

## ***Interactive comment on “Investigation of Arctic ozone depletion sampled over midlatitudes during the Egrett Campaign of spring/summer 2000” by D. E. M. Ross et al.***

### **Anonymous Referee #1**

Received and published: 12 January 2004

general comments

this paper combines airborne tracer data obtained at mid latitudes and modelling results to derive ozone depletion. The paper is of good quality and contains sufficient material to merit publication. My main comment is that the authors acknowledge that mixing may influence their results based on tracer-tracer correlations, but then do not take this into account when interpreting their data. This could be overcome by comparing the CFC11-passive O<sub>3</sub> correlation in the model for the January period with the same model correlation in the June period as done in Figure 4 (a). Another problem which should be addressed, is the fact that the model is not able to capture the correct ozone mixing ratio in the mid or low latitude air surrounding the filament. This cer-

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tainly would be a prerequisite in order to attribute the good agreement between model and observation inside the filament to chemical ozone depletion. In fact, the absolute difference between observation and passive ozone is remarkably constant inside and outside the filament. The model also seems to overestimate the mixing between the outside of the filament with inside filament air, as it underestimates the gradients of the tracer CFC-11. This overestimated mixing should of course also affect the ozone distribution. To my feeling, the ozone loss is only visible in the model data, based on the passive ozone. Only when using the correlation approach, ozone loss can be diagnosed from the data, with the model as a tool to show that mixing should not have affected the correlation between CFC11 and ozone.

specific comments

p2., l 19: the concentrations of tracers do not remain constant during transport; the mixing ratios do if there is no mixing; the correlations do even if there is mixing, as long as the correlations are linear.

p. 5, last line: I do not understand why the instrument should take samples at preset times on a balloon. An in-situ GC should be able to measure at regular intervals.

p. 7., last line: Figure 3 gives an equivalent latitude of  $38^{\circ}\text{N}$  for the outside filament air. I would be careful to call this a subtropical intrusion.  $38^{\circ}\text{N}$  is certainly still mid-latitudes.

p. 8., l 10: I would be careful to call the air younger, as no age tracer was measured.

p. 8, l 15: the modeled ozone is only in good agreement inside the filament.

p. 10, las paragraph: be careful with this statement: the model does not get the gradients from the inside to the outside of the filament right, and has too high mixing ratios outside (factor 2!)

p. 12, chapter 5: I think one should be careful to compare two filaments (one in april, one in june) with each other. Both filaments may have had a different history and been subject to different conditions. Such statements as drawn here should be based on a

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statistical approach if the conclusions are to be meaningful.

technical corrections

p2, l1: please provide reference (WMO 1993 can not be a reference for O3 destruction in 1997-2001)

p3., 2nd paragraph: sentence starting with several studies.. comes twice.

Figure 2: flight path is missing in my version of the paper.

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Interactive comment on Atmos. Chem. Phys. Discuss., 4, 141, 2004.

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