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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Biannual cycles of organochlorine pesticide enantiomers in arctic air suggest changing sources and pathways" *by* T. F. Bidleman et al.

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General comments: Atmospheric samples extracts (presumably in n-hexane/ acetone) from an archive dating back 2 decades (1994 – 2000) where examined and reanalyzed for the here presented study. A well-established enantiomer selective analytical method applying modified cyclodextrin based chiral separators as stationary phase for the capillary gas chromatographic separation. Especially since results from samples covering such a long time span (between sampling/ extraction and reanalysis(were reported here, the QC strategy to document and control possible changes in Enantiomer distribution (EF change) during long-term storage should be documented and

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Interactive Discussion

Discussion Paper

described here (I am sure that the authors have considered this aspect, but unfortunately not included in the text). Since the enantiomer selective analysis is a crucial point for the entire study, the chiral separators (complete IUPC name and percentage in the achiral mediating stationary phase) as well as the chosen temperature program and the instrumentation used should be explained in more detail. Statistical significance: Very small deviations from EF derived from relatively a relatively restricted data set (i.e. P250033/L20: 0.507$\pm$0.002 by n = 7 data pairs and more) are evaluated as a significant deviation. Expecting ultra-low concentration and "peak" identification close to the LOD for most of the values in combination with a low number of samples for these comparisons, the high confidence provided here is highly surprising. A (significant) deviation from racemic of 0,007 is implying an method uncertainty of better than 1.5% for the complete determination determination method (incl. GC/MS determination). According to my understanding, different integration settings for the automatic integration of used quantification software will account for ca. 6-10% of the total uncertainty in EF determination (dependent on the area/ height of the signals). Therefore a detailed paragraph on the selected statistical significance criteria, analytical uncertainties, distribution testing etc. is considered as an important added value for the manuscript in order allow the interested reader to appreciate the high scientific value of this study.

Detailed Comments: P25032/L3 "EF = quantities of (+)/[(+)+(−)]" The "term" quantities is implying that the amount of the separated enantiomers has been calculated before the EF is determined. Usually, the area ratios derived from the chromatogram directly are used for the EF calculation, please clarify.

P24033/L19 "Average summer-fall minima and winter-spring maxima" Please provide information on average/median concentrations (min/max) underlying these EF values

Aspects considered: 1. Does the paper address relevant scientific questions within the scope of ACP? Yes 2. Does the paper present novel concepts, ideas, tools, or data? Yes 3. Are substantial conclusions reached? Yes 4. Are the scientific methods and assumptions valid and clearly outlined? Not completely (revisions/ explanations

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14, C8483–C8485, 2014

required) 5. Are the results sufficient to support the interpretations and conclusions? Yes 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes 8. Does the title clearly reflect the contents of the paper? Yes 9. Does the abstract provide a concise and complete summary? Yes 10. Is the overall presentation well structured and clear? Yes 11. Is the language fluent and precise? Yes 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? No 14. Are the number and quality of references appropriate? Yes 15. Is the amount and quality of supplementary material appropriate? Yes

Recommendation: The manuscript is recommended for publication in “Atmospheric Chemistry and physics” after major revisions, for details please see above

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 25027, 2014.