**Introduction**

Cloud condensation nuclei (CCNs) encourage the formation of cloud droplets that form rain through collision and coalescence. CCN concentrations vary throughout the atmosphere. Their effects on warm and cold rain processes are a matter of ongoing study. Research shows that large concentrations of CCNs in convective storms reduce precipitation. Examine now, a year of reanalysis data of CAPE, vertical velocity, aerosols, and remote precipitation measurements.

**Aerosols**

- Chemical transport model (CTM)
- TOMAS: An aerosol module extension.
- CCNs of diameter greater than 40 nm (N40).
- 2.0° grid spacing.

**Radar reflectivity and precipitation**

- Global Precipitation Measurement (GPM) satellite.
- Horizontal GPM data is a resolution of 125 m² pixels.
- Vertical layers averaged to a 500 m resolution.

Nearest ECMWF and GEOS-Chem TOMAS forecast grid points are paired with every GPM pixel that has recorded precipitation in the area of 20° to 56° latitude, -132.5° to -62.5° longitude and a time period from 02 01-09-2014 to 02 29-08-2015.

**Data & Methods**

- Convective available potential energy (CAPE) and vertical velocity.
- European Centre for Medium Range Weather Forecast (ECMWF) reanalysis.
- Grid spacing (CONUS) is 0.75° latitude and longitude.

**Aerosol data**

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- Goddard Earth Observing system (GEOS).
- TOMAS: An aerosol module extension.
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**Radar reflectivity and precipitation**

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**Goals**

- Determine what effect different aerosol concentrations have on deep convection using observations.
- What ways do aerosols affect cold and warm rain processes?
- Are there any anthropogenic aerosol influences that can affect the weather on the weekends Vs. the weekdays?

**Impact of CAPE**

- CAPE also has a large influence on storm size and precipitation.

**Conclusions**

- High aerosol concentrations increase storm heights.
- Warm rain is suppressed while cold rain is enhanced by aerosols.
- In larger convective storms high aerosol concentrations can reduce surface precipitation rates.
- There is a small difference between weekend and weekdays in deep convection. Anthropogenic causes cannot be identified in this data set.

It is important to note that surface clutter is present in radar reflectivity for many of the lowest level layers. Desired future work on this would include investigating the role of vertical wind shear and available moisture. Isolate smaller regions to better capture human aerosol activity.

**References**


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