

## ***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.***

### **Anonymous Referee #2**

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#### 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 comprehensive 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.

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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”

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.

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.

3) The authors should give more quantitative conclusions or discussions instead of those subjective words of ‘more rapid decline’

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

- As to “Test of statistics significance”

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.

- As to the “comparison with previous results”

The authors should focus more on the result same to or different from previous works

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and the reasons why. No need to describe the previous work one by one.

Technical corrections

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

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