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## ***Interactive comment on “Explicit calculation of indirect global warming potentials for halons using atmospheric models” by D. Youn et al.***

**Anonymous Referee #1**

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The authors discuss explicit calculations of the indirect global warming potentials of the two most important halons and compare the results with the traditional strongly parameterized method of calculation. Their results are smaller than previously published with the traditional method. The methods employed are sound. I find the paper well organized, mostly easy to read, and interesting to be published.

A few specific comments on the manuscript: 1. The abstract contains the sentence “State-of-the-arts global CTMs were used . . . to derive more realistic ozone depletion changes.” Although it is clear that this is what is needed to obtain better results than with the EESC method, the manuscript contains no comparison of modeled and measured ozone concentrations. The EESC method uses a realistic total ozone column change since it is based on observations, but it uses no time series. The results of the UIUC

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2D CTM and 3D CTM MOZART have been compared with observed ozone columns time series in other papers. A paragraph discussing these results is important here to substantiate the statement above. 2. It is mentioned that EESC method depends on “the emission scenarios assumed” and “an unchanging atmosphere”. This is true, but this is in part also the case for the calculations with the CTMs. A scenario is assumed for the ODSs, while the background values for other gases are representative for 1999. Changing CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions are not taken into account. 3. Understandably, it is almost impossible to reach a steady state for halons with a 3D CTM. The method employed to get around this, parallel simulations and curve fitting, seems very good. The results also point in this direction. Since the use of a steady-state initial condition is mentioned in section 3.2 as a prerequisite, it would be good to add some extra support for the method employed. This could be done by applying the parallel simulations and curve fitting method, as an example, also to their 2D CTM calculation. This should be an easy exercise which does not require reprogramming their model.

Minor points: 1. Abstract and Page 15514, line 14-15: The abstract and text do not mention why indirect GWPs of halons are particularly significant. I suggest to add a sentence to mention the larger bromine efficiency over chlorine for ozone destruction. 2. Page 15514, line 11-12: The sentence seems grammatically incorrect, with “cooling” and “opposite direction”. 3. Page 15514: EESC is defined as Eq. Eff. Stratospheric Chlorine (not Eff. Eq.). 4. Page 15520: There are only very limited “future policy decisions” possible with respect to halons. The current use of halons is small and there is a global ban on production and consumption starting Jan. 1, 2010. 5. Table 1. I suggest to round off the numbers of the 2D and 3D models runs, similar to the other numbers (to “tens”).

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 15511, 2009.

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