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Examining the Effect of Wind and Raindrop Size on Gauge Catch

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Gauge measurements are widely used as the true rainfall reaching the land surface for a variety of applications, ranging from calibration of remotely sensed rainfall estimates to water budget studies. The quality of rain gauge data may be affected by a variety of factors, including human or animal interference, mechanical or electrical failure, or debris that settled inside the collector funnel hindering rainwater from reaching the measuring device. Other sources of rainfall measurement errors relate to the wind effect on the rain gauge catch and whether the instrument's funnel rim is level. Detailed measurements of rainfall have been made in the Goodwin Creek research watershed in northern Mississippi to examine the effects of wind and raindrop size on the gauge catch. The instrumentation comprised a variety of rain gauges (installed both above ground and buried in a pit), a raindrop spectrometer, and wind profile observations. Analyses of this multi-year data set include simple comparisons of rainfall amounts collected by aboveground and buried gauges, and evaluation of a recent technique advocated to estimate the undercatch of wind-exposed gauges based on contemporaneous wind speed at gauge rim height and raindrop size distribution information.