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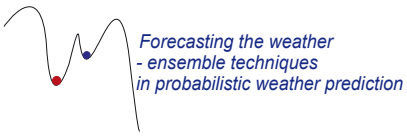

Tropical ozone change in sensitivity studies with the Chemistry-Climate-Model EMAC-FUB

S. Meul, S. Oberländer, A. Kubin, and U. Langematz

FU Berlin, Meteorologie, Geowissenschaften, Germany (stefanie.meul@met.fu-berlin.de)

The change of tropical ozone in a changing climate is investigated by analysing simulations with the Chemistry-Climate-Model (CCM) EMAC-FUB. In order to investigate the impact of different parameters such as increasing greenhouse gas (GHG) concentrations, the regulation of ozone depleting substances (ODSs) and the changing sea-surface temperatures (SSTs) on ozone, sensitivity studies have been performed for the past (1860), the present (2000) and the future (2045). Additionally, transient simulations integrated from 1960 to 2100 according the CCMVal SCN-B2c and SCN-B2d recommendations are used for comparison.

The tropical stratosphere is known as the main production and source region of atmospheric ozone. As the chemical lifetime of ozone is larger than the transport timescale in this region, ozone is transported from the tropics into the extra-tropical and high latitudes leading there to a high ozone column, especially in spring. The decrease of stratospheric temperatures due to increasing GHGs and a likely acceleration of the Brewer-Dobson Circulation in the 21st century will affect the evolution of ozone. Whereas in the mid- and high latitudes the total column ozone is predicted to recover to pre-1980 values until the middle of the 21st century, the tropical column ozone will not reach the corresponding values until 2100. The chemical and dynamical drivers of tropical ozone change in the future and in the past are investigated by analysing the sensitivity experiments which additionally give information of the origin of the ozone molecules and hence allow the identification of ozone that has been produced in the tropics.