Atmos. Chem. Phys. Discuss.,
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud-venting induced downward mixing of the Central African biomass burning plume during the West Africa summer monsoon" *by* Alima Dajuma et al.

Anonymous Referee #2

Received and published: 19 September 2019

This manuscript describes the simulation of meteorology and transport of CO from biomass burning in Central Africa and its arrival in the boundary layer over the Gulf of Guinea. The model did a reasonably good job with this simulation, and showed that convection over the Gulf was capable of downward transport of CO from the elevated plume into the boundary layer. The manuscript is quite well written. I have several minor comments as listed below, and once they are addressed I think the manuscript can be accepted for publication.

line 63: emission of what?

line 66: up to 30%

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line 76: add reference to Dickerson et al. (1987). This was the first observational evidence of the upward transport of pollutants by deep convection.

line 84: TRACE-A

line 87: Please add another TRACE-A reference: Pickering et al. (1996) simulated observed convective transport of biomass burning emissions over Brazil in TRACE-A and their downwind transport over the Atlantic.

Figure 3: need to mention again that the model gets too much cloud over ocean. Also note not enough cloud north of 8 degrees N.

line 220: Is this the monthly mean of CO from the model over each day of the month at the MOPITT overpass time? If so, then you need to say that. If it is not that, then it needs to be corrected.

line 226: How does MOPITT perform for surface CO? You need to cite some literature concerning the validation of the MOPITT product at this level version some in-situ observations. Does MOPITT CO at the surface have a low or high bias?

line 248: Are the more pronounced cooler areas over land also related to convective cells?

Figure 6: Point out again that the model produced too many convective cells over the ocean.

line 316: What about convection over land. Did it also show downward mixing?

line 339: Figure 8a and 8b are zonal cross sections

line 346: I can't see that CO in the PBL is less than at 6.1 degrees W. It is the same color.

line 347: Figure 8f says 1 degree W. The text and caption say 1 degree E. Please correct one or the other.

line 378: add reference to Figure 9c here

lines 395-396: west to east, i.e., from A to D

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