Geoscientific
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Interactive comment on "On the computation of planetary boundary layer height using the bulk Richardson number method" *by* Y. Zhang et al.

Anonymous Referee #2

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Based on field data, the paper reports a study on the variability of the critical bulk Richardson number used to determine the boundary layer height in some atmospheric models.

Authors use four different datasets to find, for three broad classes (strongly and moderately stable and unstable) of boundary layer regimes, the Ri_bc that makes the Richardson bulk method results to "best fits" other methods (turbulence intensity, temprature profile, ...).

Although, as far as I know, some of the data used here have never been used for this purpose, the manuscript lacks the necessary consideration of related work (although cited) that face the same problem in a rather similar and, possibly, more accurate way.

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Interactive Discussion

Discussion Paper

Richardson et al. (2013) suggest a "continuous" relationship (as opposite to the one proposed here, which is based on very broad classes) and Basu et al. (2014) refine the coefficient also using one the the experiemnt considered here. Authors must account for those papers, and discuss their results accordingly.

In lack of this, it cannot be claimed that the manuscript reports substantial new concepts or technical advances.

In case the authors are requested to submit a revised version of the manuscript, I strongly suggest to revise carefully the language.

It would also be very interesting to go a bit farther and show (or at least discuss) to what extent the proposed parameterization can improve model results in real applications.

Minor comments:

- the word "critical" referred to the Bulk Richardson number between the ground and the boundary layer height can be misleading because it does not indicate that the whole boundary layer undergoes a transition to laminar regime);

- it can be useful to define the range of stability parameters for the different classes (this can also help comparing to Basu et al. (2014);

- numerical models using Richardson bulk method to estimate the PBLH are cited. It would be useful to add some details;

- figures presentig vertical profiles could be improved by increasing the line thickness;

- in all of the figures, axes labels must be increased;

- as "h" is typically used for "fixed" height (e.g. boundary layer height) I suggest replacing it with "z" in equation (1).

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