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Combined satellite-surface precipitation products: assessment of regional and temporal characteristics and relationships.

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The accurate estimation of precipitation across the globe is critical to our understanding of the Earth system and to a great number of applications. While surface data records are deemed to provide the best available data, where available, satellite data sets arguably provide more consistent and spatially comprehensive data. In order to provide the best available information on precipitation the goal is to combine both satellite and surface data sets to provide globally contiguous data sets with the accuracy of the surface data records.

An initial key step in the combination process is the analysis of the precipitation characteristics of the component data sets. In this study gauge and radar data over England are compared over a range of spatial and temporal resolutions, typical of current and future satellite retrievals. Initial results show that gauge-radar relationships for individual locations are consistent at coarser time scales, but become increasingly disparate at finer time scales. This suggests that systematic biases exist within the radar and gauge data sets that are dominant at monthly scales; at finer scales the inherent variability of precipitation causes local and short-term variations in the relationships.

This study shows that a multi-scale approach is necessary to ensure that the combined data sets reduce individual biases while retaining the necessary short-term information.