

Interactive comment on “Study on the impact of sudden stratosphere warming in the upper mesosphere-lower thermosphere regions using satellite and HF radar measurements” by N. Mbatha et al.

Anonymous Referee #2

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Stratospheric sudden warming (SSW) is an important phenomenon in the middle atmosphere during which there are dramatic changes not only in the stratosphere but also in the mesosphere. However because most of the data assimilation analyses are available only below the stratopause, diagnostic studies on SSW often focus on the changes in the stratospheric temperature and wind. To gain a comprehensive picture of the SSW, changes in wind and temperature above stratopause need to be examined.

This work examines the dynamical response of the mesosphere and lower thermosphere (MLT) to the 2002 SSW by using the high frequency radar wind data from

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SANAE, satellite observations from SABER and NCEP analyses. The results of this work show some interesting features of wind and temperature changes during the 2002 Antarctic major warming in the MLT regions. Although similar results have been published (e.g. Dowdy et al., 2004) on the reversal of zonal wind in the MLT prior to the SSW and the mesospheric cooling during the SSW it is still worthwhile to publish this work because it confirms these features from an independent data source.

I have following questions and suggestions that the authors may find useful.

(1) When using SABER data in the MLT one should be careful because the observation errors of SABER temperature are very large. The authors should discuss the impact of the large error on the some conclusions of this paper.

(2) On page 10 the authors pointed out that NCEP data can be used to identify SSW and final warming. However from Fig.1 only SSW (around September 27) can be identified. Temperature does not retreat back to its pre-warming value.

Further exploration of this feature may make this work more interesting.

(3) About the mesospheric cooling in the SH during the 2002 SH SSW the work of Ren et al. (GRL, vol 35, doi:10.1029/2007GL032699) has very detailed discussions based on CMAM-DAS analysis data The results of that work may be helpful in interpreting the authors' results.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 23051, 2009.

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