

Interactive comment on “Observed correlations between aerosol and cloud properties in an Indian Ocean trade cumulus regime” by K. Pistone et al.

Anonymous Referee #1

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This manuscript reported a positive correlation between LWP and aerosol number concentration for “dry” atmosphere condition observed during the recent CARDEX field campaign. This relationship was further explored for the low and high polluted cases separately that led to the discussion about the causal mechanisms. The analysis based on new data and the supplemental material made this manuscript valuable for the community. However, the presentation of the results was lack of coherence. A proper literature review was missing in the introduction; some figures were out of place; the key points were not presented clearly in the current manuscript, some of them were discussed back and forth with supporting material in different sections; the writing should be refined and improved. The manuscript should be accepted after some substantial revisions.

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1. In the introduction, there should be a review on the climatology and aerosol transport of this studied region. Current Figure 1 offers a big picture of the aerosol transport, but has not been discussed in details in the text. The discussion on large scale condition and aerosol origin in section 3 would have more theoretical support if the related information and previous studies were properly introduced first.

2. The introduction should also include a literature review about the past studies on aerosol to cloud properties relationship. Without literature review and comparison of this work to the previous studies, it is hard to see how this work contributes to the scientific understanding of the aerosol-cloud interaction.

3. Figures and tables from the appendix are frequently cited in the section 2 and 3, affecting the logical flow of the writing. It seems Figure A1,2,3,4,7,8,9,10, Table A1 are not cited in the appendix, but only in section 2 and 3. Appendix A may be consolidated into the method section, since it is only three paragraphs and they are closely related to the results being discussed later in the manuscript.

4. Since the moderately polluted cases contribute to nearly half of the total cases, the results from these cases should be at least discussed in the manuscript, and compared to the low- and high-polluted cases.

5. Have the authors explored the reasons why the “wet” cases do not show a correlation between LWP and CPC? This seems to be an important piece of the puzzle, and could potentially help to explain the correlation shown in the “dry” cases.

6. Figure 8 seems redundant after Figure 7.

7. The air mass back trajectories are mentioned in section 2.2, and the air mass origin is again discussed in section 3.2.2. The authors should consider rearrange and consolidate the material.

1. Page 29349, line 7, change to “INDOEX is the result of. . .”

2. Page 29349, line 16, delete “would”

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3. Page 29349, line 25, "CARDEX follows. . ." should be moved to the next paragraph
4. Page 29350, line 16, delete "a time"
5. Page 29350, line 17 to 20, "The atmospheric conditions. . ." please rephrase this sentence
6. Page 29350, line 28, "discussion" seems to be a more suitable word instead of "speculation"
7. Page 29353, line 14 to 19 need to be rephrased.
8. Page 29355, line 16, change to "all available low/high pollution dry days"
9. Page 29360, line 2, this sentence "The bottom. . ." is not necessary
10. Page 29361 line 26, delete one of the "in contrast to the"

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 29347, 2015.