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Statistical Assessment of Rainfall Properties Over Varying Scales

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When discussing rainfall, it is often assumed that rain properties remain consistent over small temporal and spatial scales. With a very dense network of rain measurement equipment, a novel data set was used to investigate rainfall variability over scales of just 1-100 meters. Using temporally precise instrumentation, the temporal variability was explored on a range of timescales from seconds to days. These investigations utilized the drop diameters and arrival times to determine variability and how it affects derived quantities such as rain rate. Statistical methods were used to determine the effects of sampling in measuring these quantities, and what sampling is sufficient to reflect the “true” behavior of rainfall. The data and their derived quantities were examined to determine behavior below scales typically observed in, for example, RADAR and tipping bucket rain gauge studies. These investigations have shown how rain may fluctuate more than previously expected, and how assumptions about rainfall distributions in space in time may be more complex than previously treated.