Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC2
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## see below

Anonymous Referee #2

Referee comment on "A meteorological overview of the ORACLES (ObseRvations of Aerosols above CLouds and their intEractionS) campaign over the southeast Atlantic during 2016-2018: Part 1 - Climatology" by Ju-Mee Ryoo et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-274-RC2, 2021

This paper is important and presents original work on a feature that has not received much attention. I was originally going to rate this as "minor revision". However, I realized that the length and complexity is such that very few would read it. I am extremely interested in this topic, but would dread, as a researcher, having to go through this article. The word count must be close to 15,000, roughly twice that accepted by most journals. It indicates 26 figures, yet most have numerous panels. In most cases those panels are quite independent of each other, so that 40 figures is a more realistic number. I am indicating major revision because I feel it is imperative that the authors break this into two articles. That is actually not that difficult or time-consuming to do. It will guarantee that the work receives more attention.

Based on this comment, I have stopped the review around Figure 5.

I do hope the authors will consider what is suggested above, as it is important work and should eventually be published. Also, the authors might want to look at the extensive work on the fogs and stratus done by Cermac and colleagues and cite some of that literature.

**INDIVIDUIAL COMMENTS**

The abstract is too long and includes too many details that really belong in the text. This is particularly the case in describing the anomalous characteristics for the three months considered.

Good overview of the background literature. Variables considered and data sets to derive them are clearly described.

A major concern is their use of ERA-5 because its representation of the AEJ-S is questionable. The core tends to be over the ocean in the various diagrams, with little extension over the land in most cases. The only paper that focuses directly on the AEJ-S is Kuete et al. (2020) in Climate Dynamics (see also Jackson et al. 2009). Of the three reanalyses Kuete et al. examined, only ERA-Interim shows a pattern similar to that in this paper. The others show a core further land-ward and extensive development over the land. The greater development over land is consistent with the idea that the temperature gradient between the rain forest to the north and the dry season in the savanna to the south is the cause of the jet. I would suggest that the authors start by showing the jet in at least two additional reanalyses, in order to recognize that there are differences. MERRA and JRA 55 would be good choices. They should also speculate on how the use of ERA-5, with the core over the ocean, would affect their results.

A general issue: the authors discuss altitude both in terms of pressure level and height. However, their figures only give height, but call it pressure altitude (not a commonly used term). Putting the associated pressure level somewhere (e.g., once at the far right of the figure) would really help the reader.

More specific points:

Line72 and 73 I looked at both papers cited and do not see the links suggested here. This statement should be removed. Lamb and Peppler do not even consider the same season evaluated in this article.

Figs. 1 b and c are too busy, so hard to interpret.

Lines 220-225 That feature cannot possibly be part of the Tropical Easterly Jet because it is clearly a relatively local feature. The TEJ commences over the central Indian Ocean and then extends over Africa. Also, the Wu et al. (2009) reference is not appropriate here. That paper concerns the AEJ-North only. The TEJ is well known and several papers describe is directly, starting with papers in the 1960s or 1970s. A more recent paper on the TEJ is Nicholson and Klotter (2021), which I think appeared in the International Journal of Climatology.

Also in that section, I wonder if the pattern described could instead be a "moist tongue" near the level of the AEJ-S. Sometimes cross-circulations are associated with jet streams. This could be determined by looking at the meridional wind.

Fig. 3. The caption indicates a box is shown in at the top left of (a) giving the area over

which precipitation is averaged. I cannot see this box. However, the coordinates are given, so the box is not really necessary, but the caption must be changed.

Please note that in determining the impact on rainfall, this was not the best region to choose. The jet appears to be characterized by a "jet streak" circulation, with rainfall enhanced in the right entrance quadrant and left exit quadrant (Jackson et al. 2009). By averaging more or less over the entire region of the jet, the impact on rainfall is probably lower than if the right entrance quadrant were used. I am not suggesting that the authors change anything. This comment is only for their own reference. But they might examine this and see if results are enhanced.

Fig. 5. What is -1*omega?