

AAS003-08

Room: 301B

Time: May 27 14:00-14:15

A future ozone projection run and the sensitivity experiments calculated by the CCSRNIES CCM under the CCMVal-2 scenario

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The CCMVal-2 project recommends future ozone projection calculation and the sensitivity experiments in order to evaluate the effects of halogens and greenhouse gases (GHGs) in the future atmosphere (Eyring et al., 2008). We performed some of the experiments using the Center for Climate System Research/ National Institute for Environmental Studies chemistry-climate model (CCSR/NIES CCM).

- (1)REF-B2: A control run under the adjusted A1 scenario from WMO2006 for halogens and the A1B scenario from IPCC2000 for GHGs for the period 1960-2100.
- (2)SCN-B2b: Same as (1) but a sensitivity run under halogen concentrations fixed to the 1960 values.
- (3)SCN-B2c: Same as (1) but a sensitivity run under GHG concentrations fixed to the 1960 values.
- (4)SCN-B2a-SRESB1: Same as (1) but under the B1 scenario from IPCC2000 for GHGs and for the period 2000-2100.
- (5)SCN-B2a-SRESA2: Same as (1) but under the A2 scenario from IPCC2000 for GHGs and for the period 2000-2100.
- (6)SCN-B2f: Same as (1) but under the world avoided scenario (no regulations) for halogens.

The experiment (2) shows that the minimum total ozone at 40-90S gradually increases for the period, affected only by the GHG increase. The minimum total ozone at 40-90S of the experiments (3), (4), and (5) shows a minimum around 2000 when the equivalent effective stratospheric chlorine (EESC) reaches a maximum, as that of the control run (1) shows. The minimum total ozone of the experiment (3) shows a smaller increase than those of (4) and (5) because of the fixed GHGs. A GHG scenario dependence of the minimum total ozone among the experiments (1), (4), and (5) becomes slightly evident after 2050. The experiment (6) shows that the minimum total ozone continuously decreases for the entire period.

Differences in other quantities among the control run and the sensitivity runs such as zonal-mean total ozone at several latitude belts will be shown. The zonal-mean zonal wind, the zonal-mean temperature, the residual circulation, and ozone recovery date will be also shown.

References

Eyring et al. (2008), Overview of the new CCMVal reference and sensitivity simulations in support of upcoming ozone and climate Assessments and the planned SPARC CCMVal report, SPARC newsletter, No.30, 20-26.

IPCC (Intergovernmental Panel on Climate Change) (2000), Special report on emissions scenarios: A special report of Working Group III of the Intergovernmental Panel on Climate Change, 599pp., Cambridge University Press, Cambridge, U.K.

World Meteorological Organization (WMO) (2007), Scientific Assessment of Ozone Depletion: 2006, Global Ozone Res., Monit. Proj. Rep. 50, Geneva, Switzerland.

Keywords: ozone layer, future projection, sensitivity experiment, CCMVal, greenhouse gas, halogen