

***STUDY OF CLOUD LIFETIME EFFECTS USING THE SGP HETEROGENEOUS  
DISTRIBUTED RADAR NETWORK: PRELIMINARY CONSIDERATIONS***

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**ABSTRACT**

Despite decades of active research, there exist limited observational resources for the multi-dimensional morphology and life cycle of clouds. Detailing key cloud processes as they transit from the formation stage to precipitation onset and cloud dissipation is critical towards establishing uncertainties in climate models linked to cloud-climate radiative feedbacks. This challenge is exacerbated by the need for detailed measurements at scales often not suitable for single platform. One path forward is to capitalize on ARM's multi-frequency, multi-radar scanning radar facility to document temporal and spatial cloud evolution. In this work, we examine the potential of the SGP heterogeneous distributed radar network to detect and monitor different stages of cloud development. Here, we express cloud life cycle in terms of the temporal evolution of maximum cloud radar reflectivity ( $Z_{max}(t)$ ). Using the locations and expected performance of the weather and cloud radars deployed for the Midlatitude Continental Convective Clouds Experiment (MC3E) in central Oklahoma, maps of minimum detectable reflectivity have been developed. Also, different hypothetical scenarios of cloud lifetime, in terms of the temporal evolution of maximum cloud radar reflectivity, are tested to evaluate the spatial and temporal capabilities of the radar facility to provide qualitative measurements of the different stages of the cloud lifetime.