HYDROGEOLOGICAL MODEL OF MIJAS MOUNTAIN AQUIFERS UNDER DIFFERENT CLIMATE CONDITIONS (MALAGA, SPAIN)

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Abstract: Carbonate aquifers represent an important source of freshwater, both for urban and agricultural uses. This is particularly true in semiarid regions, where intensive pumping has often led to aquifer overexploitation. One example is the Mijas mountain carbonate diffuse flow system (80 km^2), located to the SW of the city of Malaga, Spain. From a geological standpoint, this area consists of Triassic dolomitic and calcareous rocks, which overlay Palaeozoic metapelites. The geological structure is formed by ESE-WNW folds and the metapelites anticlinal cores have divided the study area into four aquifer systems. The recharge of Mijas mountain aquifers comes from direct infiltration of rainfall, while pumping is the main discharge. To improve the knowledge of geological and hydrodynamic parameters, and therefore to improve water resources management, a hydrogeological model has been developed with Processing Modflow 8.0.42. Piezometric level and spring flows have been modelled, under steady and transient-flow conditions for a 35-year period. Five future scenarios were simulated for different rainfall and pumping conditions. Outcomes confirm that the water level evolution is determined by the quantity and distribution of rainfall during the hydrological year, with the same pumping rate. The results also suggest that current trends are likely to raise sustainability issues in the future.

Key words: Groundwater model, Processing Modflow, Future scenarios, Karstic aquifer, Fisurated flow system.