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Modelling atmospheric transport of α-hexachlorocyclohexane in the Northern Hemispherewith a 3-D dynamical model: DEHM-POP

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Abstract. The Danish Eulerian Hemispheric Model (DEHM) is a 3-D dynamical atmospheric transport model originally developed to describe the atmospheric transport of sulphur into the Arctic. A new version of the model, DEHM-POP, developed to study the atmospheric transport and environmental fate of persistent organic pollutants (POPs) is presented. During environmental cycling, POPs can be deposited and re-emitted several times before reaching a final destination. A description of the exchange processes between the land/ocean surfaces and the atmosphere is included in the model to account for this multi-hop transport. The α-isomer of the pesticide hexachlorocyclohexane (α-HCH) is used as tracer in the model development. The structure of the model and processes included are described in detail. The results from a model simulation showing the atmospheric transport for the years 1991 to 1998 are presented and evaluated against measurements. The annual averaged atmospheric concentration of α-HCH for the 1990s is well described by the model; however, the shorter-term average concentration for most of the stations is not well captured. This indicates that the present simple surface description needs to be refined to get a better description of the air-surface exchange processes of POPs.

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