Reviewer 2

This paper presents a feasible method to estimate TKE dissipation rate (ε) based on a unit of WPR-LQ-7 in a sheared atmospheric boundary layer. The model is illustrated clearly with proper experimental settings. The authors point out the relevance of L_{out} and D, which is valuable in a real-world application. Although the condition (in a sheared environment) is a little bit strict, I think this work can be published after some minor revisions.

We thank the reviewer for his comments. Please note that the analysis was made from data collected above the atmospheric boundary layer. It does not include KH instabilities that may develop at the CBL top, for example, to avoid cases that may interact with other instabilities.

Specific comments:

1. In **Abstract**, the definition of L_{out} should be clearly pointed out.

   Done. L_{out} refers to an apparent outer scale estimated from radar Doppler variances and UAV-derived TKE dissipation rates (Luce et al., 2018). This scale was noted L_c by Luce et al. (2018) ('c' stands for 'characteristic'). But the term L_{out} is perhaps more adapted because it can be related to turbulence scales as shown in the present work.

2. Line 30: *half the Doppler spectral width* mentioned here is not consistent with *half width σ of the Doppler spectrum peak* mentioned in **Abstract**, which may confuse readers without background.

   We used the terminology "*half the Doppler spectral width*" *everywhere*. The spectral width is 2σ (twice the standard deviation)

3. Line 42-46. The sentence starting from *(2) The model...* is too long. I suggest the authors use short sentences.

   We have modified the text as follows:

   The model $\varepsilon_S = C_S \sigma^2 S$ provides better agreement than $\varepsilon_N = C_N \sigma^2 N$. ε_N is commonly used by the MST radar community. It is expected to be applicable to turbulence under stable stratification *(e.g. Hocking, 1983; Hocking et al., 2016). ε_S* was originally proposed by *Hunt et al. (1988)* from heuristic arguments and confirmed by *Basu et al. (2021)* and *Basu and Holtslag (2022)* from Direct Numerical Simulations (DNS) and analytical derivations. It is expected to be valid for weakly stratified and/or strongly sheared conditions, i.e. for low *Ri* values.

   We have also revised the text to avoid sentences that are too long in some places.

4. In Table 1, the authors list many key parameters of the WPR-LQ-7. It would be better if they could include what parameters can be derived from WPR-LQ-7 measurement. In this section, I cannot find this critical information.

   It is included in the text and in the table 1.

5. Line 123. The authors need to explain why a KH layer can be visible with enhanced SNR signal or to provide a reference.

It is now explained how a KH layer can be identified from its distinctive signature in time-height cross-sections of radar echo power

6. In Figure 3, I suggest the authors mark the KH layer mentioned in Figure 2a with two dash lines or a grey zone.

Done.

7. Line 304-307. This part should be mentioned in a **Discussion. I suggest** the authors discuss the strengths and shortages of the new mode compared with other studies in this paragraph and change the section title to **Discussion**.

We included a section "Discussion" before the conclusion.