

Interactive comment on “Aerosol-induced changes in the vertical structure of precipitation: a perspective of TRMM precipitation radar” by Jianping Guo et al.

Anonymous Referee #1

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General comments: The study utilized the TRMM radar reflectivity and PM10 data over the PRD region to investigate the potential impacts of aerosol on precipitation. How to quantify aerosol impacts on precipitation based solely on observations is a tough task since meteorological factors need to be isolated effectively. The study is unique in that it separated precipitation associated with synoptic or mesoscale forcing from those localized precipitation events. Furthermore, other meteorological factors, including vertical wind shear, which is important for convective system development, are also analyzed and described. The finding that aerosol is able to invigorate deep convections is generally consistent with previous modeling studies. The study is thus a good contribution to this community. Nevertheless, I have some suggestions for the

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authors to consider.

Specific comments 1. Although manual identification of synoptic or localized precipitation event is described on 26-28 p11, a few more description might help since it is very subjective. I am also wondering whether localized precipitation is more appropriate than local-scale precipitation. 2. Smaller reflectivity below the freezing level for polluted cases than clean cases (Fig. 5c, P14 Line 10) might be due to the large numbers, but smaller sizes of rain drops within polluted environment. 3. Looks like PM10 (P8, Line 5) is much higher during the periods with occurrence of shallow convection than other two types of precipitation. Any reasons for this? Does this imply heavy pollution tends to inhibit deep convection development sometimes, although it will invigorate deep convection once the negative impacts of aerosols are overcome. 4. Regarding that deep convections sometimes developed from shallow convections, is it possible that the composite will divide one precipitation event into different types. This need to be mentioned somehow.

Technical corrections:

1. Why use the vertical wind shear between 1000 and 700 hPa instead over a higher level? 2. P6, L20, delete “use to” and some other typos. Please double check.

Please also note the supplement to this comment:

<https://www.atmos-chem-phys-discuss.net/acp-2018-366/acp-2018-366-RC1-supplement.pdf>

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-366>, 2018.

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