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Atmospheric Chemistry and Physics Discussions

Interactive comment on "HFC-23 (CHF_3) emission trend response to HCFC-22 ($CHClF_2$) production and recent HFC-23 emission abatement measures" *by* B. R. Miller et al.

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We thank Ann Stavert for the positive remarks and constructive comments regarding the manuscript doi:10.5194/acpd-10-13179-2010.

Please note that the reviewer references an early version of the manuscript that does not include changes prompted by input from the editor. We therefore reply to the reviewer's comments individually below, including the online version page and line numbers for reader clarity.

General comments and other minor corrections/comments:

1. "...The only criticism I have is that the aims of the "top-down" and "bottom-up" comparisons, namely emission reporting verification and assessment of the impact of the emission abatement techniques are not clearly expressed early in the paper, in particular in the abstract and introduction. Although the assessment of the abatement techniques is alluded to in the introduction (Page 4, lines 21-24) the verification of reported emissions is not outlined until Page 7, lines 17-18. I feel that a clear iteration of these aims early in the paper would strengthen it considerably."

Author response: In the Introduction, on page 13184, lines 5-10, we alert the reader that we will be using a top-down vs. bottom-up emission histories comparison to examine developed and developing countries' emissions (i.e., emission verification) and an evaluation of recent abatement measures of the CDMs. We leave the outline and detail of these examinations for the Results section.

2. The text refers to HFC-23 and HCFC-22 but the plots refer to CHF3 and CHCIF3. I don't mind which one you use but it would be nice to be consistent.

Author response: In the captions of tables and plots, the common name is followed by the chemical name in order to refresh the association of one terminology with the other. Chemical name usage within the tables and plots has the advantage of fewer letters and less space requirement.

3. Page 2, line 8 I'd be tempted to write "countries through the" rather then "countries under the". The word "under" to me, in that context, implies being governed by something. On first reading I thought that the UNFCC CDM was some sort of guideline/rule that the developing countries had to follow and I got a little distracted trying to figure out why developing countries had to follow a higher standard then developed ones.

Author response: Facilities wishing to participate as CDM projects must adhere to guidelines established by the CDM Executive Board in order for their requests for CERs to be approved. In this sense, the projects are very much operating under the guidance of the Board. The relevant details of this arrangement are given in section 3.3 Clean

Development Mechanism. Developed country facilities are not eligible to participate as CDM projects.

4. Page 2, line 13 It's unclear whether the time period is referring to only the archive or to the in situ record.

Author response: The date range of the in situ measurements has been added to clarify this sentence (online page 13181, line 17).

5. Page 3, line 3 ". . .a 100-yr time horizon (Forster and Ramaswamy, 2007), which. . ." not ". . .a 100-yr time horizon, (Forster and Ramaswamy, 2007) that. . ."

Author response: We thank the reviewer for pointing out this grammatical error, which has now been corrected (online page 13181, lines 2-5) in combination with item #6 the reviewer.

6. Page 3, lines 2 – 6 The flow of this is a bit odd. At the moment it goes: Fact about HFC-23 - HFC-23 is a by product of HCFC-22 production - Fact about HFC-23 – Discussion of HCFC-22 Maybe change the order to: Fact about HFC-23 - Fact about HFC-23 -HFC-23 is a by product of HCFC-22 production - Discussion of HCFC-22

Author response: The flow of the discussion of HFC-23 and HCFC-22 in this first paragraph of the Introduction has been reordered as the reviewer suggests.

7. Page 4, line 1 This sentence confuses me. From what to what? What is the percentage of? Is it a reduction of 43-48%? Or is it that 43-48% of what was produced was incinerated? How about? "These countries have reportedly incinerated the HFC-23 produced by 43-48% of the developing world's HCFC-22 production during 2007-2008"

Author response: We thank the reviewer for suggesting this clarification, which has been implemented in the Introduction (online page 13183, lines 14-16).

8. Page 5 The tense used seems to change on this page it starts of past tense line 1 "Analyses for HFC-23 were" then goes present line 29 "Data processing . . . allows. .

." then line 30 "contamination was". Is that intended?

Author response: We believe that the tense usages are appropriate to the discussion (online page 13186, lines 25-29). That the analyses "were" performed for HFC-23 denotes that this specific work of interest occurred the past. The tense of "allows" was chosen to describe the capability of the data processing for corrections that could have been applied in the past, and can still be applied today and in the foreseeable future, i.e., there is no time limitation on the application. For this particular set of analyses, no contamination "was" observed.

9. Page 5, line 30 I'd change "this instrument" to "Medusa9". I got confused again.

Author response: We thank the reviewer for suggesting this improvement, which has now been implemented in the text (online page 13185, line 28).

10. Page 8, line 7 "diverging low to _70 %" remove the low "diverging to _70%".

Author response: We thank the reviewer for pointing out superfluous verbage. Text in online page 13189, line 12, has been modified to omit the word "low".

11. Page 18, line 7 "for dispersive uses to a peak in 2007" sentence doesn't make sense.

Author response: We thank the reviewer for pointing out unclear text. We have modified the sentence (online page 13201, lines 8-11) for greater clarity to read:

"... In the 1990s, HFC-23 emissions from developed countries dominated all other sources, then began to decline and eventually became fairly constant during 2003-2008. By this point, with developed countries' emissions essentially at a plateau, the major factor controlling the annual dynamics of global HFC-23 emissions became the historical rise of developing countries' HCFC-22 dispersive use production, which peaked in 2007. . . ."

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