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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

The acceleration of the Brewer-Dobson Circulation from the past to the future in simulations 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.

To analyse and interpret the past and future changes 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 changing sea surface temperatures (SSTs) will be presented. 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.

It is well known, that planetary waves are the main drivers of the BDC. Expected future changes in planetary wave generation and propagation are a major source of uncertainty. Here, planetary wave generation and future evolution caused by waves on different scales will be assessed.