



Atmospheric transport of persistent organic pollutants to the Arctic, today and in a future climate

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Persistent organic pollutants are of great concern because of their long residence time and long-range transport potential in the environment and because they are readily bioaccumulated along food chains and toxic for wildlife and humans.

A multicompartiment model is used to study global-scale and long term chemodynamics of anthropogenic organic substances in the Earth system. Model components are the atmosphere (ECHAM5) and ocean general circulation models (MPIOM), which include dynamic sub-models for atmospheric aerosols and the marine biogeochemistry, two-dimensional surface compartments (topsoil, vegetation surfaces, ice, and temporal snow cover) and intercompartimental mass exchange process parameterisations [1-3].

The transports into and out of the Arctic (66°N) are characterized for 1950-2000 under one realisation of present-day climate [4-5] and for 2001-2100 under one realisation of future climate (greenhouse gas emission scenario A1B of IPCC-AR4).

Despite decaying primary emissions (since decades) polychlorinated biphenyls (PCB) and dichlorodimethyl-trichloromethane (DDT) are continuing to accumulate in the Arctic, which is fed by atmospheric transports. The main regions of import (and export) are identified and the vertical distribution and seasonalities are characterized. Changes by the end of the 21st century are discussed in the context of a major teleconnection, i.e. the Arctic Oscillation.

References

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