Spatial temporal sampling error diagrams have been created for 48 rainfall events from our high-resolution mobile radar (20m and 6 seconds) showing normalized mean absolute error due to sampling effects for 10 minute rainfall accumulations. These errors were of significant magnitudes, varying from 20% to 70% of the mean accumulated rainfall. A strong relationship was discovered between the magnitude of the sampling error and the mean decorrelation length of an event, with longer decorrelation lengths resulting in lower error. This relationship is weaker when considering only more intense rainfall, such as for mean 10-minute rainfall rates of 10 mm/hr and above. An estimate of this sampling error could be included in a more comprehensive radar error model to improve the estimation of the total measurement error so that more representative ensembles could be generated for use with probabilistic quantitative precipitation forecasting and hydrology.