

Interactive comment on “Mid-latitude ozone changes: studies with a 3-D CTM forced by ERA-40 analyses” by W. Feng et al.

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General comments:

This paper presents a model study of ozone trends from 1979 to 2004 using the SLIM-CAT 3-D CTM forced by ERA-40 (before 2002) and operational analyses (2002-2004) from ECMWF. Four calculations are presented, using time-dependent and fixed halogens and with and without short-lived bromine compounds. The results indicate that caution should be used in attributing ozone increases to halogen decreases, and that the ERA-40 data produced spurious ozone variations on an interannual time scale.

The first paragraph of the introduction should mention aerosols and solar cycles, as well as "chemical loss due to increased halogens and dynamical changes" as pro-

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cesses contributing to mid-latitude ozone change.

Section 2.1, 2nd paragraph describes the modeled bromine source gases. Combining H1211 and H1301 emissions leads to some skewing of the odd bromine profile, since these two gases have rather different lifetimes. Likewise for combining the very short lived bromine species (VSLS) into CH₂Br₂, as CHBr₃ has a different lifetime (though the effect should be restricted to the troposphere in this case). These are minor impacts and don't detract from the paper, but including two halons and two VSLS would make the modeling cleaner.

Section 2.1, last paragraph, there is a discrepancy in the bromine source gas description for run C here and in Table 1. The text implies that halons are included in run C and the table indicates that they were not. Please clarify.

Section 3.3, first paragraph should have an explanation of how the data in Figure 3 was deseasonalized (12-month running means?). Why do you use 12-month rather than 24-month running means? QBO signals remain in the 12-month averages. In addition, 24-month averages make for easier comparison with WMO ozone assessments where the QBO is removed.

Section 4, the conclusion should state that this 3-D CTM agrees with the Salawitch et al.(2005) paper on the importance of VSL bromine species to the ozone trend primarily during times of elevated aerosol loading. Despite the fact that the Salawitch paper ignored VSL species and simply added 4-8 pptv of bromine throughout the stratosphere.

This paper is well-written and should be published in ACP. However, it should be noted that there are several aspects of the historical ozone trend which are not addressed. These include interannual variability (there is no calculation with annually-repeating temperature and circulation for comparison), solar cycles (apparently not included), and Pinatubo effects (included but no calculation without, so no conclusions possible).

Specific comments:

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Abstract, p. 6695, line 16, "not increase due to" ("due" missing)
page 6703, line 4, change "through the maximum" to "though the maximum"
Figure 4, c and d, the "(A-C)" is spaced off to the right

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