Response to reviewer 1

Dear Anonymous Reviewer 1,

we highly appreciate your feedback. It helped us to improve the manuscript. Below we comment on your suggestions in detail.
All reviewer comments appear in *italic text* below, while authors' responses appear in blue text. Line numbers referenced in the authors' responses refer to the revised document.

The manuscript presents a data set on the turbulent dissipation rate derived from 3 lidar systems during the LAPSE-RATE field campaign in the San Luis Valley, Colorado. Although the calculations of the dissipation rate are based on previously published methods and algorithms is the data set of interest, as it includes the possibility of comparison and validation of the algorithms i) at two different locations (by two identical Leosphere WindCube lidars) and ii) for two different lidar systems at one location (Leosphere Windcube v1 vs. Halo Streamline).

General comments

The manuscript is in general clearly written and well structured and the data are well described and presented. I see, however one main issue in the lowest layers of the Halo instrument. The yellowish and very constant (at least in height) "bright band" around 50 m looks rather suspicious, and I am rather in doubt that this is an expression of the surface layer as the authors state. I hypothesize that this is some kind of measurement artefact close to the ground. If it would be a real (and of course expected) enhancement due to the surface layer, I would expect a clear diurnal variation in its vertical extension (which I can only see in very weak nuances) and an additional clear dependency on the wind speed. This has to be closer investigated and discussed before I can recommend the manuscript to be considered for publication. I firmly believe there is a measurement/evaluation issue in the lowest range gates for the Halo system. A first important test would be to look into (and also present) two additional time height plots of horizontal and vertical velocity in Fig. 4.

Thank you for this comment, we looked into this issue and compared our lidar measurements with similar datasets. We found this artifact is common on Halo Doppler Lidars, and also has been previously reported (Pearson et al., 2009). Furthermore, our co-authors have detected this issue in all three of their Halo lidars at OU/NSSL. In the figure below, we show how the vertical velocity variance remains nearly constant for one range-gate, while it varies for the other ones. Therefore, we decided to remove data from the lowest three range gates in the Halo lidar.
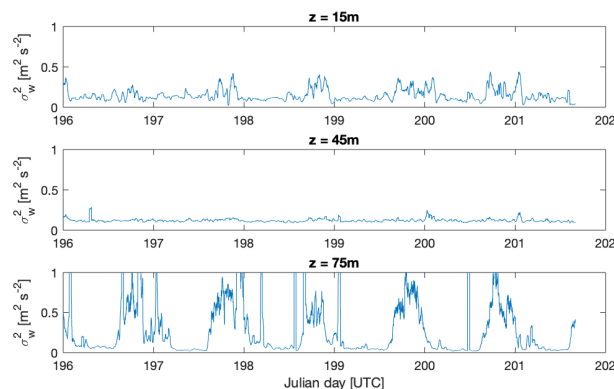
Minor comments

- line 50: which type of the HATPRO are you using? would be useful and consistent with the type for the lidar

Thank you for your suggestion on adding this information. We added a reference where the interested reader can find more information. We did not include further information because this is not directly related to our dataset and manuscript.

- line 50: is the Atmospheric Emitted Radiance Interferometer "home-made" or do you also have manyufacturer and type for it?

Thank you for your suggestion on adding this information. We have a reference where the interested reader can find more information about the AERI. We did not include further information because this is not directly related to our dataset and manuscript.

- Fig. 1: an additional overview map on the location on a bit larger scale would be desireable! And I also would highly prefer the x and y axes labeling in km instead of degree

Thank you for your comment, we agree on labeling x- and y-axes with distances in km. We modified our map to show a larger portion of the terrain around Moffat School and Saguache. We also modified the labeling to km instead of degree.

- Fig. 6: I assume you have an issue with artificially enhanced dissipation rates by the Halo lidar that is related to the strange bright band in the figure 4a

Thank you for this comment, as we mentioned above, we discarded data within the first three range gates of the Halo lidar.

- references: inconsistencies in abbreviating/not-abbreviating journal names

Thank you for this comment, we fixed this issue. All of our references have their corresponding abbreviated journal names.