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OPTIMAL STRATEGIES FOR VALIDATING TRMM RAINFALL ESTIMATES WITH RAIN-GAUGE DATA

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In spite of all their problems, rain gauges measure rainfall in such a direct way when compared with other methods of estimating rainfall that comparing their totals to satellite estimates remains an essential tool in the validation of satellite products. Some disagreement between averages of satellite data and rain-gauge data is expected because of the very different sampling patterns of the two systems--the satellite provides only occasional snapshots of large areas, whereas rain gauges provide continuous measurements over very small areas. A quantitative estimate of the expected level of disagreement due to the differences in sampling is needed in order for comparisons of the two kinds of averages to be informative.

As part of an earlier effort to determine the sampling error of satellite averages, a space-time model for rainfall statistics was developed. Sets of parameter values for the model have been obtained for which the model statistics are found to agree quite well with those of radar data taken over the Atlantic during GATE and the western Pacific during TOGA COARE. Although the model was intended to represent the statistics of relatively large scale fluctuations of rain, it is surprisingly consistent with the very different scales on which rain gauges observe. Implications for maximizing the benefit in comparisons of rain gauge averages and TRMM estimates are derived using the model predictions.