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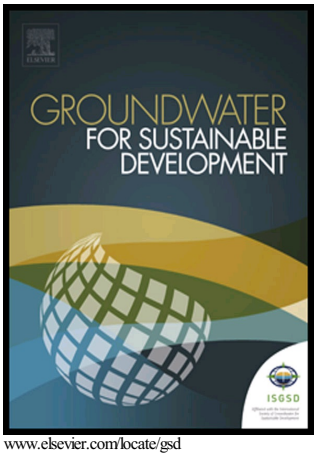


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# Impact of Climate Change on Groundwater Recharge and Base Flow in the Sub-Catchment of Tekeze Basin, Ethiopia

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## Abstract

The impacts of climate change are significant on both surface and groundwater resources. However, little attention has been given to the effect of climate change on groundwater resources. Therefore, the present study is concerned with the effect of climate change on groundwater recharge and base flow in Tekeze sub-catchment in Ethiopia. The future climate variables were obtained from Coordinated Regional Climate Downscaling Experiment (CORDEX) Africa program for Representative Concentration Pathways (RCPs) of RCP 2.6 and RCP 4.5 scenarios. The Mann-Kendall test and Sen's slope estimator were used for trend detection using XLSTAT software package. Further, the downscaled and bias corrected precipitation, temperature, and potential evapotranspiration were used as input to the WetSpa model to simulate future water balance changes. The results indicated a decreasing trend in annual rainfall and an increasing trend in average temperature and evapotranspiration for selected scenarios. At the catchment level, precipitation decreases by 20% for both RCP 2.6 and RCP 4.5 scenarios, and actual evapotranspiration shows 0.4% and 8.1%increment for RCP 2.6 and RCP 4.5, respectively. Consequently, the groundwater recharge decreases by 3.4% for RCP 2.6 and 1.3% for RCP 4.5. Base flow will also decrease by 1.5%and 0.55% for RCP 2.6 and RCP 4.5, respectively. The results of this study would help policymakers, scientists, government officials and local stakeholders in planning and management of the surface and groundwater resources in the Ethiopian regions.