



Bias correction of satellite-based rainfall data

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Limitation in hydro-meteorological data availability in many catchments limits the possibility of reliable hydrological analyses especially for near-real-time predictions. However, the variety of satellite based and meteorological model products for rainfall provides new opportunities. Often times the accuracy of these rainfall products, when compared to rain gauge measurements, is not impressive. The systematic differences of these rainfall products from gauge observations can be partially compensated by adopting a bias (error) correction. Many of such methods correct the satellite based rainfall data by comparing their mean value to the mean value of rain gauge data. Refined approaches may also first find out a suitable time scale at which different data products are better comparable and then employ a bias correction at that time scale. More elegant methods use quantile-to-quantile bias correction, which however, assumes that the available (often limited) sample size can be useful in comparing probabilities of different rainfall products.

Analysis of rainfall data and understanding of the process of its generation reveals that the bias in different rainfall data varies in space and time. The time aspect is sometimes taken into account by considering the seasonality. In this research we have adopted a bias correction approach that takes into account the variation of rainfall in space and time. A clustering based approach is employed in which every new data point (e.g. of Tropical Rainfall Measuring Mission (TRMM)) is first assigned to a specific cluster of that data product and then, by identifying the corresponding cluster of gauge data, the bias correction specific to that cluster is adopted. The presented approach considers the space-time variation of rainfall and as a result the corrected data is more realistic.

Keywords: bias correction, rainfall, TRMM, satellite rainfall