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Title: On the bias correction of General Circulation Model output for Indian Summer Monsoon
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Abstract:
General circulation model (GCM) is an alternative avenue for predicting Indian summer monsoon rainfall (ISMR) over the existing empirical/statistical models in recent time. However, the intrinsic biases present in the GCM hamper its potentiality. Therefore, there is a high need for bias correction of GCM. Very less number of studies on bias correction of GCM is available in the context of ISMR. A comparative study is reported in this paper on the six different bias correction methods by applying on the hindcast (May start JJAS) of the climate forecast system (CFS) model (version 1) from the National Centers for Environmental Prediction (NCEP) for 27 years (1982-2008). Among the six methods discussed in this paper, three methods did not use any statistical transformation technique viz. Mean Bias-remove technique (U), Multiplicative shift technique (M) and Standerised-reconstruction technique (Z) and the remaining three methods used statistical transformation technique viz. Regression technique (R), Quantile Mapping Method (Q), Principal Component Regression (PCR). The statistical evaluation of the said six bias correction techniques clearly showed significant improvement of bias corrected products over raw rainfall products from GCM. Finally, it is found that the standardized-reconstruction technique (Z) and Quantile Mapping Method (Q) are more skillful than the others and both are equally skillful in simulating ISMR. Bias corrected rainfall is also tested in extreme years such as two deficit years (1987, 2002) and two excess years (1988, 1994). It was also found that the both of these methods (Z and Q) could expeditiously capture these extremes reasonably well as compared to the other approaches. Although the present study is carried out on a single GCM (CFS), the characteristics of bias for all other GCMs are almost the same in the context of ISMR.
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