential improvement using spatial analysis techniques

Emmanouil Varouchakis, Kalaitzaki Eleuthera, and George P Karatzas

Technical University of Crete, Environmental Engineering, Environmental Engineering, Chania, Greece
(varuhaki@mred.tuc.gr)

Throughout the Mediterranean region, semi-arid climate in conjunction with intensive agriculture stress and degrade scarce groundwater supplies which are over-exploited to cover irrigation demands. One such example is the Geropotamos Basin on the island of Crete, Greece. This over-overexploitation of groundwater has led to the increased groundwater extraction cost, the risk of pollution and seawater intrusion along the coastal zone, and to negative environmental impacts such as the extinction of wetlands. As a result and in order to stabilize groundwater tables, managerial measures on groundwater withdrawals were imposed by the regional government in 2015. According to the local authorities, groundwater pumping is not expected to cease. The aim of this work is to perform a suitability assessment study for potential aquifer recharge that will consider the quality and quantity of water resources, the soil quality and suitability, the socioeconomic analysis, and ecological assessment. This work also aims to deliver a simple methodology for selecting the most suitable recharge locations of the underlying aquifers and to demonstrate the socioeconomic and environmental advantages of this methodology. A combined field- and GIS-based approach will be developed to select the most suitable locations in the Geropotamos Basin. In addition, the groundwater potential degradation risk is examined by applying the DRASTIC-LU method. The outcome of this work will be the groundwater recharge suitability and pollution risk maps.