

Interactive comment on “Evaluation of near-tropopause ozone distributions in the Global Modeling Initiative combined stratosphere/troposphere model with ozonesonde data” by D. B. Considine et al.

Anonymous Referee #4

Received and published: 19 February 2008

This paper describes the evaluation of a new model of stratospheric and tropospheric chemistry focusing on ozone in the tropopause region. It demonstrates that there is good general agreement in global ozone between the model and observations, but notes that tropopause ozone is biased high and attributes this to insufficient vertical resolution in the tropopause region. This is explored by comparing model and observations relative to the diagnosed tropopause height, a technique which represents the near-tropopause region more appropriately and provides substantial additional insight. The coupling between stratosphere and troposphere is then examined by comparing

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the annual variation in tropopause ozone in tropical and mid-latitude regions.

The paper is well conceived, well written and appropriately illustrated. In addition to providing a useful evaluation of a recently-developed model, it demonstrates the application of new methodology for comparison of model data with observations in the near-tropopause region, approaches which future model evaluations should be encouraged to adopt. As such, the paper makes a substantial scientific contribution and will be a valuable addition to the literature. The paper is already very polished, and I find only a few minor points to be addressed before it is suitable for publication in ACP.

Page 1596, line 26: add "thermal" before "tropopause" as a reminder of the tropopause definition that is being used here.

Section 4.2: Are the observed tropopause heights used here based on the regrided (35 level) ozonesonde climatology? How is the thermal tropopause definition then applied? Is the ozone comparison in section 4.3 then performed with mean ozone in the level at which the tropopause is found? Some clarification of the technique used is necessary here.

Page 1599, line 26: While I would agree that vertical resolution is the most likely source of the high bias here, what contribution might tropospheric processes (convection, chemical formation) make to this bias?

Page 1607, line 21: How do the model RTT-averaged profiles compare? This panel has been omitted from Fig 17.

The column headings in Table 2 would be clearer if they were allowed to span multiple columns (e.g., the first three columns all refer to annual mean tropopause pressure: observed, model, and difference respectively.)

Figs 4, 5 and 6 are clear enough, but could make better use of the available space by using larger plots packed closer together.

Figs 13 and 14: It would be valuable to have these figures side by side, as a direct

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comparison provides significant additional insight.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 1589, 2008.

ACPD

8, S266–S268, 2008

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