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Interactive comment on "Seasonal variability of atmospheric tides in the mesosphere and lower thermosphere: meteor radar data and simulations" *by* Dimitry Pokhotelov et al.

Anonymous Referee #2

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Review of "Seasonal variability of atmospheric tides in the mesophere an lower thermosphere: meteor radar data and simulations" by Dimitry Pokhotelov et al. (ANGEO communicates, March 2018)

This paper compares the semi-diurnal tide amplitudes from two meteor radars at northern latitudes with the Kühlungsborn Mechanistic Climate Model (KMCM). It is well written and well organized.

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Discussion paper

1. This is a very light paper as regards content: what is the purpose? If the meteor data are taken as representing the true semi-diurnal tide, then it seems the purpose is to show the quality of the mesospheric KMCM. In this case, comparison of the MWR with other tidal models, e.g. GSWM, is essential. That is, are there other equally realistic or better models with which to feed the upper level KMCM simulation? All that is required here is a commment on whether or not the same similarity features mentioned here are present in another modern tidal GCM. [If the tide is considered migrating only, then 6 hr data can yield phase and amplitude.] Does this other GCM have the parameters needed to feed the upper KMCM?

2. The figure arrangements are not conducive to comparison; some or all figure pairs should show meteor and KMCM together.

3. Semi-diurnal tidal phases should also be compared.

4. More detail is needed on special fitting process - e.g. what is the basic interval length, fitting method (least squares?), periods and fitting/subtraction order. Was a linear trend included in the fit?

5. Some significant meteor-KMCM differences have been glossed over, e.g. the KMCM tidal maximum in spring, which is not shown by the radar data. Figure 4 shows KMCM tide is almost linear at summer upper heights whereas meteor is probably circular; at least zonal and meridional components are roughly equal. Tidal phases are necessary to test circularity.

6. “special spectral ..." why are GW mentioned and not used. Unless the original data contains a pure sinusoid, when a spectral component is fitted and removed extra noise is created - that is, more is being subtracted than is actually present. An alternate method is to use an hourly difference filter, whose response peaks at 2 hr (but it also has a drawback in that there is a residual response at tidal frequencies.) There is additional noise in the original meteor wind fits created by angle-of-arrival and radial velocity errors (which, because of the radial nature of the measurements, cannot be broken down into zonal and meridional wind errors.)

Line 15-22: Explain how tidal variabilities "contaminate" the data. Is the argument that the KMCM does not have as much variability as meteor tidal amplitude data?

Line 13: Which references used which model(s)?

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