

Interactive comment on “Atmospheric transport of persistent semi-volatile organic chemicals to the Arctic and cold condensation at the mid-troposphere – Part 1: 2-D modeling in mean atmosphere” by J. Ma

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We appreciate the constructive comments from the anonymous referee. We have revised the manuscript following the Referee's comments. In reply to the referee's comments, our response will follow the referee's comments.

Comments: The difficulty with modelling chemical behavior above the atmospheric boundary layer is the lack of measurements with which to compare with model results. However, the author should be aware of an important measurement campaign which

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took place on the remote Mount Teide on Tenerife (28°N) with an air sampler located at 2300 masl (see Van Drooge et al. (2002) ES&T 36(6): 1155). Concentrations of HCH isomers, PCBs and HCB are reported and would serve as a very useful dataset to compare to the model results in this study. The author should consider including a comparison of the modelled data (for this latitude/altitude) with this measured data.

Following the referee's suggestion, the modeled a-HCH air concentration was compared with van Drooge et al's data. The measured mean air concentration of a-HCH at this sampling site was 5.9 pg m⁻³ (van Drooge et al., 2002). During the same period, our modeled atmospheric level of a-HCH is 2.7 pg m⁻³ at 2000 m atmospheric height. Result was presented in the 3rd paragraph of section 4.3 of the revised paper. However, although the modeled concentration appears to agree with the measurement, we notice that this measurement was taken on a 15 m high tower above the surface (van Drooge et al., 2002) of the high mountain, rather than in the free troposphere which is defined as the portion of the troposphere above the planetary boundary-layer (~1000 m above the surface rather than above the sea level). In free troposphere, the effect of the surface fraction on air motion is negligible. This point is also added in this paragraph.

Equations listed after eqn.7 are not numbered.

The expression for dry deposition has been number as Eq. (9). Other two equations after this expression have been removed in the revised manuscript.

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