Second review of "Low cloud reduction within the smoky marine boundary layer and the diurnal cycle" by J. Zhang and P. Zuidema

The authors have done a thorough revision of the manuscript, it has improved substantially, both in terms of contents and structure. The results are interesting and relevant for the scientific community and they are now analyzed and presented in a more objective way. However, there are still many minor issues that I think need consideration, as outlined in my comments below.

Main comments:

- In general, I find that the manuscript could be more concise, both in terms of text and figures; 22 figures in a manuscript seems a bit excessive. Could the different figures showing radiosonde data (for example) be combined? And could some figures that are shown more as support for arguments be moved to a supplementary section?
- Considering my many minor comments below (and I did not include all of them), I think the manuscript would benefit from another thorough read-through to check that all sentences are clear.
- Discussion regarding smoke transport: I agree with the authors that the smoke transport most likely occurs (primarily) above the boundary layer. But I don't think that this can be taken for granted, and I think this uncertainty should be more clearly reflected on/considered in Section 5, in particular in the discussion related to the smoke loading and the strength of the inversion.
    - The smoke measurements are at the surface, and (unfortunately), we don't know if there is more or less smoke above –the vertical structure could maybe explain some of the relation between inversion strength and smoke loading. On lines 13-19, you discuss a case with high smoke in the BL, but advection of air with smoke in the free troposphere, which is quite confusing.
    - There are two lidar profiles shown, but the purpose of these are not clear to me. I don't think they add much information as they are only for a single case (and it's not clear if this is a typical case). Furthermore, I don't think the lidar profiles can be trusted in the boundary layer, so they cannot help understanding the relation between the surface concentrations and the free troposphere.
    - Line 10: from where do you get that the warming is only 0.5K?
    - Wind pattern in the free troposphere: it is not clear to me from Figure 20 that "easterlies and north-easterly winds become more frequent when the BL is smokier". "Winds are stronger in the BL and lower FT when the smoke loading is high…", but this is not true for 2016?

Minor comments :

Abstract:

- Line 8: "… decreases further." Further than what?
- Lines 11-14: The sentence starting with "A reforming…" and "After the sun rises…": I assume that what you describe here is for smoky conditions? It needs to be clarified that during smoky conditions you do not (always) reform the stratiform layer and that you therefore have less chance of recoupling.
- Line 16: I would suggest changing "reestablishing" to "strengthening" as the cumulus convection only locally and temporarily couples the surface, sub-cloud and cloud layer.

1. Introduction

- Page 2, line 34: I think “maxima” should be “maximum”?

2. Data, overview and compositing approach

- Page. 7, lines 8-10: The sentences starting with “Pennypacker et al….” and “This suggests” need clarification.
- Page 7, line 21: “The monthly-mean profiles…” Are you referring to Figure 2 or Figure 6 here..? I assume Figure 6, but still it’s not clear to me how you see that there is a decoupling. Perhaps it could also be good to include the layers in the figure?
- Page 8 lines 4-5: I think it should be “ones” instead of “one” as you are referring to two events in mid-August and two events at the end of August, one for each year.
- Page 8, line 11: I suggest changing “reduce to” to “approach”.
- Page 8, line 13: I suggest changing “observed reports” to “observations”.

3. The cloud diurnal cycle as a function of the smoke loading

- Page 9, line 2: I suggest changing “not completely similar” to “different” or “slightly different”.
- Page 9, line 3: I suggest changing “…a nighttime LWP maximum has corresponding…” to “there is a nighttime LWP maximum that corresponds with..”
- Page 9, lines 4-5: The sentence starting with “A secondary maximum….” is vague. I suggest reformulating or remove.
- Page 9, lines 19-23: Are these characteristics specific for smoky conditions? This is not clear.
- Page 9, lines 25-29: Please check sentence structure and make it clearer why there is less (local) coupling with less cumulus.
- Page 9: lines 29-30: Why are these two cases selected? I think this needs to be at least briefly motivated.
- Page 9, line 30: I don’t think “possesses” is the right word here. Perhaps “display”?
- Page 9, line 33: How do you know that the stratiform layers come primarily from detrainment..?
- Page 10, lines 5-6: Please explain how you see that the sounding profiles are decoupled all day (i.e. exactly which sub-figure(s) are you referring to).

4. Explanations for the altered cloud diurnal cycle

- Page 10, lines12 and 13: I would suggest changing “can” to “could”.
- Page 10, line 22: Is “capped” really the right word? I would think that this refers to something *above* the layer?
- Page 10, line 31: I would suggest changing “better-defined” to “more defined”.
- Page 11, line 6: I would suggest changing “if more” to “although”.
- Page 11, line 6: I would suggest changing “with the hint of” to “indicating a possible”.
- Page 11, line 9: I would suggest changing “an afternoon” to “the afternoon”.
- Page 11, lines 15-17: Are you referring to the non-smoky BL here? The description does not fit so well with the smoky BL.
- Page 11, lines 17-18: Please check sentence structure.
- Page 11, line 25: When you mention “cumulus coupling”, I think it would be good to make clear that this is a local, intermittent coupling.

6. Discussion and summary

- Page 12, line 13: I suggest changing “its coupling to” to “potentially coupling it to”.
- Page 13, line 10: I suggest changing “discourages” to “inhibiting”.
- Page 13, line 23: “Why is cumulus-coupling…”, is this statement referring to smoky conditions?

- Page 13, lines 7-9: Please check the sentence structure.
- Page 13, line 15: “Meanwhile, 800 hPa winds are more easterly/northeasterly….”. As mentioned above, I don’t think this is really clear from figure 20.
- Page 13, lines 25-26: Please check sentence structure.

Figures

- Figure 9c and d: Are these for 2016 or 2017 or both?