



Satellite and Surface-based Quantitative Precipitation Estimation during the Colorado Flood

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During the period of 9-16 September 2013, a large area of greater than 150 mm of rain, with local amounts of up to 450 mm, fell over a large part of the Colorado Front Range foothills and adjacent plains. This extreme rainfall event caused severe flooding of main river channels and some localized flash flooding which resulted in millions of dollars of damage to private and public properties. The rainfall regime associated with this extreme precipitation event was atypical of storms usually observed in this region. As a result, the satellite and radar rainfall algorithms tuned for this region significantly underestimated the total amount of rainfall. In order to quantify the underestimation and provide insight for improving the radar rainfall estimates for this unique precipitation regime, a comparison study has been conducted using data from several disdrometers that were operating throughout the event. Disdrometers observed over 5000 minutes of rainfall during the event. Analysis of the raindrop spectra indicated that most of the rainfall was comprised of a large number of small drops (< 2 mm in diameter). The raindrop spectra have been stratified by the precipitation regime. For these different regimes, new radar rainfall estimators have been derived from the raindrop spectra. The new estimators have been applied to the radar data to provide new rainfall estimates. These estimates along with satellite-based precipitation estimates have been evaluated using independent rain gauge data. The presentation will provide an overview of the Colorado flood and a summary of results from the precipitation estimation development and analysis.