

Interactive comment on “The climatology, propagation and excitation of ultra-fast Kelvin waves as observed by meteor radar, Aura MLS, TRMM and in the Kyushu-GCM” by R. N. Davis et al.

Anonymous Referee #1

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General comments

This is a nice study that ties together different types of data from different sources to give a picture of ultra-fast Kelvin waves in the middle atmosphere. The paper is well written and the figures are appropriate.

I appreciate that the authors included their analysis of correlations of MLS temperature waves with TRMM precipitation even though the results do not contribute to a clear picture of the processes that generate the waves.

C13219

Both the title and discussion mention the behavior of the UFKW in a general way but the analysis is entirely focused on waves with zonal wavenumber 1. Please give some comments about the motivation for this restriction. Other than this concern, I have only minor comments about the manuscript.

Minor comments

1. (p. 29480, l. 11) Instead of “profiles centred over the equator” perhaps you mean “maxima centred over the equator”.
2. (p. 29481) This is not required but it would be useful to include at least a few recent references about the waves that force the QBO. A couple of suggestions are included in the reference list.
3. (p. 29485, l. 20) Please be more precise about what is “typical of all years”. Also, Figure 2 shows only a half-year. Are results in the second half of the year also similar between years? Why do you show only 6 months?
4. (Figures 2, 6a) Please annotate the axis to also show the period in days. This will make it much easier to find features mentioned in the text, which uses these units.
5. (p. 29486, l. 1) “Meridional amplitudes can be significant. . .”. It is clearer if the term “significant” is reserved for statistical significance. You could substitute “large”.
6. (p. 29486) Do you have an explanation for why the GCM amplitudes are more than an order of magnitude smaller than the observations?
7. (p. 29488, l. 20; caption to Figure 10) “highest height gate” The height gates have not been defined for MLS. Do you mean the MLS temperatures corresponding to the highest radar observations? Please clarify.
8. I found Figure 18 cramped and hard to read even after blowing it up on my screen. It would be easier to read if you expand the panels in the abscissa direction.

References

C13220

Alexander, S. P., T. Tsuda, and Y. Kawatani, and M. Takahashi, (2008) Global distribution of atmospheric waves in the equatorial upper troposphere and lower stratosphere: COSMIC observations of wave mean flow interactions. *J. Geophys. Res.*, 113, D24115, doi:10.1029/2008JD010039.

Kawatani, Y., K. Sato, T. J. Dunkerton, S. Watanabe, S. Miyahara, and M. Takahashi (2010) The roles of equatorial trapped waves and internal inertia gravity waves in driving the quasi-biennial oscillation. Part I: Zonal mean wave forcing. *J. Atmos. Sci.* 67, 963-980.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 11, 29479, 2011.

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