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The Brewer-Dobson Circulation in sensitivity simulations for the past and future with the Chemistry Climate Model EMAC-FUB

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Radiosonde data show an annual mean cooling of the tropical lower stratosphere over the past few decades. One possible explanation could be a change in the Brewer-Dobson-Circulation (BDC).
Several independent model simulations indicate an acceleration of the BDC due to higher greenhouse gas (GHG) concentrations with direct impact on the exchange of air masses between the troposphere and stratosphere. In contrast, from balloon-born measurements no significant acceleration of the BDC could be identified. This disagreement between observations and model analyses motivates further studies. For the future, expected changes in planetary wave generation and propagation in an atmosphere with increasing GHG concentrations are a major source of uncertainty for predicting future levels of stratospheric composition.
To analyse and interpret the past and future evolution of the BDC, results from sensitivity simulations with the Chemistry-Climate Model (CCM) EMAC-FUB for past, present and proposed future GHG concentrations as well as prescribed SSTs will be presented. The model has been integrated over 20 years for each sensitivity study. The role of reduced (past) and increased (future) GHG concentrations and SSTs on the BDC will be assessed by comparing the results from the past and future simulations with the reference simulation for the year 2000. The sensitivity studies will be compared with the transient SCN2d-simulation of the model.