Review 2 of ‘Assessing Cloud Representation in Two Microphysics 2 Schemes of MPAS-Atmosphere Model (version 8.2.2) over the Maritime Continent with Himawari-9 AHI Observations’

Summary

Many thanks to the authors for addressing my comments and questions. I do have a few follow-up questions to consider.

Best Regards, Ted Mansell

Minor Points:

1. Looking back through the manuscript, Fig. 5 raised a question regarding thick ice clouds. Perhaps this is a naive question, but I wonder how model ‘thick’ ice clouds could have 11.2 brightness temperatures that are above freezing? Panel (c) (Obs) has basically no points for BT (11.2) greater than about 277K, but the models have a lot of points (differences) for BT (11.2) greater than 280K. I realize that frequencies are for the BT differences, but there has to be a BT (11.2) of the given temperature to start with. Are the ‘thick’ clouds simply vertically thick but not very dense, such that the surface temperature is peeking through? The more basic question is why the model thin and thick cloud patterns look very similar, but the observed ones are very distinct? Is this a generally common issue with models?

2. The zenodo link for the MPAS model is an NCAR release version that does not include the NSSL microphysics scheme. This would instead have been an in-progress version that added it.

3. The namelist.atmophere on zenodo for the NSSL forecast does not set a value for `config_nssl_hail_on`. The default value is true, so if it was not set to false, then the hail category would have been turned on. If this is indeed the case, I suggest simply combining qh with qg in Fig. 8. Depending on the version, the log.atmosphere.0000.out should have a printout of the value of `config_nssl_hail_on`.

4. WSM6 probably has a lower graupel fall speed than in NSSL, which would keep mass aloft longer (Fig. 8) and contribute to loading. WSM6 uses the same weighted fall speed for both snow and graupel: vt = (vts*qs + vtg*qg)/(qs + qg).

5. If I am looking at the correct version (or close enough), the default `config_nssl_cccn` value was 0.8e9, which is moderate-high continental. (Check the `core_atmosphere/Registry.xml` to see the actual value for the simulations.) If the authors wish, they could change that to something like 0.25e9 for a maritime-dominant environment and see if there is a substantial difference. If there are large differences, that would be informative.