Quantitative groundwater modelling for a sustainable water resource exploitation in a Mediterranean alluvial aquifer

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Description
To analyze the water budget under human influences in the Isser wadi alluvial aquifer in the northeast of Algeria, we built a mathematical model which can be used for better managing groundwater exploitation. A modular three-dimensional finite-difference groundwater flow model (MODFLOW) was used. The modelling system is largely based on physical laws and employs a numerical method of the finite difference to simulate water movement and fluxes in a horizontally discretized field. After calibration in steady-state, the model could reproduce the initial heads with a rather good precision. It enabled us to quantify the aquifer water balance terms and to obtain a conductivity zones distribution. The model also highlighted the relevant role of the Isser wadi which constitutes a drain of great importance for the aquifer, ensuring alone almost all outflows. The scenarios suggested in transient simulations showed that an …