

EVALUATING AND IMPROVING THE PERFORMANCE OF RADAR TO ESTIMATE RAINFALL

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ABSTRACT

A network of 10 rain gages reports data from the Goodwater Creek catchment in central Missouri. Because such a network is expensive to operate, it could be useful instead to use only a few gages and augment the observations with radar-estimated rainfall. The purpose of this work is to evaluate the differences between using many gages and using only radar with, at most, a single gage.

Additional work was done to develop an algorithm for the purpose of improving the techniques used to estimate rainfall from radar observations. Frequently a single Z-R relationship is applied to the entire scanning area over which a radar observes. The purpose of the algorithm was to evaluate the characteristics of storms observed by radar and to select different Z-R relationships for individual portions of the scanning area. In addition to developing the algorithm to demonstrate the concept, a comparison was done to evaluate the differences between using a single Z-R relationship and multiple Z-R relationships simultaneously in one domain.

It was found that applying a single Z-R relationship to the entire domain underestimated rainfall over the catchment. Applying multiple Z-R

relationships increased the estimated rainfall accumulation in most instances, often overestimating the rainfall accumulation. The results strongly suggest that the appropriate Z-R relationship to relate reflectivity to rain rate, varies highly spatially and temporally, even within a single storm.