

Uncertainty Analysis in Hydrologic and Climate Change Impact Assessment in Streamflow of Upper Awash River Basin

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Abstract

The study will quantify the total uncertainties in streamflow and precipitation projections for Upper Awash River Basin located in central Ethiopia. Three hydrological models (GR4J, CAT, and HBV) will be used to simulate the streamflow considering two emission scenarios, six high-resolution GCMs, and two downscaling methods. The readily available hydrometeorological data will be applied as an input to the three hydrological models and the potential evapotranspiration will be estimated using the Penman-Monteith Method. The SCE-UA algorithm implemented in PEST will be used to calibrate the three hydrological models. The total uncertainty including the incremental uncertainty at each stage (emission scenarios and model) will be presented after assessing a total of 24 ($=2 \times 6 \times 2$) high-resolution precipitation projections and 72 ($=2 \times 6 \times 2 \times 3$) streamflow projections for the study basin. Finally, the primary causes that generate uncertainties in future climate change impact assessments will be identified and a conclusion will be made based on the finding of the study.

Keywords: Climate Change, Downscaling, Hydrological Models, Uncertainty

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