

Interactive comment on “Ultra-clean and smoky marine boundary layers frequently occur in the same season over the southeast Atlantic” by Sam Pennypacker et al.

Anonymous Referee #1

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acp-2019-628 Ultra-clean and smoky marine boundary layers frequently occur in the same season over the southeast Atlantic Sam Pennypacker, Michael Diamond, Robert Wood

This manuscript uses data from LASIC campaign and data from Ascension Island between June 2016 and October 2017. They catalogue ultra-clean events (41 in number) over this time period and compare them to smoky cases and background conditions. They find that there is evidence for seasonality in the occurrence of the ultra-clean layers and that they occur during the same time as smoky conditions. They propose mechanisms and ways that these ultra-clean days are related to cloud properties and

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precipitation. The most interesting aspect of this work is the comparison between the smoky and ultra-clean days and how it related to drizzle amount and occurrence. This work is well written, easy to read and to follow, the results follow clearly from their analysis and the figures are well chosen and presented. My recommendation to accept his work with minor revisions

Main comments: 1) It would be helpful to justify why the authors chose $< 50 \text{ cm}^{-3}$ as ultra-clean. Is this arbitrary or is there some other reason for this choice?

2) The record is quite short. Is there any way to extrapolate information about ultra-clean days from satellite data sets to get an idea of how often these ultra-clean days occur in a longer-term record? This could be brought up in the discussion section, perhaps, as future work.

3) For the figures, the tick marks are hard to read and the numbers bleed into the figure space. Also, for Figure 2 there should be a few more markers (or at least tick marks) on (d).

4) For Figure 2, what do the PDFs for non-UC days look like for CO and rBC from the SP2? It'd be interesting to see the comparison for the non-clean days in these PDFs.

No Line by Line Comments: This work was well edited and has no issues in the text.

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