INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

This research work focuses on the assessment of impact of climate change on hydro-climatology of the Subansiri river basin in northeast India. Study includes downscaling of the temperature and precipitation for the river basin, using coupled model inter-comparison project phase five datasets for three representative concentration pathways emission scenarios i.e. RCP2.6, RCP4.5 and RCP8.5. Downscaling of the precipitation and temperature was performed for five stations of the river basin. National center for environmental predictions (NCEP) predictor variables were selected for preparing the downscaling model. Calibrated and validated downscaling model were used for the projection of the precipitation and temperature for long term period of 2011-2100. Changing trends in the projected precipitation and temperature were calculated using the Mann-Kendall non parametric method and magnitude of changes were calculated using Sen's slope method. Apart from this, precipitation extreme indices were calculated from the projected precipitation data series and it was observed that the precipitation intensities are likely to change in the river basin for the different RCP scenarios. Although the annual precipitation tends to increase for all the emission scenarios, increase in intensity is the result of decrease in the number of rainy days per year. Hydrological modeling of the Subansiri river was done using soil and water assessment tool (SWAT) model. Observed streamflow data for the period of 2002-2013 was utilized for the calibration and validation of the hydrological model. Parameterization, sensitivity of the parameter and uncertainty analysis was carried out using sequential uncertainty fitting tool 9SUFI2) algorithm. Downscaled precipitation and temperature data was used as the primary inputs in the calibrated hydrological model for the projection of the streamflow for different emission scenarios up to 2100. Trend analysis of the streamflow shows an increasing trend for the emission scenarios. Further an integrated simulation-management approach was proposed for the river basin planning and it was applied for the Subansiri river basin for the water resources management following the top-down approach.