Atmospheric
Chemistry
and Physics
Discussions

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**Interactive
Comment**

Interactive comment on "Marine boundary layer structure as observed by space-based Lidar" *by* T. Luo et al.

Anonymous Referee #2

Received and published: 3 January 2016

The authors present a study of the boundary layer height and mixing layer height based on 4 years of CALIOP data using the clear sky aerosol backscatter in the eastern pacific region, with additional help from CLOUDSAT, AIRS, AMSR-E data and ECMWF model data. The use of the CALIOP data is evaluated using data from the MAGIC field campaign and SONDE data. The relation of the decoupling of the estimated boundary layer height and mixing layer height with the estimated inversion strength is explored. The study shows a promising method of studying the boundary layer structure using satellite lidar data. I am very impressed with the BL dataset the authors have made using the CALIPSO data.

Many of the major issues have already been addressed by the Anonymous referee 1, I will not add them here again.

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The main issue I want to mention here is that the authors need to add correlation values, and in some cases the means/rms (see below) when they are discussed. The results discussed can only be appreciated and referred to in future work when we can assess the real values/effects.

Minor additional comments: Please use spell checker once more! Page 34065 Lines 4-11: Please rephrase the entire paragraph, each individual line is short and uses the word decoupled making it hard to read.

Page 34066: line 20 bellow → below

Page 34068: lines 26-27. The RMS of the SST can be seen as relatively small knowing roughly the absolute mean values but in case of the winds it is hard to see if the bias and rms are high or low. Please provide the mean values for both wind and sst. Are the RMS and bias in the wind absolute or relative to the wind value, i.e. is the rms for all winds representative of the error or is it overestimated by the occurrence of a few higher wind events?

Page 34070 ; Lines 8-10. The method was not used, did you estimate the MBL on any other way or was this not possible at all. And if not, what did you do with the data of the cloud contaminated data, since you mention in 34071 line 22 that the MHL was based on the MBL structure observed in MAGIC

Line 13: What does SONDE stand for. Do you mean Sonde or is it an abbreviation not defined.

Page 34071: Line 23. Biased lower is not correct here. That would mean that SONDE is the truth.

Page 34072: Line 4/5 please provide correlation values. The red dots in Figure 2 show no correlation in this presentation, a 2D histogram may show that there is a positive correlation but not as plotted here. Same holds for Lines 10/11. To strengthen your case you should provide a correlation factor (the figure does show this ofcourse in 2d)

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Line 15 ''built in the last" → described in the previous

Page 34073: Line 2 : correct "shows increase tendency when westwards"

Line 11: results

Page 34074 Discussion on salt aerosol vs U10 in NPO and SPO. I am not convinced by the explanation of the lack of U10 correspondence in the SPO region. Could you compare the TAB vs U10 along the two boxes. This way you may be able to see if above a MLH threshold value the NPO and SPO show the same U10-TAB[for Z< ZBLH] relationship.

Page 34076 Lines 9-13 Give values of mean/error and correlations when you mention it in the discussion Acknowledgements: You use a lot of data sources but mention non of these in the acknowledgements. Please add those from which you downloaded the data (i.e. MAGICS/calipso/SONDE)

Figures:

Figure 1 Change Magenta to Black

Figure 3: Skip a number of latitude values, it feels crowded

Figure 4/5: Small fonts. EIS values unreadable as they overlap vertically, lower text of CTHxx in d3 and d4

Figure 6a: Provide error estimates in Figure to provide a visual estimate of what we look at and if the slope difference has significance. You can also show it in a contour lightly colored box if you are afraid that it becomes crowded

———————————————

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 34063, 2015.

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