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The climate impact of interactive stratospheric ozone in ICON-ART climate simulations

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The ICOsahedral Nonhydrostatic model with Aerosols and Reactive Trace gases (ICON-ART [1]) is a state-of-the-art modelling system for the simulation of interactions between atmospheric composition and circulation. It can be used across a wide variety of spatial and temporal scales, e.g. from weather to climate time scales. A new flexible tracer framework [2] allows for tailor-made configurations of ICON-ART in all applications. We use this capability to create an ICON-ART configuration for assessing past climate changes and how they relate to stratospheric ozone changes in the Southern Hemisphere.

We perform decadal integrations using a simple stratospheric chemistry scheme in conjunction with the climate physics configuration of ICON-ART. The climate physics configuration uses the same dynamical core as the operational weather prediction configuration but parameterisations are based on ECHAM6 [3]. We compare the results for the year 2000 with ERA-Interim.
In interactive simulations, modelled ozone is coupled back to the radiation scheme. The non-interactive simulation uses a default background climatology of ozone. Circulation changes are diagnosed using an age of air tracer.
We show how the interplay of stratospheric composition and circulation, including the thermal structure can influence the surface climate in the Southern Hemisphere.

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