

Climate Change in Awash River Basin of Ethiopia: A Projection Study Using Global and Regional Climate Model Simulations

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Abstract : The aim of this study was to project and analyze climate change in the Awash River Basin (ARB) using bias-corrected Global and Regional Climate Model simulations. The analysis included a baseline period from 1986-2005 and two future scenarios (the 2050s and 2070s) under two representative concentration pathways (RCP4.5 and RCP8.5). Bias correction methods were evaluated using graphical and statistical methods. Following the evaluation of bias correction methods, the Distribution Mapping (DM) and Power Transformation (PT) were used for temperature and precipitation projection, respectively. The 2050s and 2070s RCP4 simulations showed an increase in precipitation during half of the months with 32 and 10%, respectively. Moreover, the 2050s and 2070s RCP8.5 simulation indicated a decrease in precipitation with 18 and 26%, respectively. The 2050s and 2070s RCP8.5 simulation indicated a significant decrease in precipitation in four of the months (February/March to May) with the highest decreasing rate of 34.7%. The 2050s and 2070s RCP4.5 simulation showed an increase of 0.48-2.6 °C in maximum temperature. In the case of RCP8.5, the increase rate reached 3.4 °C and 4.1 °C in the 2050s and 2070s, respectively. The changes in precipitation and temperature might worsen the water stress, flood, and drought in ARB. Moreover, the critical focus should be given to mitigation strategies and management options to reduce the negative impact. The findings of this study provide valuable information on future precipitation and temperature change in ARB, which will help in the planning and design of sustainable mitigation approaches in the basin.

Keywords : variability, climate change, Awash River Basin, precipitation

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