

## **Acceleration of the Brewer-Dobson Circulation in a Changing Climate**

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The evolution of the Brewer-Dobson (BD) circulation as a result of climate change has been analyzed using NCAR's Whole Atmosphere Community Climate Model (WACCM). Two experiments, one with observed greenhouse gas (GHG) concentrations and SSTs from 1950-2003, and one in which GHG concentrations follow the A1B IPCC for the period 2000-2050, are examined. The analysis indicates that the BD circulation in the tropical lower stratosphere strengthens in both simulations as GHG concentrations increase. The acceleration is driven mainly by changes in the Eliassen-Palm (EP) flux divergence in the subtropical lower stratosphere, below 20 km. Above 20 km, strengthening of the circulation is driven by changes in parameterized wave drag. However, in the period 1950-2003 there is also significant acceleration of the BD circulation in the middle and upper stratosphere of the Southern Hemisphere, which is related to the development of the ozone hole. Changes in the structure of the waves responsible for the calculated trends in EP flux divergence are examined, as are the mechanisms that produce these changes.