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***Interactive comment on* “Record high peaks in PCB concentrations in the Arctic atmosphere due to long-range transport of biomass burning emissions” by S. Eckhardt et al.**

S. Eckhardt et al.

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We thank Kevin Jones for his positive review and excellent discussion points on our study!

Certainly more work needs to be done to verify and specify the processes responsible for the reemission of the persistent organic pollutants. It is known that in the boreal region there is a high capacity for the storage of PCBs, but more detailed measurements about the actual concentrations there are lacking.

More knowledge could be gained, by either taking more measurements at places where biomass burning occurs frequently (e.g., during campaigns in the major burning seasons), or by analyzing existing measurement data from locations which are closer to

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Discussion Paper

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sources than it was the case in our study. For instance, the measurement network in the Great-Lakes area in Canada might have been influenced by boreal forest fires quite frequently.

Two other venues of research would help clarifying the role of biomass burning for the POP cycling. Burning of biomass in controlled chambers in the laboratory would allow a quantification of the POPs residing in the material before the burning and the fraction of them released during the burning. Another approach would be to perform controlled burning under realistic (but to some extent controllable) conditions in different areas where burning normally occurs (e.g., agricultural fields versus boreal forests). Another important aspect, which was also suggested by R. Lohmann and which could be investigated by both approaches, is whether new POP formation can occur during the burning.

As K. Jones stated, it will be really important, to gain more data about the temperature in the soil and also about the formation of BC aerosols which are likely to take up especially the heavier PCB congeners, or in general POPs with a high KOA(organic matter/air partitioning coefficient) value. The fraction of POPs staying in the soil, compared to the fraction emitted to the atmosphere could also be estimated by controlled burning (both in the laboratory and in the open landscape). Measurements of soil temperature after a burning event could help estimating for how long the heated soil can retain its capacity to eventually release POPs.

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