Geophysical Research Abstracts
Vol. 20, EGU2018-3102, 2018
EGU General Assembly 2018

Impacts of Climate Changes on the Water Resources of Tekeze River Basin part of Eastern Nile, Ethiopia

Fikru Fentaw (1,2), Assefa Melesse (1), Dereje Asfaw (2), and Agizew Nigussie (2)

(1) Florida International University, Florida International University, Earth and Environment, Miami, United States (melessea@fiu.edu), (2) School of Civil and Environmental Engineering, Addis Ababa University, Addis Ababa, Ethiopia

Climate change over the next century is expected to severely impact water resources of the Nile River Basin. In this study, we investigated the sensitivity of water resources to climate change in Tekeze River Basin, Northwest of Ethiopia part of the Eastern Nile using the Soil and Water Assessment Tool (SWAT) model. An ensemble of downscaled climate projections from CORDEX-Africa participating in the CMIP5 climate projections under the two Representative Concentration Pathways (RCPs) 4.5 and 8.5 scenarios for the periods of 2011–2040, 2041-2070 and 2071–2100 were incorporated into the calibrated SWAT model. Results confirmed that the calibrated SWAT model accurately depicts hydrological processes features at daily, monthly, and yearly scales. According to the projected climate data in all time periods, maximum and minimum temperature is likely to have an increasing trend up to +2.6˚C and +2.99˚C respectively in both scenarios. Precipitation in all periods increases up to +32% and +40% for RCP 4.5 and 8.5 scenarios respectively. In both scenarios, precipitation in the wet season showed an increasing trend whereas the short rainy season from February-May showed a decreasing trend. The dry season precipitation showed a mixed increasing and decreasing trends. Projected annual river discharge increases however, there is significant variation in the seasonal and monthly flows. In both scenarios, the wet and dry season river discharge increased except for RCP8.5 in 2080s. The small rainy season flow exhibit a decrease for RCP8.5 in all time periods. This increasing river discharge for future time horizon is advantageous for planning and operation of large water resources infrastructures in the downstream Nile Basin countries Ethiopia, Sudan and Egypt.
Keywords: Tekeze River Basin; Water Resources; SWAT; CORDEX-Africa; RCP Scenario; Climate Change