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An Alternative Means for Observation-Based Cloud Size Distributions

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An Alternative Means for Observation-Based Cloud Size Distributions

College of Sciences and Health Professions

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Abstract

Clouds are a poorly understood phenomenon that have a significant impact on climate and day-to-day weather. This research aims to measure cloud size distributions for shallow cumulus clouds from observational data. Clouds are sampled via a ceilometer, which indicates both the presence of cloudy air and the base height of the respective cloud. When combining this data with the recorded horizontal wind velocity, we can infer a cloud transect size distribution. After sufficient sampling, we can use an algorithm to deduce an approximate cloud area distribution for the specified time range and cloud field. Once the cloud size distributions are obtained, they are compared to cloud size distributions acquired through Large-Eddy simulations. The data used is sourced from Atmospheric Radiation Measurement (ARM) facilities in the Southern Great Plains (SGP) region, which are established by the Department of Energy (DOE).