Earth Syst. Sci. Data Discuss., author comment AC1
https://doi.org/10.5194/essd-2022-158-AC1, 2022

Reply on RC2

Natalie Kaifler et al.

Author comment on "The polar mesospheric cloud dataset of the Balloon Lidar Experiment (BOLIDE)" by Natalie Kaifler et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-158-AC1, 2022

Two of the manuscripts which we cited and were not yet available online at the time of review are now published. The two companion papers on multi-scale Kelvin-Helmholtz instability dynamics observed by PMC Turbo on 12 July 2018 can be found at

https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2021JD036232

https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2021JD035834

and the updated citations are:

Kjellstrand, C. B., Fritts, D. C., Miller, A. D., Williams, B. P., Kaifler, N., Geach, C., Hanany, S., Kaifler, B., Jones, G., Limon, M., Reimuller, J., and Wang, L.: Multi-Scale Kelvin-Helmholtz Instability Dynamics Observed by PMC Turbo on 12 July 2018: 1. Secondary Instabilities and Billow Interactions, Journal of Geophysical Research: Atmospheres, 127, e2021JD036 232, https://doi.org/https://doi.org/10.1029/2021JD036232, e2021JD036232 2021JD036232, 2022.

Fritts, D. C., Wang, L., Lund, T. S., Thorpe, S. A., Kjellstrand, C. B., Kaifler, B., and Kaifler, N.: Multi-Scale Kelvin-Helmholtz Instability Dynamics Observed by PMC Turbo on 12 July 2018: 2. DNS Modeling of KHI Dynamics and PMC Responses, Journal of Geophysical Research: Atmospheres, 127, e2021JD035 834, https://doi.org/https://doi.org/10.1029/2021JD035834, e2021JD035834 2021JD035834, 2022.

The manuscript by Kaifler et al. on “Signatures of gravity wave-induced instabilities in balloon lidar soundings of polar mesospheric clouds” submitted to ACPD under acp-2022-572 is currently awaiting reviewer’s reports and are hopefully available online within few days.

“If possible, a brief description of data analysis methods on how to use your dataset to obtain small-scale features (such as vortex rings, instability structures, and so on) would be helpful for readers. “

The data can be subjected to a variety of analysis methods that are suitable to detect patterns like correlations, feature detections or spectral methods. The chosen method will

likely depend on the specific goal of a study and may also depend on the case, i.e. the characteristics of the event to be studied. For guidance, the cited publications analyzing PMC Turbo or ALOMAR RMR lidar data are useful. It would be desirable to be able to define the identified small-scale features well enough such that they can automatically be pulled out of a lidar dataset by a standard algorithm. Possibly, the natural variability and different viewing geometries and wind speeds make it necessary to evaluated the dynamics case by case. The work by Kaifler et al. submitted to ACPD mentioned above employs a general method based on the evaluation of gradients at high resolution to locate small-scale features, and then discusses examples that are grouped by morphology and the likely underlying dynamics, for which tailored methods can be developed in the future.