



Projections of Rainfall and Surface Temperature from CMIP5 Models under RCP4.5 and 8.5 over BIMSTEC Countries

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Rainfall and surface temperature are the most important climatic variables in the context of climate change. Thus, these variables simulated from fifth phase of the Climate Model Inter-comparison Project (CMIP5) models have been compared against Climatic Research Unit (CRU) observed data and projected for the twenty first century under the Representative Concentration Pathways (RCPs) 4.5 and 8.5 emission scenarios. Results for the seven countries under Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) such as Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand have been examined. Six CMIP5 models namely GFDL-CM3, GFDL-ESM2M, GFDL-ESM2G, HadGEM2-AO, HadGEM2-CC and HadGEM2-ES have been chosen for this study. The study period has been considered is from 1861 to 2100. From this period, initial 145 years i.e. 1861 to 2005 is reference or historical period and the later 95 years i.e. 2005 to 2100 is projected period. The climate change in the projected period has been examined with respect to the reference period. In order to validate the models, the mean annual rainfall and temperature has been compared with CRU over the reference period 1901 to 2005. Comparison reveals that most of the models are able to capture the spatial distribution of rainfall and temperature over most of the regions of BIMSTEC countries. Therefore these model data can be used to study the future changes in the 21st Century. Four out six models shows that the rainfall over Central and North India, Thailand and eastern part of Myanmar shows decreasing trend and Bangladesh, Bhutan, Nepal and Sri Lanka shows an increasing trend in both RCP 4.5 and 8.5 scenarios. In case of temperature, all of the models show an increasing trend over all the BIMSTEC countries in both scenarios, however, the rate of increase is relatively less over Sri Lanka than the other countries. Annual cycles of rainfall and temperature over Bangladesh, Myanmar and Thailand reveals that the magnitudes are more in 2070 to 2100 of RCP8.5. Inter-model comparison show that there are large more uncertainties within the CMIP5 model projections.