

Atmos. Meas. Tech. Discuss., author comment AC1
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Reply on RC1

Joel P. Younger et al.

Author comment on "Meteor radar observations of polar mesospheric summer echoes over Svalbard" by Joel P. Younger et al., Atmos. Meas. Tech. Discuss.,
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The authors would like to thank both reviewers for their consideration of the manuscript and helpful suggestions. Please note that line numbers and figure numbers in this response refer to the original manuscript, but figure numbering has changed in the revised manuscript. In addition to the responses to the reviewers' comments, the estimate of aspect sensitivity has been updated from $6.6 \pm 2.8^\circ$ to $6.8 \pm 3.3^\circ$, following the discovery of an error in the antenna beam pattern calculation. Figure 9 has been updated accordingly. Responses (bold) to specific comments are listed below.

Fig.1, Fig.2: I recommend showing the same height range in both figures.

Changed range of figure 2 to match figure 1

P4 L96: The given reference to Chechowsky et al., 1989 could not be related to MAARSY results.

Changed "MAARSY" to "mobile SOUSY"

P5 L104: The wide field-of-view is often mentioned here and elsewhere in the text and probably refers to the characteristics of the individual antennas. It would be interesting to find here some statements about the characteristics of the antenna pattern resulting from the five incoherently added receiving channels, which would clarify the mentioned advantage that different parts of the horizontally extended PMSE can be detected.

Added to section 2.1: "While coherent addition of antennas would enhance sensitivity around zenith, the complexity of the sidelobe structure (see e.g. figure 1 of Chau, 2019), makes this unsuitable for the analysis of PMSE Doppler described in section 3.2."

Moved meteor analysis description to following paragraph and added:

"Meteor characteristics recorded include range, direction (angle of arrival), radial velocity, echo power, SNR, and echo duration."

Fig.4: To what height do these spectra belong?

Changed line 146 to read: "Fig. 4 shows the power at the strongest detection range in each frequency bin for one minute PMSE range-Doppler spectra.."

Changed Fig. 4 caption to read: "Movement of a perturbation in profiles of the power at the strongest detection range in each frequency bin of PMSE detection for NSMR on 19 July, 2020. Solid line is spectral power smoothed with a 0.5 Hz window."

P10 L184: Fig.3 to Fig.5

This is correct as written. For clarity, the sentence is changed to read "Seen as dashed lines in Fig. 3, the range-Doppler curves calculated from meteor wind estimates closely match the peak power of the range-Doppler profiles of PMSE return."

P10 L184ff: The horizontal wind shown in Fig.5 is in the range 76–100km. The statement that "the dashed lines in Fig.3" show that "the meteor wind estimates closely match the peak power of the range-Doppler profiles of PMSE return" is therefore somewhat misleading.

See response to above comment. We do not feel that the statement is misleading, but may have suffered from a lack of clarity. Changed sentence to read: "Seen as dashed lines in Fig. 3, the range-Doppler curves calculated from meteor wind estimates closely match the peak power of the range-Doppler profiles of PMSE return, as seen by the overlap between the dashed lines and PMSE intensity."