



On the relationship between time series of gauge precipitation and satellite-based cloud-top temperature

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In this study we explore the relationship between time series of gauge precipitation and satellite-based cloud-top temperature (CTT) at different time scales, based on similarity measures of correlation method and dynamic time warping method. The potential and the uncertainty to use CTT time series to generate daily rainfall estimates or rainfall time series are analyzed. Results show their negative correlation increases as with increasing temporal scale, from > -0.4 at daily scale to < -0.75 at monthly scale. In addition, strong similarity of CTT time series at two locations indicates strong similarity of precipitation time series at these two locations at any time scale, with the allowance of an optimal time shift. All the evidences imply high potential of using CTT data to extend rainfall estimation algorithm and parameterization (based on satellite observation, numerical weather model, or stochastic weather generator, etc.) derived at locations with ground-based rainfall observations to any arbitrary location.