Atmos. Chem. Phys. Discuss., 12, C12171–C12173, 2013
www.atmos-chem-phys-discuss.net/12/C12171/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Avoiding HFC growth is critical for keeping global warming below 2 during the 21st century" *by* Y. Xu et al.

Anonymous Referee #2

Received and published: 31 January 2013

This paper takes the previously published work on the role of HFCs from the radiative forcing metric to a more "user friendly" temperature metric. This is a useful contribution to drive the point home about the potential role of HFCs. It also places the temperature changes in the "transient" time of the 21^{st} century to note the immediacy of the issue. Because of this, I think that this paper merits publication.

However, before it is published the authors really need to address some key issues:

1. The paper does not provide any uncertainty estimates- either in the emissions or in the calculated temperature changes. I realize that they have run the RX10 model that reasonably reproduces observed temperatures. But, what is really more robust in these calculations is the contribution of HFCs relative to CO2.

   Why not couch it in those terms? In any case, they really should provide some estimates of uncertainties coming from the emission estimates as well as the calculations.

2. As noted above, the scenarios for HFC emissions are uncertain and the quoted 0.5C is an upper limit. Is this not true? Some of the lower emission estimates would give much lower temperature increases. This needs to be acknowledged. (Velders et al. evaluations are based on use of the current mix of HFCs in the developing world.)

3. The contribution of HFC-23 is glaringly missing. This is a molecule with huge GWP; its capture and destruction is a key component of reducing the contribution of HFCs. It also is a connection of HFCs to MP.

4. Not all HFCs are the same! Clearly, the uses of short-lived HFCs are precisely a way to reduce the emission of longer-lived more potent HFCs. Therefore, including HFC reductions a part of the short-lived climate pollutant approach is inappropriate and counter to what is being suggested. It is precisely the short-lived HFCs that should be used!

5. Alternate technologies that completely avoid the use of HFCs are only mentioned in passing- it needs to be emphasized. This is a good way to avoid using HFCs of any kind.

6. The conclusions read more like recommendations. Is this appropriate for a scientific paper? May I suggest that they rephrase this section to sound less prescriptive?

7. It is worthwhile for this paper to clearly stress that the current forcing by HFCs is negligibly small.

Minor comment:

Lines 21-22: Please give the time horizon for the GWP used.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 32613, 2012.