# 1.22 A FOUR YEAR LAGRANGIAN STUDY OF ISOLATED CONVECTION IN HOUSTON, TEXAS: USING PUBLIC DATA AND OPEN SOURCE CODE TO DESIGN A FIELD CAMPAIGN

S. COLLIS[1], R. JACKSON[1], M. PICEL[1], M VAN LIERWALQUI[2], A. FRIDLIND[2]
[1]Argonne National Laboratory, USA
[2]NASA Goddard Institute of Space Studies, USA
scollis@anl.gov

Due to the role aerosols play in droplet and ice nucleation, to understand and accurately simulate wet convective processes in weather and climate models, aerosol cloud processes need to be understood. Similar to cloud seeding research, the greatest challenge in obtaining statistically meaningful data sets is the natural variability in non-aerosol related forcings. To overcome this, members of the Aerosol, Cloud, Precipitation, and Climate Working Group are proposing a deployment of radar and aerosol instrumentation to Houston, Texas. The Houston region is attractive for aerosol cloud studies as there is a natural variation of aerosol content due to the Houston metroplex and a constant flow of isolated towering cumulus systems that are weakly externally forced and therefore relatively more susceptible to aerosol variation. Radars are attractive owing to their ability to rapidly scan a large number of storm cells. In designing an experiment there are several questions that need to be answered: What is the best time of year to deploy to maximize observed cells? What are the prevailing propagation paths of isolated cells? How many cells can we observe over their full lifecycle (initiation to dissipation) as a function of maximum unambiguous range of a radar?

To answer this a four year study of data from the Houston NEXRAD radar (KHGX) was performed. The open source TINT (TINT Is NOT TITAN) package was used to calculate cell tracks and the Python ARM Radar Toolkit was used to retrieve cell statistics including the spatial properties of specific differential phase ($K_{dp}$) structures above the freezing level. This reduces a data set of several terabytes to several hundred megabytes allowing for quick statistical analysis. This presentation will showcase the processing and cell tracking techniques and present a full statistical picture of the nature of convection propagating off the Gulf of Mexico into the Houston region. Issues of NEXRAD samping and the impact on the spatial structure of $K_{dp}$ will also be addressed.