

## ***Interactive comment on “Large-scale planetary disturbances in stratospheric temperature at high-latitudes in the Southern Summer Hemisphere” by M. G. Shepherd and T. Tsuda***

**Anonymous Referee #1**

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This paper is a largely well written study utilising GPS COSMIC derived temperature observations in an analysis of planetary scale waves at wave numbers 1 and 2 with periods of 10, 16 and 23 days. Due to the observational characteristics, high latitude waves can be analysed and the results obtained show a very dynamically active Antarctic (early?) summer stratosphere. The part about the background state of the atmosphere and the QBO was confusing and requires a re-write (see details below). The paper is suitable for publishing in ACP after some revision.

Major comments:

Only one height level is analysed (30km). The notion of a height range (10-40km)

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should be dropped (in the abstract and the main text), if no additional information is provided. It seems a missed opportunity, not to investigate other levels, but this should not be prohibitive for publication.

When talking about the QBO the authors are confusing me: QBO/vortex relationships have quite a long tradition in stratospheric research (e.g. work by Holton and Tan). The Labitzke reference on page 16426 is not in the literature list and is quite likely not the most relevant here (I guess the reference is to the overview paper from 2006, but some detailed earlier/original work by Labitzke et al. and Gray et al. would be more suitable to cite here). In addition, there seems to be no clear distinction between Northern and Southern hemisphere (most work is based on NH data). The following description of the phase of the QBO during the observational period is confusing. The authors should rephrase this (16426) and the following paragraph after plotting and providing a figure for the paper from NCEP or ECMWF zonal wind data to illustrate the background state of the atmosphere clearly (two panels: zonal mean zonal wind at 30km as a function of time and latitude, zonal mean zonal wind at the equator as a function of time and height). Figure 1 could be dropped instead, I do not think this much detail about the sampling is required,; it cannot be assessed by eye anyway.

The conclusions need to be adjusted to the work presented. A small snapshot study is very valuable, but should not be used to speculate about long-term changes or past exciting events that have no relation to the data base presented in the paper. A toned down outlook might be permissible, but foremost the presented findings should be summarised and discussed in the context of the common perception of a quiet Antarctic summer stratosphere. Maybe the authors should come back to figure 6 in this context. Looking at this figure for quite some time, I get the feeling that the (late) Antarctic summer is quiet, and the timing of the seasonal transition is most interesting (which might come back to a proper description of the seasonal evolution of winds, see above).

Minor comments:

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Technical: colour scale in figure 4 was very low in contrast; maybe the authors could consider a colour scale similar to figure 3?

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 16409, 2008.

**ACPD**

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