

## Response to 'Comment on the revised version acp-2022-233' by Referee #2

We thank the Referee for his/her time and his/her constructive comments. We have complied with most of the proposed changes. In the following, the comments made by the Referee appear in black, while our replies are in blue.

Review of the revised manuscript of “Acceleration of the southern African easterly jet driven by radiative effect of biomass burning aerosols and its impact on transport during AEROCLO-SA” by Chaboureau et al.

The authors have made major changes in their revised manuscript, especially by adding ensemble members and thereby providing the needed confidence in the presented results and analysis. They also addressed most of my previous comments satisfactorily in their revisions and review responses. The literature review part is also improved, and the writing is overall clearer and more coherent than it was before. I recommend the publication of the revised manuscript in ACP.

I only have minor/editorial comments below that should be considered before publication:

Figure 6: The changes in extinction between the BBRAD and NORAD are explained using the back-trajectory analysis of the air masses observed along LNG track. I wonder if there is also a role of associated water vapor transport that is causing the differences in extinction? For example, are the AOD and extinction differences between BBRAD and NORAD due to more smoke mass being transported in BBRAD at these levels or the humidity is also higher in BBRAD plume than NORAD? It would be interesting to add a panel here or elsewhere, depicting the changes in specific humidity/ RH between BBRAD and NORAD along AEJ-S. **Changes of water vapor mixing ratio and cloud fraction along longitude are now shown in Fig. 10. In the text, we added "In the first km, both over land and sea, water vapor and cloud fraction increase, except along the coast where they decrease significantly. Over the sea, water vapor also increases between 2 and 4 km altitude. This shows the co-occurrence of smoke, temperature, wind and moisture anomalies." (In the simulations, BB extinction does not vary with relative humidity.)**

Line 247: “Note that no dust is simulated along the leg for both simulations.” This sentence is confusing. Did you mean that “no dust” is observed in the simulations even though the track is off of Namibe or did you not include the dust component for these simulations? In that case, is it a different set of simulations than presented elsewhere? **Changed to "no dust is found along the leg for both simulations"**

Line 352: “Another semi-direct effect of BBA on deep convection”. Replace/omit “semi-direct”. **Deleted**

Figure 12: The figure caption does not refer to the correct figure panels. It would also be useful to add the name of the location (Ascension Island, São Tomé, St. Helena, and Walvis Bay) on each profile panel. **Changed**

Line 422: “globally” → overall. It is not a global simulation. **Changed**