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# Reinvestigation of the stratospheric age of air in the Bremen CTM

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The Brewer-Dobson circulation (BDC) and its variability are investigated in the three-dimensional chemistry transport model B3DCTM, driven by ERA-INTERIM reanalysis meteorology.

The aim of our research is to understand structural changes in the transport characteristics over the last 2.5 decades which are thought to underwent dynamical, radiative, and chemical changes. As indicated by free-running climate models, measurements of SF6 and CO2, and regression of measured and modelled partial column ozone and reanalysis heating rates.

To estimate strengths and variability of the BDC the mean age of air conceptual model was used. Mean age of air is defined as residence time of an idealised passive particle in the stratosphere. We conducted 26-year simulations from 1986-2011 with the B3DCTM from different development branches. The spatial resolution of the model is 2.5° lat. × 3.75° lon., with 29 vertical levels of potential temperature, ranging from 335 K to 2726 K (about 10 to 55 km). Horizontal transport has been calculated from meteorological wind fields, and the vertical transport from diabatic heating rates using the Prather advection scheme.

The aim of the study is to better understand how changes in conceptual formulations, i.e. physical and chemical parametrizations, affect the model's transport characteristics. This comparison is a necessary step to further evaluate the capabilities of our CTM in order to adequately model important transport pathways into and within the stratosphere, which are still debated (e.g. SPARC CCMVal, 2010; Vernier et al., 2013).

References

1. SPARC CCMVal, SPARC report on the evaluation of chemistry-climate models, V. Eyring, T.G. Shepherd, D.W. Waugh (Eds.), SPARC Report No. 5, WCRP-132, 2010.

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