Responses to the reviewers' comments

Reviewer #2:

Low-level turbulence in the atmospheric boundary layer remains a critical component for understanding near-surface exchange processes, mesoscale dynamics, and safe aviation operations, yet remains under-characterized due to data scarcity. This manuscript presents a new turbulence dataset derived from a synergistic combination of radar wind profiler (RWP) and radiosonde observations at different sites across China. The authors employ the Doppler spectral width method to estimate a suite of turbulence-related parameters including ε , N^2 , κ , l_0 , and LB, and offer a comprehensive analysis of their spatial, vertical, and seasonal patterns. The paper is technically sound and analyses low-level turbulence climatology over China. As the dataset can be very important and helpful for boundary layer modeling, I believe this study is suitable for publication following a few minor revisions.

Reply: We thank the reviewer for his thoughtful and excellent comments and suggestions. We have tried as much as possible to address all the concerns and have revised the manuscript accordingly. The reviewer 'comments are written in normal font, and our point-to-point responses to the reviewer' comments are in blue italics.

Minor Comments:

1. The manuscript would benefit from improved clarity and precision in defining symbols and variables, especially within different equations. For example, in Equation (1), the height variable (h) is introduced without definition, while other equations such as (4) use z for altitude. A consistent notation may be easy for readers to understand.

Response: Per your kind suggestions, we have carefully reexamined and revised all variable nomenclature, definitions, and symbolic representations in both the main text and mathematical formulations to guarantee precise and consistent expression throughout the revised manuscript. 2. The variables (e.g., T, P, ϕ , ψ , v) are mainly given their names. I suggest the authors add the physical meaning of these variables in section 2 for clarity, thus being more accessible for readers unfamiliar with the PBL scheme.

Response: Thanks for pointing this out. We have thoroughly examined and revised all variable nomenclature, definitions, physical meanings, and symbolic representations in both the main text and mathematical formulations to guarantee precise and consistent expression throughout the revised manuscript. The variables are now consistently defined with their physical context upon first use in the text.

3. The term "high-resolution" is mentioned several times, which may cause confusion. It would be clearer to specify that the dataset offers high vertical resolution, as the temporal resolution is limited to twice daily observations.

Response: We appreciate this insightful comment. In the revised manuscript, we have carefully replaced all instances of the general term "high-resolution" with the more precise description "high vertical resolution" when referring to the dataset. This clarification explicitly distinguishes the vertical resolution (which is about 5 to 8 m) from the temporal resolution (limited to twice-daily observations).

4. Line 123: The use of "see" before the citation appears unnecessary and is inconsistent with the citation style used elsewhere in the manuscript.

Response: Per your kind suggestions, we have revised as suggested.

5. Abbreviations such as ε , N^2 , and K are repeatedly redefined. For example, ε defined third times in Sections 1-2.

Response: Per your kind suggestion, in the revised manuscript, we have deleted the redundant definitions for the variables you mentioned.