

Gloria L. Manney

Senior Research Scientist,
NorthWest Research Associates
(Adjunct Professor, Department of Physics,
New Mexico Institute of Mining and Technology;
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Education

- May 1988 Ph.D. Physics**, Iowa State University
Thesis Title: Numerical Studies of Barotropic Stability of Stratospheric States
- May 1982 B.S. Engineering Physics**, University of Kansas

Career Outline

- 2012-present NWRA Senior Research Scientist**
- 2005-present Adjunct Professor, New Mexico Institute of Mining and Technology**, Department of Physics
- 2000-2012 JPL Principal Scientist/Senior Research Scientist**, Microwave Atmospheric Science Group
- 1992-2000 JPL Scientist/Research Scientist**, Earth and Planetary Atmospheres Element
- 1991-1992 JPL Postdoctoral Associate**, Atmospheric and Oceanographic Sciences Section
- 1989-1991 JPL National Research Council Research Associate**, Atmospheric and Oceanographic Sciences Section
- 1988 Postdoctoral Research Associate, Atmospheric Physics, Iowa State University**

Honors and Awards

- 2014 NASA Group Achievement Award**, Aura Microwave Limb Sounder Science Team
- 2014 Elected Fellow of the American Meteorological Society**
- 2013 Journal of Geophysical Research – Atmospheres**, Editor's Citation for Excellence in Reviewing in 2012
- 2012 NASA Exceptional Achievement Medal**, For performing a uniquely comprehensive analysis and first report of the unprecedented ozone loss in the Arctic winter/spring of 2010/2011, the first ever Arctic "ozone hole"
- 2010 JPL/NASA Contributions and Inventions Board Awards**, NTR#47709, "Jet and Tropopause Products for Analysis and Characterization (JETPAC)"
- 2007 NASA Group Achievement Award**, UARS Science Team
- 2007 JPL/NASA Contributions and Inventions Board Awards**, NTR#44936 "Derived Meteorological Products for Solar Occultation Satellites, EOS MLS, and User-Defined Locations"
- 2005 NASA Goddard Space Flight Center Group Achievement Award**, Aura Team
- 2005 NASA Group Achievement Award**, Aura Project
- 2005 NASA Group Achievement Award**, Aura Microwave Limb Sounder Ground Data System Development Team

- 2004 Elected to International Ozone Commission**, Membership, through election by peers, is limited to approximately 30 of the world's top ozone scientists
- 1995 Low Allen Award for Excellence**, For innovative use of conventional meteorological data, remote sensing observations and atmospheric models to achieve quantitative estimates of the relative contributions of dynamical and chemical processes to seasonal changes in Arctic stratospheric ozone
- 1995 NASA Exceptional Achievement Medal**, For outstanding contributions to scientific analysis in support of the Upper Atmosphere Research Satellite
- 1993 NASA Group Achievement Award**, UARS Microwave Limb Sounder Data Processing/Analysis Team

Professional Memberships

- American Meteorological Society, Fellow**
Royal Meteorological Society, Member
American Geophysical Union, Member

Projects/Experience

- 2016-present Co-lead, Stratosphere-troposphere Processes and their Role in Climate (SPARC) Emerging Activity: Observed Composition Trends and Variability in the UTLS (OCTAV-UTLS)**
- 2015-present Co-lead, SPARC Reanalysis Intercomparison Project (S-RIP)**
- 2012-present Member, S-RIP steering group**
- 2012-present Co-lead, S-RIP Extratropical UTLS Chapter; Co-lead, S-RIP Polar Processes Chapter**
- 2012-present Member, SAGE III on ISS Science Utilization Team**
- 2003-present Co-Investigator, EOS Microwave Limb Sounder (MLS) Experiment**
- 2004-present ACE (Atmospheric Chemistry Experiment) Science Team Member**
- 2002-present SPARC Data Assimilation Working Group Member**
- 2013-2014 Contributor, Chapter 3 (Polar Ozone) of "WMO Scientific Assessment of Ozone Depletion 2013"**
- 2012 Co-Host/Local Organizer, 2012 SPARC Data Assimilation Workshop, 11–13 June 2012, Socorro, NM (with Ken Minschwaner)**
- May-Aug 2009 Visiting Scientist, Atmospheric Physics, University of Toronto**
- 2004-2012 Member, International Ozone Commission**
- 2003-2010 Convenor, Earth Observing System (EOS) Aura Satellite Meteorological Products Working Group**
- 1999-2008 Polar Ozone and Aerosol Measurement (POAM) Science Team Member**
- 1998-1999 Co-author, Chapter 6 (Upper Stratospheric Processes) of "WMO Scientific Assessment of Ozone Depletion 1998"**
- 1996-1999 Member, American Meteorological Society Middle Atmosphere Committee**
- 2015-present Co-Investigator, ROSES-2014 ACMAP Investigation "Composition of the Asian Summer Monsoon Anticyclone: Climatology and Interannual Variability from 10 Years of Satellite Measurements and Modeling" (PI: M.L. Santee, JPL)**

- 2014-present Co-Investigator, NASA-GMAO Investigation** “Atmospheric Dynamical Studies with High-Resolution GEOS-5 Simulations and MERRA2” (PI: M.J. Alexander, NWRA)
- 2014-present Principal Investigator, ROSES-2013 AST (Aura Science Team) Investigation** “The Upper Troposphere/Lower Stratosphere (UTLS) in the Climate System: Composition and Transport in the Jet/Tropopause Context”
- 2012-present Co-Investigator, ROSES-2011 MEaSURES Investigation** “A long term record of mesospheric and upper stratospheric temperature profiles” (PI: N.J. Livesey, JPL)
- 2011-2014 Principal Investigator, ROSES-2010 AST Investigation** “The Upper Troposphere/Lower Stratosphere in the Climate System: Transport and Dynamics in the Extratropics from Aura and Complementary Datasets”
- 2008-2010 Principal Investigator, ROSES-2008 Aura Science Team (AST) Investigation** “Modeling and Climate Implications of Stratopause and Tropopause Evolution”
- 2008-2011 Co-Investigator, ROSES-2008 AST Investigation** “Stratospheric Chlorine, Polar Processes, and Ozone Loss” (PI: M.L. Santee, JPL)
- 2005-2009 Principal Investigator, Atmospheric Chemistry, Modeling and Analysis Program (ACMAP) Investigation** “Interannual Variability in the Extratropical Stratosphere: Transport, Trend, and Tropospheric Implications”
- 1998-2005 Principal Investigator, ACPMAP Investigation** “Stratospheric Polar Vortex Development and Evolution: Interannual Variability and Transport Implications”
- 2003-2009 Co-Investigator, ACPMAP Investigation** “Analysis and Modeling of Active Chlorine and PSCs” (PI: M.L. Santee, JPL)
- 2003-2005 Co-Investigator, ACPMAP/Solar Occultation Satellite Science Team (SOSST) Investigation** “Occultation Data Intercomparison and Evaluation” (PI: C.E. Randall, CU-LASP)
- 1998-2003 Co-Investigator, Upper Atmosphere Research Satellite (UARS) Investigation** “Studies of PSC Processes and Denitrification Based on Satellite Observations” (PI: M.L. Santee, JPL)
- 1992-1999 Co-Investigator, UARS Theoretical Investigation** “Radiative-Dynamic Balances in the Middle Atmosphere” (PI: R. Zurek, JPL).
- 1992-1997 Participating Scientist, EOS IDS** “JPL/NCAR Project to Interface Climate Modeling on Global and Regional Scales with EOS Observations” (PI: R. Dickinson).
- 2002-2004 Organizer, Women in Science Discussion Group (bi-weekly), New Mexico Highlands University**
- 2016 Invited talk** “Upper Tropospheric/Lower Stratospheric Trace Gases in a Jet Coordinate Framework: JETPAC and Applications”, presented at the WMO/GAW/SPARC/NDAAC - UTLS observation workshop, 24–27 May 2016, Geneva, Switzerland.
- 2014 Invited talk** “Satellite Observations of Extreme Events In the Polar Middle Atmosphere”, presented at the SPARC General Assembly 2014, 12–17 January 2014, Queenstown, New Zealand.
- 2012 Invited talk** “A long term record of mesospheric and upper stratospheric temperatures based on UARS, TIMED and Aura satellite measurements”, presented at the CMAM20 Workshop, 17 December 2012, Toronto, Canada.
- 2011 Invited talk** “Unprecedented Arctic Ozone Loss in 2011: An Echo of the Antarctic”, presented at the 2011 Fall American Geophysical Union Fall Meeting, 5–9 December 2011, San Francisco, California, USA.

- 2011 Invited talk** “Transport and mixing in relation to the upper tropospheric/lower stratospheric (UTLS) jets from satellite and aircraft data”, presented at the 2011 International Union of Geodesy and Geophysics 2011 General Assembly, 27 June–7 July 2011, Melbourne, Australia.
- 2007 Invited talk** “Polar Stratopause and Tropopause Evolution: Implications for Assimilated Analyses”, presented at SPARC Data Assimilation Workshop and SPARC Workshop on the International Polar Year, 4-7 September 2007, Toronto, Ontario, Canada.
- 2005 Invited talk** “Review and Update of Assimilated Meteorological Dataset Intercomparisons”, presented at SPARC Data Assimilations Workshop and SPARC Workshop on Stratospheric Winds, 12-16 September 2005, Banff, Alberta, Canada.
- 2005 Invited talk** “Polar Processing in the 2004-2005 Arctic Winter From EOS MLS and SOSST Observations”, presented at Solar Occultation Satellite Science Team 2005 Workshop, 6-9 June 2005, Columbia, MD.
- 2003 Invited talk** “Simulating dynamics and transport during the 2002 Antarctic major warming”, presented at Royal Meteorological Society ACSG Special Meeting on 2002 Antarctic Winter, 29 August 2003, Cambridge, UK.
- 2002 Invited talk** “Interannual variability and uncertainties in dynamical processes and implications for quantifying Arctic ozone loss” at the Arctic Ozone Loss (AOL) Workshop, 4-6 March 2002, Potsdam, Germany.
- 2002 Invited talk** “Comparison of measurements and models in stratospheric polar vortex studies” at Global Chemistry for Climate Annual Workshop, 17-18 December 2002, Toronto, Canada.
- 1995 Invited talk** “Ozone loss in the Arctic lower stratosphere from UARS observations” at 1995 Fall AGU Meeting, December 1995, San Francisco, CA.
- 1995-2015 Seminars** – Presented seminars by invitation at University of Washington, National Oceanographic and Aeronautics Administration (NOAA), Freie Universität Berlin, Jet Propulsion Laboratory (multiple times), UK Met Office, University of Edinburgh, New Mexico Highlands University (multiple times), New Mexico Institute of Mining and Technology (multiple times), University of Toronto (multiple times), Environment Canada, NWRA (Seattle and Boulder).
- 1987-present Publications** – Approximately 210 peer-reviewed publications, 56 as lead author.

Advising/Mentoring/Outreach

- 2016-2017** New Mexico Institute of Mining and Technology, Co-Teaching (Fall 2016) / Teaching (Spring 2017) “Introduction to Research and Communications” (Phys 501/502, Required graduate course on professional communications (talks, posters, papers, proposals, etc) and research strategies)
- February 2017** Member of team organizing and administering the Meteorology Element of the NM Science Olympiad.
- February 2016** Member of team organizing and administering the Meteorology Element of the NM Science Olympiad.
- 2005-present** New Mexico Institute of Mining and Technology, undergraduate research mentoring:
- David Herceg (BS in Physics, 2008)
 - Daniel McCoy (BS in Physics, 2010)
 - Eric Peterson (BS in Physics, 2011)

- Zachary Lawrence (BS in Physics, 2014)
- Luis Torres (BS in Physics, 2014)
- Anthony Giljum (BS in Physics and Math, 2017)
- Noah d'Antonio (junior in Physics in 2017)

2000-2004 New Mexico Highlands University, undergraduate research mentoring:

- Sara Sena (BS, MS in Natural Resources Management, 2005, 2008)
- Crystal Montoya (BS in Education, 2005)

2008-present New Mexico Institute of Mining and Technology, graduate student committees:

- Committee Member, David Herceg (MS in Atmospheric Physics, 2011)
- Research Advisor, Zachary Lawrence (PhD Candidate)

2005-present University of Toronto, Informal mentoring of numerous PhD students / postdocs:

2008 University of York, Toronto, Canada, External Examiner, Jianjun Jin, PhD Defense

2013-2014 Co-supervised JPL Postdoctoral Researcher Chuanxi Lui (with Nathaniel Livesey, Biajun Tian)

2010-2012 Co-supervised JPL Postdoctoral Researcher Jianjun Jin (with Nathaniel Livesey)

Publications (Peer-reviewed and Under Open Review)

- Manney, G.L.**, and M.I. Hegglin, Seasonal and Regional Variations of Long-Term Changes in Upper Tropospheric Jets from Reanalyses, submitted to *J. Clim.*, 2017, in press.
- Manney, G.L.**, M.I. Hegglin, Z.D. Lawrence, K. Wargan, L.F. Millán, M.J. Schwartz, M.L. Santee, A. Lambert, S. Pawson, B.W. Knosp, R.A. Fuller, and W.H. Daffer, Reanalysis comparisons of upper tropospheric/lower stratospheric jets and multiple tropopauses, *Atmos. Chem. Phys.*, 17, 11,541–11,566, 2017.
- Davis, S., M.I. Hegglin, M. Fujiwara, R. Dragani, Y. Harada, C. Kobayashi, C. Long, **G.L. Manney**, E. Nash, G.L. Potter, S. Tegtmeier, T. Wang, K. Wargan, J.S. Wright, Assessment of upper tropospheric and stratospheric water vapour and ozone in reanalyses as part of S-RIP, *Atmos. Chem. Phys.*, 17, 12,743–12,778, 2017.
- Fujiwara, M., J.S. Wright, **G.L. Manney**, L.J. Gray, J. Anstey, T. Birner, S. Davis, E.P. Gerber, V.L. Harvey, M.I. Hegglin, C.R. Homeyer, J.A. Knox, K. Krüger, A. Lambert, C.S. Long, P. Martineau, B.M. Monge-Sanz, M.L. Santee, S. Tegtmeier, S. Chabrillat, D.G.H. Tan, D.R. Jackson, S. Polavarapu, G.P. Compo, R. Dragani, W. Ebisuzaki, Y. Harada, C. Kobayashi, W. McCarty, K. Onogi, S. Pawson, A. Simmons, K. Wargan, J.S. Whitaker, and C.-Z. Zou, Introduction to the SPARC Reanalysis Intercomparison Project (S-RIP) and overview of the reanalysis systems, *Atmos. Chem. Phys.*, doi:10.5194/acp-17-1417-2017, 1417–1452, 2017.
- Griffin, D., K. A. Walker, S. Conway F. Kolonjari, K. Strong, R. Batchelor, C.D. Boone, L. Dan, J.R. Drummond, P.F. Fogal, D. Fu, R. Lindenmaier, **G.L. Manney**, and D. Weaver, Multi-year comparisons of ground-based and space-borne Fourier Transform Spectrometers in the high Arctic between 2006 and 2013, *Atmos. Meas. Tech.*, 10, 3273–3294, 2017.
- Kolonjari, F., D.A. Plummer, K.A. Walker, C.D. Boone, J.W. Elkins, M.I. Hegglin, **G.L. Manney**, F.L. Moore, D. Pendlebury, E.A. Ray, K.H. Rosenlof, and G.P. Stiller, Assessing stratospheric transport in the CMAM30 simulations using ACE-FTS measurements, *Atmos. Chem. Phys. Disc.*, doi:10.5194/acp-2017-352, 2017.
- Lawrence, Z.D., and **G.L. Manney**, Characterizing stratospheric polar vortex variability with computer vision techniques, *J. Geophys. Res.*, in press, 2017.
- Millán, L., and **G.L. Manney**, An assessment of ozone mini-hole representation in reanalyses over the Northern Hemisphere, *Atmos. Chem. Phys.*, 17, 9277–9289, 2017.
- Ryan, N.J., M. Palm, U. Raffalski, R. Larsson, **G.L. Manney**, L.F. Millán, and J. Notholt, Strato-mesospheric carbon monoxide profiles above Kiruna, Sweden (67.8°N, 20.4°E), since 2008 since 2008, *Earth. System. Sci. Datasets.*, doi:10.5194/essd-9-77-2017, 9, 77-89, 2017.
- Santee, M.L., **G.L. Manney**, N.J. Livesey, M.J. Schwartz, J.L. Neu, and W.G. Read, A comprehensive overview of the climatological composition of the Asian summer monsoon anticyclone based on 10 years of Aura Microwave Limb Sounder measurements, *J. Geophys. Res.*, 122, 5491–5514, doi:10.1002/2016JD026408., 2017.
- Thomason, L., N. Ernest, L. Millán, L. Rieger, A. Bourassa, J.-P. Vernier, G. Manney, B. Luo, F. Arfeuille, and T. Peter, A global, space-based stratospheric aerosol climatology: 1979 to 2016, *Earth. System. Sci. Datasets. Disc.*, <https://doi.org/10.5194/essd-2017-91>, 2017.
- Zhao, X., D. Weaver, K. Bognar, **G. Manney**, L. Millán, X. Yang, E. Eloranta, M. Schneider, K. Strong, Cyclone-Induced Surface Ozone and HDO Depletion in the Arctic, *Atmos. Chem. Phys.*, in press, 2017.
- Manney, G.L.**, and Z.D. Lawrence, The major stratospheric final warming in 2016: Dispersal of vortex air and termination of Arctic chemical ozone loss, *Atmos. Chem. Phys.*, 16, 15371–15396, doi:10.5194/acp-2016-633, 2016.
- Koo, J.-H., K.A. Walker, A. Jones, P.E. Sheese, C.D. Boone, P.F. Bernath, and **G.L. Manney**, Global climatology based on the ACE-FTS version 3.5 dataset: Addition of mesospheric levels and carbon-containing species in the UTLS, *J. Quant. Spectrosc. Radiat. Transfer*, doi:10.1016/j.jqsrt.2016.07.003, 2016.

- Millán, L.F., N.J. Livesey, M.L. Santee, J.L. Neu, **G.L. Manney**, and R.A. Fuller, Case Studies of the Impact of Orbital Sampling on Stratospheric Trend Detection and Derivation of Tropical Vertical Velocities: Solar Occultation versus Limb Emission Sounding, *Atmos. Chem. Phys.*, 16, 11521–11534, doi:10.5194/acp-2016-356, 2016.
- Ryan, N.J., K.A. Walker, U. Raffalski, R. Kivi, J. Gross, and **G.L. Manney**, Ozone profiles above Kiruna from two ground-based radiometers, *Atmos. Meas. Tech.*, 9, 4503–4519, 2016.
- Sheese, P.E., K.A. Walker, C. McLinden, C. Boone, P. Bernath, J. Burrows, D. Degenstein, B. Funke, D. Fussen, **G. Manney**, D. Murtagh, C. Randall, P. Raspollini, A. Rozanov, J. Russell, M. Suzuki, M. Shiotani, J. Urban, T. von Clarmann, and J. Zawodny, Validation of ACE-FTS version 3.5 NO_y species profiles using correlative satellite measurements, *Atmos. Meas. Tech.*, 9, 5781–5810, 2016.
- Manney, G.L.**, Z.D. Lawrence, M.L. Santee, W.G. Read, N.J. Livesey, A. Lambert, L. Froidevaux, H.C. Pumphrey, and M.J. Schwartz, A minor sudden stratospheric warming with a major impact: Transport and polar processing in the 2014/2015 Arctic winter, *Geophys. Res. Lett.*, 42, 7808–7816, doi:10.1002/2015GL065864, 2015.
- Manney, G.L.**, Z.D. Lawrence, M.L. Santee, N.J. Livesey, A. Lambert, and M.C. Pitts, Polar processing in a split vortex: Arctic ozone loss in early winter 2012/2013, *Atmos. Chem. Phys.*, 15, 5381–5403, 2015.
- Lawrence, Z.D., **G.L. Manney**, K. Minschwaner, M.L. Santee, and A. Lambert, Comparisons of Polar Processing Diagnostics from 34 years of the ERA-Interim and MERRA Reanalyses, *Atmos. Chem. Phys.*, 15, 3873–3892, 2015.
- Livesey, N.J., M.L. Santee, and **G.L. Manney**, A Match-based approach to the estimation of polar stratospheric ozone loss using Aura Microwave Limb Sounder observations, *Atmos. Chem. Phys.*, 15, 9945–9963, 2015.
- Minschwaner, K., **G.L. Manney**, I. Petropavlovskikh, L.A. Torres, Z.D. Lawrence, B. Sutherland, A.M. Thompson, B.J. Johnson, Z. Butterfield, M. Dubey, L. Froidevaux, A. Lambert, W.G. Read, and M.J. Schwartz, Signature of a Pacific cyclone in the composition of the upper troposphere over Socorro, NM, *Geophys. Res. Lett.*, 42, 9530–9537, doi:10.1002/2015GL065824, 2015.
- Minschwaner, K., and **G.L. Manney**, Derived Methane in the Stratosphere and Lower Mesosphere from Aura Microwave Limb Sounder Measurements of Nitrous Oxide, Water Vapor, and Carbon Monoxide, *J. Atmos. Chem.*, DOI 10.1007/s10874-015-9299-z, 2015.
- Petropavlovskikh, I., R. Evans, G. McConville, **G.L. Manney**, and H.E. Rieder, On the influence of atmospheric dynamics on mean and extreme values of column ozone over the United States, *Atmos. Chem. Phys.*, 15, 1585–1598, 2015.
- Schwartz, M.J., **G.L. Manney**, M.I. Hegglin, N.J. Livesey, M.L. Santee, and W.H. Daffer, Climatology of trace gases in midlatitude double-tropopause regions from MLS, HIRDLS and ACE-FTS measurements, *J. Geophys. Res.*, 120, 843–867, 2015.
- Manney, G.L.**, M.I. Hegglin, W.H. Daffer, M.J. Schwartz, M.L. Santee, and S. Pawson, Climatology of Upper Tropospheric/Lower Stratospheric (UTLS) Jets and Tropopauses in MERRA, *J. Clim.*, 27, 3248–3271, 2014.
- Liu, C., B. Tian, K.-F. Li, **G.L. Manney**, N.J. Livesey, D.E. Waliser, and Y. Yung, Northern Hemisphere mid-winter vortex-displacement and vortex-split stratospheric sudden warmings: Influence of the Madden-Julian Oscillation and Quasi-Biennial Oscillation, *J. Geophys. Res.*, 119, 12,599–12,620, 2014.
- Martinez-Alonso, S., M.N. Deeter, H.M. Worden, J.C. Gille, L.K. Emmons, L.L. Pan, M. Park, **G.L. Manney**, P.F. Bernath, C.D. Boone, K.A. Walker, F. Kolonjari, S.C. Wofsy, J. Pittman, and B.C. Daube, Comparison of Upper Tropospheric Carbon Monoxide from MOPITT, ACE-FTS, and HIPPO-QCLS, *J. Geophys. Res.*, 119, 14,144–14,164, 2014.
- Miyagawa, K., I. Petropavlovskikh, R.D. Evans, C. Long, J. Wild, **G.L. Manney** and W.H. Daffer, Long term changes in the upper stratospheric ozone at Syowa, Antarctica, *Atmos. Chem. Phys.*, 14, 3945–3968, 2014.
- Neu, J.L., T. Flury, **G.L. Manney**, M.L. Santee, N. Livesey, and J. Worden, Tropospheric Ozone Variations Governed by Changes in the Stratospheric Circulation, *Nature Geosci.*, 7, 340–344, 2014.

- Peevey, T.R., J.C. Gille, C.R. Homeyer, **G.L. Manney**, and W.H. Daffer, The double tropopause and its dynamical relationship to the tropopause inversion layer in storm track regions, *J. Geophys. Res.*, 119, 10,194–10,212, doi:10.1002/2014JD021808, 2014.
- Adams, C., K. Strong, X. Zhao, A.E. Bourassa, W.H. Daffer, D. Degenstein, J.R. Drummond, E.E. Farahani, A. Fraser, N.D. Lloyd, **G.L. Manney**, C.A. McLinden, M. Rex, C. Roth, S.E. Strahan, K.A. Walker, and I. Wohltmann, The spring 2011 final stratospheric warming above Eureka: anomalous dynamics and chemistry, *Atmos. Phys. Chem.*, 13, 611–624, 2013.
- Adams, C., A.E. Bourassa, A. F.Bathgate, C.A. McLinden, N.D. Lloyd, C.Z. Roth, E.J. Llewellyn, J.M. Zawodny, D.E. Flittner, **G.L. Manney**, W.H. Daffer, and D.A. Degenstein, Characterization of Odin-OSIRIS ozone profiles with the SAGE II dataset, *Atmos. Meas. Tech.*, 6, 1447–1459, 2013.
- Brakebusch, M., C.E. Randall, D.E. Kinnison, S. Tilmes, M.L. Santee and **G.L. Manney**, Evaluation of Whole Atmosphere Community Climate Model simulations of ozone during Arctic winter 2004–2005, *J. Geophys. Res.*, 118, 2673–2688, 10.1002/jgrd.50226, 2013.
- Hitchcock, P., T.G. Shepherd, and **G.L. Manney**, Statistical characterization of Arctic Polar-night Jet Oscillation Events, *J. Clim.*, 26, 2096–2116, 2013.
- Jin, J.J., N.J. Livesey, **G.L. Manney**, J.H. Jiang, M.J. Schwartz, and W. H. Daffer, Chemical discontinuity at the extratropical tropopause and isentropic stratosphere-troposphere exchange pathways diagnosed using Aura MLS data, *J. Geophys. Res.*, 118, 3832–3847, doi:10.1002/jgrd.50291, 2013.
- McLandress, C., J.F. Scinocca, T.G. Shepherd, M.C. Reader and **G.L. Manney**, Dynamical control of the mesosphere by orographic and non-orographic gravity wave drag during the extended northern winters of 2006 and 2009, *J. Atmos. Sci.*, 70, 2152–2169, 2013.
- Moffat-Griffin, T., M.J. Jarvis, S.R. Colwell, A.J. Kavanagh, **G.L. Manney** and W.H. Daffer, Seasonal variations in lower stratospheric gravity wave energy above the Falkland Islands, *J. Geophys. Res.*, 118, 10,861–10,869, 2013.
- Santee, M.L., N.J. Livesey, **G.L. Manney**, A. Lambert, and W.G. Read, Methyl Chloride from the Aura Microwave Limb Sounder: First Global Climatology and Assessment of Variability in the Upper Troposphere and Stratosphere, *J. Geophys. Res.*, 118, 13,532–13,560, doi:10.1002/2013JD020235, 2013.
- Schwartz, M.J., W.G. Read, M.L. Santee, N.J. Livesey, L. Froidevaux, A. Lambert, and **G.L. Manney**, Collectively injected water vapor in the North American summer lowermost stratosphere, *Geophys. Res. Lett.*, 40, 2316–2321, doi:10.1002/grl.50421, 2013.
- Sugita, T., Y. Kasai, Y. Terao, S. Hayashida, **G.L. Manney**, W.H. Daffer, H. Sagawa, M. Suzuki, M. Shiotani, K.A. Walker, C.D. Boone, and P.F. Bernath, HCl and ClO profiles inside the Antarctic vortex as observed by SMILES in November 2009: Comparisons with MLS and ACE-FTS instruments, *Atmos. Meas. Tech.*, 6, 3099–3113, 2013.
- Whaley, C., K. Strong, C. Adams, A.E. Bourassa, W.H. Daffer, D.A. Degenstein, H. Fast, P.F. Fogal, **G.L. Manney**, R.L. Mittermeier, B. Pavlovic, and A. Wiacek, Using FTIR measurements of stratospheric composition to identify mid-latitude polar vortex intrusions over Toronto, *J. Geophys. Res.*, in press, 2013.
- Wohltmann, I., T. Wegner, R. Müller, R. Lehmann, M. Rex, **G.L. Manney**, M. L. Santee, P. Bernath, O. Sumińska-Ebersoldt, F. Stroh, M. von Hobe, C.M. Volk, E. Hösen, F. Ravagnani, A. Ulanovsky, and V. Yushkov, Uncertainties in modeling heterogeneous chemistry and Arctic ozone depletion in the winter 2009/2010, *Atmos. Chem. Phys.*, 13, 3909–3929, 2013.
- Adams, C., K. Strong, X. Zhao, M.R. Bassford, M. Chipperfield, W.H. Daffer, J.R. Drummond, E. Farahani, W. Feng, A. Fraser, F. Goutail, **G.L. Manney**, C.A. McLinden, A. Pazmino, M. Rex, and K.A. Walker, Severe 2011 ozone depletion assessed with 11 years of ozone, NO₂, and OCIO measurements at 80°N, *Geophys. Res. Lett.*, L05806, doi:10.1029/2011GL050478, 2012.
- Adams, C., K. Strong, R.L. Batchelor, P.F. Bernath, S. Brohede, C. Boone, D. Degenstein, W.H. Daffer, J.R. Drummond, P.F. Fogal, E. Farahani, C. Fayt, A. Fraser, F. Goutail, F. Hendrick, F. Kolonjari, R. Lindenmaier, **G.L. Manney**, C.T. McElroy, C.A. McLinden, J. Mendonca, J.-H. Park, B. Pavlovic, A. Pazmino,

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Publications (Submitted Papers)

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Griffin, D., K.A. Walker, I. Wohltmann, S.S. Dhomse, M. Rex, M.P. Chipperfield, **G.L. Manney**, J. Liu, and D. Tarasick, Stratospheric ozone loss in the Arctic derived with ACE-FTS measurements between 2005 and 2013, submitted to *Atmos. Chem. Phys.*

Wargan, K., J.E. Nielsen, **G.L. Manney**, M.L. Santee, N.J. Livesey, Z.D. Lawrence, S. Pawson, and L. Coy, Polar Processing During the 2015/2016 Arctic Winter in a Goddard Earth Observing System Assimilation Experiment with Stratospheric Chemistry, submitted to *J. Geophys. Res.*, under revision.

Publications (Papers in Advanced Stage of Preparation)

Lawrence, Z.D., **G.L. Manney**, and K. Wargan, Reanalysis intercomparisons of stratospheric polar processing diagnostics, to be submitted to *Atmos. Chem. Phys.*