



Determination of recharge in a semi-arid Andarax River Basin by hydrological modeling

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The 2,265 km² Andarax river basin is located in the Southern Spain. It is one of the most arid regions in Europe with a precipitation of 250-350 mm/year, which mainly falls (70%) in autumn and winter. The terrain changes from sea level at the coast to more than 2,500 m in the Sierra Nevada Mountains. The geological settings in the upland areas are mostly Triassic schists and limestone whereas the medium and lower-laying areas consist of Neogene-Quaternary deposits. The Andarax river basin consists of two important river systems: The Andarax river and the Nacimiento river. Most of the precipitation falling in the mountainous areas, where the unit Triassic schists dominates, is converted into overland flow, which runs directly to the rivers. In the limestone aquifer most of the precipitation infiltrates and is subsequently routed through fractures before discharging into the Andarax river. When the river reaches the medium and lower-laying areas most of the water infiltrates into the highly permeable Detritic aquifer. River discharge into the Mediterranean Sea only occurs at rare occasions and for high rainfalls. Consequently nearly all excess rainfall generated from the upstream catchments areas is discharged as groundwater flow which thus determines the water availability in the delta region.

The rather unique hydrological behavior of the Andarax river basin is simulated by the MIKE SHE code, which is a physically based, distributed and integrated hydrological model. Particular emphasis is given to the simulation of the seasonal and spatial distribution of recharge within the river catchment. Intensive abstractions of groundwater from agriculture occur in the delta region. In drought periods the model can be used as a tool for proper management of the scarce groundwater resources in the downstream

areas.