Atmos. Chem. Phys. Discuss., 11, C13914–C13916, 2012
www.atmos-chem-phys-discuss.net/11/C13914/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Ozone zonal asymmetry and planetary waves characterization during Antarctic spring" *by* I. Ialongo et al.

Anonymous Referee #2

Received and published: 5 January 2012

General Comments:

This paper describes the zonal asymmetry in spring-time ozone over Antarctica using OMI, GOMOS, and MLS data over the 6-year period from 2005-2010. The asymmetry is characterized primarily by the stationary and total wave 1 and 2 amplitudes, examined using time-series Hovmoller plots and montly and tri-monthly average plots. The results should be of interest to the atmsopheric science community due to the impact of zonal anomalies on climate modeling. The paper presents some good results, but in my opinion still lacks some "big picture" discussion. The specific comments below will hopefully help guide the authors in revising the manuscript to give it a larger scientific impact.

Specific Comments:

1. Please define "N" in Equation 1.

2. I'm not sure why Fig. 2 used October mean, but Fig. 3 used Sep-Nov mean. Why not be consistent?

3. If you decide to make Figs. 2 and 3 consistent, you could put dots on Fig. 2 to indicate the min/max locations.

4. P32344, First paragraph: This discussion is a bit confusing. I'm not sure what the point is that you're trying to make here. I think it's that you're making trend-like comments based on 6-years, but this is likely simply interannual variation.

5. Time-series plots of the OMI W1 and W2 amplitudes may help augment your discussion of Figure 4. Some of the points you're making are a bit difficult to see in the Hovmoller diagrams.

6. I'm not sure I'm getting the take-home point on Figure 5. Yes, there is a lot of interannual variability, but what is the "big picture" here?

7. You say several times that GOMOS and MLS show asymmetry up to 60-65 km. Yet the MLS plot only extends to $\sim$50 km, and the amplitudes based on MLS mixing ratios are quite small above 30 km. Was there a plot with MLS-based number density in an earlier version of the manuscript? Please explain.

8. P32347, L23-25: It looks like there are strong year-to-year variations in September and October, too.

9. Characterization of planetary wave amplitudes is often done with geopotential height. I was curious why you didn't agument your analysis with analysis of the height field to show the dynamical influence. Maybe this would be redundant with the air density and temperature plots.

Technical Corrections:

1. P32339, L14: "planetary waves activity" should be "planetary wave activity"

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2. P32343, L22: "respect to the South Pole" should be "with respect to the South Pole"

3. P32347, L16: Strange wording, please look at this.

4. P32347, L16: You say 60 km, but plot only reaches ∼50 km. Amplitudes look small above 30 km.

5. P32348, L10: "is" should be "are" to match noun "amplitudes"

6. P32348, L15: You didn't show MLS ozone asymmetries extend up to 60-65 km.

7. In the manuscript title, shouldn't "planetary waves" be "planetary wave"?

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 32337, 2011.

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