

General Comments:

The manuscript "Levels of persistent organic pollutants (POPs) in the Antarctic atmosphere over time (1980) and estimation of their atmospheric half-lives" by Luarte et al. is well written and of high quality. It reviews scientific literature from 1988 to 2021 that published atmospheric levels of different POPs families. POP families that were studied are polychlorinated biphenyls, hexachlorobenzene, hexachlorocyclohexanes and DDT. With concentration levels published, the respective half-lives were estimated by using characteristic decreasing times. Concentrations levels and half-lives are then compared between the POP families and discussed with their dates of ban under the Stockholm Convention.

The detection of POPs in the remote and vulnerable polar environments has been increasingly discussed during the last years. While a lot of studies on the Arctic environment is available, data on POPs occurrence in the Antarctic environment are rare and highly needed. Therefore, this systematic review of POPs in the Antarctic atmosphere provides a good data basis and raises important issues with the Stockholm Convention ban of POPs. In addition, the identified temporal trends as well as the discussion of the influence of climate change are very valuable.

However, there are some aspects that need to be clarified and improved before publishing the paper. Some aspects concern the communication of results and the respective references to Figures and Tables, I have given some examples of that. Other aspects concern the logical reasoning. Please check this thoroughly.

I therefore propose this manuscript for acceptance with minor revisions.

Specific comments/ Technical corrections:
Manuscript

Page 2 line 43/P5 l116 – please give a consistent time frame of the investigated studies and check the whole manuscript for it. Here you use 1988-2021 whereas 1980-2021 is given in the title, 1980-2018 in conclusion etc. This should also be consistent with the *years* column given in table 1.

P 3 l 62– Number of substance/substance groups of POPs under SC should be checked, according to my information it should read '35'.

P5 l18 – please include some more information/criteria on how data quality check of the literature studies was performed. E.g. did you use a specific data quality check system?

P6 l162 – please correct typing error in trend e and table 4)), in addition please check reference to table 4, because it does not exist

P7 l 175 and 180 – There is a confusion about Figures 1 B-D. Fig 1C might be missing, and text in brackets should read 1 B, C and D? If the text is okay, the headline of Fig 1 A-D should be corrected accordingly. In consequence it is difficult to follow this section on HCHs. Please check.

P7 l 186 – A DDTs decreasing trend is not shown in Table 2, Table 2 is on PCBs, please check.

P7 l185-189 – Information on potential spatial differences is missing for DDTs. Is there a reason? Since you discuss spatial differences for some substances it should be included for all substance groups. If not possible, please indicate this in text.

P7 l201 – Please check wording of Sentence 'The estimated half lives ...' because it is not easy to understand. Please also use a consistent wording of *half-lives* in the whole manuscript

P8 l203 – please check reference to Table 4 because it does not exist.

P11 l 315 – delete blank in (Azcune)

P12 I 332 – Please check meaning of sentence *In response ...* it seems that there is something missing.

References:

Please check whole reference section for typing errors, links etc.

Tables:

Why is a table for DDT levels missing such as Tables 1 and 2 for HCBs, HCHs and PCBs? On p5 I121 you refer to the results of the overall literature review but DDT results are not listed. If there is a reason, please indicate.

Table 3 – Please change wording of the heading into ‘Estimated atmospheric decreasing times of examined compounds POPs’ because this is the consistent use within the manuscript.

Table 4 - There are several links to Table 4 in the text (see comments above, P9 I246), but Table 4 is missing/does not exist. Please check the whole manuscript.

Figures:

Figure 1 A-D – According to headline 4 figures but only 3 are shown, in addition results might be mixed up in 1A-C, Fig 1C might read 1D and Fig C for b-HCH needs to be included ?? please also check corresponding texts in the whole manuscript

Fig 4 A+B - Please check nomenclature in heading and x-axis legend such as meaning of A-HCH, the use of colours and symbols in figure and x-axis labeling should also be checked, at current stage it is difficult to follow content.

Supplementary Material:

Please check headings in presented tables etc. for typing errors and self-explanatory wording. Please include information on abbreviations e.g. BDL, NR, ND, pp, op ..