Comments to the manuscript (Lambert Kuijpers, lambert.kuijpers@kpnmail.nl)

CFC-11 emissions are declining as expected in Western Europe
MS No.: egusphere-2023-40, by Redington, A. et al.

Overall quality

Reading through the manuscript, there are some interesting observations, however, I am not sure whether the title (and the last sentence in the conclusions) really covers what is in the manuscript. The manuscript is not really aiming at specific CFC-11 emissions that are declining in Western Europe, but is gives an overview of the trends of the emissions for three chemicals (CFC-11, -12 and CTC) from Western Europe during the last 5-12 years, so to say. From the observations one concludes that emissions are declining, and identifies specific "hotspots" where there have been relatively (not excessively) large emissions in recent years. However, a conclusion that CFC-11 emissions are declining "as expected" has no scientific basis, since there have no patterns been published during the last 10 years forecasting these precise developments. Of course, anybody would logically expect that the emissions of CFC-11, CFC-12, and CTC would have decreased in Western Europe during the last decade or so. The manuscript addresses scientific questions, but does not present novel concepts and ideas, it presents some new info on tools and new data, of course.

In the abstract it says "The motivation for this work was to assess the emissions of CFC-11 and the associated gases, CFC-12 and CCl_4, from Western Europe". OK, clear, that has been done in the manuscript, and these data are now available. After an introduction, and a long description of measurement methods, then an analysis of emissions patterns, one concludes emission decreases, with certain differences, and with some regions where there have been (temporarily) higher emissions of one of the three chemicals. This without too much of an explanation why, while there are some "rough" assumptions mentioned. The conclusions mention again the emissions decrease of the three gases, mention some spots for higher emissions, and then say that "Despite the regions of higher emissions of CFC-11 in France and Benelux, as the emissions are reducing at a rate consistent with a decline in the bank, we do not consider this to be indicative of unreported production or consumption …. [..] .. We thus conclude that CFC-11 emissions are declining as expected in Western Europe". Where the conclusions may adequately summarize what has been measured, with some special hotspots, the "we thus conclude" sentence is not good at all for me, and it is no conclusion in fact.

The overall presentation is well structured, the language is fluent and precise, and symbols, and units are correctly defined. However, my major question remains: will the reader get any important information here, that confirms other measurements, or that shows that unexpected things are happening? I do not think so, that implies that after reading the manuscript, one is inclined to say: "so what?". And that should not be result of a scientific paper, in my opinion. So, this may require changing the overall set-up of the manuscript, so it has more the character of new findings in a certain perspective, if at all.

General comments

Let me give some further impressions, and after that, a number of more detailed comments.

Abstract:

A lot of detailed information, also on other CFC-11 measurements in China, which are not relevant, or maybe confusing (line 4-8), not needed. There is lot of info on the regional measurements, the precision, etc. After that, there are a number of more detailed comments, which could be shortened, some info on CFC-12 and CTC is missing, and a much less strong statement (as expected, compared to the conclusions) is made on CFC-11 (why only on CFC-11, that is not clear): "Our estimated decline in 20 emissions of CFC-11 is consistent with a Western European bank release rate of 3.4 (2.6-4.5)%, which is in the upper half of the published range ….". Is that it (?), is that the conclusion, which is in fact *quite different* from the title and the last sentence in the conclusions.

Introduction:
A lot of information is included here. A certain amount has been given many times in many publications during the last 20-30 years, and some of it is not really correct here. The paragraphs on CFC-11 issues in China, and also the issues are USA and Australia are not relevant. The relevancy of that material for this article is not really elaborated upon here. It could be shortened, and it would imply that one would have to focus much more on the European issue. There are numbers given, yes, but the overall framework why and how to do this, that is not made clear.

Methods:
I cannot comment. But it will be a long text for the reader to read after the introduction, however, I understand that certain issues are coming back under results and discussions (and this needs detailed explanation here).

Results:
Lines 248-320 give all kind of results (also for regions), on the three chemicals. It is all good, but as mentioned the CFC-12 and CCl4 do not make it to the end. That means, there is no conclusion that there are certain relations, why things happen to one, or the other in comparison to others.

Lines 320-351 give various types of information. It first tends to go to bank releases from CFC-11, then starts to say something about bank releases from CFC-12, mentions that one should look at combined patterns, mentions regional issues. It may all be important, but I get lost what one actually wants to derive…… One sentence mentions: "We can only speculate why Benelux (Belgium, Luxembourg, and the Netherlands) and north-east of France show enhanced CFC-11 emissions (Figure 4). There is a significant chlorine chemical industry in the region and it contains Europe's largest ports. Possibly, historical banks are higher in this region". I cannot support such a statement, without further explanation. Are banks related to the presence of the chemical industry in the region? This is not really possible, or the real thing. This statement would really need to be further analyzed, so it would give some good information (e.g., one can also mention that Germany, Netherlands, Luxemburg etc. have had the most thorough program during 1994-2020 to take CFC-11 out of the foam and condense it as a liquid for destruction or for other purposes where it would not leak out (Becker, RAL, LUX, still coordinates the program. Christoph.Becker@ral-online.org)).

Conclusions:
The authors give proper credit to related work and they more or less indicate their own new contribution. Where it concerns the references, no comments, the supplementary material seems OK.

There are no real conclusions in my opinion. Where the scientific methods and assumptions are valid and clear, the results are sufficient to support the interpretations, with some concluding remarks, but there is no real conclusion. At least not the sort of conclusion I want to see from this draft paper "We thus conclude that CFC-11 emissions are declining as expected in Western Europe".

Specific issues

A few line comments:

3	Dispersive use is to some degree correct, but it is just all uses (without feedstock), UNEP will never use dispersive uses in data
5	refrigerators, not clear, for CFC-11, yes. CFC-12 was another issue, mainly in mobile AC
5-7	China emissions do not belong here, confuse the picture, or it should JUST be mentioned that they can be excluded here
9	True, Europe phased out in 1995, however, the MP had a phaseout in 1996
28	use is not controlled
30	as in line 9
33	CFC-12 was used in MOBILE air conditioning (not much in large AC units) … it was used in refrigeration (domestic and retail, in retail small to large units were on R-502 and HCFC-22), not too much in foams
35	feedstocks are not exempted, feedstocks are allowed, they only need to be reported
38	emissions do not decrease as a result of the MP, that is a side effect, the MP is a consumption control mechanism
35-40	confusing as it concerns banks
43-45	Any TEAP estimate is not giving emissions; banks sizes are also reported by others (see the Lickley publications)
45-67	I do not think this is needed here the way it is now, it is not related to this paper (maybe delete, at least shorten substantially)