

Review of "Impacts of long-range transported mineral dust on summertime convective cloud and precipitation: a case study over the Taiwan region" by Yanda Zhang et al.

Recommendation: Minor Revisions

The manuscript "Impacts of long-range transported mineral dust on summertime convective cloud and precipitation: a case study over the Taiwan region" mainly studies a severe precipitation event impacted by dust over Taiwan region in 2006 by using the WRF with properly cloud microphysics parameterizations and immersion freezing parameterization. In general, the paper is well written and presented in a logical way. It is a timely and important piece of work, and of general interest for cloud-aerosol interaction, extreme precipitation and so on. I therefore recommend publication of this paper in Atmospheric Chemistry and Physics after minor revisions. My comments are listed as follows:

Comments:

1. In Figure1a: Dust are usually in coarse mode, and MERRA-2 can provide dust aerosol loadings. Why did authors just use PM_{2.5}? I think it cannot demonstrate the aerosol type.
2. It should be better to add Morr2 and Morr2-ec runs in Table1.
3. There are two peaks of rain rate in this precipitation event. Large part of dust might be rainout during P1, so dust may not invigorate the convection during P2. Authors should consider about that how long the initial dust could affect development of subsequent clouds and precipitation.
4. In Line219: "about 24% stronger than Morr2-Orig and Clean runs", is that "24%" for both runs?
5. The aerosol invigoration effect is argued to come from the enhanced latent heating when large amounts of liquid water freeze after being transported above the 0C

level by convective updrafts. It would be much clearer if author mark freezing levels on the latent heating rate profiles in Figure 9 and 11.

6. In Figure 9(b): Why latent heating rate in clean condensation are larger than that in dusty condensation? And is there any mistake in this caption?
7. When talking about long range dust transportation and dust-cloud interactions over East Asia, the authors could cite following references, e.g.
 1. Li Z., Y. Wang, J. Guo, et al. 2019: East Asian study of tropospheric aerosols and their impact on regional clouds, precipitation, and climate (EAST-AIR(CPC)). *Journal of Geophysical Research: Atmospheres*. 124 (23), 13026-13054. DOI: 10.1029/2019JD030758.
 2. Wang W., J. Huang, P. Minnis, et al. 2010: Dusty cloud properties and radiative forcing over dust source and downwind regions derived from A-Train data during the Pacific Dust Experiment. *Journal of Geophysical Research: Atmospheres*. 115 . DOI:10.1029/2010JD014109.
 3. Fu Q., T. Thorsen, J. Su, et al. 2009: Test of Mie-based single-scattering properties of non-spherical dust aerosols in radiative flux calculations. *Journal of Quantitative Spectroscopy & Radiative Transfer*. 110 (14-16), 1640-1653. DOI:10.1016/j.jqsrt.2009.03.010.