



Vertical flux profiles of reactive trace gases derived by stochastic Lagrangian transport model with parameterized chemical degradation

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Reactive trace gases emitted from the soil or vegetation are chemically degraded while transported by the turbulence in the planetary surface layer. As our canopy scale flux measurements are conducted above vegetation canopies, the chemical degradation may have an effect on the fluxes. This effect is likely to be more important for the compounds with very short atmospheric lifetimes.

A stochastic Lagrangian transport model with parameterized chemical degradation was used to study the effect of chemistry on the fluxes of reactive trace gases. The transport model used was originally developed for estimation of flux footprints. In the modified model the chemical degradation is described using first order differential equation. Various scenarios with different chemical lifetimes, canopy structures and emission distributions are studied.

The results show a clear decrease of the fluxes of fast reacting compounds with height. This decrease depends on the chemical lifetime of the trace gas, magnitude of turbulent mixing and on the canopy structure. The results will help us to interpret measured above canopy fluxes of reactive trace gases and to link them to surface emissions.