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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characteristics of convective boundary layer and associated entrainment zone as observed by a ground-based polarization lidar" *by* Fuchao Liu et al.

Anonymous Referee #3

Received and published: 20 November 2020

This manuscript presented case studies of convective boundary layer (CBL) and entrainment zone observed by a ground-based lidar. The evolution of CBL has been described by four stages. The values of CBL depth and entrainment zone thickness (EZT) are reported under different stages. However, the paper only discusses a few cases. Meanwhile, the meaning and significance of this study are not clear. Therefore, this paper needs major revisions before publication.

Specific Comments:

1. The characteristics of CBL and entrainment zone are widely reported in numerous previous papers. I do not find the new characteristics of CBL in this study. The authors

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Discussion paper

may carefully consider the title. The title also should include the measurement location (Wuhan).

2. The introduction part needs improvements. Currently, this section introduced some related works, but did not state the limitations in previous studies. This section also did not tell readers the novelty of this work.

3. The manuscript classified the evolution of CBL into four stages. However, it is a well-known feature, which is well discussed by Stull. (1988). I suggest the authors refer such classifications to the previous papers.

4. The determination of EZT is a highlight in this study. Nonetheless, there is a lack of validations of EZT retrievals derived from FWHM. The limited cases also cannot support the robustness of this method.

5. Page 15, line 457. The statement is not appropriate. The ratio of EZT to CBL depth cannot support the accuracy of the retrieved EZT values.

6. The authors may consider revising the manuscript type as “Measurement Report”, which more fit the scope of this study.

References.

Stull, R. B.: An Introduction to Boundary Layer Meteorology, Kluwer Acad. Publ., Netherlands, 1988.

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