

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

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### **Reply to remarks of reviewer W. Angevine**

*Some improvements to the presentation could be made.*

*The paper shows that the height-dependent geometric correction after Kon is necessary and useful. However, the selection of the specific value for the effective antenna radius is not clearly justified. Does the selected value minimize some statistical measure or cost function, or is it purely empirical?*

The value of  $a_e = 0.8$  was chosen because it corrects the temperature profiles during situations which are assumably neutral to a zero gradient of virtual potential

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temperature (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.

*Corrected profiles shown in figures 4, 7, and 9 seem reasonable for the meteorological conditions, with the possible exception of the lowest 1-2 range gates. The tower temperatures do not always match the RASS profiles, however. This is especially evident when the surface layer should be neutral or unstable, for example at 15:0 and 17:0 in figure 7, and after 11:0 in figure 9. This could indicate a need for further correction of the lowest 1-2 heights of the RASS profile, and/or a problem with the 10 m temperature. Is the 10 m measurement at Munich well calibrated?*

The near-surface instruments were calibrated before operation.

The problem of remaining mismatch of unstable profiles with surface measurements and general uncertainties is discussed now.

*Specific comments:*

*1. Equation 1 shows units in an unusual way. It would be clearer to indicate the units in the text following the equation.*

Equation 1 is a numerical value equation. In response to an earlier editor's comment on the initial format of equation 1 we decided to rewrite the equation in conformity with **NIST Guide to SI** (<http://www.nist.gov/pml/pubs/sp811/index.cfm>) Chapter 7.11 Quantity and numerical value equations.

Citation: 'Because a quantity equation such as  $l = v t$  is independent of the units used to express the values of the quantities that compose the equation, and because  $l$ ,  $v$ , and  $t$  represent quantities and not numerical values of quantities, it is incorrect to associate the equation with a statement such as 'where  $l$  is in meters,  $v$  is in meters per second, and  $t$  is in seconds.

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On the other hand, a numerical value equation expresses a relation among numerical values of quantities and therefore does depend on the units used to express the values of the quantities.)

2. *p.1082, line 7: The 'height of maximum correction...' is not clear from the figure.*

The sentence is supplemented by an explanation of 'height of maximum correction'.