Geosci. Model Dev. Discuss.,
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Geoscientific Model Development Discussions

Interactive comment on "The impact of precipitation evaporation on the atmospheric aerosol distribution in EC-Earth v3.2.0" *by* Marco de Bruine et al.

Anonymous Referee #1

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There are still large uncertainties to simulate the aerosol distribution, especially for the aerosol-cloud interaction. Aerosol-cloud interaction significantly affects the aerosol vertical distribution. The impact of precipitation evaporation on the atmospheric aerosol distribution in EC-Earth model is investigated by implementing several more physical and realistic parameterizations in this manuscript. The results are interesting. I recommend to accepting it after minor revision as indicated below.

1. Page 4 Line 27, Aerosol species are assumed as a complete internal mixture in each mode, what do you mean the mass of the included species are tracked by separate prognostic variables? Please clarify it. 2. Page 4 Line 29, How the prognostic total

number of aerosols of each mode is calculated in the TM5? 3. Page 5 Line 1, how do you calculate the optical properties due to the condensed ammonium nitrate? 4. Page 5, Line 21, How do you set the time step for the TM5, 6 hours or not? What do you mean of the next time step and the artificially introducing mixing? 5. Page 6, Line 11, Does the coupler only exchange the meteorological fields at the time snapshot of only every 6 hours? How about the intermediate fields at every 45 minutes? 6. Page 8, Line 17, How does the IFS calculate the evaporated precipitation fraction? 7. How do you compare the simulated AODs with MODIS? Do you consider the time inconsistent? MODIS combined Terra and Aqua generally only have twice observations per days.

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