

Guo et al. present a well written manuscript that reports on a comprehensive investigation of the planetary boundary layer height (BLH) in China using fine-resolution sounding observations and reanalysis data from January 2011 to July 2015. The bulk Richardson number based BLH estimation method is a popular approach and the results are finely analyzed and discussed. The findings are important in understanding air pollution in China. This manuscript should be published after my suggestions below have been satisfactorily addressed.

Specific Comments:

1. The physical meaning of the Richardson number method, turbulent flow becomes laminar flow when $Ri > R_C$ (Stull, 1988), should be included in the manuscript in a proper way. $R_C = 0.25$ is the critical value of the bulk Richardson number.
2. Which map projection is used in the manuscript (Figs. 1, 7-10, 13)?
3. Page 5, Line 10: “121operational” → “121 operational”.
4. Page 6, Line 10: “0.7 degree” → “0.75 degree”?
5. Page 7, Line 7: Add latitude, longitude and altitude for Beijing site.
6. Page 8, Line 4: “Figures 2” → “Figure 2”.
7. Page 10, Lines 16-17: “due to the solar radiation in eastern China is stronger than that of western regions” → “due to stronger solar radiation in eastern China than that of western regions”.
8. Page 14, Line 17: It is not appropriate to write “As the first attempt to obtain climatology of BLHs in China” because Liu et al. (2015) have already done research on BLH over China using CALIPSO and ERA-Interim reanalysis data.
9. Page 16, Line 17: “Reference” → “References”.
10. Page 31, Fig. 10: ERA-BLH and CMA-BLH don't agree well at 0200 BJT, why?

References

- Liu, J., Huang, J., Chen, B., Zhou, T., Yan, H., Jin, H., Huang, Z., and Zhang, B.: Comparisons of PBL heights derived from CALIPSO and ECMWF reanalysis data over China, *Journal of Quantitative Spectroscopy and Radiative Transfer*, 153, 102-112, doi:<http://dx.doi.org/10.1016/j.jqsrt.2014.10.011>, 2015.
- Stull, R. B.: *An Introduction to Boundary Layer Meteorology*, edited by R. B. Stull, Springer 5

Netherlands, Dordrecht., 1988.