

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2021-256-RC1>, 2021
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Comment on amt-2021-256

Anonymous Referee #1

Referee comment on "Detecting wave features in Doppler radial velocity radar observations" by Matthew A. Miller et al., Atmos. Meas. Tech. Discuss.,
<https://doi.org/10.5194/amt-2021-256-RC1>, 2021

Review of the article titled "Detecting Wave Features in Doppler Radial Velocity Radar Observations" by Miller and coauthors for publication in the journal of atmospheric measurements and techniques.

The authors have presented a new technique for identifying wave-like signatures in the mean Doppler velocity data collected by the WSR-88D S-band radars. The technique relies on subtracting the radial velocity field from two successive PPI scans. The authors have discussed the limitation of the technique in detail using a forward operator simulation. The authors have applied the technique to two cases, one of a winter storm and another one of a extratropical cyclone. The paper is short, straightforward and easy to understand. By their own admission, the author state that the technique cannot be blindly applied to wide set of data, but may prove as a useful starting point for scientists studying severe weather. I recommend the article for publication and mention below few minor things that could be used for improving the article further.

One thing I kept thinking of while reading the paper is the role of collective variability of the hydrometeor fall speed, vertical air motion and horizontal air motion in determining the radial velocity field. Some of the "wave-like" features determined here could be purely referring to changes in hydrometeor fall speed, and large boundary layer eddies that tend to orient themselves along the prevailing wind. This is further complicated by small congestus clouds embedded in the large precipitation field observed by the WSR-88D. It will be good to discuss this issue, and maybe do some back of the envelope calculation of the error such and phenomenon might cause. Thanks.

The authors have only used data from the negative velocity perturbations. It will be good if you can mention if you get similar results if you used positive perturbations. I assume that the positive perturbations will have less contamination from the falling rain, and hence might be more robust.

The simulator is great. However, I could not understand the fall speed or the drop size distributions used in the Figures 3 and 4. It will be good to mention those. Thanks.

Line 27: it will be good to define mesoscale here. I assume you mean meso-beta?

Line 58: are you results sensitive to the 0 dBz threshold used for removing noise?

Line 233: It will be good to mention the native resolution of the scanning KaSAPR. Thanks. Less than 200 m sounds vague.

Line 272-273: I understand the reasoning behind not classifying the hurricane rain bands as gravity waves, but shouldn't they have a larger wavelength than the mesoscale (~20 km) ? This might provide an objective way to discard them.

Figure 1, 2, 5, 6 and 8 are missing some of the axis labels.

Figure 3 caption mentions upper and middle panels, but the figure only has two rows. Something is missing here.