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The evolution of stratospheric ozone in sensitivity studies with the Chemistry-Climate-Model EMAC-FUB

Stefanie Meul (1), Sophie Oberländer (1), Ulrike Langematz (1), and Volker Grewe (2)

(1) FU Berlin, Meteorologie, Geowissenschaften, Germany, (2) Deutsches Zentrum für Luft- und Raumfahrt (DLR), Oberpfaffenhofen, Germany

The evolution of stratospheric ozone in a changing climate is investigated by performing and analysing simulations with the Chemistry-Climate-Model (CCM) EMAC-FUB. In order to analyse the impact of different parameters such as increasing greenhouse gases (GHGs), the reglementation of CFCs since the Montreal Protocol and the changing sea-surface temperatures (SSTs) on the evolution of stratospheric ozone, sensitivity studies are performed for the past (1860), the present (2000) and the future (2045). Additionally, two transient simulations of the period 1960-2100 with the CCMVal SCN-B2c and SCN-B2d scenarios are used for comparison.
It has been investigated how changes in the atmospheric composition and in stratospheric temperature will affect ozone chemistry as well as the influence of changing dynamics. Different model studies indicate an acceleration of the stratospheric meridional circulation (Brewer-Dobson Circulation) in the 21st century. Consequently, the large scale transport of trace gases, especially ozone, from the tropics into the extra-tropical latitudes will be modified. With a newly implemented diagnostic submodel the mechanism of ozone transport and its response to climate change have been studied in more detail. First results of the ozone transport diagnostic will be presented.