

## ***Interactive comment on “Observation and a numerical study of gravity waves during tropical cyclone Ivan (2008)” by F. Chane Ming et al.***

**Anonymous Referee #3**

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This article presents the investigation of the GW activities relating to a tropical cyclone (TC Ivan in 2008) in the SWIO. Results from analyzing radiosonde measurements, GPS-RO dataset, ECMWF operational analysis dataset, and numerical simulation are provided. The article reports that the GWs fall in a very broad spectrum both in the spatial and temporal aspects. Then the authors highlight their simulation results regarding the TC-related quasi-inertia GW during the TC's intensification phase, and also provide a mechanism on the generation of the GWs. Again by the simulation results, GW-activity and TC clouds are connected by the author. Finally, the authors suggest that the GWs excited during a TC's landfall can likely impact the upper troposphere and stratospheric circulation. Generally, the article shows quite amount of estimation results, each of them are helpful to the community. However, the article only provides

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pieces of information that need further re-arrangement so as to provide readers a clear context of the research. Furthermore, in-depth analyses are necessary such that a general convincing product is presented to readers.

My major comments are listed below.

1 Section 5 contains the results that are derived by using four kinds independent dataset. And one can see three independent sub-sections as no substantial inter-comparison between the materials is conducted. Thus no comprehensive conclusion can be made for section 5.

2 I doubt the results in Table 1 as GW components with very small horizontal scale are seen both in the troposphere and stratosphere. Technically, the measurements are taken along the ascending of balloon at vertical speed of  $\sim 5$  m/s and drifting in horizontal flow. The horizontal resolution of the measurements may not be sufficient to resolve atmospheric processes with the horizontal scales shown in Table 1. Moreover, I never see such kind estimates from other researches using radiosonde measurements. I would suggest the authors check these data again.

3 The advantage of a simulation is that continuous atmospheric variables on regular spatial grids are available. Currently, very high horizontal resolution (4 km) is applied, many details of the TC as well as other processes, e.g., the GWs, should be resolved analytically. However, in addition to the conventional analysis procedure applied to a radiosonde profile, the authors always conduct 2D / 3D investigation with eyes. There have been several simulation studies, as listed in references, and the analysis strategies introduced in these papers should be applicable with the current simulation results.

4 Regarding the major finding of 'the TC-related quasi-inertia GW during the TC's intensification phase', i.e., the GWs with horizontal scale  $\sim 600$ km. The result is very similar to that shown in Chen et al. (2012), which inherits from Preusse et al. (2003, AFO Newsletter 5: 3-6) and the subsequent researches (as is referred by Chun et al.,

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2005). I think this is an interesting result and worth further investigation. Moreover, with high horizontal resolution simulation results, more details of the GWs are expectable.

Minor comment.

The authors choose a strategy to support their results by appending every statement a citation. This writing makes it very difficult for a reader to discriminate which is the authors' results. I would suggest detract all the materials without novel information.

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 10757, 2013.