

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



Volumes and Issues | Contents of Issue 6 | Special Issue

Atmos. Chem. Phys., 8, 1763-1788, 2008

www.atmos-chem-phys.net/8/1763/2008/

© Author(s) 2008. This work is distributed under the Creative Commons Attribution 3.0 License.

Intercomparison of UV-visible measurements of ozone and NO₂ during the Canadian Arctic ACE validation campaigns: 2004–2006

A. Fraser¹, F. Goutail², K. Strong¹, P. F. Bernath^{3,4}, C. Boone⁴, W. H. Daffer⁵, J. R. Drummond^{1,6}, D. G. Dufour⁷, T. E. Kerzenmacher¹, G. L. Manney^{8,9}, C. T. McElroy^{1,10}, C. Midwinter¹, C. A. McLinden¹⁰, F. Nichitiu¹, C. R. Nowlan¹, J. Walker¹, K. A. Walker^{1,4}, H. Wu¹, and J. Zou¹

¹Department of Physics, University of Toronto, Toronto, Canada

²Service d'Aéronomie du Centre Nationale de la Recherche Scientifique, Verrières le Buisson, France

³Department of Chemistry, University of York, Heslington, UK

⁴Department of Chemistry, University of Waterloo, Waterloo, Canada

⁵Columbus Technologies and Services Inc., Pasadena, USA

⁶Department of Physics and Atmospheric Science, Dalhousie University, Halifax, Canada

⁷Picomole Instruments Inc., Edmonton, Canada

⁸Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA

⁹New Mexico Institute of Mining and Technology, Socorro, USA

¹⁰Environment Canada, Downsview, Ontario, Canada

Abstract. The first three Canadian Arctic ACE validation campaigns were held during polar sunrise at Eureka, Nunavut, Canada (80° N, 86° W) from 2004 to 2006 in support of validation of the ACE (Atmospheric Chemistry Experiment) satellite mission. Three or four zenith-sky viewing UV-visible spectrometers have taken part in each of the three campaigns. The differential slant column densities and vertical column densities of ozone and NO₂ from these instruments have been compared following the methods of the UV-visible Working Group of the NDACC (Network for Detection of Atmospheric Composition Change). The instruments are found to partially agree within the required accuracies for both species, although both the vertical and slant column densities are more scattered than required. This might be expected given the spatial and temporal variability of the Arctic stratosphere in spring. The vertical column densities are also compared to integrated total columns from ozonesondes and integrated partial columns from the ACE-FTS (ACE-Fourier Transform Spectrometer) and ACE-MAESTRO (ACE-Measurements of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation) instruments on board ACE. For both species, the columns from the ground-based instruments and the ozonesondes are found to generally agree within their combined error bars. The ACE-FTS ozone partial columns and the ground-based total columns agree within 4.5%, averaged over the three campaigns. The ACE-MAESTRO ozone partial columns are generally smaller than those of the ground-based instruments, by an average of 9.9%, and are smaller than the ACE-FTS columns by an average of 14.4%. The ACE-FTS NO₂ partial columns are an average of 13.4% smaller than the total columns from the ground-based instruments, as expected. The ACE-

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 | ACPD, 03 Nov 2008: Anthropogenic influence on SOA and the resulting radiative forcing

02 | ACPD, 03 Nov 2008: Evidence of mineral dust altering cloud microphysics and precipitation

03 | ACPD, 03 Nov 2008: Technical Note: A new method for the Lagrangian tracking of pollution plumes from source to receptor using gridded model output

04 | ACPD, 03 Nov 2008:

MAESTRO NO₂ partial columns are larger than the total columns of the ground-based instruments by an average of 2.5% and are larger than the partial columns of the ACE-FTS by an average of 15.5%.

■ [Final Revised Paper](#) (PDF, 1491 KB) ■ [Discussion Paper](#) (ACPD)

Citation: Fraser, A., Goutail, F., Strong, K., Bernath, P. F., Boone, C., Daffer, W. H., Drummond, J. R., Dufour, D. G., Kerzenmacher, T. E., Manney, G. L., McElroy, C. T., Midwinter, C., McLinden, C. A., Nichitiu, F., Nowlan, C. R., Walker, J., Walker, K. A., Wu, H., and Zou, J.: Intercomparison of UV-visible measurements of ozone and NO₂ during the Canadian Arctic ACE validation campaigns: 2004–2006, *Atmos. Chem. Phys.*, 8, 1763-1788, 2008. ■ [Bibtex](#) ■ [EndNote](#) ■ [Reference Manager](#)