

Ann. Geophys. Discuss., referee comment RC2
<https://doi.org/10.5194/angeo-2020-91-RC2>, 2021
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Comment on angeo-2020-91

Anonymous Referee #2

Referee comment on "Detection of Kelvin-Helmholtz billows over the National Capital Region of India using SODAR" by Nishant Kumar et al., Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2020-91-RC2>, 2021

General comments

This study analysed Kelvin-Helmholtz billows in the planetary boundary layer over a station, New-Delhi using the SODAR measurements from March-November 2019. The subject is worth investigating as Kelvin-Helmholtz billows are a principal source of mixing by redistributing the momentum, mass, and thermophysical properties in the atmosphere. Nevertheless, this paper describes observations with little attempt to take any analysis further. The novelty of the work is missing. The evidence presented is not convincing for Kelvin-Helmholtz billows. The results presented are not supported by the analysis. Therefore, the manuscript needs substantial revisions before being suitable for publication.

Specific comments

- Abstract need to more focused on the findings. General statement about Kelvin-Helmholtz billows should be omitted in the abstract.
- In the Introduction, I miss the point of why this study has been carried out. I encourage rewriting the introduction section by clearly stating the importance of KH instability, the studies being carried out over India and worldwide, and the area of the gap they need to focus on. Also, state few scientific questions that will be addressed through your work.
- Ln 72: There is no description of the measurement site. Also, discuss the background meteorological conditions of the measurement site.
- SODAR: How often the SODAR is being calibrated? Discuss more on SODAR technical parts. What kind of experimental set-up has been done?
- Ln 96: Fig1. Diurnal variation of which day/month. What does the colour bar indicate?

- The figure is too noisy; how authors eliminate those noises? How you defined ABL.
- Fig 1: How the authors have eliminated the presence of aerosol loading?
 - Fig 1: Authors need to discuss the possible reason for the observed Kelvin-Helmholtz billows.
 - Fig 2. I cannot see the KH billow structure. At what height it is observed? Please mark in Figure
 - Ln 107: How periodicity (90-110 s) is determined?
 - Ln 110: return signal intensity is directly related.. Please demonstrate how SODAR backscattered is related to temperature.
 - Ln 117: ... visual inspection of echograms... What factors are considered during visual inspection of the SODAR signal?
 - Are there always clear sky conditions for 90 cases? How about during the monsoon?
 - Kelvin-Helmholtz billows presence should be associated with larger variability of the physical observables such as wind and wind shear. Authors need to consider this aspect also.
 - Table 2: Why monsoon months (June-September) have fewer Kelvin-Helmholtz billows?
 - Ln 148: Fig. 4: The metrological variables should be discussed in terms of anomaly (difference between without and with Kelvin-Helmholtz billows).
 - Table 3: What is convection period? How have authors defined convection?
 - Findings of the work need to be discussed in context to other studies.
 - Authors should discuss what the implication of their work and future work area.

Technical corrections

- Ln 12: Change KH billows to KHB
- Ln 16: Change K-H billows to KHB. Please make it consistent throughout the manuscript.
- Ln 39: According to Stull (2012) in the structure of ABL.... The structure of the sentence is not correct.
- Ln 25-43. This paragraph is too wordy and can be concise in 3-4 sentences.
- Ln 89-91. Considering the vastness....This is a redundant statement.