

Home

Online Library ACP

- Recent Final Revised Papers
- Volumes and Issues**
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
4.865

ISI
indexed



[Volumes and Issues](#) [Contents of Issue 5](#)

Atmos. Chem. Phys., 3, 1267-1283, 2003
www.atmos-chem-phys.net/3/1267/2003/

© Author(s) 2003. This work is licensed
under a Creative Commons License.

Sensitivity studies of oxidative changes in the troposphere in 2100 using the GISS GCM

J. L. Grenfell^{1,2}, D. T. Shindell¹, and V. Grewe^{1,3}

¹NASA Goddard Institute for Space Studies and Center for Climate Systems Research, Columbia University, New York, USA

²Present address: Stratosphärengruppe, Institut für Meteorologie, Freie Universität Berlin, Germany

³Present address: DLR-Institut für Physik der Atmosphäre, DLR Oberpfaffenhofen, Germany

Abstract. We examine the relative importance of chemical precursor emissions affecting ozone (O₃) and hydroxyl (OH) for the year 2100. Runs were developed from the Comparison of Tropospheric Oxidants (Ox_Comp) modeling workshop year 2100 A2p emissions scenario, part of the Intergovernmental Panel on Climate Change (IPCC) third assessment report (TAR). While TAR examined only cumulative change, we examine individual components (NO_x, CH₄, CO, etc.). Also, since there will be climate changes in 2100 (not accounted for by TAR), we investigate the effect of changing our fixed SSTs/ocean ice from present day to 2100 conditions, as projected by a coupled ocean-atmosphere model with doubled CO₂. Unlike TAR we perform multiannual integrations and we include interactive lightning. Largest changes arose from the run with 2100 industrial NO_x (O₃=+16.9%, OH=+29.4% in July) and the run with 2100 methane (O₃=+17.4%, OH= -19.1% in July). In the latter run, large ozone increases in the NH upper troposphere appeared to repartition HO₂ into OH to such an extent that the lowering in OH associated with increased methane was overwhelmed in that region. Incorporating all changes collectively led to the July tropospheric ozone burden increasing from 426 to 601 Tg (+41.1%) and the July OH concentration increasing from 13.6 to 15.2x10⁵ molecules/cm³ (+11.8%).

[Final Revised Paper](#) (PDF, 1742 KB) [Discussion Paper](#) (ACPD)

Citation: Grenfell, J. L., Shindell, D. T., and Grewe, V.: Sensitivity studies of oxidative changes in the troposphere in 2100 using the GISS GCM, Atmos. Chem. Phys., 3, 1267-1283, 2003. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Search ACP

Library Search

Author Search

News

- Sister Journals AMT & GMD
- Financial Support for Authors
- Journal Impact Factor
- Public Relations & Background Information

Recent Papers

01 | ACP, 11 Mar 2009: Measurements of Pollution In The Troposphere (MOPITT) validation through 2006

02 | ACP, 11 Mar 2009: Air-sea fluxes of biogenic bromine from the tropical and North Atlantic Ocean

03 | ACPD, 10 Mar 2009: Characterization of organic ambient aerosol during MIRAGE 2006 on three platforms

04 | ACPD, 10 Mar 2009: Regional differences in