

Interactive comment on “A new formulation of equivalent effective stratospheric chlorine (EESC)” by P. A. Newman et al.

Anonymous Referee #1

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Review of "A new formulation of equivalent effective stratospheric chlorine (EESC)" by P.A. Newman, J.S. Daniel, D.W. Waugh, and E.R. Nash

GENERAL COMMENTS

This is a well written paper that will be of interest to a wide range of ACP readers. I have only a few suggested corrections. Page and line numbers below refer to the version of the paper that has appeared on ACPD.

SPECIFIC COMMENTS

Too often in this paper is reference blandly made to the past 4 WMO/UNEP ozone assessments (1995, 1999, 2003 and 2007). Any citation that covers all 4 ozone assessment provides the reader with little real value. What are they expected to do, go

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and read all 4 assessments cover to cover? Where possible rather refer to the source papers which were assessed.

Page 3967, line 21: The sentence "The relative effectiveness ... compounds for ozone destruction" doesn't actually tell me anything. Specifically, why are the compounds containing inorganic bromine more active regarding ozone destruction than those containing chlorine?

It would be good in Figure 1 to indicate when measurements stop and when scenario A1 starts. The A1 'scenario' is based on measurements up to some point and then projections thereafter, right?

Page 3971, line 1: The sentence "Stratospheric lifetimes for CFC-11, CFC-12, and methyl chloroform are 45 y, 100 y, and 49 y, respectively" doesn't make sense to me when on line 15 of page 3970 you state that "For a 5.5-year mean age-of-air, essentially all of the CFC-11 has been converted". So surely you mean that atmospheric lifetimes for CFC-11, CFC-12, and methyl chloroform are 45 y, 100 y, and 49 y, respectively? Not stratospheric lifetimes. It might anyway pay to add a sentence here to explain this apparent inconsistency i.e. that while in the stratosphere CFC-11 is quickly (<5.5 years) converted to inorganic Cl_y, the lifetime of CFC-11 is still 45 years because only a fraction of the tropospheric reservoir of CFC-11 is transported to the stratosphere each year and photolyzed to Cl_y.

Panels (b) and (c) of Figure 3: Please replace "BR" with "Br". Otherwise, Figure 3 is beautiful.

Page 3972, line 26: With regard to "The reasons for the differences between our reformulated EESC fractional release values and the WMO release values are currently uncertain" - well yikes! that's a bit of a problem isn't it? Shouldn't this be resolved before you publish this paper? Otherwise you leave the reader hanging, not knowing which is correct. Ah, OK, I see the follow-up discussion which provides partial resolution.

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Page 3974, line 11: I understand the argument here but it doesn't seem to be consistent with the curves shown in Figure 5 where large age of air implies HIGHER EESC levels in 1980. Some rewording to clarify this may be required.

Page 3974, line 20: I am not sure what you mean by "For a 5.8-year age" since Figure 6b shows the EESC peak year for a range of mean ages.

Page 3976, line 2: I had a look at Figure 5 of Daniel et al. (1995) and it shows mid-latitude ozone loss for various northern hemisphere locations - nothing to do with the variation of alpha with latitude?

Page 3977, line 14: I think something is incorrectly worded here when you say "Also shown are the mean age-of-air results", don't you mean the EESC results?

Page 3981, line 24: I was surprised that "A faster circulation will both decrease the age and shift the fractional release values to higher numbers". I thought faster circulation would decrease the fractional release values since there is less time for the organic source gases to photolyze? I suspect I am making a mistake in my thinking and perhaps other readers may also make this mistake at this point so it may be worth adding an explanatory sentence there.

GRAMMAR AND TYPOGRAPHICAL CORRECTIONS

Page 3964, line 23: Was there just one adjustment to the protocol?

Page 3964, line 25: Should this be "have been developed"?

Page 3969, line 19: I think it is misleading to refer to these as "The surface observations" given that the future values cannot possibly have been observed.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 3963, 2007.