Review of "Stratospheric gravity waves excited by Hurricane Joaquin in 2015: 3-D characteristics and the correlation with hurricane intensification" by Wu et al.

General comments:

This work studies the correlations between the stratospheric gravity waves (GWs) excited by TCs and TC intensity for the case of Hurricane Joaquin (2015) using high-resolution WRF simulations and 3D Stockwell transform method. Large time-lagged correlation is found between the hurrican intensification and stratospheric GWs, with different chacteristics between the GWs in the intensifying and weakening stages of the hurrican. Overll, the paper is well organized and well written. The findings are interesting which is thought to be beneficial for the detection of hurrican intensification using satellite observation of stratospheric GWs.

Major comments:

1. L157: For the peak spectral amplitude of (f_x, f_y, f_z), do you mean the maximum of sqrt(f_x^2+f_y^2+f_z^2)? The authors seem to find out the dominant wave component. Shouldn't this be done for the power spectrum of wave energy rather than the wave frequency?
2. Fig. 3. Are the variables show on this figure derived in the entire D02 or part of it? Are the results sensitive to the domain size? As shown in the right column of Fig. 2, notable GWs are confined in the inner core of the hurricane. Moreover, the maximum heating rate (HR) is shown herein, why not the domain-average HR which should be more relevant to the GWI (variance of vertical velocity in the domain)? More importantly, the HR seems to be the local change of temperature which includes both adiabatic (e.g., temperature advection) and diabatic (e.g., latent heat release) processes? Which process is more relevant to the generation of GWs, the latter one? If this were the case, should it be better show only the diabatic heating rate in the model?
3. About the GW characterisitics in section 5.3. In L291-304, the authors studied various aspects of the GWs. For examlple, high-frequency, short-scale waves are confined in the inner core region while low-frequency ones propagate outward. But there is a lack of

physical explanation for these phenomena. An in-depth discussion of the GW dispersion relationship (combining the wave hoirozntal/vertical scale, phase velocity and intrinsic frequency) will be helpful. Similarly, while the authors found distcint differences between the wave properties in the intensifying and weakening periods, the underlying mechanisms are unclear. For example, why are the wave intrinsic frequency (horizontal wave scale) higher (shorter) in the intensification than in the weakening period?

4. L421-422. While I generally agree with this statement "… *the stratospheric GWs during hurricane intensification exhibit relatively higher frequencies, shorter horizontal wavelengths, and longer vertical wavelengths* …", it is not clear what frequency can be viewed as high or low and what scale is short/long. The differences between the distribution patterns of GWs in the two periods (Fig. 7) are indeed quite small. This may challenge the use of satellite observation of GWs in detecing the hurrican intensification (recalling the last sentence of abstract).

Minor comments:

1. L175: *H* is the scale height of stratosphere or troposphere?
2. L251: sensible -> sensitive
3. L343: expected->as expected
4. L393: note->noted
5. Fig.5. Please be more specific with the intensification period in this figure. Is it the three gray shadings in Fig. 3a or only the one in Fig. 3b? So is the weakening period.
6. The title of section 5.3 reads like the authors only studied the GWs during the intensifying period.
7. It's better to add the mean values of each parameter on Fig. 7 and Fig. 9 for comparision. Moreover, to convince the readers, statistical signfiicance tests are needed for these figures.