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Comment

## ***Interactive comment on “Spatio-temporal observations of tertiary ozone maximum” by V. F. Sofieva et al.***

**Anonymous Referee #1**

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### Spatio-temporal observations of tertiary ozone maximum

**Opening Remarks** In this paper the authors have presented GOMOS results that clearly illustrate the spatio-temporal distribution of the Tertiary Ozone Maximum (TOM) throughout the years 2002-2006. They have compared these data with model results produced by WACCM and have found reasonably good agreement. The main results of the paper include: observations of the TOM at high latitudes away from the polar terminator; observations of the TOM in the middle of the winter; observations of downward transport of ozone by meridional circulation and observations of the impact of stratospheric warmings and solar proton events on the TOM.

**General Comment**

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This is a well written paper that clearly demonstrates the utility of the GOMOS data set for the study and understanding of the tertiary ozone maximum phenomenon. I feel the GOMOS results have been presented nicely but I also believe the WACCM results could have been presented differently in order to enhance the comparisons. My main concern with the article is the limited set of WACCM results. This will be addressed in more detail below. Overall I feel the paper presents useful results and should be published pending the modifications suggested below.

#### Specific Comments

1) I have a minor question as to the use of MSIS data. Have the authors attempted to merge ECMWF and MSIS to provide continuity at altitudes where they overlap. 2) Another minor question. What exactly is meant by three point smoothing? Is this done in latitude, time or both. 3) Figure 2 would be enhanced if these plots were supplemented with additional plots containing cross-sectional slices of these two-dimensional data sets. For instance two or three cross sections of the GOMOS data and the WACCM results over-plotted, with time as the independent variable, would better illustrate the model-measurement comparisons. These cross-sections could be for 60, 70 and 80 degrees latitude. 4) Is it possible to run the WACCM model to better replicate the viewing times of GOMOS data set? Looking at Figures 3 and 4 and reading the text associated with these figures gives the impression that apples are being compared to oranges. It is difficult, to impossible, to determine how well the model compares to the measurements by looking at these figures. Closing Remarks This is a generally well written paper that provides useful measurements related to the tertiary ozone maximum. I suggest that if the authors tighten up their WACCM comparison sections the article should be published.

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 6597, 2009.

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