Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., author comment AC1
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Reply on CC1

Jenna Ritvanen et al.

Author comment on "Complementarity of wind measurements from co-located X-band weather radar and Doppler lidar" by Jenna Ritvanen et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-193-AC1, 2022

We thank the author for the comment and pointing out a considerable shortcoming in the analysis presented in the manuscript.

To investigate the issue whether insects are biased scatterers for the radar, we added a scatterplot (Fig. 9 in manuscript; see also the attachment for the figure) to Section 4.3 that contains only measurements where the X-band radar has $Z_{DR} \geq 5$ and $\rho_{HV} \leq 0.9$, as those measurements would be expected to be from insects. For this subset of the data, the coefficient of determination $R^2 = 0.95$ is slightly decreased and bias (ME = 0.078 ms $^{-1}$) increased, but the RMSD = 1.13 ms $^{-1}$ is decreased. Visually, the artefacts seen in Fig. 3 are not present in the new scatterplot. This leads us to conclude that for our location and data, insects are not an issue when comparing Doppler velocity measurements from lidar and radar. However, this is certainly not the case everywhere, so the issue should be investigated separately for each location.

We have added discussion summarizing the above in Section 4.3 and in the conclusions in Section 5. Additionally, we added discussion of dual-PRF unfolding errors as an error source in Section 4.1.

Please also note the supplement to this comment:
https://amt.copernicus.org/preprints/amt-2022-193/amt-2022-193-AC1-supplement.pdf