

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## Comment on acp-2022-257

Anonymous Referee #1

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Referee comment on "Measurement report: Structure of the atmospheric boundary layer and its relationship with the land-atmosphere interaction on the Tibetan Plateau" by Maoshan Li et al., Atmos. Chem. Phys. Discuss.,  
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This study used the sounding, surface heat flux and reanalysis data to characterize the PBL structures of 5 stations in Tibetan Plateau (TP) under different wind flow conditions (south branch of westerly wind VS summer monsoon).

The major weakness of this study is a lack of physical explanation of the PBL structures from the data analysis. The sounding data analysis presents only a few days to characterize the PBL structure under the influence of monsoon flow, plateau flow, and westerly flow. The results from the limited data analysis are not sufficient. A seasonal and long-term data analysis is required to enhance the validity of this study.

- P3, line 82-84, It is found that the thermal structure of the "Plateau Atmospheric boundary layer is abnormal, the development of the convective boundary layer is deep, and the dynamic mechanism of Ekman "suction pump" in the plateau boundary layer. "What do you mean "abnormal"? Please explain "suction pump".
- P3, line 85, why there are extreme values?
- P4, "strengthening period", unclear description.
- Line 94, why PBL height is high in west and low in east?
- What is the similarities and dissimilarities of this study comparing with the previous studies? What is the importance and unique results from this study?
- Line 142, is PBL height determined by subjective personal inspection?
- Line 157, this study only utilized limited observation data in 2014 and 2019.
- This study only utilized limited sounding observations to characterize the PBL structures. I suggest you expanding the analysis by including the regular sounding observations (twice a day 00 and 12 UTC) for longer period (3 to 5 years) to enhance the representativeness of the results.
- Discussions in session 3 and 4 are very descriptive and lacking in any in-depth

interpretation. It's very difficult to understand the whole discussions. The physics responsible for characterizing the structures are not discussed.

- Line 168, why the low-level interval of radiosonde data is large?
- Line 194-196, how the westerly jet affect inversion stratification?
- Line 199, what is super-insulation layer?
- Line 214, "Stable Boundary Layer" height reaches 1500 m? Isn't 1500 m too high for a SBL?
- Line 243, why convective BL height reached highest point at hour 20:00?
- Line 284, how did you tell there is formation of valley wind?
- Line 305, how the glacial wind is formed? How to tell there is formation of glacial wind?
- Line 311-314, unclear description.
- Line 346-349, there is apparent bias between observation data and ERA5 data.
- Line 331, "under coordinated action of the westerly wind and monsoon", unclear description.
- The structure of the presentation needs to be better organized.
- The writing needs to be improved.
- Please remove the general descriptions in the manuscript to enhance the understanding of the importance from this study.
- Sessions 3 and 4 and conclusions of the current form are lengthy and tedious descriptions and must be rewritten to enhance the interest of the reader.
- Some conclusions based on limited data analysis (a single sounding observation) is a major defect and is of little interest to the broader scientific community.