



## Estimation of Rain Intensity Spectra over the Continental US Using Surface Radar-Gauge Data

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A high-resolution rainfall product merging surface radar and gauge data is used to estimate statistics of rain occurrence and rain volume over the continental United States as functions of rain intensity. It is found that statistics of rain characteristics have large seasonal and geographical variations across the continental US. On the average, heavy rain events ( $> 10$  mm/hr.), although occupying only 2.6% of total rain occurrence, may contribute to 27% of total rain volume. Light rain events ( $< 1.0$  mm/hr.), occurring much more frequently (65%) than heavy rain events, can also make important contributions (15%) to the total rain volume.

Quantitative estimations are also conducted to evaluate the impact of missing light rain events due to satellite sensors' detection capabilities. Results indicate that for minimum detectable rain rates setting at 0.5 and 0.2 mm/hr which are close to sensitivities of the current and near-future space-borne precipitation radars, there are about 43.1% and 11.3% of total rain occurrence below these thresholds, and they respectively represent 7% and 0.2% of total rain volume.

Fractions of rain occurrence and rain volume are also examined on different horizontal domains, providing a useful guide for evaluating many other satellite sensors' rain detection capabilities.