

Interactive comment on “High resolution humidity profiles retrieved from wind profiler radar measurements” by Frédérique Saïd et al.

Anonymous Referee #2

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GENERAL COMMENTS

This manuscript investigates the potential of UHF wind-profiling radar returns for the retrieval of atmospheric humidity profiles. Owing to the fundamental importance of water (in all phases) in the atmosphere, and to the fact that meteorological services are still primarily reliant on 12 hourly balloon-borne sensing, this technique would be very valuable if it could be used operationally. The technique itself is not new, and the development presented in the current manuscript is incremental rather than fundamental. Nevertheless, I think that the manuscript makes a useful contribution to this area of research. It is good that the authors have acknowledged instances where the technique does not produce reliable results.

SPECIFIC COMMENTS

C1

The manuscript is clearly written and I have very few general or specific comments to make about it.

1) Section 2. The symbol q is usually used to imply the specific humidity (i.e. the mass of water vapour per unit mass of moist air) rather than the mixing ratio (r , the mass of water vapour per unit mass of dry air) as is stated at the beginning of this section. I suspect that q has simply been misnamed since the formulae in this section all appear to be consistent with it implying specific humidity. The abbreviation WVMR is used throughout the manuscript.

2) Although the figures are all sufficiently large to allow the important features to be seen, the labels are quite small on some of them - particularly Figs 9 - 12. It would be useful if the labels were made larger.

3) In connection with Figure 6, use of the gradient Richardson number will only identify regions of (dry) convective instability (which are expected to be confined to the boundary layer) and dynamic instability. I would expect moist convective processes to be a more significant contributor to turbulence at these altitudes, although such regions will not be identified in this way.

4) Page 17, line 27. "We checked the distributions of C_n^2 for the 3 datasets and found that the logarithmic averages of C_n^2 (close to the median values) gave 1.4, 31, and $1.0 \cdot 10^{-14} \text{ m}^{-2/3}$." Should the middle value be 31 or 3.1? The shown value of 31 is much larger than the two other values quoted.

5) Page 19, second paragraph. The authors discuss the possibility that the cloud connected with Fig. 9 may be virga. If so, the radar might be seeing hydrometeor scatter rather than clear-air scatter and the humidity retrieval algorithm would not be valid. This possibility should be discussed. This point is also relevant for the discussion of Fig. 10.

TECHNICAL CORRECTIONS

C2

6) Page 18, line 18. The word "criterion" is misspelled as "criterium" twice in this section.

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