Review of *Mesospheric semidiurnal tides and near-12-hour waves through jointly analyzing five longitudinally-distributed specular meteor radars at boreal midlatitudes* by He and Chang.

This manuscript reports on 6 semidiurnal and cuasi-semidiurnal tidal components, namely, SW2, SW1, SW3, M2 and the lower and upper side band interactions of SW2 and the 16-day PW (LSB and USB). These are derived from 5 radar measurements located at roughly three longitudes and ~50N. The three 12hr components are further compared to results from CTMT, showing a relatively good agreement. They also study the tidal enhancement during SSWs. As in previous works, the authors suggest that, due to their close period, aliasing between these waves may have lead to misinterpretation in semidiurnal tide measurements.

The paper is well written and easy to read, the methodology is generally adequate and the results are convincing. In general, the conclusions are not completely new and the results confirm previous works, but, in this one, a decomposition of the six waves is simultaneosly performed using several radar measurements extending 7 years.

I think the manuscript deserves publication in ACP once the following comments are addressed.

Main comments

1. The title is misleading. It is true that 5 radars are used but they are not longitudinally distributed: only 3 longitudes are sampled. Please, change the title accordingly.

2. Radar measurents have a significantly better resolution than CTMT results (~2months). Comparisons at similar temporal resolutions would make more sense. In that sense, the discussion in the text and panels a-f in Fig. 7 accordingly. On the other hand, that would additionally allow to delete Fig. 7 a-c panels, which are almost the same as j-l in Fig.4. That the phase does not change from year to year could just be mentioned in the text.

3. The authors report here (and also in previous works) that SW1 and SW3 are aliased with LSB and USB, respectively, in most previous tide studies from observations. I guess that CTMT is also that case. In the radar measurements with CTMT comparisons, why do you then compare SW1 and SW3 for both datasets instead of SW1+LSB and SW3+USB for the measurements with SW1 and SW3, respectively, for the model?

4. In general, the manuscript sometimes misses the opportunity to explain reasons for the tidal behavior. For example, there is no mention of the origin of the tidal seasonal variation. Also, the reasons for the LSB and M2 dependence on the SSW classification could be explored further. Potential attribution to planetary wave of particular wavenumbers might help.

Specific comments

P2L1-2. MLT monitoring is not only possible with those two techniques. Please, expand.

P2L4. Please, write single-point (in space or time).

P8L8-9. this is not exact. Slowly precessing satellite measurements may have large temporal resolutions but still can distinguish temporal variations. Also, finer temporal resolution can be achieved in some particular cases (e.g. Li et al., JGR, doi:10.1002/2015JA021577, 2015).

P3L2. Are the data available continuosly from the years indicated?

P3L16. Define f and t

P3L28. Even if the correlation between 40 and 50N is high, what is the difference in amplitude of these modes in CTMT?

P4L1. are -> is

P3L5. 12hr -> 12hr period,

P4L31.12.0h period

P4L32. Shortly explain in the text why only those m_k 's

P5L2. Please, comment on possible aliasing with other period waves.

P6L28. Is it possible that the interaction between PW and M2 is the origin of LSB?

P6 Why didn't you consider minor wamings?

P7L3. Please, provide your definition of PVW strength.

P7L5. Is there any relationship between PW1 (associated to displacement events) and the strong LSB (m=1)?

P7L5. There was a major final warming in March 2016 (Manney et al., 2016) but you find weakest M2 and LSB at that time. Please, explain why. Perhaps indicating your definition of non-SSW would help.

P7L18. I do not think it suggest to be more dominated by SSW but just that SSW have a significant effect.

P7L23. Please, specify that waves eventially dissipate.

P7L24. temporal variations are similar except when the altitude of dissipation changes with season. In general, it seems that does not apply to your waves (except SW3 in December, which appartently starts dissipating at lower altitudes than other years. Please, comment on that.

P7L26. Figure 6 is misleading. I do not think this gives a good representation of the seasonal behavior, particularly if one wants to compare the three waves. Indeed, SW1 is clearly enhanced in winter (mainly no wave during the rest of the year), which is not felt in Fig. 6. Also, SW1 looks relatively stronger in Fig. 6 than in Fig. 4: in winter, relatively stronger than SW1; in May stronger than SW3; in late October, even SW3 dominates as seen in Fig 4, but not in Fig.6. Given the non-linear amplitude vertical grow, perhaps averaging amplitude relative seasonal anomalies at each altittude would work better.

P7L30. I do not agree that SW2 is a reasonable approximation of SW2, particularly above 92km. For example, according to Fig 4, SW1 + SW3 contribute around 30% during Jan-Feb. In early December, SW1 contributes more than 30%. Please, be more precise.

P7L31-32. Repeated.

P8L10. Is this also due to the non-linear SW2 - sPW1 interaction that excites SW1 preferentially (as compared to SW3) in the winter?

P8L26. It is true that CTMT's resolution smoothes the maxima and the minima but they can be inferred. However, the summer CTMT SW2 max is shifted one-two months in you measurements. Please, provide some explanation for this difference.

P8L27. Please, degrade the temporal and vertical resolution of your measurments to two months and 1,7km (as CTMT) and replace corresponding panels in Fig. 7. That way the comparison with CTMT would make more sense.

P8L30. different from -> before

P8L30-P90L1. I do not agree that the difference is due to an uneven sampling because that is not the case. Neither to the temporal resolution difference (that, on the other hand, should be seen once the radar temporal resolution is degraded) because that would just smear out the maximum instead of producing a temporal shift.

P9L2. Please, describe the major discrepancies for SW1.

P9L3-6. I do not really understand what new to Fig. 7 Figure 8 adds?

P9L19. neglected tidal components

P9L16. Discussing the overall yearly bias as compared to your amplitude estimations for SW1, SW2 and SW3 is misleading. It would be more useful to check the bias relative to the amplitudes for each month. For example, for SW3 and SW1 in August above 90km, the bias is 3-4 m/s, not bad, but the relative bias would be large or extremely large, respectively. In other words, estimated SW3 amplitude might be 50% biased and all estimated SW1 amplitude is not even SW1. Note that there is also the possiblility that CTMT is not fully correct.

P9L29. Please, comment also on possible leakage from waves of other periods on your estimated semidiurnal amplitudes.

P10L6. from five SMRs "located at roughly 3 longitudes"

P10L9. Contrary to "most"

P10L6. SW1 and SW3 do not enhance during SSWs, "as suggested by He et al. (2018a, b)".

P10L20. I find more useful to know when and how much SW2 is not a good approximation for the semidiurnal tide.