Swiss halocarbon emissions for 2019 to 2020 assessed from regional atmospheric observations

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Reply to editor:

Dear Mr. Grooß,

thank you very much for your clarifying remarks. Below please find our answers.

(1) Would you judge the average emissions in Table 2 as your recommended best values taking in account advantages and disadvantages of the two methods?

Yes, as written in Sect. 3.2.4, both top-down methods incorporate specific disadvantages and thus uncertainties. Since it is very difficult to quantify these method uncertainties arising from made assumptions, we stated the average of the results calculated with both independent methods as our best emission values, thereby also increasing the uncertainty to each average value listed in Table 2. In addition, we indicated where the uncertainty range of the average value does not overlap with the individual results, which is in many cases when we also pointed out reduced reliability of our calculated results, evaluated based on the parameters described in the respective sections. We added the following text to Sect. 3.2.4 of the manuscript: "With both independent top-down approaches incorporating method uncertainties due to the made assumptions, we stated the average of the individually calculated TRM and BI results as our best emission value (Table 2), thereby also increasing the uncertainty to each emission value. In addition, we indicated where the uncertainty range of the average emission value does not overlap with the individual results, which often is the case when we pointed out reduced reliability of our calculated results."

(2) It may be valuable to provide the results, especially the emission maps of the BI method also in the form of data files in addition to the used data in the observation data. This may help in constructing updates of the emission inventories.

We added additional data results for the Bayesian inversion to the Zenodo repository. Therefore a new Zenodo version (2.0.0) had to be created with a new DOI (https://doi.org/10.5281/zenodo.5843548), which was also referenced accordingly in the data availability section of the manuscript. The Zenodo repository now contains the Beromünster measurement data file and information for the Bayesian inversion. The data files for the Bayesian inversion are provided in netCDF format for the 28 individual substances discussed in the paper. Each file contains the a priori and a posteriori emissions as used or calculated in the Bayesian inversion. Data are provided on the grid used in the inversion (irregular longitude/latitude). Metadata are included as netCDF attributes. The netCDF files follow the CF conventions and should be readable with any netcdf interface/tool.