



Spatial assessment of the performance of multiple gridded, reanalysis and remote sensing rainfall products over Saudi Arabia

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A comparative study of the statistical characteristics of rainfall derived from different gridded, reanalysis and space-based products has been undertaken over Saudi Arabia. The comparison was made for the period from January 1998 to December 2012 using daily rainfall data from a network of 83 rain gauges spanning the region. In this work, we assessed how rainfall anomalies and climatologies varied for the various data sources. In addition, we also investigated the differences in the rainfall characteristics using a set of accuracy estimators, including the bias, coefficient of determination (R^2) and a set of skill score measures (e.g., frequency bias index, probability of detection, and false alarm ratio). The statistical distribution parameters, as revealed by the L-moment coefficients that provide information on the scale (L-coefficient of variance, t_2), shape (L-coefficient of skewness, t_3) and peakedness of the series (L-coefficient of kurtosis, t_4), were also evaluated. Given the complexity of the terrain and associated high spatial variability of rainfall in the region, results reveal that both gridded (e.g., CRU, GPCC and APHRODITE) and remotely sensed data (e.g., TRMM) can make a significant contribution to improving the spatial and temporal coverage of rain gauges in the region, providing insights into rainfall patterns and characteristics across a range of temporal scales.