2020 International Conference on the Nile and Grand Ethiopian Renaissance Dam: Science, Conflict Resolution and Cooperation, August 20-21, 2020, Florida International University, Miami, FL USA (Virtual)

Impact of Climate Change on the Ecohydrology of the Nile River Basin

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Abstract

The impacts of climate change on the hydrology and ecosystems are becoming more noticeable in many regions and water basins in different part of the world. Climate change affects the hydrological cycle, water quantity and quality, ecosystems and occurrence of flooding and droughts. In the Nile Basin regions climate change and variability are affecting many sectors, including agriculture, energy, fisheries, tourism, public health, and biodiversity. Previous studies in the Blue Nile Basin in general and Lake Tana Basin in particular show that climate change has the potential to reduce water resource in the coming decades. We investigated the sensitivity of water resources to climate change in the Blue Nile River Basin using outputs from global climate models (GCMs). First, we compiled projected changes in monthly precipitation and temperature in the basin from 15 GCMs. We investigated how changes in daily temperature and precipitation might translate into changes in streamflow and other hydrological components. For this, we generated daily climate projections by modifying the historical data sets to represent the changes in the GCM climatology and calculated hydrological changes using physically based ecohydrological model. We interpreted our results that anthropogenic climate changes may indeed alter the water balance in the Lake Tana Basin during the next century but that the direction of change cannot be determined with confidence using the current generation of GCMs. The impact of climate change on water resources is highly significant as all-natural ecosystems and humans are heavily dependent on water. The Blue Nile Basin is characterized by erosive rainfall, erosion susceptible soil, and land degradation. Therefore, mitigation and adaptation measures should be applied. An integrated water resources management need to be implemented to reduce the impact climate change on the Nile Basin. Water resources policy and management should include practices that ensure that water usage is ecologically sensitive, consistent with sustainable development goals.

Keywords: Climate Change, ecohydrology, Nile River Basin, Lake Tana, IWRM

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