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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of the sudden stratosphere warming on quasi-2 day waves" *by* S.-Y. Gu et al.

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Interactive comment on "Influence of the sudden stratosphere warming on quasi-2 day waves" by S.-Y. Gu et al.

Anonymous Referee #2

Received and published: 7 March 2016

General comments:

The authors use the thermosphere-Ionosphere-Mesosphere-Electrodynamics General Circulation model to model the effect of the sudden stratospheric warming on the quasi-2-day wave (QTDW). They investigate the non-linear interaction of the QTDW with westward zonal wavenumber 3 (W3) and the stationary planetary wave with zonal

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wavenumber 1 and show that a QTDW with westward zonal wavenumber 2 can be produced.

Specific comments:

I agree with the specific comments of referee nr. 1 in addition I was wondering:

1) Why has the analysis of the W3 wave been performed in the meridional wind at 82 km, 7.5 S and days 25-30

Reply: We thank the reviewer for catching this. It should be 90 km and 22.5S. We changed some plots during the manuscript preparation without changing all the corresponding text. The mistakes are corrected in the revision. Figure 5b shows that the meridional perturbations of W3 maximize at ∼90 km and 22.5°S in our simulations. Figure 6 shows that the W3 maximizes at around day 25-30 in all the three cases. Thus, we choose the peak location and peak time during the data analysis. 90 km and 22.5°S are also the grid points in TIME-GCM with no specific meanings.

2) Why are days 15-20 chosen for the analysis of the W2 and not the same time period as for the analysis of the W3?

Reply: In our simulations, W2 peaks earlier than W3 with maximum amplitude at around day 15-20, which is shown by Figure 10. When examining the vertical and global structure of W2 and W3, we would like to choose the periods with strongest wave perturbations.

3) Why has the analysis of the W2 wave been performed in the meridional wind at 100 km, 2.5 N and during days 15-20?

Reply: Figure 9b shows that the meridional perturbations of W2 maximize in the equatorial regions at ∼100 km. We choose the peak location during the wavenumber-period spectrum analysis. 2.5N is also just one grid point near the equator in TIME-GCM.

4) In the caption of Figure 5 the authors state that the analysis of the W3 has been

performed at 22.5S and 90km. However, in the text describing Figure 5 (page 11, line 226f), the authors state that the analysis of the W3 wave has been performed at 82 km and at 7.5S. Which coordinates have been used?

Reply: We changed some plots during the manuscript preparation without changing all the corresponding text. It should be 90 km and 22.5S. The mistakes are corrected in the revision.

Technical corrections:

1) Page 15, Line 313: Baratropic/baraclinic => barotropic/baroclinic

Reply: Revised in the revision.

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