Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC3
https://doi.org/10.5194/acp-2020-1306-RC3, 2021

Comment on acp-2020-1306

Anonymous Referee #4

Referee comment on "Sensitivity of low-level clouds and precipitation to anthropogenic aerosol emission in southern West Africa: a DACCIWA case study" by Adrien Deroubaix et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-1306-RC3, 2021

Review of "Sensitivity of low-level clouds and precipitation to anthropogenic

aerosol emission in southern West Africa: a DACCIWA case study, bu Deroubaix et al.

This manuscript presents a nice study on aerosol impact on cloud cover and precipitation in the southern West Africa. To evaluate the effects, the authors use the combined Chimere-WRF model, and first compare the model results against observations. They find that increased aerosol loading has moderate effect on precipitation and cloud cover. The main findings are changes in cloud breakup time and precipitation timing, and with increased aerosol loading leading to slightly reduced precipitation. The paper is well written, clear to understand and I recommend publishing after addressing some minor issues.

Minor comments:

1) Page 4, line 8: By adding spectral nudging, is it possible that some of the aerosol effect on dynamics is lost? This comes up again on page 13, lines 3-5. I would not expect the aerosols to have a large effect on the rh and wind, but could spectral nudging also

reduce any impact (specifically on the wind)? Perhaps you could add a small discussion regarding how spectral nudging impact aerosol indirect effect evaluation.

2) Page 20, line 9: Could the relative difference between AE1 and AE10 be larger over the ocean because the aerosol loading there is lower (cleaner)? Large changes in aerosols over a clean area is likely to impose a larger effect compared to increase aerosol loading in an already polluted area.

Technical comments:

Page 2, line 14. I would add Thompson and Eidhammer (2014) here as well.

Page 2, line 32-33. This sentence is hard to read. Please rephrase.

Page 3, line 9. Change Inflow to inflow.

Page 4, line 15: Perhaps add Iacono 2008

Page 6, line 8. Why is sulfate not being evaluated?

Page 10, line 7. I would suggest to shortly describe how RH affect aerosol optical properties.

Page 19, line 23. Please refer to Figure 1 here.

Page 22, line1. After 12:00 UTC , you could add "the next day"