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Climate change impact on groundwater modeling using an integrated approach: a Moroccan's case study

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Abstract:

Climate change forecasts from IPCC (Intergovernmental Panel on Climate Change) reports and different studies provided that by 2100, Morocco will face a decrease of average annual rainfall by 10 to 30% and an increase of average annual temperature by 1° to 2°C. Aquifer's overexploitation due to the increase of water demand, for urban, agricultural and industrial development; and climate change, has negative impact on groundwater resources. Therefore, different consequences are predicted: natural recharge decrease, water quality decline, salinity intrusion. The scientific knowledge of processes related to climate change impact on groundwater resources remains insufficient both nationally and internationally. This is due particularly to: the inadequacy of databases both quantitatively and qualitatively; Insufficient accuracy of predictions by climate models especially rainfall and their sensitivity to the choice of climate scenarios; Insufficient accuracy of methods for estimating groundwater recharge; the difficulty of modelling surface water/groundwater interaction. The assessment of climate change impacts on groundwater resources requires reliable predictions of climate variables; a good estimation of groundwater recharge; and modeling of the aquifer's hydrodynamic response to climate change scenarios. This research aims to improve assessment of climate change impacts on Moroccan's groundwater resources, using a global methodology. The proposal approach was based on national and international benchmark, and outcomes derived from Berrechid aquifer's studies which is among many vulnerable Moroccan's aquifers to climate change and water scarcity. The results of simulations showed a decline of water table of this aquifer even for optimistic IPCC scenarios: SRES-B1 (Special Report on Emissions Scenarios) or RCP-2.6 (Representative Concentration Pathways). Berrechid aquifer was considered as case study to improve this global methodology based on a link of different aspects (climate, hydrologic, and flow groundwater), to assess future impacts of climate change on groundwater resources in Morocco.

Biography:

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