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Atmospheric Chemistry and Physics Discussions

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

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This paper uses clear sky aerosol back scattering signal to estimate boundary layer height (BLH) and mixing layer height (MLH) and then studies the relation between MBL decoupling (MLH/BLH) and the estimated inversion strength (EIS). The overall research topic is interesting and approach is good. However, the analysis needs to be more quantitative and there should be more descriptions on the data processing. I would be happy to recommend the publication of this paper when the following concerns are addressed.

1) Provide quantitative measures whenever possible. I list here a few examples for reference. The uncertainties in the estimated BLH and MLH using the aerosol back scattering are estimated by comparing with SONDE-derived heights. (See first paragraph in page 34071.) But, for MLH, is +/-0.45km a good precision? How would it

affect the relation between the ratio BLH/MLH and EIS? For fig 2b, it would be useful to report also the correlations between SONDE and CALIPSO-derived heights to tell how tightly the heights derived by SONDE and CALIPSO are connected.

In fig 3, it is also useful to use spatial correlations to quantify similarity between patterns.

In fig 4,5, correlations with wind and EIS should be quantified.

In fig 6, the uncertainties of MLH/BLH, and EIS should be quantified.

2) provide more details about data processing. Here are some examples.

For fig 3c, When computing MLH/BLH, is it computed as the ratio of average MLH and average BLH or the average of ratio over the 4 year.

Is EIS only computed for clear sky? How do we connect with cloud, for example, in the discussion of last paragraph in page 34073?

For fig 6, how are data points computed? Are they time averages of data at different spatial locations?

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