Atmospheric Chemistry and Physics
An Interactive Open Access Journal of the European Geosciences Union

Volumes and Issues Contents of Issue 6

Atmos. Chem. Phys., 9, 2207-2213, 2009
www.atmos-chem-phys.net/9/2207/2009/

Stratospheric ozone in the post-CFC era

F. Li[1], R. S. Stolarski[2], and P. A. Newman[2]
[1]GEST, University of Maryland, Baltimore County, Baltimore, MD, USA
[2]Atmospheric Chemistry and Dynamics Branch, NASA GSFC, Greenbelt, MD, USA

Abstract. Vertical and latitudinal changes in the stratospheric ozone in the post-chlorofluorocarbon (CFC) era are investigated using simulations of the recent past and the 21st century with a coupled chemistry-climate model. Model results reveal that, in the 2060s when the stratospheric halogen loading is projected to return to its 1980 values, the extratropical column ozone is significantly higher than that in 1975–1984, but the tropical column ozone does not recover to 1980 values. Upper and lower stratospheric ozone changes in the post-CFC era have very different patterns. Above 15 hPa ozone increases almost latitudinally uniformly by 6 Dobson Unit (DU), whereas below 15 hPa ozone decreases in the tropics by 8 DU and increases in the extratropics by up to 16 DU. The upper stratospheric ozone increase is a photochemical response to greenhouse gas induced strong cooling, and the lower stratospheric ozone changes are consistent with enhanced mean advective transport due to a stronger Brewer-Dobson circulation. The model results suggest that the strengthening of the Brewer-Dobson circulation plays a crucial role in ozone recovery and ozone distributions in the post-CFC era.

Final Revised Paper (PDF, 705 KB) Discussion Paper (ACPD)

Citation: Li, F., Stolarski, R. S., and Newman, P. A.: Stratospheric ozone in the post-CFC era, Atmos. Chem. Phys., 9, 2207-2213, 2009. Bibtex EndNote Reference Manager