Review of "Potential Indirect Effects of Aerosol on Tropical Cyclone Intensity: Convective Fluxes and Cold-Pool Activity", by Krall and Cotton (not Cottom), submitted to ACPD.

This is an interesting paper that uses the CSU RAMS model to investigate the effects of ingestion of aerosols from pollution emanating from the east Asian coast on the lifecycle of tropical storm NURI. I have been directly involved in no fewer than four studies that have attempted to examine the effects of the Saharan Air Layer (SAL) on Atlantic Tropical Storms and Hurricane life cycles. It has been virtually impossible to definitively separate the negative effects of dry warm air in the SAL from the positive effects of aerosol enhancements from the SAL. As pointed out by the authors, the NURI case is unique in that the negative effect cited above are not a factor and so sensitivity studies involving enhanced CCN concentrations produce more robust results. For this reason and also because the article is well written and the RAMS model has had decades of development so that the results are defensible, the article should be published with minor revision.

General Comments:

1. (pg. 352, lines 20-21 and elsewhere. I have difficulty in understanding the basis for suggesting that the latent heating is different when greater amounts of supercooled liquid water are thrust high up in a storm. If you start with cloud base air, latent heat is released via condensation of vapor at temperatures above 0C and from vapor onto droplets or vapor onto ice when ice is present at temperatures below 0C. Ultimately, at -40C for example, it is condensation directly onto ice, I don't see where there is a net increase in the column latent heating when high concentrations of drops are lofted higher up in the storm. The main differences are the extent of entrainment, condensate loading and the vertical distribution of the latent heating.

2. Points related to RAMS and its application.

a. (358, 3-5). Paul Demott, also of CSU, has developed a relationship between CN/CCN concentration and primary ice nuclei concentrations thatI think should have been applied, at least for one of the sensitivity studies conducted. I recommend that this is done.

b. What droplet by ice particle collection efficiencies are used and are these known well enough to state that "being smaller, droplet collection is suppressed" (358, 12-14)?

c. If there are more ice particles (a. above), won't there be more aggregation which would impact the results because the fall velocities of aggregates are much larger than for small droplets and with enhanced riming rates? How is the aggregation process considered?

d. Dust from the SAL is usually located at heights from 1-3 or 4 km MSL and so in most instances it is entrained into updrafts rather than into cloud base. How do you know that pollution went through cloud base rather than entrained above the cloud base level? You cannot rely on passive satellite measurements to know.

e. With the SAL and dust, aging of the dust aerosols during transport over the ocean leaves them with a sulfate coating that allows them to act as good CCN. Do you have any evidence that this is the case with the pollution aerosols that were associated with NURI?

Minor Comments

1. (354, 2-9). Agree entirely with this point.
2. (354, 18). …and perturbations
3. (355, 14). Change “particle” to “aerosol”.
4. 356, 24. Fix “The”.
5. 357, 23. What is the SPRINTARS model?
6. 359, 22. Unconventional use of entrainment. Suggest “ingestion”.
7. 361, 18. “rain droplets” to “rain drops

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