

Interactive
Comment

***Interactive comment on* “Model simulations of stratospheric ozone loss caused by enhanced mesospheric NO_x during Arctic Winter 2003/2004” by B. Vogel et al.**

Anonymous Referee #2

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This paper discusses CLAMS model simulations of the impact of the NO_x descent from the polar mesosphere into the stratosphere upon stratospheric ozone loss. Several model simulations were carried out with varying injected NO_x amounts at the top boundary. Ozone loss and ozone column loss are compared in the simulations, and the impact of the NO_x descent is inferred.

The paper is well written, and the authors have carefully designed the experiments to prescribe realistic amounts of NO_x. The paper is well worth to be published in ACP, and I have only minor comments.

1) It is unclear what in-homogeneities in NO_x (at 1600K) the authors refer to, when

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discussing Figure 7. It is apparent that the satellite NOX observations are higher than in the model at 2000K, but at 1600K the plot is cluttered by the superposition of satellite data (circles) on the model field, which indeed seems to show localised enhancements. What is the origin of these inhomogeneities ? This needs clarification and possibly an improved or additional figure (e.g. scatter plot ?). It is also very difficult to see the ACE observations (diamonds) in these figures. 2) In Figure 5, there are discrepancies between MIPAS and the model below 750K in November and December 2003. Are these consistent (in time and altitude) with satellite observations of the NOX enhancements following the SPEs of late October 2003. 3) In Fig. 9, the depletion shows up in column ozone from February (roughly), presumably due to the ozone change in the 350K-700K layer. The NOX anomalies do not seem to penetrate that low. Is the rate of descent of the NOX anomalies in the model throughout the winter consistent with other studies and observations? The authors should discuss this point. 4) The paper discusses only the effect of NOX injection at the top of the stratosphere, not the in-situ stratospheric NOX production due to the SPEs. This is mentioned in the text, but should be re-emphasised in the Abstract and Conclusions.

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