Atmos. Chem. Phys. Discuss., 15, C2109–C2112, 2015
www.atmos-chem-phys-discuss.net/15/C2109/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Modelling impact of climate change on atmospheric transport and fate of persistent organic pollutants in the Arctic" *by* K. M. Hansen et al.

K. M. Hansen et al.

kmh@envs.au.dk

Received and published: 30 April 2015

Reply to anonymous referee #2

Anonymous Referee #2

Received and published: 31 March 2015

General comments

The authors present the research on the impact of climate change on atmospheric transport and fate of 13 persistent organic pollutants in the Arctic by a comprehen-

sive DEHM model with relatively higher resolution and complex chemical and physical processes compared to the peers.

The research results would enrich the current understandings of POPS distributions in the Northern Hemisphere and in Arctic and their future changes under future climate change scenarios.

However, the paper is not well organized and hard to follow the results. Suggest to re-organize the paper with following points:

Major comments

- As to “the results”

Referee: 1) The paper presents a rich set of modeling data and their presentation style is a little confusing. There are more than three categories for discussing the results: (1) regions from northern Hemisphere to the Arctic, (2) components from HCHS to PCBs, (3) compartments from air, soil, water to vegetable for the variations of total mass, difference, relatively difference and monthly means of POPS in two climate periods. The authors should select ONE category as the main pillar and then describe results of other categories within the main category.

Answer: We thank the referee for the comments on the organization of the manuscript. As a result the result and discussion sections have been re-arranged so the main category now is the individual compounds under where all other subjects are discussed. This has improved the readability of the manuscript significantly.

Referee: 2) A lot of results or discussions came or were based from the supplements materials. Suggest that the authors select major plots from the Figure sX to the manuscript figures to make the paper more readable.

Answer: The referee requests an improvement of the readability of the manuscript. We have carefully considered the suggestion of the Referee to move plots from the supplement to the main manuscript, and we have decided not to follow the suggestion

ACPD

15, C2109–C2112, 2015

but to improve the readability in other ways. As a result of comments from Referee #1 the references for the supplement figures have been reduced to a minimum and only in cases where the plots are essential for the discussion. In this way the manuscript has been made more reader friendly as the referee requests.

Referee: 3) The authors should give more quantitative conclusions or discussions instead of those subjective words of 'more rapid decline'

Answer: We have strengthened the discussion and conclusions and as a result the subjective words have been removed and we only discuss results that are statistically significant.

Referee: 4) The key word of this paper is on the transport. The impact of climate changes on the transport pathways of the POPs should be discussed. Scientifically, we would like to know how the climate changes will influence the pathways such as the "grasshopper" and "cold condensation" effects

Answer: While we agree with the Referee that it is scientifically interesting to know how climate change will influence the 'grasshopper' transport and the 'cold condensation' process this is not possible to quantify with the model set-up applied in this study. The model applied in the study is a very complex model and it is not possible to separate the effect of one single process with the applied model set-up. It is out of the scope of the study but could be the subject of a future study.

- As to "Test of statistics significance"

Referee: The authors should add this content to the results and discussion to support the discussion instead of simply description alone just like it does in 4.3 for r-HCH.

Answer: We have combined the 'Results' and the 'Discussion' sections and moved the section about test of statistical significance to the beginning of the new 'Result and Discussion' section. We furthermore only presents and discusses the results that are statistical significant.

ACPD
15, C2109–C2112, 2015

- As to the" comparison with previous results"

Referee: The authors should focus more on the result same to or different from previous works and the reasons why. No need to describe the previous work one by one.

Answer: We have shortened this section according to the suggestion of the referee.

Technical corrections

Referee: The first (Fig. S9) should be Fig. S7 in 3.2 The Arctic

Answer: We have corrected this error.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 6509, 2015.