The precipitation products evaluated in the study was chosen based on their underlying theory, performance in similar climatic conditions, available spatial and temporal resolution.

Validity of the Gauge-free evaluation like TC method depend on each dataset being an independent estimate of the truth (Stoffelen 1998). The precipitation products used in the present study have certain overlap in the observation techniques and equipment used to generate the retrieval. For instance, satellite-based products, use measurements from infrared and/or microwave sensors as the basis for their precipitation estimates. Reanalysis and gauge-based products also incorporate measurements from many of the same observation station. This violates the assumption of zero error cross correlation, which can lead to bias in TC estimates (Gruber et al. 2016). Further, considering this assumption would have greatly restricted the products to be considered in the study.

Previous studies evaluating TC method considered products which hasn't been previously evaluated for climatic conditions in India (Duan et al. 2021, Lu et al. 2021). For instance, soil moisture based precipitation product SM2RAIN-ASCAT hasn't been evaluated in similar Indian climatic zones. Further, the product isn't available prior to 2007 for conducting an initial assessment with the station data. Directly evaluating such products can violate the assumptions of TC and lead to higher uncertainty in the estimates.

Another major drawback of this methodology is that it requires log transformation data preprocessing. This requires either to remove the days with zero rainfall (Massari et al. 2017) or to replace with very small value such as 10^{-4} (Duan et al. 2021). So far, clear conclusion hasn't been reached for zero precipitation days and this will produce a noticeable impact on RMSE (Lu et al. 2021). As semi arid regions are considered in the present study where there are higher number of days with zero rainfall, this will influence the accuracy of evaluation results. Hence, despite the station data being almost decade old, it will provide the most direct and accurate representation of the study region for evaluation.

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