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Interactive comment on “Prediction of gas/particle partitioning of polybrominated diphenyl ethers (PBDEs) in global air: a theoretical study” by Y.-F. Li et al.

Anonymous Referee #2

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A steady-state model is developed in this study to model gas/particle participation of PBDEs in air. In addition to the chemical transfer from gas to particles, the competing dry and wet depositions of particles are taken into account in quantifying gas/particle participation. The study concludes that the equilibrium state is a special case of the steady state when particle depositions are negligible relative to gaseous transfer. The steady-state model shows better performance in fitting field measurements than the equilibrium model published previously. The authors present a list of equations to substantiate the development of the steady-state model. The findings are novel and could be applied to model environmental behaviour and fate of PBDEs. The manuscript

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is recommended for publication in ACP.

Line 5 on page 23418, defining K_{pm} is not really necessary since this parameter is not used in any equations. The readers can be easily confused by so many newly defined parameters such as K_{pr} , K_{pe} or K_{pp} .

Line 25-28 on page 23418, f_{om} is not a constant and it varies significantly from one site to another, similar to TSP. As such, f_{om} needs to be monitored as well in real environment.

Line 12 on page 23420, the parameters A and B in Eq. (8) vary among different PBDE congeners. Consider deriving another equation of $\log K_{pp}(t)$, similar to Eq. (8), since ambient temperature is more readily available than $\log K_{oa}$, and can thus be readily used by modellers.

Line 16-18 on page 23441, consider re-wording this sentence.

Line 25 on page 23424, it appears arbitrary to introduce the constant C in Eq. (21). What is the physical meaning of C? How could this parameter be subjectively changed from 5 to 50 at Waliguan site? A bit more explanation and justification is needed here for the constant C.

Typos: 1. Line 4 on page 23416, replace 'routs' with 'routes'. 2. Line 2 and 4 on page 23419, consider replacing 'Eq. (3)' with 'Eq. (2)'. 3. Line 21 on page 23419, replace 'are' with 'is'. 4. Line 4-7 on page 23440, consider replacing 'steady' with 'steady state'. 5. Line 12 on page 23441, replace 'planed' with 'planned'.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 23415, 2014.

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