

Impact analysis of climate change on near future streamflow using CORDEX-SA datasets in a hilly watershed

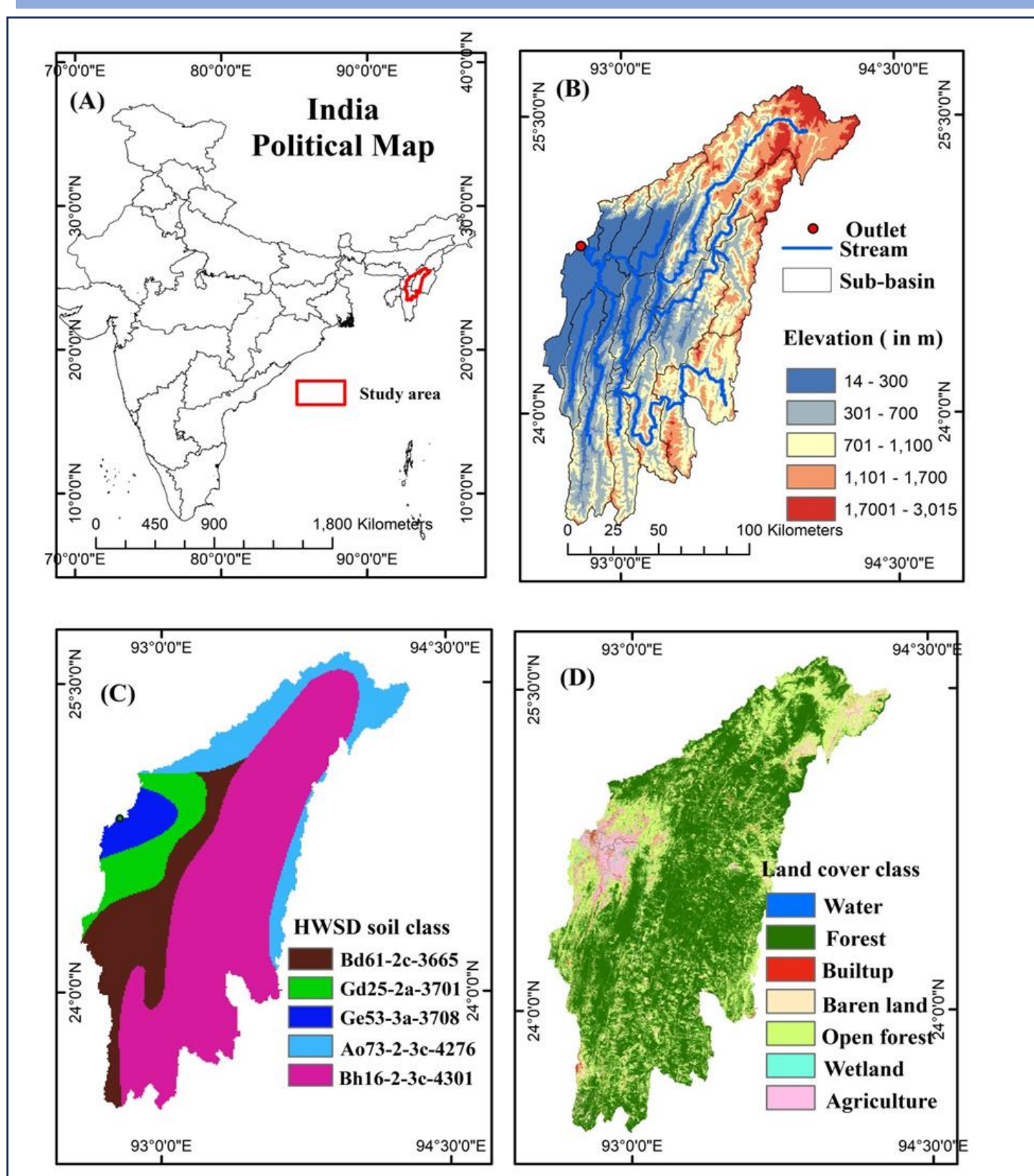
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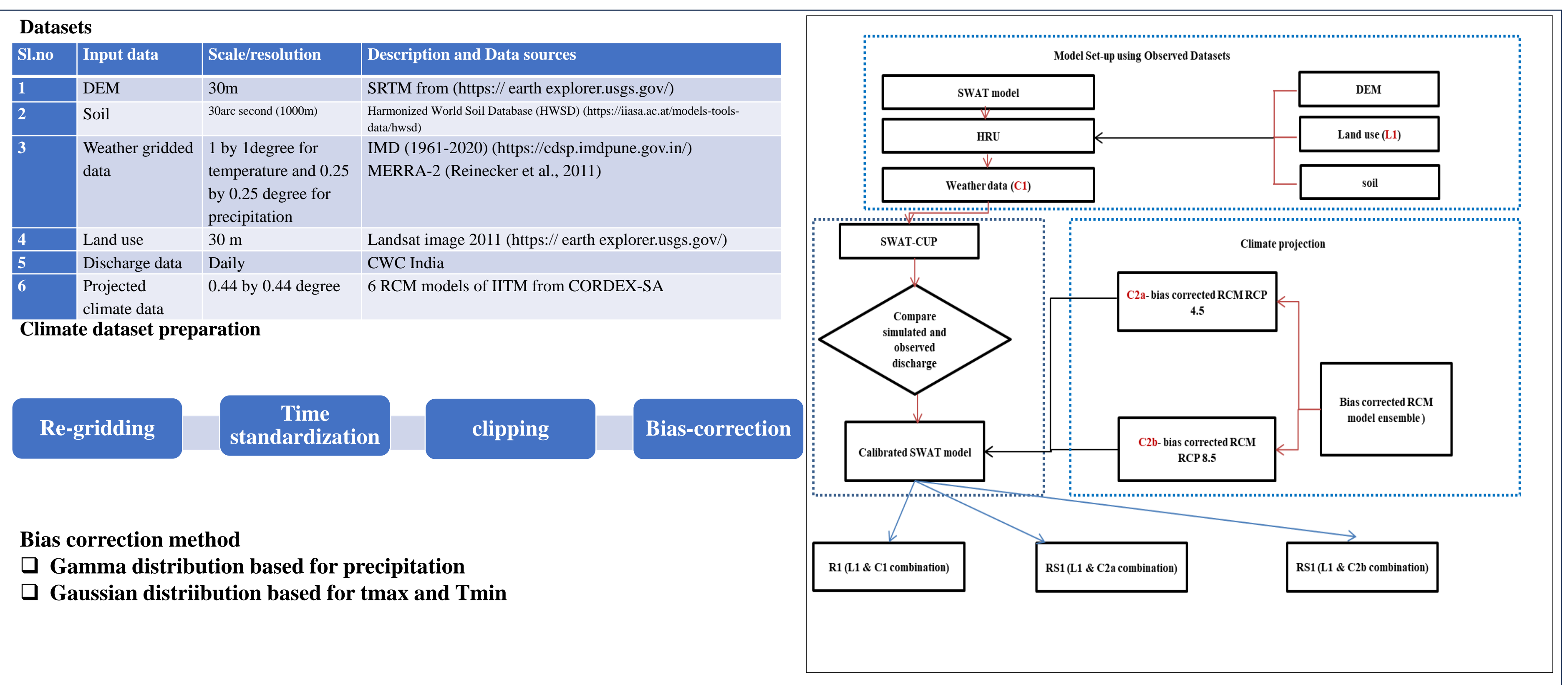
Abstract

The study was carried out in the rain-fed basin of the Barak River up to Silchar, which is a location near the border of India and Bangladesh, with the basin covering 19004 sq. km. In the background of recent decreasing forest cover and annual precipitation, there has been an increasing occurrence of flood events in the region. The study attempts to analyze the impact of climate change on the river streamflow for the near-future (NF) (2021-2050) based on the ensemble multi model ensemble median (MME) of 6 Regional Climate Models (RCMs) CORDEX-SA i.e. models CNRM-CERFACS, CCCma-CanESM2, IPSL-CM5A, MPI-ESM-MR, CSIRO-QCCE, and NOAA-GFDL-ESM2M using SWAT model. The study developed a base model of SWAT based on the LULC of 2011 and observed climate datasets for the period 1990-2020. The base model is calibrated and validated using observed discharge for the period (1995-2020). The model runs on MME. These model datasets are bias-corrected using the distribution function. The result shows that the basin is represented well after calibration in the SWAT model with R² and NSE scoring about 0.81 and 0.80 respectively in calibration; and 0.76 and 0.74 respectively in validation. Projected temperature (Tmax and Tmin) and while precipitation decrease in the period. The discharge output also shows a severe decrease in both the emission scenarios of RCP45 and RCP85. The monthly mean discharge distribution pattern closely follows the precipitation mainly because the river system of the basin is rain-fed. However, there is no distinct difference found in precipitation, temperature and discharge between RCP4.5 and RCP8.5 in the study during the period. The bias correction process needs to be refined for more accurate study.

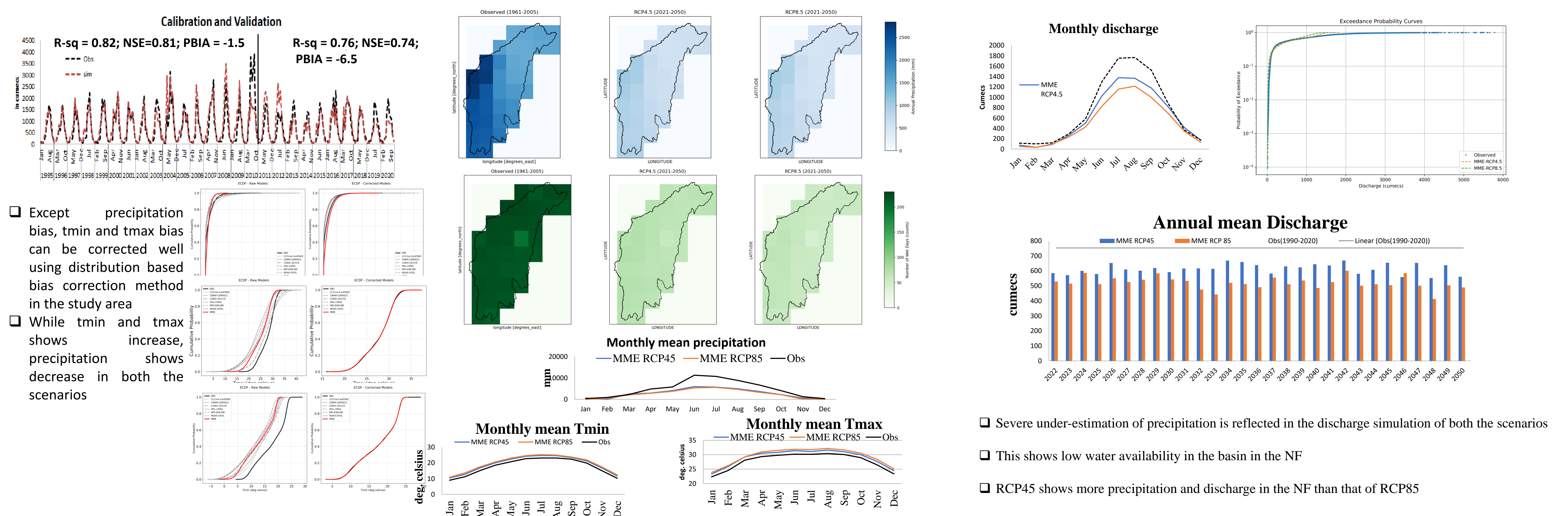
Study Area



Methodology



Results



Conclusion

- Since the watershed is water-fed the under-estimation in the precipitation is well reflected in the discharge of the river
- The findings are not consistent with the other nearby basin studies like Alam et al. (2021), Zheng et al 2018
- The bias correction method specially for precipitation should be refined for more appropriate depiction of the projected precipitation and discharge
- The study is intended for establishing a method of analyzing climate change impact to the discharge in the NF

Acknowledgement

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