

Interactive comment on “Three-dimensional wind profiles using a stabilized shipborne cloud radar in wind profiler mode” by Alain Protat and Ian McRobert

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This paper describes a method for retrieving the air velocity components from a motion stabilized shipborne millimeter wavelength Doppler radar. The methodology is simplified from a previously published variational methodology that was developed for dual-Doppler observations. The method assumes that the Doppler velocity measurements are stabilized in pitch and roll with ship's heave motion removed from the measurements prior to applying the variational method. The authors explain that the challenge with the method is that the radome only allows for off-zenith pointing 8 degrees which is much less than typically used. The method is applied to several case

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studies observed in the tropics and compared against radiosonde measurements of horizontal wind. The comparison is quite good suggesting that the methodology is successful. The paper is well-written, concise, and informative. It demonstrates an important capability that is new for ship-borne W-Band radar. I suggest publication with minor revision.

I would like to see the authors address the following:

1. I think there needs to be a more careful discussion of uncertainty. A close look at the figures suggests that there is a distribution of retrievals at each height with a fairly strong peak. The distribution is particularly noticeable in the 20-24 plots on the top row of Figure 3. Is each of these points a reasonable retrieval or is the distribution caused by noise in the retrievals? Is part of the error budget the precision in the Doppler velocity measurement itself, does the noise arise from the pointing, etc? The congestus highlights the instantaneous aspects of the retrievals whereas the stratiform cases as depicted represent many hours of data yet the same level of noise seems to be present in both. There does seem to be some rather odd spikes in V_y in the congestus example on the sides of the cloud and at the top that do not show up in the vertical or eastward components. Are these real or outliers?

A short discussion regarding these issues would demonstrate how accurate you expect the single retrievals to be and how much averaging is expected to be necessary to converge on a useful solution. It would be interesting to show an actual updraft if such an example is available.

2. It would be nice to include plots of the radar reflectivity in the figures.

The only typographical issue I see is on line 28 where it should read Plan Position Indicator not Plane.

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