The influence of large volcanic eruptions on stratospheric circulation and trace gas concentration
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Motivation
Major volcanic eruptions have a significant impact on stratospheric and tropospheric climate, chemical composition and circulation. 

Model set up
We use the stratospheric mesospheric version of the Hamburg climate model (AM/ECSCAM) with interactive stratospheric chemistry and prognostic and interactive volcanic aerosol to analyse the influence of large volcanic eruptions on the stratospheric ozone concentration. GCM simulations are shown for the 1991 volcanic eruption of Mt. Pinatubo.

The changes in the chemical concentration due to the volcanic aerosol are a combined effect of heterogeneous chemistry, and of perturbations in the heating rates and in the photolysis rates.

The Pinatubo cloud encircles the Earth in three weeks and stays in the first three months in a latitude band between 30°S and 30°N in good agreement with observations.

The strong ozone decreases in polar winter is reproduced by the model. The positive ozone anomaly in winter 1992/1993 at NH high latitudes reflects the false dynamical feedback which can clearly be seen in the NOX concentration.

Asymmetry factor (r,W)
Absorption coefficient (r,W)

Surface Area Density [m²cm⁻³]
at 41°N

Changes of Chemical Concentration
Tropical Average (30°S-30°N)
O₃ [ppmv]
CLOX [ppmv]
NOX [ppbv]

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