

CURRICULUM VITAE

Name: John Joseph Orlando

Date /Place of Birth: February 25, 1960; Timmins, Ontario, Canada

Present Address: (Home) 185 Iroquois Drive, Boulder, CO 80303, 303-499-5642

(Work) National Center for Atmospheric Research, Atmospheric
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POSITIONS HELD

National Center for Atmospheric Research, Boulder CO (1989 – present)

Scientist I, Atmospheric Chemistry Division, December 1989 to June 1992.

Scientist II, Atmospheric Chemistry Division, July 1992 to July 1996.

Scientist III, Atmospheric Chemistry Division, July 1996 to July 2004.

Senior Scientist, July 2004 to present.

Deputy Director, Atmospheric Chemistry Division, Dec. 2009 to March 2015. Deputy Director, Atmospheric
Chemistry Observations and Modeling Laboratory, March 2015-present.

Cooperative Institute for Research in Environmental Science / NOAA Aeronomy Laboratory (1987-1989)

Research Associate, Atmospheric Chemical Kinetics Group, December 1987 to November 1989.

Supervisors: Dr. C.J. Howard, Dr. A.R. Ravishankara.

EDUCATION

Graduate School: McMaster University, Sept. 82 to Nov. 87, received Ph.D. in Chemistry.

Thesis: Time-resolved tunable diode laser detection of products of IRMPD of halocarbons.

Undergraduate: McMaster University, Sept. 1978 to April 1982, B.Sc., Honours Chemistry.

High School: Timmins High and Vocational School, Sept. 1973 to June 1978.

AWARDS

DATE

NCAR Special Achievement, Writing ACD Science Plan 2003

Velux Foundation Visiting Professor Fellowship,
University of Copenhagen 2002

AMS Special Award (for work on Editorial Board,
Glossary of Meteorology) 2001

SCHOLARSHIPS

DATE

NSERC Post-Doctoral Fellowship (declined)	1989
Hooker Graduate Scholarship	1982/83 to 1985/86
NSERC Post-graduate Scholarship	1982/83 to 1985/86
NSERC Summer Scholarship	1981 and 1982
Burke Memorial Ring	1982
BP Canada Scholarship	1981/82
J.L.W. Gill Scholarship	1981/82
University Scholarship	1979/80, 1980/81
TexasGulf Scholarship	1978/79 to 1981/82
Lloyd Memorial Scholarship	1978/79 to 1981/82
Deans' Honours List	1978/79 to 1981/82

SUMMARY OF RESEARCH AND RELATED EXPERIENCE

- A) Scientist I, Atmospheric Chemistry Division, National Center for Atmospheric Research, Boulder, Colorado, December 1989 to June 1992. Scientist II, July 1992 to July 1996. Scientist III, July 1996 to July 2004. Senior Scientist, July 2004 to present. Deputy Director, Atmospheric Chemistry Division / Atmospheric Chemistry and Modeling Laboratory, December 2009 to present.

Member of Laboratory Kinetics Group. Kinetics and mechanisms of chemical reactions in the atmosphere; photochemistry of atmospheric trace gases; IR and UV spectroscopy of atmospheric trace gases; development of chemical mechanisms for atmospheric chemistry studies. Techniques and equipment employed : environmental chamber / FTIR system for mechanistic studies of atmospheric reactions; microwave discharge - flow tube system; Ar⁺ ion-pumped ring dye laser for laser induced fluorescence; excimer pumped dye laser for quantum yield studies and pulsed laser induced fluorescence kinetics studies; atomic resonance fluorescence; pulsed excimer laser photolysis / time-resolved tunable diode laser absorption system for kinetics studies; flow-tube / chemical-ionization mass spectrometer system for mechanistic studies.

- B) Research Associate, Atmospheric Chemical Kinetics Group, NOAA Aeronomy Laboratory, Boulder, Colorado, December 1987 to November 1989. Supervisors: Dr. C.J. Howard, Dr. A.R. Ravishankara.

Spectroscopic studies of atmospheric trace gases; kinetics and mechanisms of atmospheric chemical reactions. Equipment used included: microwave-discharge/flow tube systems; FT-IR spectrometer for emission and absorption measurements; diode array spectrometer for UV/visible absorption studies.

- C) Ph.D. Thesis, McMaster University, Sept. 1982 to Nov. 1987.
Supervisors: Dr. D.R. Smith, Dr. J. Reid.

Used tunable diode lasers to detect the products of the IR multiphoton dissociation of halocarbons, both in cw and time-resolved experiments.

- D) Teaching Assistant, McMaster University. Sept. 1982 to April 1987.

T.A. in undergraduate labs (freshman chemistry, thermodynamics, reaction kinetics, instrumentation).

- E) NSERC Summer Research Student and Undergraduate Thesis Project
May 1981 to August 1982.
McMaster University and Canadian Center for Inland Waters.
Supervisors: Dr. D.P. Santry, Dr. J.J. McCullough, Dr. J. Carey.

UV photodegradation of substituted phenols in water; ab initio calculations on substituted phenols.

TECHNICAL ACCOMPLISHMENTS

Graduate School

Participated in the design, fabrication, and implementation of a pulsed CO₂ laser flash photolysis / time-resolved tunable diode laser IR absorption system for the production and study of free radicals.

Post-doctoral Work

Participated in the design, fabrication, and implementation of a temperature-regulated flow tube system. Interfaced a UV/visible Diode Array Spectrometer to this system.

NCAR

Designed and assembled a laser flash photolysis / resonance fluorescence system.

Designed and assembled a temperature-regulated UV/visible absorption spectrometer system.

Participated in the design, building, and testing of an excimer laser flash photolysis / time-resolved tunable diode laser system.

LEADERSHIP AND COMMUNITY SERVICE ACTIVITIES

NCAR ACD Seminar Coordinator, Fall 1990 to Fall 1993.

Session Co-convener, "Tropospheric Hydrocarbons: Measurements, Models, and Mechanisms", Fall AGU Meeting, San Francisco, December 1994 (joint with Suzanne Paulson).

Participant, The 1995 Methyl Bromide "State of the Science" Workshop, Monterey CA, June 1995.

Contributor to Scientific Assessment of Ozone Depletion: 1998, Chapter 2, Short-lived ozone-related compounds.

Invited participant in Pellston Workshop entitled "Evaluation of persistence and long-range transport of organic chemicals in the environment", organized by The Society of Environmental Toxicology and Chemistry (SETAC), 1998.

Co-editor of the ACD textbook, *Atmospheric Chemistry and Global Change*, Oxford Press, 1999.

Co-editor, *Glossary of Meteorology* (Atmospheric Chemistry section), American Meteorological Society, published in 2001.

Member of the Mozart Model Development team, 2001-present.

Contributing author, "Atmospheric Chemistry in an Changing World: An integration and synthesis of a decade of tropospheric chemistry research", IGAC report to summarize major achievements of atmospheric-biospheric chemistry community over the last decade, Springer-Verlag, 2003.

Contributing author and editor, ACD Strategic Plan for 2003-2009, completed in 2003.

Contributing author to UT/LS white paper entitled, "Radical Chemistry in the Upper Troposphere/Lower Stratosphere: A Summary of Current Scientific Issues and a Proposed Observational Study", 2003.

Member of scientific steering committee for the MIRAGE field campaign, 2003-2005.

Member of Editorial Advisory Board, *International Journal of Chemical Kinetics*, 2004-2006.

Member of the scientific steering committee, "Transport and Air Pollution", International Scientific Symposium held in Boulder CO, September 2004.

Session Co-convenor, "Biogenic Compounds and Secondary Organic Aerosol", Fall AGU Meeting, San Francisco, December 2006 (with Jim Burkholder, NOAA).

Lead organizer for ACD participation in the OASIS (Ocean-Atmosphere-Sea Ice-Snowpack) workshop field project (Barrow, AK, Feb.-Apr., 2009). Local organizer of OASIS workshops, held in Boulder, July 9-10, 2007 and June 9-10, 2008.

Co-Chair, Atmospheric Chemistry Center for Atmospheric Research and Data (ACCORD) Science Committee, 2014-present.

Regular reviewer of articles for several journals (*Journal of Geophysical Research*, *Geophysical Research Letters*, *Chemical Physics Letters*, *Journal of Physical Chemistry*, *International Journal of Chemical Kinetics*, *Atmospheric Environment*, *Environmental Science and Technology*, *Atmospheric Chemistry and Physics*, *Physical Chemistry Chemical Physics*, etc.), and also of proposals for various agencies (NSF, NASA, DOE, Petroleum Research Fund, etc.).

EDUCATIONAL ACTIVITIES

Lectured at the NCAR ASP Summer School, *Observational Techniques in the Atmospheric Sciences*, Summer 1992.

Supervisor for NCAR Summer Employment Program students, Alvin Huang (Summer 1991) and Edgar Estupiñan (Summer 1995).

Presented introductory lectures on atmospheric chemistry to undergraduate students at the University of Colorado - Colorado Springs (April 1994) and Regis University (April 2000).

Supervisor, senior research project of Chris Ceazan, undergraduate student at Metro State University, 1999-2000.

Supervised four undergraduate exchange students (S. Haberkorn, A. Zimmer, S. Amann, K. Henning) from the Louis Pasteur Institute, Strasbourg France.

Velux Foundation Visiting Professor Fellowship, University of Copenhagen, summer 2002.

Scientific mentor for SOARS student, Cherele Blazer (Summer 2004).

Hosted and supervised Angelita Denny, M.Sc. student at University of Arizona, for three summers (2008-2010).

Participated in guiding and/or supervising the research of other graduate and undergraduate students (C. Roehl, C. Kegley-Owen, T. Møgelberg, M. Bilde, C. Bacher, P. Cassanelli, K. Feilberg, Hongyi Hu, many students from Fresno State), post-doctoral fellows (S. Paulson, T. Staffelbach, J.-M. Fracheboud, L. Iraci, B. Nozière, Y. Tang), and visitors (G. Vazquez, C. Ferronato, B. Ramacher, A. Pimentel, C. Blazer).

Thesis committee member, Josh McGrath, Ph.D candidate, University of Colorado, 2008-2010.

Lead organizer and a lecturer for a graduate-level course on Atmospheric Chemistry provided to students at North Carolina Agricultural and Technical State University, Greensboro NC.

Guest lecturer, University of Oklahoma School of Meteorology, Fall 2013, 2014, 2015, 2016. Presented four lectures per year on Atmospheric Chemistry to first-year graduate students, as part of a course entitled "Fundamentals of Atmospheric Science."

PROPOSALS FUNDED

1. J.J. Orlando, G.S. Tyndall, C.A. Cantrell, R.E. Shetter, and J.G. Calvert, Atmospheric chemistry of methylglyoxal, funded by Coordinating Research Council, 1992.
2. G.S. Tyndall, J.J. Orlando, A. Fried, C.A. Cantrell, J.G. Calvert, Laboratory studies of homogeneous and heterogeneous stratospheric reactions involving halogenated reservoir species, funded by NASA Upper Atmosphere Research Program, 1992-1995.
3. G.S. Tyndall, J.J. Orlando, T.J. Wallington, A.J. Hynes, Chemistry of the upper troposphere and lower stratosphere, funded by NASA Upper Atmosphere Research Program, 1996-1999.
4. G.S. Tyndall, J.J. Orlando, Laboratory studies of upper tropospheric reactions, funded by NASA Upper Atmosphere Research Program, 1999-2002.
5. G.S. Tyndall, J.J. Orlando, Laboratory studies of upper tropospheric reactions, funded by NASA Upper Atmosphere Research Program, 2002-2005.

6. J. Smith, L. Mauldin, J. Orlando, G. Tyndall, B. Lefer, and F. Eisele, Investigations into the role of organic compounds in aerosol processes, NCAR Director's Opportunity Fund, FY 2002.
7. J. J. Orlando, G. S. Tyndall, J. G. Calvert, T. J. Wallington, R. G. Derwent, Writing of a New Book: The Mechanisms of Atmospheric Oxidation of the Alkanes, funded by the Coordinating Research Council, November 2004 - November 2005.
8. G.S. Tyndall, J.J. Orlando, A. Hasson, F. Flocke, L. Emmons, Laboratory studies of upper tropospheric reactions, funded by NASA NNH05ZDA001N-AC, 2006-2009.
9. J. J. Orlando, J. G. Calvert, T. J. Wallington, M. Pilling, A. Mellouki, Writing of a New Book, "The Mechanisms of Atmospheric Oxidation of the Oxygenates", funded by the Coordinating Research Council, September 2007 – December 2008.
10. T. S. Dibble, G. Tyndall, J. Orlando, Isotope effects in methoxy radical kinetics, funded by NSF, Jan 2010 – Dec. 2012.
11. J. J. Orlando, J. G. Calvert, T. J. Wallington, W. H. Stockwell, Writing of a Book, "Chemistry of Tropospheric O₃ Generation and the Influence of Trace Gases", funded by the Coordinating Research Council, December 2011 – June 2013.

REFEREED PUBLICATIONS

1. Beckwith, P. H., J. J. Orlando, J. Reid, and D. R. Smith, 1986: Analysis of the products of photochemistry using tunable diode lasers, with application to the multiphoton dissociation of chloroform. *J. Photochem.*, **34**, 267-279.
2. Orlando, J. J., J. Reid, and D. R. Smith, 1987: Time-resolved tunable diode laser detection of products of CF₂HCl IRMPD: A linestrength measurement for CF₂. *Chem. Phys. Lett.*, **141**, 423-427.
3. Brown, C. E., J. J. Orlando, J. Reid, and D. R. Smith, 1987: Diode laser detection of transient CF₃ radicals formed by CO₂ laser multiphoton induced dissociation of halocarbons. *Chem. Phys. Lett.*, **142**, 213-216.
4. Orlando, J. J., and D. R. Smith, 1988: Time-resolved tunable diode laser detection of products of the IRMPD of hexafluoroacetone: a linestrength and bandstrength for CF₃. *J. Phys. Chem.*, **92**, 5147-5150.
5. McKellar, A. R. W., J. B. Burkholder, J. J. Orlando, and C. J. Howard, 1988: Fourier transform infrared spectrum of the ν_3 band of HCO. *J. Mol. Spec.*, **130**, 445-453.
6. Burkholder, J. B., J. J. Orlando, and C. J. Howard, 1990: UV absorption cross sections of Cl₂O₂ between 210 and 410 nm. *J. Phys. Chem.*, **94**, 687-695.
7. Greenblatt, G. D., J. J. Orlando, J. B. Burkholder, and A. R. Ravishankara, 1990: Absorption measurements of oxygen between 330 and 1140 nm. *J. Geophys. Res.*, **95**, 18577-18582.

8. Nelson, D. D. Jr., A. Schiffman, D. J. Nesbitt, J. J. Orlando, and J. B. Burkholder, 1990: H + O₃ Fourier transform infrared emission and laser absorption studies of OH ($X^2\Pi$). *J. Chem. Phys.*, **93**, 7003-7019.
9. Orlando, J. J., J. B. Burkholder, A. M. R. P. Bopegedera, and C. J. Howard, 1991: Infrared measurements of BrO ($X^2\Pi_{3/2}$). *J. Mol. Spec.*, **145**, 278-289.
10. Orlando, J. J., J. B. Burkholder, S. A. McKeen, and A. R. Ravishankara, 1991: Atmospheric fate of several hydrofluoroethanes and hydrochloroethanes: 2. UV absorption cross sections and atmospheric lifetimes. *J. Geophys. Res.*, **96**, 5013-5023.
11. Burkholder, J. B., R. R. Wilson, T. Gierczak, R. Talukdar, S. A. McKeen, J. J. Orlando, G. L. Vaghjiani and A. R. Ravishankara, 1991: Atmospheric fate of CF₃Br, CF₂Br₂, CF₂ClBr, and CF₂BrCF₂Br. *J. Geophys. Res.*, **96**, 5025-5043.
12. Tyndall, G. S., J. J. Orlando, C. A. Cantrell, R. E. Shetter, and J. G. Calvert, 1991: Rate coefficient for the reaction NO + NO₃ → 2 NO₂ between 223 and 400 K. *J. Phys. Chem.*, **95**, 4381-4386.
13. Orlando, J. J., G. S. Tyndall, C. A. Cantrell, and J. G. Calvert, 1991: Temperature and pressure dependence of the rate coefficient for the reaction NO₃ + NO₂ + N₂ → N₂O₅ + N₂. *J. Chem. Soc., Faraday Transactions*, **87**, 2345-2349.
14. Tyndall, G. S., J. J. Orlando, K. E. Nickerson, C. A. Cantrell, and J. G. Calvert, 1991: An upper limit for the rate coefficient of the reaction of NH₂ radicals with O₂ using FTIR product analysis. *J. Geophys. Res.*, **96**, 20761-20768.
15. Orlando, J. J., G. S. Tyndall, K. E. Nickerson, and J. G. Calvert, 1991: The temperature dependence of collision-induced absorption by oxygen near 6 μm. *J. Geophys. Res.*, **96**, 20755-20760.
16. Roehl, C. M., J. J. Orlando, and J. G. Calvert, 1992: The temperature dependence of the UV/visible absorption cross sections of NOCl. *J. Photochem. Photobiol. A: Chem.*, **69**, 1-5.
17. Orlando, J. J., G. S. Tyndall, and J. G. Calvert, 1992: Thermal decomposition pathways for peroxyacetyl nitrate (PAN): Implications for atmospheric methyl nitrate levels. *Atmos. Environ.*, **26A**, 3111-3118.
18. Orlando, J. J., G. S. Tyndall, A. Huang, and J. G. Calvert, 1992: Temperature dependence of the infrared absorption cross sections of carbon tetrachloride. *Geophys. Res. Lett.*, **19**, 1005-1008.
19. Orlando, J. J., G. S. Tyndall, G. K. Moortgat, and J. G. Calvert, 1993: Quantum yields for NO₃ photolysis between 570 and 635 nm. *J. Phys. Chem.*, **97**, 10,996-11,000.
20. Cantrell, C. A., R. E. Shetter, J. G. Calvert, G. S. Tyndall, and J. J. Orlando, 1993: Measurement of rate coefficients for the unimolecular decomposition of N₂O₅. *J. Phys. Chem.*, **97**, 9141-9148.

21. Orlando, J. J., G. S. Tyndall, T. A. Staffelbach, and J.G. Calvert, 1993: The atmospheric photochemistry of methylglyoxal, Proceedings of the Annual Meeting of the Air and Waste Management Association, Paper Number 93-WA-68A.04.
22. Roehl, C. M., J. J. Orlando, G. S. Tyndall, R. E. Shetter, G. H. Vazquez, C. A. Cantrell, and J. G. Calvert, 1994: Temperature dependence of the quantum yields for the photolysis of NO₂ near the dissociation limit. *J. Phys. Chem.*, **98**, 7837-7843.
23. Crowley, J. N., F. Helleis, R. Müller, G. K. Moortgat, P. J. Crutzen, and J. J. Orlando, 1994: CH₃OCl: UV/visible absorption cross sections, J values and atmospheric significance. *J. Geophys. Res.*, **99**, 20,683-20,688.
24. Orlando, J. J. and J. B. Burkholder, 1995: UV/visible absorption spectra of HOBr and Br₂O. *J. Phys. Chem.*, **99**, 1143-1150.
25. Tyndall, G. S., J. J. Orlando, and J. G. Calvert, 1995: Upper limit for the rate coefficient for the reaction HO₂ + NO₂ → HONO + O₂. *Environ. Sci. Tech.*, **29**, 202-206.
26. Wallington, T. J., J. J. Orlando, and G. S. Tyndall, 1995: Atmospheric chemistry of chloroalkanes: Intramolecular elimination of HCl from chloromethoxy radical over the temperature range 264-336 K. *J. Phys. Chem.*, **99**, 9437-9442.
27. Staffelbach, T. A., J. J. Orlando, G. S. Tyndall, and J. G. Calvert, 1995: The UV-visible absorption spectrum and photolysis quantum yields of methylglyoxal. *J. Geophys. Res.*, **100**, 14,189-14,198.
28. Paulson, S. E., J. J. Orlando, G. S. Tyndall, and J. G. Calvert, 1995: Rate coefficients for the reactions of O(³P) with selected biogenic hydrocarbons. *Int. J. Chem. Kin.*, **27**, 997-1008.
29. Tyndall, G. S., T. A. Staffelbach, J. J. Orlando and J. G. Calvert, 1995: Rate coefficients for the reactions of OH with methylglyoxal and acetaldehyde. *Int. J. Chem. Kin.*, **27**, 1009-1020.
30. Tyndall, G. S., J. J. Orlando, C. S. Kegley-Owen, 1995: Rate coefficients for quenching of Cl(²P_{1/2}) by various atmospheric gases. *J. Chem. Soc., Faraday Transactions*, **91**, 3055-3061.
31. Tyndall, G. S., J. J. Orlando, T. J. Wallington, J. Sehested, O.-J. Nielsen, 1996: Kinetics of the reactions of acetonitrile with chlorine and fluorine atoms. *J. Phys. Chem.*, **100**, 660-668.
32. Xu, Y., A. R. W. McKellar, J. B. Burkholder, and J. J. Orlando, 1996: High resolution infrared spectrum of the $\bar{\nu}_1$ and $\bar{\nu}_3$ bands of dichlorine monoxide, Cl₂O. *J. Mol. Spec.*, **175**, 68-72.
33. Shetter, R. E., C. A. Cantrell, K. O. Lantz, S. J. Flocke, J. J. Orlando, G. S. Tyndall, T. M. Gilpin, C. A. Fischer, S. Madronich, J. G. Calvert, and W. Junkermann, 1996: Actinometric and radiometric measurement and modeling of the photolysis rate of ozone to O(¹D) during MLOPEX II. *J. Geophys. Res.*, **101**, 14,631-14,641.

34. Orlando, J. J., G. S. Tyndall, T. J. Wallington, M. Dill, 1996: Atmospheric chemistry of CH₂Br₂: Rate coefficients for its reaction with Cl atoms and OH and the chemistry of the CHBr₂O radical. *Int. J. Chem. Kin.*, **28**, 433-442.
35. Orlando, J. J., G. S. Tyndall, T. J. Wallington, 1996: The atmospheric oxidation of CH₃Br: Chemistry of the CH₂BrO radical. *J. Phys. Chem.*, **100**, 7026-7033.
36. Wallington, T. J., M. D. Hurley, J.-M. Fracheboud, J. J. Orlando, G.S. Tyndall, J. Sehested, T. Mogelberg, O.-J. Nielsen, 1996: Role of excited CF₃CFHO radicals in the atmospheric chemistry of HFC-134a. *J. Phys. Chem.*, **100**, 18116-18122.
37. Orlando J. J. and G. S. Tyndall, 1996: Rate coefficients for the thermal decomposition of bromine nitrate and the heat of formation of bromine nitrate. *J. Phys. Chem.*, **100**, 19398-19405.
38. Paulson, S. E., J.J. Orlando, 1996: The reactions of ozone with alkenes: An important source of HO_x in the boundary layer. *Geophys. Res. Letters*, **23**, 3727-3730.
39. Tyndall, G. S., J. J. Orlando, T. J. Wallington, M. Dill, E. W. Kaiser, 1997: Kinetics for the reactions of chlorine atoms with ethane, propane, and butane. *Int. J. Chem. Kinet.*, **29**, 43-55.
40. Mogelberg, T., J. Sehested, G. S. Tyndall, J. J. Orlando, J.-M. Fracheboud, T. J. Wallington, 1997: Atmospheric oxidation of HFC-236cb: Effect of NO on the product yields. *J. Phys. Chem. A*, **101**, 2828-2832.
41. Talukdar, R., M. K. Gilles, F. Battin-Leclerc, A.R. Ravishankara, J.-M. Fracheboud, J. J. Orlando, G.S. Tyndall, 1997: Photolysis of ozone at 308 and 248 nm: Quantum yield of O(¹D) as a function of temperature. *Geophys. Res. Letters*, **24**, 1091-1094.
42. Tyndall, G. S., J. J. Orlando, T. J. Wallington, M. J. Hurley, 1997: Pressure dependence of the rate coefficients and product yields for the reaction of CH₃CO radicals with O₂. *Int. J. Chem. Kinet.*, **29**, 655-663.
43. Tyndall, G. S., C. S. Kegley-Owen, J. J. Orlando, and J. G. Calvert, 1997: Quantum yields for production of Cl, ClO, and O from the photolysis of chlorine nitrate at 308 nm. *J. Chem. Soc., Faraday Transactions*, **93**, 2675.
44. Sehested, J., L. K. Christensen, T. Mogelberg, O. J. Nielsen, T. J. Wallington, A. Guschin, J. J. Orlando, G. S. Tyndall, 1998: Absolute and relative rate constants for the reaction CH₃C(O)O₂ + NO and CH₃C(O)O₂ + NO₂ and thermal stability of CH₃C(O)O₂NO₂. *J. Phys. Chem. A*, **102**, 1779-1789.
45. Bilde, M., T. J. Wallington, C. Ferronato, J. J. Orlando, G. S. Tyndall, E. Estupinan, S. Haberkorn, 1998: Atmospheric chemistry of CH₂BrCl, CHBrCl₂, CHBr₂Cl, CF₃CHBrCl, and CBr₂Cl₂. *J. Phys. Chem. A*, **102**, 1976-1986.
46. Sehested, J., L. K. Christensen, O. J. Nielsen, M. Bilde, T. J. Wallington, W. Schneider, J. J. Orlando, G. S. Tyndall, 1998: Atmospheric Chemistry of Acetone: Kinetic Study of the CH₃C(O)CH₂O₂ + NO/NO₂ Reactions, and Decomposition of CH₃C(O)CH₂O₂NO₂. *Int. J. Chem. Kin.*, **30**, 475-489.

47. Donaldson, D. J., J. J. Orlando, S. Amann, G. S. Tyndall, R. J. Proos, B. R. Henry, V. Vaida, 1998: Absolute intensities of nitric acid overtones. *J. Phys. Chem. A*, **102**, 5171-5174.
48. Burkholder, J. B., J. J. Orlando, 1998: Rate coefficient upper limits for the BrONO₂ and ClONO₂ + O₃ reactions. *Geophys. Res. Lett.*, **25**, 3567-3569.
49. Orlando, J. J., G. S. Tyndall, M. Bilde, C. Ferronato, T. J. Wallington, L. Vereecken, J. Peeters, 1998: Laboratory study of the mechanism of OH- and Cl-initiated oxidation of ethylene. *J. Phys. Chem. A*, **102**, 8116-8123.
50. Ferronato, C., J. J. Orlando, G. S. Tyndall, 1998: Rate and mechanism of the reactions of OH and Cl with 2-methyl-3-buten-2-ol. *J. Geophys. Res.*, **103**, 25579-25586.
51. Phillips, J. A., J. J. Orlando, G. S. Tyndall, V. Vaida, 1998: Integrated intensities of OH stretching overtones in alcohols. *Chem. Phys. Lett.*, **296**, 377-383.
52. Orlando, J. J., G. S. Tyndall, J.-M. Fracheboud, E. Estupinan, S. Haberkorn, A. Zimmer, 1999: Laboratory studies of the rate and mechanism of the oxidation of hydroxyacetone. *Atmos. Environ.*, **33**, 1621-1629.
53. Bilde, M., J. J. Orlando, G. S. Tyndall, T. J. Wallington, M. J. Hurley, E. W. Kaiser, 1999: FT-IR product studies of the Cl-initiated oxidation of CH₃Cl in the presence of NO. *J. Phys. Chem. A*, **103**, 3963-3968.
54. Vereecken, L., J. Peeters, J. J. Orlando, G. S. Tyndall, C. Ferronato, 1999: Decomposition of β-hydroxypropoxy radicals in the OH-initiated oxidation of propene: A theoretical and experimental study. *J. Phys. Chem. A*, **103**, 4693-4702.
55. Orlando, J. J., 1999: Temperature dependence of the rate coefficients for the reaction of chlorine atoms with chloromethanes. *Int. J. Chem. Kinet.*, **31**, 515-524.
56. Iraci, L. T., B. M. Baker, G. S. Tyndall, J. J. Orlando, 1999: Henry's law coefficient measurements for 2-methyl-3-buten-2-ol, methacrolein, and methylvinyl ketone. *J. Atm. Chem.*, **33**, 321-330.
57. Orlando, J. J., G. S. Tyndall, S. E. Paulson, 1999: Mechanism for the OH-initiated oxidation of methacrolein. *Geophys. Res. Letters*, **26**, 2191-2195.
58. Tyndall, G. S., J. J. Orlando, C. S. Kegley-Owen, T. J. Wallington, M. J. Hurley, 1999: Rate coefficients for the reactions of chlorine atoms with methanol and acetaldehyde. *Int. J. Chem. Kinet.*, **31**, 776-784.
59. C. S. Kegley-Owen, G. S. Tyndall, J. J. Orlando, A. Fried, 1999: Tunable diode laser studies of the reaction of Cl-atoms with CH₃CHO. *Int. J. Chem. Kinet.*, **31**, 766-775.

60. Thuner, L. P.; I. Barnes, K. H. Becker, T. J. Wallington, L. K. Christensen, J. J. Orlando, B. Ramacher, 1999: Atmospheric chemistry of tetrachloroethene ($\text{CCl}_2=\text{CCl}_2$): Products of chlorine atom initiated oxidation. *J. Phys. Chem. A.*, **103**, 8657-8663.
61. Wallington, T. J., O. Sokolov, M. D. Hurley, G. S. Tyndall, J. J. Orlando, I Barnes, K. H. Becker, R. Vogt, 1999: Atmospheric chemistry of methyl cyclopentadienyl manganese tricarbonyl (MMT): Photolysis, reaction with OH radicals, and reaction with O_3 . *Environ. Sci. and Technol.*, **33**, 4232-4238.
62. Burkholder, J. B., J. J. Orlando, 2000: UV absorption spectrum of BrONO. *Chem. Phys. Lett.*, **317**, 603-608.
63. Orlando, J. J.; J. B. Burkholder, 2000: Identification of BrONO as the major product in the gas-phase reaction of Br with NO_2 . *J. Phys. Chem. A.*, **104**, 2048-2053.
64. Orlando, J. J., B. Nozière, G. S. Tyndall, S. E. Paulson, G. Orzechowska, Y. Rudich, 2000: Product studies of the OH- and ozone-initiated oxidation of some monoterpenes. *J. Geophys. Res.*, **105**, 11561-11572.
65. Orlando, J. J., L. T. Iraci, G. S. Tyndall, 2000: The chemistry of the cyclohexoxy and cyclopentoxy radicals at sub-ambient temperatures. *J. Phys. Chem. A*, **104**, 5072-5079.
66. Burkholder, J. B., G. Knight, J. J. Orlando, 2000: The gas phase UV absorption spectrum of BrOCl. *J. Photochem. Photobiol. A: Chemistry*, **134**, 133-137.
67. Ramacher, B.; J. J. Orlando, G. S. Tyndall, 2000: Temperature-dependent rate coefficient measurements for the reaction of bromine atoms with aldehydes. *Int. J. Chem. Kinet.*, **32**, 460-465.
68. Orlando, J. J.; B. Ramacher, G. S. Tyndall, 2000: Upper limits for the rate coefficients for the reaction of BrO with HCHO and HBr. *Geophys. Res. Letters*, **27**, 2633-2637.
69. Frøsig, L.; O. J. Nielsen, M. Bilde, T. J. Wallington, J. J. Orlando, G. S. Tyndall, 2000: Kinetics and mechanism of Cl atoms with nitrobenzene. *J. Phys. Chem. A*, **104**, 11328-11331.
70. Orlando, J. J.; G. S. Tyndall, L. Vereecken, J. Peeters, 2000: The atmospheric chemistry of the acetonoxo radical. *J. Phys. Chem. A*, **104**, 11578-11588.
71. Orlando, J. J.; G. S. Tyndall, 2001: The atmospheric chemistry of the HC(O)CO radical. *Int. J. Chem. Kinet.*, **33**, 149-156.
72. Ramacher, B.; J. J. Orlando, G. S. Tyndall, 2001: Temperature-dependent rate coefficient measurements for the reaction of bromine atoms with a series of unsaturated organic species. *Int. J. Chem. Kinet.*, **33**, 198-211.

73. Orlando, J. J.; G. S. Tyndall, N. Ceazan, 2001: Rate Coefficients and Product Yields from Reaction of OH with 1-penten-3-ol, (Z)-2-penten-1-ol, and Allyl Alcohol (2-propen-1-ol). *J. Phys. Chem. A* **105**, 3564-3569.
74. Bacher, C.; G. S. Tyndall, J. J. Orlando, 2001: The atmospheric chemistry of glycolaldehyde. *J. Atmos. Chem.* **39**, 171-189.
75. Wallington, T. J.; M. D. Hurley, T. Maurer, I. Barnes, K. H. Becker, G. S. Tyndall, J. J. Orlando, A. S. Pimentel, M. Bilde, 2001: Atmospheric oxidation mechanism of methyl formate. *J. Phys. Chem. A* **105**, 5146-5154.
76. Tyndall, G. S.; J. J. Orlando, T. J. Wallington, M. D. Hurley, 2001: Mechanism of Cl- and OH-initiated oxidation of acetonitrile. *J. Phys. Chem. A* **105**, 5380-5384.
77. Orlando, J. J.; G. S. Tyndall, 2002: Oxidation mechanisms for ethyl chloride and ethyl bromide under atmospheric conditions. *J. Phys. Chem. A* **106**, 312-319.
78. Tyndall, G. S.; C. S. Kegley-Owen, J. J. Orlando, A. Fried, 2002: Tunable diode laser study of the reaction $\text{OH} + \text{ClO} \rightarrow \text{HCl} + \text{O}_2$. *J. Phys. Chem. A* **106**, 1567-1575.
79. Apel, E. C.; D. D. Riemer, A. Hills, W. Baugh, J. Orlando, I. Faloon, D. Tan, W. Brune, B. Lamb, H. Westberg, M. A. Carroll, T. Thornberry, C. Geron, 2002: Measurement and interpretation of isoprene fluxes and isoprene, methacrolein and methyl vinyl ketone mixing ratios at the PROPHET site during the 1998 intensive. *J. Geophys. Res.*, **107**, 10.1029/2000JD000225.
80. Orlando, J. J.; G. S. Tyndall, S. B. Bertman, W. Chen, J. B. Burkholder, 2002: Rate coefficient for the reaction of OH with MPAN. *Atmos. Environ.*, **36**, 1895-1900.
81. Tyndall, G. S.; J. J. Orlando, T. J. Wallington, M. D. Hurley, M. Goto, M. Kawasaki, 2002: Mechanism of the reaction of OH radicals with acetone and acetaldehyde at 251 and 296 K. *Phys. Chem. Chem. Phys.* **4**, 2189-2193.
82. Orlando, J. J.; G. S. Tyndall, 2002: Mechanism for the reaction of OH with two unsaturated aldehydes: acrolein and crotonaldehyde. *J. Phys. Chem. A*, **106**, 12252-12259.
83. Ridley, B. A.; J. J. Orlando, 2003: Active nitrogen in surface ozone depletion events at Alert during Spring 1998. *J. Atmos. Chem.*, **44**, 1-22.
84. Klonecki, A.; P. Hess, L. Emmons, L. Smith, J. Orlando, D. Blake, 2003: Seasonal changes in the transport of pollutants into the Arctic troposphere – model study. *J. Geophys. Res.*, **108**, 10.1029/2002JD002199.
85. Tanaka, P. L.; D. D. Riemer, S. Chang, G. Yarwood, E. C. McDonald-Buller, E. C. Apel, J. J. Orlando, D. J. Neece, C. B. Mullins, D. T. Allen, 2003: Direct evidence for chlorine-enhanced urban ozone formation in Houston, Texas. *Atmos. Environ.*, **37**, 1393-1400.

86. Orlando, J. J.; G. S. Tyndall, 2003: Gas phase UV absorption spectra for peracetic acid, and for acetic acid monomer and dimer, *J. Photochem. Photobiol A: Photochem.*, **157**, 161-166.
87. Orlando, J. J., G. S. Tyndall, E. C. Apel, D. D. Riemer, S. E. Paulson, 2003: Rate coefficients and mechanisms of the reaction of Cl-atoms with a series of unsaturated hydrocarbons under atmospheric conditions, *Int. J. Chem. Kinet.*, **35**, 334-353.
88. Horowitz, L. W.; S. Walters, D. L. Mauzerall, L. K. Emmons, P. J. Rasch, C. Granier, X. X. Tie, J.-F. Lamarque, M. Schultz, G. S. Tyndall, J. J. Orlando, G. P. Brasseur, 2003: A global simulation of tropospheric ozone and related tracers: Description and validation of MOZART, version 2, *J. Geophys. Res.*, **108**, 4784, 10.1029/2002JD002853.
89. Orlando, J. J.; G. S. Tyndall, T. J. Wallington, 2003: The atmospheric chemistry of alkoxy radicals, *Chemical Reviews*, **103**, 4657-4690.
90. Seakins, P.; J. J. Orlando, G. S. Tyndall, 2004: The rate coefficients and fraction of vibrationally excited HCl from the reactions of chlorine atoms with methanol, ethanol and formaldehyde, *Phys. Chem. Chem. Phys.*, **6**, 2224-2229.
91. Hasson, A.; G. S. Tyndall, J. J. Orlando, 2004: A product yield study of the reaction of HO₂ radicals with ethyl peroxy, acetyl peroxy, and acetonyl peroxy radicals, *J. Phys. Chem. A*, **108**, 5979-5989.
92. Tyndall, G. S.; J. J. Orlando, A. S. Pimentel, 2004: Temperature dependence of the β -ester rearrangement reaction, *J. Phys. Chem A.*, **108**, 6850-6856.
93. Hanson, D. R.; J. J. Orlando, B. Nozière, E. Kosciuch, 2004: Proton transfer mass spectrometry studies of peroxy radicals, *Int. J. Mass Spec.*, **239**, 147-159.
94. Orlando, J. J.; G. S. Tyndall, E. A. Betterton, 2005: Atmospheric chemistry of HN₃: UV absorption spectrum, OH reaction rate coefficient, and reactions of the N₃ radical, *Environ. Sci. Technol.*, **39**, 1632-1640.
95. Orlando, J. J.; C. A. Piety, J. M. Nicovich, M. L. McKee, P. H. Wine, 2005: Rates and mechanisms for the reactions of chlorine atoms with iodoethane and 2-iodopropane, *J. Phys. Chem. A*, **109**, 6659-6675.
96. Matsunaga, S. N.; C. Wiedinmyer, A. B. Guenther, J. J. Orlando, T. Karl, D. Toohey, J. P. Greenberg, Y. Kajii, 2005: Isoprene oxidation products are a significant atmospheric aerosol component, *Atmos. Phys. Chem. Disc.*, **5**, 11143-11156.
97. Cassanelli, P.; R. A. Cox, J. J. Orlando, G. S. Tyndall, 2006: An FTIR study of the isomerization of 1-butoxy radicals under atmospheric conditions, *J. Photochem. Photobiol A: Photochem.*, **177**, 109-115, doi: 10.1016/j.jphotochem.2005.11.001.

98. Lamarque, J.-F.; J. T. Kiehl, J. J. Orlando, 2007: On the potential role of hydrogen sulfide in a stratospheric ozone collapse at the Permian-Triassic boundary, *Geophys. Res. Letters*, **34**, L02801, doi:10.1029/2006GL028384.
99. Ridley, B. A.; T. Zeng, Y. Wang, E. L. Atlas, E. V. Browell, P. G. Hess, J. J. Orlando, K. Chance, and A. Richter, 2007: An ozone depletion event in the sub-arctic surface layer over Hudson Bay, Canada, *J. Atmos. Chem.*, **57**, 255-280, doi: 10.1007/s10874-007-9072-z.
100. Orlando, J. J., 2007: The atmospheric oxidation of diethyl ether: Chemistry of the C₂H₅-O-CH(O•)CH₃ radical between 218 and 335 K, *Phys.Chem.Chem. Phys.*, **9**, 4189-4199, doi: 10.1039/b706819k.
101. Kinnison, D.E.; G.P. Brasseur, S. Walters, R.R. Garcia, B.A. Boville, L. Harvey, C. Randall, L. Emmons, J.F. Lamarque, P. Hess, J.J. Orlando, X.X.Tie, W. Randel, L. Pan, A. Gettelman, C. Granier, T. Diehl, U. Niemeier, A. J. Simmons (2007): Sensitivity of Chemical Tracers to Meteorological Parameters in the MOZART-3 Chemical Transport Model, *J. Geophys. Res.*, **112**, D20302, doi:10.1029/2006JD007879.
102. E. Iwasaki, Y. Matsumi, K. Takahashi, T.J. Wallington, M.D. Hurley, J.J. Orlando, E.W. Kaiser, J.G. Calvert, 2008: Atmospheric chemistry of cyclohexanone: UV spectrum and kinetics of reaction with chlorine atoms, *Int. J. Chem. Kinet.*, **40**, 223-229, doi: 10.1002/kin.20291.
103. Pfister, G. G.; L. K. Emmons, P. G. Hess, J.-F. Lamarque, J. J. Orlando, S. Walters, A. Guenther, P. Palmer, P. Lawrence, 2008: Contribution of isoprene to chemical budgets: A model tracer study with the NCAR CTM MOZART-4, *J. Geophys. Res.*, **113**, D05308, doi:10.1029/2007JD008948.
104. Riemer, D. D., E.C. Apel, J.J. Orlando, G. S. Tyndall, W. H. Brune, E. Williams, J. Neece, 2009: Unique isoprene oxidation products demonstrate chlorine atom chemistry occurs in the Houston, Texas urban area, *J. Atmos. Chem.*, **61**, 227-242, doi: 10.1007/s10874-009-9134-5.
105. Monks, P. S.; et al., 2009: Atmospheric Composition Change - Global and Regional Air Quality, *Atmos. Environ.*, **43**, 5268-5350, doi: 10.1016/j.atmosenv.2009.08.021.
106. Emmons, L. K.; S. Walters, P. G. Hess., J.-F. Lamarque, G. G. Pfister, D. Fillmore, C. Granier, A. Guenther, D. Kinnison, T. Laepple, J. Orlando, X. Tie, G. Tyndall, C. Wiedinmyer, S. Baughcum and S. Kloster, 2009: Description and evaluation of the Model for Ozone and Related chemical Tracers, version 4 (MOZART-4), *Geoscientific Model Development*, **3**, 43-67, 2010, doi: 10.5194/gmd-3-43-2010.
107. Tang, Y.; G. S. Tyndall, and J. J. Orlando, 2010: Spectroscopic and kinetic properties of HO₂ radicals and the enhancement of the HO₂ self reaction by CH₃OH and H₂O, *J. Phys. Chem.A*, **114**, 369-378, doi: 10.1021/jp905279b.
108. Kim, S., T. Karl, A. Guenther, G. Tyndall, J. Orlando, P. Harley, R. Rasmussen, and E. Apel (2010): Emissions and ambient distributions of biogenic volatile organic compounds (BVOC) in a ponderosa pine ecosystem: Interpretation of PTR-MS mass spectra, *Atmos. Chem.*

- Phys.*, **10**, 1759-1771, 2010, doi:10.5194/acp-10-1759-2010.
109. Orlando, J. J.; G. S. Tyndall, 2010: The atmospheric oxidation of ethyl formate and ethyl acetate over a range of temperatures and oxygen partial pressures, *Int. J. Chem. Kinet.*, **42**, 397-413, doi: 10.1002/kin.20493.
 110. Pimentel, A. S., G. S. Tyndall, J. J. Orlando, M. D. Hurley, T. J. Wallington, M. P. Sulbaek Andersen, P. Marshall, T. S. Dibble, 2010: Atmospheric chemistry of isopropyl formate and tert-butyl formate, *Int. J. Chem. Kinet.*, **42**, 479-498, doi: 10.1002/kin.20498.
 111. Liao, J.; H. Sihler, J. Neuman, D. Tanner, U. Frieß, U. Platt, F. Flocke, J. Orlando, P. Shepson, H. Beine, A. Weinheimer, S. Sjostedt, J. Nowak, D. Knapp, R. Staebler, W. Zheng, R. Sander, 2011: A comparison of Arctic BrO measurements by chemical ionization mass spectrometry (CIMS) and long path-differential optical absorption spectroscopy (LP-DOAS), *J. Geophys. Res.*, **116**, D00R02, doi:10.1029/2010JD014788.
 112. Vila-Guerau de Arellano, J.; E. G. Patton, T. Karl, K. van den Dries, M. C. Barth, and J. J. Orlando, 2011: The role of boundary layer dynamics on the diurnal evolution of isoprene and the hydroxyl radical over tropical forests, *J. Geophys. Res.*, **116**, D07304, doi:10.1029/2010JD014857.
 113. Lamarque, J.F.; J. R. McConnell, D. T. Shindell, J. J. Orlando and G. S. Tyndall, 2011: Understanding the drivers for 20th century change of hydrogen peroxide in Antarctic ice-cores, *Geophys. Res. Letters*, **38**, L04810, doi: 10.1029/2010GL045992.
 114. Wiedinmyer, C., S. K. Akagi, R. J. Yokelson, L.K. Emmons, J.A. Al-Saadi, J.J. Orlando, A.J. Soja, 2011: The Fire INventory from NCAR (FINN): A high resolution global model to estimate the emissions from open burning, *Geoscientific Model Development*, **4**, 625-641, doi:10.5194/gmdd-3-2439-2010.
 115. Zheng, W., A. Swanson, F. M. Flocke, J. M. Roberts, G. S. Tyndall, J. J. Orlando, L. G. Huey, D. J. Tanner, D. R. Hanson, 2011: Characterization of a thermal decomposition chemical ionization mass spectrometer for the atmospheric measurement of peroxyacyl nitrates (PANs) in the atmosphere, *Atmos. Chem. Phys.*, **11**, 6529-6547, doi: 10.5194/acp-11-6529-2011.
 116. Saiz-Lopez, A., J.-F. Lamarque, D. E. Kinnison, S. Tilmes, C. Ordóñez, J. Orlando, J. M. C. Plane, A. S. Mahajan, G. S. Santos, E. Atlas, D. R. Blake, S. P. Sander, S. Schauffler, A. M. Thompson, and G. Brasseur, 2011: Climate significance of halogen-driven ozone loss in the tropical marine troposphere, *Atmos. Chem. Phys. Discussions*, **11**, 32003-32029.
 117. Liao, J., L. G. Huey, D. J. Tanner, F. M. Flocke, J. J. Orlando, J. A. Neuman, J. B. Nowak, A. J. Weinheimer, S. R. Hall, J. N. Smith, A. Fried, R. M. Staebler, Y. Wang, J.-H. Koo, C. A. Cantrell, P. Weibring, J. Walega, D. J. Knapp, P. B. Shepson, and C. R. Stephens, 2012: Observed and modeled inorganic bromine (HOBr, BrO, and Br₂) speciation at Barrow, Alaska in spring 2009, *J. Geophys. Res.*, **117**, doi: 10.1029/2011JD016641.
 118. Lamarque, J.-F., L. K. Emmons, P. G. Hess, D. E. Kinnison, S. Tilmes, F. Vitt, C. L. Heald, E. A. Holland, P. H. Lauritzen, J. Neu, J.J. Orlando, P. Rasch, and G. Tyndall, 2012: CAM-chem:

- Description and evaluation of interactive atmospheric chemistry in CESM, *Geoscientific Model Development*, **5**, 369-411, doi:10.5194/gmd-5-369-2012.
119. Hu, H., T. S. Dibble, G. S. Tyndall and J. J. Orlando, 2012: Temperature-dependent branching ratios of deuterated methoxy radicals (CH₂DO•) reacting with O₂, *J. Phys. Chem. A*, 6295-6302, doi: 10.1021/jp211873w.
 120. Hasson, A. S.; G. S. Tyndall, J. J. Orlando, S. Singh, S. Q. Hernandez, S. Campbell, and Y. Ibarra, 2012: Branching ratios for the reaction of selected carbonyl-containing peroxy radicals with hydroperoxy radicals, *J. Phys. Chem. A*, **116**, 6264-6281, doi: 10.1021/jp211799c.
 121. Orlando, J. J., and G. S. Tyndall, 2012: Laboratory studies of organic peroxy radical chemistry: an overview with emphasis on recent issues of atmospheric significance, *Chemical Society Reviews*, **41**, 6294-6317, doi: 10.1039/C2CS35166H.
 122. Helmig, D., P. Boylan, B. Johnson, S. Oltmans, C. Fairall, R. Staebler, A. Weinheimer, J. Orlando, D. J. Knapp, D. D. Montzka, F. Flocke, U. Frieß, H. Sihler and P. B. Shepson, 2012: Ozone dynamics and snow-atmosphere exchanges during ozone depletion events at Barrow, AK, *J. Geophys. Res.*, **117**, doi:10.1029/2012JD017531.
 123. Liao, J., L. G. Huey, Z. Liu, D. J. Tanner, C. A. Cantrell, J. J. Orlando, F. M. Flocke, P. B. Shepson, A. J. Weinheimer, S. R. Hall, K. Ullmann, H. J. Beine, Y. Wang, E. D. Ingall, C. R. Stephens, R. S. Hornbrook, E.C. Apel, D. Riemer, A. Fried, R. L. Mauldin III, J. N. Smith, R. M. Staebler, J. A. Neuman, and J. B. Nowak, 2014: High levels of molecular chlorine in the Arctic atmosphere, *Nature Geoscience*, doi:10.1038/ngeo2046.
 124. Knote, C., A. Hodzic, J. L. Jimenez, R. Volkamer, J.J. Orlando, S. Baidar, J. Brioude, J. Fast, D. R. Gentner, A. H. Goldstein, P. L. Hayes, W. B., Knighton, H. Oetjen, A. Setyan, H. Stark, R. Thalman, G. Tyndall, R. Washenfelder, E. Waxman, and Q. Zhang, 2014: Simulation of semi-explicit mechanisms of SOA formation from glyoxal in a 3D model, *Atmos. Chem. Phys.*, **14**, 6213-6239.
 125. Chai, J. J., H. Y. Hu, T. S. Dibble, G. S. Tyndall and J. J. Orlando, 2014: Rate constants and kinetic isotope effects for methoxy radical reacting with NO₂ and O₂, *J. Phys. Chem. A*, **118**, 3552-3563, DOI: 10.1021/jp501205d.
 126. Wallington, T.J., J.J. Orlando, G. S. Tyndall, O. J. Nielsen, 2014: Comment on 'Airborne trifluoroacetic acid and its fraction from the degradation of HFC-134a in Beijing, China', *Environ. Sci. Technol.*, **48**, 9948, DOI: 10.1021/es502485w.
 127. Knote, C., P. Tuccella, G. Curci, L. Emmons, J.J. Orlando, S. Madronich, R. Baro, P. Jimenez-Guerrero, D.J. Luecken, C. Hogrefe, R. Forkel, M. Hirtl, R. San Jose, L. Giordano, D. Brunner, K. Yahya, and Y. Zhang, 2014: Influence of the choice of gas-phase mechanism on predictions of key pollutants during the AQMEII phase-2 intercomparison, *Atmos. Environ.*, **115**, 553-568, doi:10.1016/j.atmosenv.2014.11.066.
 128. Thompson, C.R., P.B. Shepson, J. Liao, L.G. Huey, E.C. Apel, C.A. Cantrell, F. Flocke, J. Orlando, A. Fried, S.R. Hall, R.S. Hornbrook, D.J. Knapp, R.L. Mauldin III, D.D. Montzka, B.C. Sive, K. Ullmann,

- P. Weibring, A. Weinheimer, 2015: Interactions of bromine, chlorine, and iodine photochemistry during ozone depletions in Barrow, Alaska, *Atmos. Chem. Phys.*, **15**, 9651-9679, doi:10.5194/acp-15-9651-2015.
129. Thalman, R. M., S. Ball, M. T. Baeza-Romero, S.M. Ball, E. Borrás, M.J.S. Daniels, I.C.A. Goodall, S.B. Henry, T. Karl, F.N. Keutsch, S. Kim, J. Mak, P.S. Monks, A. Muñoz, J. Orlando, S. Peppe, A.R. Rickard, M. Ródenas, P. Sánchez, R. Seco, L. Su, G. Tyndall, M. Vázquez, T. Vera, E. Waxman and R. Volkamer, 2015: Instrument inter-comparison of glyoxal, methyl glyoxal and NO₂ under simulated atmospheric conditions, *Atm. Measurement Techniques*, **8**, 1835-1862.
130. Custard, K.D., C.R. Thompson, K.A. Pratt, P.B. Shepson, J. Liao, L.G. Huey, J.J. Orlando, A.J. Weinheimer, E. Apel, S.R. Hall, F. Flocke, L. Mauldin, R.S. Hornbrook, D. Pöhler, S. General, J. Zielcke, W.R. Simpson, U. Platt, A. Fried, P. Weibring, B.C. Sive, K. Ullmann, C. Cantrell, D.J. Knapp, and D.D. Montzka, 2015: The NO_x dependence of halogen chemistry in the Arctic atmospheric boundary layer, 2015: *Atmos. Chem. Phys.* **15**, 10799-10809, doi:10.5194/acp-15-10799-2015.
131. Hodzic, A., S. Madronich, P. S. Kasibhatla, G. Tyndall, B. Aumont, J. Jimenez, J. Lee-Taylor and J. Orlando, 2015: Organic photolysis reactions in tropospheric aerosols: Effect on secondary organic aerosol formation and lifetime, 2015: *Atmos. Chem. Phys.*, **15**, 9253-9269, 2015, doi:10.5194/acp-15-9253-2015.
132. Kaser, L., T. Karl, B. Yuan, R. L Mauldin III, C. Cantrell, A. Guenther, E. G. Patton, A. Weinheimer, C. Knote, J. Orlando, L. Emmons, E. Apel, R. Hornbrook, S. Shertz, K. Ullmann, S. Hall, M. Graus, J. de Gouw, X. Zhou and C. Ye, 2015: Influence of atmospheric turbulence on the oxidation rate of isoprene by hydroxyl radicals, *Geophys. Res. Letters*, **42**, DOI: 10.1002/2015GL066641.
133. Thompson, C.R., P.B. Shepson, J. Liao, L.G. Huey, C. Cantrell, F. Flocke, J. Orlando, 2016: Bromine atom production and chain propagation during springtime Arctic ozone depletion events in Barrow, Alaska, *Atmos. Chem. Phys. Discussions*, submitted.
134. Hornbrook, R. S., F. M. Flocke, S. Hall, A. J. Hills, D. J. Knapp, D. D. Montzka, J. J. Orlando, A. Turnipseed, K. Ullmann, A. J. Weinheimer, E. C. Apel, R. L Mauldin III, D. D. Riemer, P. B. Shepson, B. Sive, R. M. Staebler, 2016: Arctic springtime observations of volatile organic compounds during the OASIS-2009 campaign, *J. Geophys. Res.*, **121**, 9789–9813 DOI: 10.1002/2015JD024360.
135. Hatch, L. E., R. J. Yokelson, C. E. Stockwell, P. R. Veres, I. J. Simpson, D. R. Blake, J. J. Orlando and K. C. Barsanti, 2016: Multi-instrument comparison and compilation of non-methane organic gas emissions from biomass burning and implications for smoke-derived secondary organic aerosol precursors, *Atmos. Chem. Phys.*, doi:10.5194/acp-2016-598, accepted.
136. McGillen, M. R., G. S. Tyndall, J. J. Orlando, A. S. Pimentel, D. de J. Medeiros, and J. B. Burkholder, 2016: Temperature-dependent product study of the OH and Cl-initiated oxidation of *i*-butanol in the gas phase between 251 and 340 K, *J. Phys. Chem. A*, DOI: 10.1021/acs.jpca.6b09266.

137. Burkholder, J. B., J. Abbatt, I. Barnes, J. Roberts, M. Melamed, M. Ammann, A. Bertram, C. Cappa, A.M. Carlton, L. Carpenter, J. Crowley, Y. Dubowski, C. George, D. Heard, H. Herrmann, F. Keutsch, J. Kroll, V. F. McNeill, N.L. Ng, S. Nizkorodov, J. J. Orlando, C. Percival B. Picquet-Varrault, Y. Rudich, P. Seakins, J. Surratt, H. Tanimoto, J. Thornton, T. Zhu, G. Tyndall, A. Wahner, C. J. Weschler, K. Wilson, P. Ziemann, 2016: "The Essential Role for Laboratory Studies in Atmospheric Chemistry", *Env. Sci. Technol.*, submitted.
138. Orlando, J. J., and G. S. Tyndall, 2016: The atmospheric oxidation of hydroxyacetone: Chemistry of the $\text{CH}_3\text{C}(\text{O})\text{C}\cdot\text{HOH}$ and $\text{CH}_3\text{C}(\text{O})\text{CH}(\text{OH})\text{OO}\cdot$ radicals between 248 and 298 K, *Int. J. Chem. Kinet.*, in preparation.

OTHER PUBLICATIONS

1. Ennis, C., E. Apel, A. Fried, S. Massie, J. J. Orlando, and G. S. Tyndall: Understanding the Chemical Atmosphere, in *Observational techniques in the atmospheric sciences*, ed. A. Cooper and M. Politovich, Proceedings of the NCAR ASP 1992 Summer School.
2. Kegley-Owen, C. S., G. S. Tyndall, J. J. Orlando, and A. Fried, 1996: Flash photolysis / tunable diode laser absorption spectroscopy studies of HCl as a product of the reactions: $\text{Cl} + \text{C}_2\text{H}_6$ and $\text{Cl} + \text{CH}_3\text{CHO}$, Proceedings of the SPIE, **2834**, 110-119.
3. Madronich, S.; Orlando, J. J., 2006: Preface: 13th International Symposium on Transport and Air Pollution, *Atmos. Environ.*, **40**, 5943.

CONTRIBUTION TO BOOKS

Atmospheric Chemistry and Global Change, editors G. P. Brasseur, J. J. Orlando, and G. S. Tyndall, Oxford Press, New York, 1999. (co-author of five chapters, in addition to serving as co-editor).

Franklin, J., R. Atkinson, P. H. Howard, J. J. Orlando, C. Seigneur, T. J. Wallington, C. Zetzsch, 2000: "Quantitative determination of persistence in air", chapter in *Evaluation of Persistence and Long-Range Transport of Organic Chemicals in the Environment: Guidelines and Criteria for Evaluation and Assessment*, SETAC press, Pensacola, Florida.

Glossary of Meteorology, Second Edition, editor, Todd Glickman, AMS Press, Boston, 2000. (served on Editorial Board, as co-editor for Atmospheric Chemistry).

The Handbook of Environmental Chemistry, Ed.-in-Chief O. Hutzinger, author of chapter entitled "The atmospheric chemistry of organic bromine and iodine compounds", in volume 3, *Anthropogenic Compounds: Organic Bromine and Iodine Compounds*, Springer-Verlag, 2003.

Atmospheric Chemistry in a Changing World: An integration and synthesis of a decade of tropospheric chemistry research, co-author of Chapter 5, "Advances in Laboratory and Field Measurements", Springer-Verlag, 2003.

The Mechanism of Atmospheric Oxidation of the Alkanes, authors J. G. Calvert, R. Derwent, J. J. Orlando, G. S. Tyndall, and T. J. Wallington. Author of Chapter 3 (Kinetics of Reactions of Cl, O(³P), NO₃, and O₃ with the Alkanes) and Chapter 4 (Mechanisms and End-Products of the Atmospheric Oxidation of Alkanes), Oxford University Press, New York, 2008.

The Mechanism of Atmospheric Oxidation of the Oxygenates, authors J. G. Calvert, A. Mellouki, J. J. Orlando, M. J. Pilling, and T. J. Wallington, Oxford University Press, New York, 2011.

The Mechanisms of Reactions Influencing Atmospheric Ozone, authors J. G. Calvert, J. J. Orlando, W.R. Stockwell, and T. J. Wallington, Oxford University Press, New York, 2016.

INVITED TALKS

1. The photochemistry of methylglyoxal, presented at Dow Chemical Company, Midland MI, June 1993.
2. Chemistry of the Stratosphere: Factors Influencing the Ozone Layer, presented at University of Colorado - Colorado Springs, April 1994.
3. The atmospheric chemistry of bromine species, presented at the Ford Motor Co., January 1996.
4. The atmospheric chemistry of bromine species, presented at UCLA, January 1996.
5. NMHC Oxidation Mechanisms: The role of the alkoxy radical, presented at the NOAA Aeronomy Laboratory, November 1996.
6. Laboratory studies of the oxidation mechanism of biogenic hydrocarbons, Regis Univ., April 2000.
7. Atmospheric chemistry of unsaturated hydrocarbons, Georgia Institute of Technology, Jan. 2002.
8. The OH-initiated oxidation of OVOCs, terpenes, and isoprene: Some recent data, Gordon Conference on Biogenic Hydrocarbons, Oxford UK, September 2002.
9. Atmospheric chemistry of unsaturated hydrocarbons, Univ. of Copenhagen, September 2002.
10. Laboratory studies of hydrocarbon oxidation mechanisms: Some recent results, NOAA Aeronomy Laboratory Seminar Series, January 2003.
11. The atmospheric chemistry of alkoxy radicals: Recent studies of ethers and esters, plenary lecture, Sixth International Conference on Chemical Kinetics, July 2005, NIST, Gaithersburg, MD.
12. Lifetimes and chemical processing of biogenics: A "status report", at "Planning a New Direction for Research, Biogenic Hydrocarbons: Emissions, aerosol formation, and climate impacts" workshop, Oct. 2006, Boulder CO.
13. Atmospheric chemistry of hydrocarbon oxidation: Recent data and lessons learned, American Chemical Society Spring 2008 National Meeting, New Orleans, LA, April, 2008.

14. Temperature- and pressure-dependent aspects of the hydrocarbon oxidation process, Atmospheric Chemical Mechanisms Conference, Davis CA, Dec. 2008.
15. Laboratory studies of hydrocarbon oxidation mechanisms under atmospheric conditions, University of Wisconsin-Madison Chemistry Dept., February 2010.
16. Gas-phase chemistry of biogenic hydrocarbons: A status report, Gordon Conference on Biogenic Hydrocarbons, Les Diablerets Switzerland, May 2010.
17. Overview of recent activities in the Lab Kinetics group in NCAR/NESL/ACD, Workshop on New Insights into Gas-Phase Atmospheric Chemistry, Telluride CO, August 2010.
18. Recent Advances in the Determination of the Oxidation Mechanisms of Isoprene and its By-Products, Atmospheric Chemical Mechanisms Conference, Davis CA, Dec. 2010.
19. Laboratory studies of hydrocarbon oxidation mechanisms under atmospheric conditions, North Carolina A&T State University, Greensboro, N.C., February 2011.
20. Laboratory studies of hydrocarbon oxidation mechanisms under atmospheric conditions, McGill University, Montreal Quebec Canada, August 2011.
21. Update on recent activities in the Lab Kinetics group in NCAR/NESL/ACD, Workshop on New Insights into Gas-Phase Atmospheric Chemistry, Telluride CO, July / August 2012.
22. Laboratory studies of hydrocarbon oxidation mechanisms under atmospheric conditions, Penn State University, State College, PA., March 2014.
23. Update on recent activities in the Lab Kinetics group in NCAR/NESL/ACD, Workshop on New Insights into Gas-Phase Atmospheric Chemistry, Telluride CO, July / August 2014.
24. Laboratory studies of hydrocarbon oxidation mechanisms under atmospheric conditions, University of Oklahoma, Norman, OK, September 23, 2014.
25. J.J. Orlando, BVOC Oxidation Mechanisms: Connecting the Laboratory and the Field (and the Models and the Theory), invited introductory presentation, Atmospheric Chemistry Gordon Conference, Waterville NH, August 6, 2015.
26. Laboratory studies of hydrocarbon oxidation mechanisms under atmospheric conditions, University of Colorado-Denver, October, 2015.

OTHER TALKS AND CONFERENCE PRESENTATIONS

1. J. J. Orlando, D. R. Smith, P. H. Beckwith, and J. Reid, Technique for detecting ppm of DCI using tunable diode laser absorption spectroscopy, Regional Symposium on Molecular Dynamics and Photodissociation, Waterloo, Ont., Sept. 27, 1985.

2. J. J. Orlando, D. R. Smith, P. H. Beckwith, and J. Reid, IRMPD of $\text{CDCl}_3/\text{CHCl}_3$ (poster), Regional Symposium on Molecular Dynamics and Photodissociation, Waterloo, Ont., Sept. 27, 1985.
3. J. J. Orlando, J. B. Burkholder, C. J. Howard, Quantitative UV and IR absorption spectroscopy of Cl_2O_2 , Canadian Chemical Conference, Victoria, B.C., June, 1989.
4. J. J. Orlando, G. S. Tyndall, C. A. Cantrell, R. E. Shetter, and J. G. Calvert, Rate coefficient determinations for the reaction pair $\text{NO}_3 + \text{NO}_2 + \text{N}_2 \rightarrow \text{N}_2\text{O}_5 + \text{N}_2$ (poster), XIX Informal Conference of Photochemistry, Ann Arbor, MI, June 1990.
5. J. J. Orlando, G. S. Tyndall, G. K. Moortgat, J. G. Calvert, Quantum yields for O atom production from the photolysis of NO_3 (poster), XX Informal Conference on Photochemistry, Atlanta, May 1992.
6. J. J. Orlando, G. S. Tyndall, T. A. Staffelbach, J. G. Calvert, The Atmospheric Photochemistry of Methylglyoxal, Air and Waste Management Association 86th Annual Meeting and Exhibition, Denver CO, June 16, 1993.
7. J. J. Orlando, C. M. Roehl, G. S. Tyndall, R. E. Shetter, G. Vasquez, J. G. Calvert, Temperature dependent quantum yields for NO_2 photolysis near the dissociation threshold (poster), NATO ASI on Low Temperature Chemistry of the Atmosphere, Maratea, Italy, September 1993.
8. J. J. Orlando, Chemical Kinetics at NCAR: an overview, Max-Planck-Institute, Mainz Germany, September 1993.
9. J. J. Orlando, C. S. Kegley-Owen, G. S. Tyndall, J. G. Calvert, Photochemistry of Chlorine Nitrate at 308 nm, XXIst Informal Conference on Photochemistry, Toronto, May 1994.
10. J. J. Orlando, C. S. Kegley-Owen, G. S. Tyndall, J. G. Calvert, Photochemistry of Chlorine Nitrate at 308 nm, AEAP Meeting, Virginia Beach, June 1994.
11. J. J. Orlando, G. S. Tyndall, F. Flocke, T. J. Wallington, J. Williams, The chemistry of substituted alkoxy radicals (poster), Fall AGU Meeting, San Francisco, December 1994.
12. J. J. Orlando, G. S. Tyndall, T. J. Wallington, The oxidation mechanism of CH_3Br : Chemistry of the CH_2BrO radical (poster), 1995 Methyl Bromide State of the Science Workshop, Monterey CA, June 1995.
13. J. J. Orlando, G. S. Tyndall, Rate coefficients for the thermal dissociation of BrONO_2 (poster), 1995 Methyl Bromide State of the Science Workshop, Monterey CA, June 1995.
14. J. J. Orlando, G. S. Tyndall, S. Haberkorn, E. Estupiñan, T. J. Wallington, M. Dill, Laboratory studies of some brominated compounds of atmospheric importance (poster), Fall AGU Meeting, San Francisco, December 1995.
15. J. J. Orlando, G. S. Tyndall, T. J. Wallington, W. Schneider, M. D. Hurley, Pressure dependence of the rate coefficient for the reaction of CH_3CO with O_2 , 14th Int. Symposium on Gas Kinetics, Leeds, U.K., September 1996.

16. J. J. Orlando, G. S. Tyndall, J.-M. Fracheboud, S. Haberkorn, E. Estupiñan, A. Zimmer, Laboratory studies of the rate and mechanism of the atmospheric oxidation of hydroxyacetone (poster), Fall AGU Meeting, San Francisco, December 1996.
17. J. J. Orlando, G. S. Tyndall, C. Ferronato, J.-M. Fracheboud, E. Estupiñan, S. Haberkorn, A. Zimmer, Laboratory studies of the oxidation mechanisms of organic species (poster), Biogenics and Hydrocarbons Workshop, Charlottesville, VA, August 1997.
18. J. J. Orlando, G. S. Tyndall, J.-M. Fracheboud, C. Ferronato, T. J. Wallington, M. Bilde, J. Sehested, T. Møgelberg, O.-J. Nielsen, L. Vereecken, J. Peeters, The effect of chemical activation on the chemistry of alkoxy radicals (poster), Fall AGU Meeting, San Francisco, December 1997.
19. J. J. Orlando, G. S. Tyndall, B. Nozière, S. E. Paulson, Y. Rudich, Mechanism of the OH- and O₃-initiated oxidation of some monoterpenes (poster), Fall AGU Meeting, San Francisco, Dec. 1998.
20. J. J. Orlando, G. S. Tyndall, M. Bilde, T. J. Wallington, M. D. Hurley, E. W. Kaiser, The atmospheric chemistry of the chloromethanes: Cl-atom rate coefficients and oxidation mechanisms (poster), Spring AGU meeting, Boston, 1999.
21. J. J. Orlando, B. Ramacher, G. S. Tyndall, Temperature-dependent rate coefficient measurements for the reaction of Br with a series of aldehydes and unsaturated organic species (poster), 16th International Symposium on Gas Kinetics, Cambridge UK, July 2000.
22. J. J. Orlando, B. Ramacher, G. S. Tyndall, Rates and Mechanisms of Some Br and BrO Reactions of Importance in Polar Surface Ozone Depletion Events, Telluride Summer Research Conference on Atmospheric Chemistry, Telluride CO, August 2000.
23. J. J. Orlando, G. S. Tyndall, The atmospheric oxidation of ethyl chloride and ethyl bromide (poster), UT/LS Workshop, Breckenridge, July 2001.
24. J. J. Orlando, G. S. Tyndall, T. J. Wallington, W. F. Schneider, J. Sehested, L. K. Christensen, O. J. Nielsen, M. Bilde, J. Peeters, L. Vereecken, The atmospheric oxidation of acetone (poster), UT/LS Workshop, Breckenridge, July 2001.
25. J. J. Orlando, G. S. Tyndall, T. J. Wallington, J. B. Burkholder, S. B. Bertman, W. Chen, Laboratory studies of hydrocarbon oxidation mechanisms (poster), Fall AGU meeting, December 2001.
26. J. J. Orlando, G. S. Tyndall, J. B. Burkholder, S. B. Bertman, W. Chen, The atmospheric chemistry of unsaturated aldehydes, ACS Meeting, Orlando FL, April 2002.
27. J. J. Orlando, G. S. Tyndall, J. B. Burkholder, S. B. Bertman, W. Chen, The atmospheric chemistry of unsaturated aldehydes and their PAN-like derivatives (poster), the 17th International Symposium on Gas Kinetics, Essen Germany, August 2002.
28. J. J. Orlando, G. S. Tyndall, Laboratory studies of the tropospheric loss processes for acetic and peracetic acid (poster), Fall AGU meeting, December 2002.

29. J. J. Orlando, The Atmospheric Chemistry of Biogenic Hydrocarbons, NCAR ACD Seminar Series, April 12, 2004.
30. J. J. Orlando, et al., Atmospheric Oxidation Mechanisms for Diethyl Ether and its Oxidation Products, Ethyl Formate and Ethyl Acetate, poster presentation, AGU Fall Meeting, Dec. 2006.
31. J. J. Orlando, P. H. Wine, J. M. Nicovich, D. T. Huskey, J. E. Allen, M. L. McKee, T. J. Wallington, M. D. Hurley, M. S. Javadi, O. J. Nielsen, C. A. Piety, Atmospheric Oxidation of Iodinated Hydrocarbons, Fall AGU meeting, December 2007.
32. J. J. Orlando, Hydrocarbon Oxidation in the Atmosphere: The basic rules (and a few exceptions), NCAR ACD seminar series, March 2008.
33. J. J. Orlando, et al., An overview of the gas-phase measurements made during the OASIS – Barrow Spring 2009 Campaign, (poster), Fall AGU meeting, December 2009.
34. J. J. Orlando and G. S. Tyndall, Mechanism for the oxidation of hydroxyacetone under atmospheric conditions (poster), Fall AGU meeting, December 2010.
35. J. J. Orlando, G. S. Tyndall and D. Taraborrelli, Mechanism for the oxidation of hydroxyacetone and glycolaldehyde under atmospheric conditions (poster), 22nd International Symposium on Gas Kinetics, June 2012.
36. J. J. Orlando, G. S. Tyndall and D. Taraborrelli, Mechanism for the oxidation of hydroxyacetone and glycolaldehyde under atmospheric conditions (poster), Fall AGU meeting, December 2012.
37. J.J Orlando, G. S. Tyndall, C. S. Keglly-Owen, N. Reynoldson, Atmospheric oxidation mechanisms for diethyl and di-isopropyl ether (poster), Fall AGU meeting, December 2013.
38. J.J Orlando, G. S. Tyndall, Rate coefficients for reaction of Br-atoms with a series of oxygenated VOCs (poster), Fall AGU meeting, December 2014.
39. R. Hornbrook, E. Apel, A. Hills, D. Riemer, A. Turnipseed, J. Orlando, F. Flocke, S. Madronich, R. L. Mauldin, C. Cantrell, J. Liao, L.G. Huey, D. Tanner, A. Weinheimer, D. Knapp, D. Montzka, P. Shepson, C. Thompson, S. Hall, K. Ullmann, A. Fried, P. Weibring, R. Staebler, A. Steffen, G. Villena, J. Kleffmann, and the OASIS Science Team, VOCs and reactive radical chemistry in the Arctic during OASIS-2009, Atmospheric Chemistry Gordon Conference, Waterville NH, August 6, 2015.
40. F. Østerstrøm, O.J. Nielsen, Y. Liu, J.J Orlando, G. S. Tyndall, (poster), Mechanistic studies of the reactions of NO₃ with C₃-C₆ alkenes, Atmospheric Chemical Mechanisms, Davis CA, December 2016.