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Title: On the role of aerosols, humidity, and vertical wind shear in the transition of shallow to deep convection at the Green Ocean Amazon 2014/5 site

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General Comments:

This manuscript reports on a study of using the GOAmazon data, together with an entraining plume model, to diagnose the role of humidity, vertical wind shear and aerosols in the transition of shallow to deep convection at the Green Ocean Amazon 2014/5 site. The results from the study show that the shallow to deep convective transition observed at the site primarily depends on humidity in the troposphere, which tends to increase plume buoyancy. Conditions preceding deep convection are associated with high relative humidity, and low-to-moderate CCN concentration. Vertical wind shear is shown to have little relation to moisture and plume buoyancy, while the latent heat release due to freezing is shown to be important to deep convective growth under all conditions analyzed. Shallow convection growth, on the other hand, shows an association with a strong (weak) low (deep) level vertical wind shear and with higher CCN concentration. The presentation of the manuscript is concise and clear, but I found that the results do not include new scientific findings. However, since the study demonstrated a useful example of the GOAmazon data analysis, I recommend that the manuscript be accepted for publication after it is revised to address the following few comments of mine.

Specific Comments:

Multiple places thought the manuscript: A space after semi column is needed to separate the references (e.g., in line36).

Line 69: “A few recent studies” instead of “Few recent studies”

Lines 166-168: Replace “x” with multiplication symbol “×”.

Line 192: Remove letter “T”.

Section 3.2: Is there any difference in the direct thermodynamical effects from humidity and buoyancy between the wet, dry and transition seasons? There is a need to separate the analysis between the seasons.

Line 288: Remove the extra tab/indentation.

Lines 247-248: Consider replacing “Profile associated with stronger humidity” with “Profile associated with higher humidity in the upper tercile”.

Line 248: Replace “stronger humidity” with “higher humidity”.

Lines 253-256: You should calculate the values of convective inhibition for these buoyancy profiles to support the statement.

Lines 257-258: Is this a new finding? Please cite the previous publications in this regard to compare this finding about the importance of freezing in the development of convection.

Lines 296-306: Citations of previous observational and modeling studies on the dynamical connection between the vertical wind shear and the intensity of convection should be included in the discussion.

Lines 307-325: The transition of shallow to deep convection takes places in all the wet, dry and transition seasons. Yet, CCN concentrations are sharply different between the transition and dry/wet seasons. There is a need to separately show the results from the buoyancy and covariability analyses for the three seasons to disentangle the complexity in the interaction between the aerosol loading and convection invigoration. In particular, the results with respect to the shallow convection in all the seasons should be compared with those presented in the following paper:

Sheffield, A. M., S. M. Saleeby, and S. C. van den Heever (2015), Aerosol-induced mechanisms for cumulus congestus growth, J. Geophys. Res. Atmos., 120, 8941–8952, doi:10.1002/2015JD023743.