

## ***Interactive comment on “Biomass Burning Aerosol as a Modulator of Droplet Number in the Southeast Atlantic Region” by Mary Kacarab et al.***

### **Anonymous Referee #2**

Received and published: 6 November 2019

This manuscript focuses observations of aerosol over the southeast Atlantic and how it impacts the cloud droplet number concentration in the stratocumulus clouds during the ORACLES 2017 deployment. The work includes data that covers low, intermediate, and high aerosol conditions and allows for analysis of the impact aerosol has over a range of vertical velocities and  $k$  parameters. This is a well written work that contributes to our understanding on aerosol limited and vertical velocity limited regions when considering cloud droplet formation. There are minor edits required and come confusion with alone of the figures, other than that it is a fell written manuscript that is important for publication.

My recommendation to accept his work with minor revisions

Main comments: 1) Check your figure numbers. You mention a “Figure 9” that doesn’t

match Figure 7 (the last figure) and it's not one of the supplemental figures. 2) There are instances where you make assumptions but do not justify them. Be specific in your reasoning behind using certain thresholds or cite a reference that has used them previously.

Line by line comments: Line 184: Add a space between “-“ and “assuming” Line 184-185: What are these assumptions from? Are there references for these numbers? Line 195: You need to break out “BBOA” to at least “BB Organic Aerosol” Line 238: What altitude range are you using for the MBL? Mark this on your Figure 2. Line 240: Add a space between “-“ and “derived” Line 243-244: Is there a reference for your thresholds for “clean,” “intermediate,” and “polluted” or did you arbitrarily decided on them, or are they based on something in the data? Line 276: In line 243 you used “exceeding 800” why are you switching to ~900 here? Why not use either 800 or 900 for both? Line 325: add a space between “E.” and “Mediterranean” Line 352: Did you mean Figure 6 here instead of Figure 5? Line 365: The next figure should be 7, but the description doesn't seem to match what you have in Figure 7. Is this sentence left over from a previous version, did you include an old figure or one you didn't mean to use? Line 432: add a space between “-“ and “the”

Figure comments: Figure 1) The fire map is great, tough by including the entire South African continent it makes it difficult to see the actual flight paths. Perhaps have the flight paths zoomed in and include the fire map as an inset? Figure 2) It's hard to see the markers in the back. Usually I encourage folks to make larger markers, but in this case perhaps a bit smaller would be helpful. Also, it would be helpful to include a line to show what you consider the MBL. Figure 3) You need to add a) and b) to the figures. It would be helpful to mark off the low, intermediate and high ranges on these figures. Figure 7) Doesn't seem to fit in the paper. There is no reference to this at all.

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