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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosols, Clouds, and Precipitation in the North-Atlantic Trades Observed During the Barbados Aerosol Cloud Experiment. Part I: Distributions and Variability" *by* E. Jung et al.

Anonymous Referee #2

Received and published: 29 April 2016

Review of: Aerosols, Clouds, and Precipitation in the North-Atlantic Trades Observed During the Barbados Aerosol Cloud Experiment. Part I: Distributions and Variability By Jung, Albrecht, Feingold, Jonsson, Chuang and Donaher.

Evaluation: Publish with minor revisions

Major comments:

This very much reads as a paper setting the stage for something to come. As such it is a bit light, but it does contain sufficient information to warrant publication.

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Discussion paper

Minor comments:

Page 5 line 11: “The PCASP dries the particles before measuring them.” Please provide a reference for this. For instance, Strapp et al (1992, JAOTech) leaves the door open for the PCASP only partially drying particles larger than sub-micrometer (their summary). Thus the behavior may be quite different for a dust particle (or for a coated dust particle) and a sea-salt particle. Other references?

Page 5 line 15: Missing integration sign in denominator.

Page 9 lines 24-26: I am not sure what you are implying here; does sea-salt not contribute to the larger sizes in Fig. 6? This would seem to be inconsistent with many studies that have found sea-salt in the entire range of marine aerosols, e.g. Clarke et al. (2006, JGR), Blot et al (2013, JGR), Modini et al (2015, JGR).

Page 10, lines 8-9: A reference for the sizing uncertainty?

Page 31 and rest of manuscript: Are you connecting a PCASP (which you claims dries particles), with a CIP which does not materially dry dust particles (except maybe for a thin coating layer) and which when measuring sea-salt will see un-dried hydrated particles. I do not see any discussion of the fact that you do not necessarily know what is being looked at with the CIP; maybe I missed it?

Page 11 line 9: What is a “CIP volume number concentration”? It occurs several times.

Page 11 line 20: “increases with height.” This is one of the places that the manuscript comes up missing some context. No discussion of why such a pattern may be observed, nor of what has been observed of this in the past (e.g. Lasher-Trapp work)?

Page 13 line 18-19: “tendency for aerosols to suppress precipitation.” Do you mean increase in aerosols?

Page 14 lines 12-14: Could it be that not all clouds reach the same altitude, and that the shallower ones thus bias the statistics at low altitude?

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-45, 2016.

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