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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric transport of persistent semi-volatile organic chemicals to the Arctic and cold condensation at the mid-troposphere – Part 2: 3-D modeling of episodic atmospheric transport" *by* Lisheng Zhang et al.

Anonymous Referee #2

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The study illustrates in a relatively comprehensive manner how numerical models could assist in the assessment of global-scale transport and transformation of toxic chemicals. The paper is certainly publishable in the present form subject to some clarifications and obvious editorial corrections to improve the English. My comments about the manuscript are of minor character, related mainly to the methodology of modeling and some missing details in the model description. The specific comments are itemized as follows

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1) The model is driven by the data obtained from the archived analysis of meteorological fields available on a global grid every six hours. How does this relatively coarse resolution affect the accuracy of the estimates of the boundary layer fields and the parameters describing the exchange between soil and atmosphere?

2) Is the advection scheme used in the models mass conserving to make it acceptable for long term simulations?

3) How is the information concerning the concentration of toxic substances in the ocean handled? It is not clear whether or not this information is calculated dynamically in the model or is obtained from observations.

4) The authors state that "significant improvement in solving the atmospheric tracer transport equation was made by a state-of-science numerical algorithm (Zhang et al., 2008)". After reading the aforementioned paper I cannot clearly see how this new algorithm is formulated. Some additional information on this subject will improve the paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 26237, 2009.