

Interactive comment on “Retrieval of intrinsic mesospheric gravity wave parameters using lidar and airglow temperature and meteor radar wind data” by Robert Reichert et al.

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Author's final response

We thank the referee for the comments. Please find attached the latexdiff version. Page and Line references in the latexdiff version are given in brackets.

Anonymous Referee #1

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This is a nice study presenting lidar and IR temperature measurements, and meteor radar wind measurements in the mesosphere. The authors presenting a method to

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combine the data to provide physically useful insight in the gravity wave structures. The authors do a nice job describing their method, which, as they say, combines spectral filtering using wavelet analysis with a phase line identification algorithm. The clear physical descriptions of exactly what each instrument is actually measuring help to ensure the reader that the authors understand not only the analysis, but also the measurements. I have only a few minor suggestions for improvements to the manuscript.

P2 L9-10 - “Limitations...” This is an awkward sentence and I'm not quite sure what point is being made.

> We changed the sentence to: P2 L9-10 (P2 L9-11) “The detection of GW by means of OH layer intensity observations depends on the (usually unknown) width and height of the OH layer as well as the GW period and vertical wavelength (Gardner and Taylor, 1998; Dunker, 2018).”

P3 L1 – Several abbreviations are given here, but they are not fully spelled out until page 4.

> We spelled out the abbreviations on P3 L1-2 (P3 L3-4) and use instead abbreviations on P4 L2-3 (P4 L5-6).

P3 L7 – should say “deriving” and “studying”

> Corrected. P3 L8 (P3 L10)

P20 L31 – The use of e.g. in this way is a bit awkward. Perhaps it would be better to place the phrase “e.g. due to vertical wind shear” inside parentheses.

> We changed that. P22 L31 (P22 L33)

Figure 9, and discussion in 5.1 and 5.2 – In both 5.1 and 5.2 there is the statement that 9b and 9d “are in good agreement”. Please provide some quantification of what is meant by this. Given the different scales and the fact that 9b has positive and negative wavelengths it is difficult to visually determine the level of agreement from the figure.

C2

> We have added a reference to the comparison of FWHM values given in Table 1 and 2 as quantification. We decided to show the sign of the vertical wavelength in Fig. 9ab in order to evaluate the vertical propagation direction, but we have improved the text to make clear that only absolute values are compared. P24 L7-8 (P24 L10-11)

P22 L17 – “comprised” is not the right word here.

> We changed ‘comprised’ to ‘detected’. P24 L17 (P24 L20)

P22 L27 - I asked 4 fellow native English speakers what “adumbrates” and no one knew. Still, it seems appropriate, so it is okay to keep it here if you like.

> The sentence was changed to ‘Such a vertical gradient is supported by SLICE meteor wind measurements (Fig. 3)’. P24 L27-28 (P24 L31)

P22 L34 – “angular frequency” is certainly not the right phrase here.

> We changed it to ‘angular change’ as suggested by the second reviewer. P25 L1 (P25 L4)

P23 L17 – “looking to the left of” should be replaced with an appropriate date/time range.

> We erased ‘looking to the left of’. Intentionally we just wanted to guide the eye from the right Figure, i.e. Figure 9d, to the left Figure, i.e. Figure 9c, and not the left part of Figure 9c. P25 L18 (P25 L22)

Please also note the supplement to this comment:

<https://www.atmos-meas-tech-discuss.net/amt-2019-73/amt-2019-73-AC1-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-73, 2019.