

Projections of annual rainfall and surface temperature from CMIP5 models over the BIMSTEC countries

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ABSTRACTS: Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) comprising Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand brings together 21% of the world population. Thus the impact of climate change in this region is a major concern for all. To study the climate change, fifth phase of Climate Model Inter-comparison Project (CMIP5) models have been used to project the climate for the 21st century under the Representative Concentration Pathways (RCPs) 4.5 and 8.5 over the BIMSTEC countries for the period 1901 to 2100 (initial 105 years are historical period and the later 95 years are projected period). Climate change in the projected period has been examined with respect to the historical period. In order to validate the models, the mean annual rainfall has been compared with observations from multiple sources and temperature has been compared with the data from Climatic Research Unit (CRU) during the historical period. Comparison reveals that ensemble mean of the models is able to represent the observed spatial distribution of rainfall and temperature over the BIMSTEC countries. Therefore, data from these models may be used to study the future changes in the 21st century. Four out of six models show that the rainfall over India, Thailand and Myanmar has decreasing trend and Bangladesh, Bhutan, Nepal and Sri Lanka show an increasing trend in both the RCP scenarios. In case of temperature, all the models show an increasing trend over all the BIMSTEC countries in both the scenarios, however, the rate of increase is relatively less over Sri Lanka than the other countries. The rate of increase/decrease in rainfall and temperature are relatively more in RCP8.5 than RCP4.5 over all these countries. Inter-model comparison shows that there are uncertainties within the CMIP5 model projections. More similar studies are required to be done for better understanding the model uncertainties in climate projections over this region.