

Interactive comment on “Removing spurious inertial instability signals from gravity wave temperature perturbations using spectral filtering methods” by Cornelia Strube et al.

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Dear Anonymous Referee #2,

thank you very much for your valuable comments on our article. We have addressed your two specific questions in more detail below and revised the manuscript accordingly.

Yours sincerely,
Cornelia Strube

C1

1) Why do the authors often use TIMED/SABER measurements in their studies which have a poor horizontal resolution? For example, the horizontal sampling of Aura/MLS is better. It would be important to know why the approach of Jiang and Wu disappeared after 2005 or so. They used high resolution brightness temperature measurements of MLS. It makes more sense to discover gravity waves in satellite data sets having a high horizontal resolution.

Gravity wave variances calculated from MLS measurements using sublimb geometry were used also in a few studies later than 2005, see for example in Wu and Eckermann (2008). Still, we agree with Referee #2, it is a pity that this dataset is not used more extensively in newer studies. However, we focus here on studies of vertical measurement profiles which can be used to infer GWMF as well. Therefore, including MLS observations is beyond the scope of our study. We included a short comments on the matter in the introduction (see L67 and L89).

2) line 349 "... which indicates real gravity wave activity" This seems to be a speculation since there are steep meridional and zonal gradients at the polar vortex edge which might be misinterpreted as enhanced gravity wave activity around the polar vortex. Please discuss this fundamental problem in more detail.

Of course, steep temperature gradients occur at the vortex edge and can bias estimates of GW activity. However, the feature observed here is relatively broad and extends with similar strength over almost 30° of latitude. In particular, it is also observed in the jet core and thus away from particular strong horizontal gradients. We therefore think that this is a robust feature. We add the following sentence in the manuscript (L349):

... and in particular in a wide range of latitudes associated with the polar jet. Though there may be some structures caused by horizontal gradients at the vortex edge, this enhancement spans approx. 30° of latitude and hence indicates real gravity wave activity.

C2

References

Wu, D. L., and S. D. Eckermann, 2008: *Global Gravity Wave Variances from Aura MLS: Characteristics and Interpretation*. J. Atmos. Sci., 65, 3695–3718, <https://doi.org/10.1175/2008JAS2489.1>.

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