
Dear Dr Lahoz,

Please find below the reply to the requested technical changes. Where new text was required or where the suggested change would have altered the content new text is indicated by italics.

In this version no markings are used in the manuscript.

We highly appreciate the time you spent on improving the readability of the paper.

With best regards

Peter Preusse

L. 1: "...data from the..."

L. 24-26: Use the brackets in a consistent way. Write "..., for instance, ...".
corrected

L. 51: From convection what? Do you mean GWs arising from convection?
... for GWs excited by convection

L. 55: inconsistent spelling of "parameterization".
Changed to parameterization everywhere

L. 57: "...in the cross-frontal..."

L. 62: "...point roughly..."

L. 78: "...on the global..."

L. 83, 84: Use "second" and "third" to match "first".

L. 85: "dominating" → "dominant".

L. 89: Do you need "actually"?

L. 102: "...their relative importance..."

L. 104: "...a large part..."

Modified as suggested

L. 115-121: Use the same tense throughout the paragraph. E.g., L. 121, use "showed". Please try and do this throughout the paper.

The paper is mainly written in present tense. Therefore the whole paper was carefully checked and where appropriate past tense was replaced by present tense, i.e. in all cases were not explicitly an event in the past was described.

L. 122: "Further" → "Many".

L. 128: "...activity, as in the case studied by..."

L. 132: Do you mean "...in the ECMWF fields"?

L. 146: underestimation of what?

underestimation of the GWMF resolved by the ECMWF model

L. 163: "...in the Northern Hemisphere..."

L. 168: "...always contains..."

L. 173: "..., and (3)..."

L. 179: "...capable of measuring..."

L. 181: "...of the GWMF..."

Corrected

L. 203: "..., i.e., ..." You this form elsewhere. Also use "..., e.g., ..."

Throughout the paper brackets are replaced by comma for i.e. and e.g.

L. 206: "...from the ECMWF..."

L. 214: I think you mean "...the shortest scales..."

L. 224: I think you mean "...in the dependence on intrinsic..."

L. 273: Do you need "well"?

L. 315: Do you need "of course"?

L. 349: "...analysis altitude of 25 km. This..."

L. 356: Do you need "well"?

L. 372: "ellipse"

L. 373: "ellipses"

Corrected; filler words were deleted

L. 383: Introduce acronym for WKB. Make sure acronyms are introduced when first used.

A footnote has been introduced to explain WKB

The standard theory of GWs is based on the assumption that the variation of the background field is small within one wavelength and one wave period. This assumption is named after Wentzel, Kramers and Brillouin and called WKB assumption. In GROGRAT this is quantified by a WKB parameter, which remains smaller than 1 where the assumption is valid. For details see Marks and Eckermann (1995).

L. 391: "...in the ECMWF model."

L. 433: "...in ECMWF data...".

L. 462: kilometers

corrected

L. 647: right column where?

Figure number is given in the text:

In Figure 7, phase speeds are ...

L. 694: Why is this interesting?

There is one feature shedding light on the propagation of GWs ...

L. 755: Rephrase this – I do not understand what you mean.

Gravity waves found in our study which originate between 30° S and 50° S and have LTA in the troposphere likely are generated in the storm tracks and support the hypothesis of Hendricks et al. (2014). For instance, Fig. 5c indicates large GWMF of tropospheric LTA around Cape Town.

L. 766: Why is this puzzling?

A puzzling feature in stratospheric climatologies of GWs is the low GWMF over the Rocky Mountains (Geller et al., 2013) compared to GWMF over several other much smaller and lower mountainous regions.

L. 775: "...from entering the..."

L. 791: overline → **overbar.**

Changed as suggested

L. 930: "...is within the mid-frequency..."

This is not what I meant and I fear there was a bit too much implicitly expressed:

Note that equation A1 does not rely on the polarization and dispersion relations of GWs and does therefore not require wave parameters such as the wave vector. However, this comes at the prize that equation A1 is not the exact formulation for GWs but the mid-frequency approximation. Therefore GWMF is overestimated for low frequency waves and GWMF from temperatures is modified accordingly for this comparison.

This comparison is a little bit different than the one described in section 2.2 which is based on precise values but needs the dispersion relation. In order to avoid confusion in section 2.2 the sentence "In both cases ...", previously L270 was deleted.

L. 934: approximately.

L. 945: Perhaps use "very well" instead of "excellently".

L. 954: obey

L. 966: Full-stop should be inside the bracket.

Table 1: Could you avoid abbreviations?

Corrected

Fig. 1: What do the vertical blue lines indicate?

Vertical blue lines are drawn for horizontal wavelengths of 10, 100, 1000 and 10000 km.

Fig. 3: Indicate in the caption what the ends of the colour scale signify. Same for Fig. 9, 11, 12.

Figure 3:

In panel (b) black indicates 50 hours or more.

Figure 9:

Vertical winds for 28 January 2008, 10 km altitude; dark blue indicates values of -0.5 ms^{-1} or less, dark red indicates values of 0.5 ms^{-1} or more.

Figure 11 and 12:

Black color indicates no wave events in the respective bin.

Fig. 7: Indicate in the caption what each panel shows. Same for Fig. 8.

Figure 7

The left column (panels a, c) shows cases for which backtraces naturally end at convection, i.e. intersection of rays with convection is not taken into account. The right column (panels b, d) shows all other cases. The upper row (panels a, b) gives spectra for the period 28 January 2008 to 3 February 2008, the lower row (panels c, d) gives spectra for the period 29 June 2008 to 5 July 2008. Black and white dashed concentric circles indicate 20, 40 and 60 m s^{-1} phase speed.

Figure 8: Unless this is an unavoidable rule of ACP style I would avoid this, since

- The titles in the figure are clear (at least in my eyes)
- Repetition of information should be reduced
- The figure is already large and the caption necessarily lengthy. This may result in either a small figure or in a caption on a different page than the figure, which I consider to be far worse than to rely on titles in the figure.

Fig. 10: What do the vertical green lines indicate?

The individual 7-day periods are separated by vertical green lines.

Addition to the acknowledgment:

The authors want to thank two anonymous reviewers for their constructive comments and suggestions, and the editor Dr William Lahoz for his patience in reading and correcting the manuscript. Both helped greatly to improve the presentation of the material.