Title: Temperature extremes Projections over Bangladesh from CMIP6 Multi-model Ensemble.

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Abstract: Bangladesh, a sub-tropical monsoon climate with low-lying areas, is very susceptible to the impacts of climate change. However, there has been a shortage of studies about the periodicity and projected changes in extreme temperature in this area, which is a crucial part of adapting to climate change. A study employed a multimodal ensemble (MME) mean of 13 bias-corrected CMIP6 GCMs to fill this knowledge gap. The purpose of this study was to project changes in 8 extreme temperature indices (ETIs) across Bangladesh for the near future (2021–2060) and far future (2061–2100) under two different Shared Socioeconomic Pathways (SSPs): medium (SSP2-4.5) and high (SSP5-8.5) scenarios. The research analyzed the average spatiotemporal changes by considering the reference period from 1995 to 2014 for each indicator in future periods. The results indicate that Bangladesh is projected to see a rise in average annual temperature in the 21st century, aligning with the global average. Warm days (TX90p) and nights (TN90p) were projected to increase, while cold days (TX10p) and nights (TN10p) were expected to decrease across the country for both the near (2021–2060) and far future (2061–2100). The projected highest increase in TX90p and TN90p was 6.90 days/decade in the northeast, and the highest decrease in TX10p and TN10p was 6.22 days/decade in the southwest. The study revealed a higher rise in TN90p than TX90p, indicating a faster decline in cold extremes than a rise in hot extremes. The rising temperature would cause an increase in the spell duration index (WSDI) and growing degree day (GDD) by 5–6 and 6–7 days/decade, respectively. Therefore, immediate measures must be taken to mitigate the detrimental effects of extreme temperatures, leading to heat stress. To reduce the effects on agriculture, ecosystems, human health, and biodiversity, policymakers and stakeholders must understand these anticipated changes and adopt appropriate actions.

Keyword: Climate Sciences, Climate and Earth System Modelling, Climate Change, Climate-Change Adaptation, Drought, Heat Wave Variability in a Changing Climate..

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