

Interactive comment on “Increasing and decreasing trends of the atmospheric deposition of organochlorine compounds in European remote areas during the last decade” by L. Arellano et al.

Anonymous Referee #2

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Comments on “Increasing and decreasing trends of the atmospheric deposition of organochlorine compounds in remote areas” (ACP-2014-867) by Arellano et al.

This paper is a follow-up of authors' another paper on PBDE deposition published on the same journal in 2014. The manuscript presents monitored POPs atmospheric deposition to several mountain areas across Europe. Authors investigated connections between spatial and temporal patterns of bulk deposition and environmental factors and elucidated potential mechanisms contributing to changes in deposition fluxes at different mountain sites where samplings were taken. The title of the manuscript appears not really consistent with the major objectives of this paper. With limited ambient

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data collected by authors one cannot expect any statistical significant trend to be detected. Some technique details of this paper relays to some extent on their previous paper on ACP, e.g., bulk atmospheric deposition sampler. Authors should state clearly that they collected wet and dry deposition flux. Air mass trajectories were also presented in their last ACP paper but only for the sampling period of 2004 through 2007. Present study also assessed POPs deposition fluxes for another two periods of time from 1997-98 and 2001-02. Are those backward trajectories collected in 2004-07 applied also in these two periods of time? For instance, the strongest ENSO event over the last half century took place in 1997-98 which altered considerably the large scale wind pattern in Europe. The weak El Niño winter of 2006/2007 was unusually mild in Europe. All these would affect environmental fate and deposition of POPs in Europe.

Could authors explain further why HCB deposition was lowest, even lower than HCH? HCB is very stable with longest life time (~ 2 yr) in air among those OCs investigated in this study. HCB is of higher Henry's law constant similar to PCBs and high volatility similar to α -HCH. Atmospheric level of HCB is still relatively higher as compared with PCBs and HCHs in the Northern Hemisphere (e., Hung et al., 2010). Under the same meteorological conditions, the authors' result showed lower deposition with higher air concentration of HCB. This seems weird.

Section 4.2. Authors should mention what data they used to estimate correlations between OC deposition flux and meteorological variables. Are these correlations from monthly deposition fluxes and monthly averaged temperature and precipitation? Frankly, no matter how primary emission or secondary emission dominate, these chemicals always show higher level in warm season and lower level in cold season. Given its short half-life in air, endosulfan (pg 15, line 13) would quickly be degraded after its application in summer. These are common knowledge. So such correlation analysis does not show added values to our knowledge.

Pg 3, line 21, “. . .with limited atmospheric transport”, not sure what does this mean. Without or with limited atmospheric transport, where deposited or mountain tracked

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POPs come from? A recent study by Zheng and Nizzetto et al (Environ. Pollut, 2014, 195, 115-112) showed that soil total organic carbon dominated PCBs accumulation and distribution in mountains, not cold-trapping associated with temperature.

Pg 4, line 13, "POPs were determined in bulk. . .", deposition cannot determine POPs. POPs environmental fate was determined in bulk atmospheric deposition?

Pg 4, line 21-24: the third and fourth objectives have no significant difference.

Pg 7, line 20-21 and other places of the paper for air mass trajectories: see my previous comment.

Pg 8, line 19-20:

Pg 13, line 19, 'in' should be 'on'?

Section 4.4, see my general comment.

Pg 17, line 23, PCB138 has greater long-range transport potential.

Pg 18, line 22-26, these statements are speculative.

Figure 1, add more detailed information in figure captions.

Figure 4, define upper and lower panel as fig. 4a and 4b.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 3415, 2015.