**Atmospheric
Measurement
Techniques
Discussions**

Interactive comment on "Temperature profiles with bi-static Doppler-RASS and their accuracy" by B. Hennemuth et al.

B. Hennemuth et al.

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Reply to comments of J. Van Baelen

Content related remarks that need to be addressed:
. Section 4.2: You select an effective radius of 0.8 which is said (in the abstract) to be empirically defined. How did you end up with this value rather than any other arbitrary one (obviously below 1.0). You should show the corresponding sensitivity study that brings you to make that choice, or at least describe the reasoning that made you select this value, knowing that it might be difficult perform comparisons with 'true' measurements of the temperature profiles to provide support.

We did not try to fit the RASS profile to surface observations due to the large height gap between the lowest RASS level and in-situ sensors. Instead of this we used temperature profiles in conditions where neutral stability is expected. The choice of a_e = 0.8 is justified by analysing the the relation between the corrected temperature gradient and the value of a_e (see new figure 6 and discussion).

The structure of the paper has been changed in order to clarify the procedure of empirical bi-static correction by means of adjustment of near-neutral potential temperature profiles to zero gradient.

Likewise, the comment regarding Fig 4 that 'the corrected profiles appear to fit the near surface profiles better' is slightly overstated. That is not visually obvious.

The mismatch between the lowest RASS temperature gradient and the near-surface temperature gradient is now commented in the last paragraph of section 5.1.

Finally, your argument regarding Fig 6 which justifies the Kon method correction as physically reasonable does not validate the possible height range for this correction.

The height range for the emprical correction has been changed to 150 m.

Section 5: These are interesting case studies and descriptions: : : However, how do they support the improvement in the retrieved temperature profiles by using your proposed method. What is the benefit of the Kon corrected RASS estimate in these studies. It seems to me that the trends described here (and the conclusions provided) would certainly have been the same with UN-corrected RASS profiles! Thus, this is not exactly a validation of the new method. Without demonstration of benefit of method, case studies are not the object of the article.

We agree that case studies are not the object of the article. But physical plausible interprations of the presented observations would be prevented by the bias of uncorrected profiles. This is particularly obvious in the flux-gradient plots of (now) figure 12. We addressed now the benefit of the correction in the conclusions, esp. in the last paragraph.

Conclusions: Again, 'empirical tuning' and 'optimal value' need to be developed and demonstrated before.

As mentioned before, we described now the method of finding the optimal value of a_e in detail.

Detailed remarks:

. Abstract, L.4: 'effective' or 'equivalent' rather than 'efficient'.

has been changed

P2, L13-14: 'Typically, these systems: : :'

has been changed

P2, end o fpage, you might want to provide references for Equ.(1) and for the Ts / Tv relationship.

We think that the given reference (Kaimal and Gaynor, 1991) is sufficient(?)

P3: Add ' , hence' just before equation (5)

has been changed

P4, L4: 'according to' or 'following'

has been changed

P5, L1: 'according to'

has been changed

P5, L16: 'by Kon (1981) provides a maximum'

has been changed

P5, L25-27: 'a robust validation': : : 'which enable a plausible examination' (?)

Sentence no longer exists, because the paper structure was changed.

P5, L39-40: respect the order between 'more negative and near zero' with 'unstable and neutral straticfication' respectively

has been changed

P6, L10: 'according to Kon (1981) as being physically'

has been changed

P6, L13: 'supplementary'

has been changed

P6, L16: 'evolution within the'

has been changed

P6, L25: 'very stable condition'

has been changed

P7, L20-21: 'heights, where : : : dominates, the local' 1st reference: ': : : profiler and RASS : : :'

has been changed