

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

- 2020 American Meteorological Society STAC Award for Distinguished Scientific/Technological Accomplishment**, Middle Atmosphere Committee: "For her extraordinary contributions to furthering understanding of stratospheric dynamics, polar processing, and tracer transport in the UTLS."
- 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
- 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 Lew 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

- 2021-present Contributor, Chapter 4 (Polar Stratospheric Ozone: Past, Present, and Future) of “WMO Scientific Assessment of Ozone Depletion 2022”** (in preparation)
- 2020-present Convenor, AGU GRL/JGR Special Collection “The Exceptional Arctic Stratospheric Polar Vortex in 2019/2020: Causes and Consequences”** (with Amy Butler, Krzysztof Wargan, Jens-Uwe Grooß)
- 2020-2021 Member, Stratosphere-troposphere Processes and their Role in Climate (SPARC) Science Task Team**, An advisory group to the SPARC co-chairs helping to plan key science priorities for SPARC for the next 5–10 years.
- 2018-present Member, SPARC Activity: Observed Composition Trends and Variability in the UTLS (OCTAV-UTLS) scientific steering committee**
- 2018-2019 Contributor, Chapter 4 (Polar Stratospheric Ozone: Past, Present, and Future) of “WMO Scientific Assessment of Ozone Depletion 2018”**
- 2016-2018 Co-lead, SPARC 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**
- 2012-2017 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”**

- 2018 Co-Host/Local Organizer, 2018 S-RIP Chapter Co-Leads Workshop**, 25–29 June 2018, NWRA, Boulder, CO (with Sean Davis)
- 2017 Co-Host/Local Organizer, 2017 OCTAV-UTLS Workshop**, 18–20 July 2017, NWRA, Boulder, CO (with Irina Petropavlovskikh)
- 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**
- 2020-present Principal Investigator, NSF Climate and Large-scale Dynamics Investigation “Winds and the Weather: Evaluating 3D Stratospheric / Tropospheric Jet Relationships and their Roles in Extreme Cool-Season Weather Events”**
- 2020-2021 Co-Investigator, ROSES-2016 MAP Investigation “A new look at stratospheric chemistry with multispecies chemical data assimilation” (PI: K. Wargan, NASA-GSFC)**
- 2018-2021 Co-Investigator, ROSES-2017 SAGE III/ISS Science Team Investigation “SAGE III/ISS Dynamical Diagnostics” (PI: L.F. Millán, JPL)**
- 2015-2019 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)**
- 2014-2017 Co-Investigator, NASA-GMAO Investigation “Atmospheric Dynamical Studies with High-Resolution GEOS-5 Simulations and MERRA2” (PI: M.J. Alexander, NWRA)**
- 2014-2018 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”**
- 2012-2020 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, ACMAP 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**
- 2022 Invited talk** “The SPARC-Reanalysis Intercomparison Project (S-RIP): Overview of the S-RIP Report, Implications for Future Measurement Needs, and Outlook for Future S-RIP”, presented at AMS Middle Atmosphere Conference at AMS Annual Meeting, January 2022 (virtual).
- 2021 Invited talk** “The Exceptional 2019/2020 Arctic Stratospheric Vortex: Stratospheric Ozone Loss and Transport, and Links to the Troposphere”, presented at CMOS Annual Congress, 11 June 2021 (virtual).
- 2021 Invited talk** “Aura MLS and Related Studies of Exceptional Ozone Loss and Unusual Transport in the 2019/2020 Stratospheric Polar Vortex in Comparison with Previous Extreme Winters”, presented in Conference on Atmospheric Chemistry at American Meteorological Society Annual Meeting, January 2021 (virtual).
- 2017 Invited talk** “An overview of OCTAV-UTLS (Observed Composition Trends and Variability in the UTLS) A SPARC Emerging Activity”, presented at American Meteorological Society Conference on the Middle Atmosphere, June 2017, Portland, Oregon.
- 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.
- 1995-2022 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), Kansas State University (upcoming, virtual).
- 1987-present Publications** – Approximately 235 peer-reviewed publications, 61 as lead author; Google Scholar 8 Nov 2022: h-index 68, 17,031 citations.

Advising/Mentoring/Outreach

- 2016-2017** New Mexico Institute of Mining and Technology, Co-Teaching (Fall 2016) / Teaching (Spring 2017) / Teaching Fall 2022 / Spring 2023, “Introduction to Research and Communications”, Phys 501/502, Required graduate course on professional communications (e.g., talks, posters, papers, proposals, reviews, etc) and research skills / strategies
- February 2019** Member of team organizing and administering the Meteorology Element of the NM Science Olympiad.
- February 2018** Member of team organizing and administering the Meteorology Element of the NM Science Olympiad.
- 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 (senior in Physics in 2021/2022)
- Sean Palmer (BS in Physics, 2019)
- Nicole/Nicolas Sheerin (senior in MechE in 2022/2023)
- Jordan Baker (BS in Physics in 2019)
- Jessica George (BS in Atmospheric Physics, 2021)
- Kody Gray (BS in Physics, 2022)
- Jhanene Heying-Melendrez (BS in Physics, 2022)
- Kiara Burgos (senior in Physics in 2022/2023)
- Brandon Smith (junior in Physics in 2022/2023)
- Mariana Baca (sophomore/junior in Physics in 2022/2023)

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 mentorship:

- Committee Member, David Herceg (MS in Atmospheric Physics, 2011)
- Research Advisor, Zachary Lawrence (PhD in Atmospheric Physics, 2019)
- Research Advisor, Jessica George (Graduate Student in Atmospheric Physics in 2022/2023)

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.**, L.F. Millán, M.L. Santee, K. Wargan, A. Lambert, J.L. Neu, F. Werner, Z.D. Lawrence, M.J. Schwartz, N.J. Livesey, W.G. Read, Signatures of Anomalous Transport in the 2019/2020 Arctic Stratospheric Polar Vortex, *J. Geophys. Res.*, 127, e2022JD037407, <https://doi.org/10.1029/2022JD037407>, 2022.
- Manney, G.L.**, A.H. Butler, K. Wargan, and J.-U. Grooß, Introduction to Special Collection “The Exceptional Arctic Stratospheric Polar Vortex in 2019/2020: Causes and Consequences”, *J. Geophys. Res.*, 127, e2022JD037381, <https://doi.org/10.1029/2022JD037381>, 2022.
- Manney, G.L.**, A.H. Butler, Z.D. Lawrence, K. Wargan, and M.L. Santee, What’s in a name? On the use and significance of the term “polar vortex”, *Geophys. Res. Lett.*, 49, e2021GL097617, <https://doi.org/10.1029/2021GL097617>, 2022.
- Jeffery, P.S., K.A. Walker, C.E. Sioris, C.D. Boone, D. Degenstein, **G.L. Manney**, C.T. McElroy, L.F. Millán, D.A. Plummer, N.J. Ryan, P.E. Sheese, and J. Zou, Water vapour and ozone in the upper troposphere – lower stratosphere: Global climatologies from three Canadian limb-viewing instruments, *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2022-345>, accepted for *Atmos. Chem. Phys.*, 2022.
- Millán, L.F., M.L. Santee, A. Lambert, N.J. Livesey, F. Werner, M.J. Schwartz, H.C. Pumphrey, **G.L. Manney**, Y. Wang, H. Su, L. Wu, W.G. Read, and L. Froidevaux, The Hunga Tonga-Hunga Ha’apai hydration of the stratosphere, *Geophys. Res. Lett.*, <https://doi.org/10.1029/2022GL099381>, 2022.
- Santee, M.L., A. Lambert, **G.L. Manney**, N.J. Livesey, L. Froidevaux, J.L. Neu, M.J. Schwartz, L.F. Millán, F. Werner, W.G. Read, M. Park, R.A. Fuller, and B.M. Ward, Prolonged and Pervasive Perturbations in the Composition of the Southern Hemisphere Midlatitude Lower Stratosphere From the Australian New Year’s Fires, *Geophys. Res. Lett.*, 49, e2021GL096270, <https://doi.org/10.1029/2021GL096270>, 2022.
- Manney, G.L.**, M.L. Santee, Z.D. Lawrence, K. Wargan, and M.J. Schwartz, A moments view of climatology and variability of the Asian summer monsoon anticyclone, *J. Clim.*, 34, 7821–7841, 2021.
- Manney, G.L.**, M.I. Hegglin, and Z.D. Lawrence, Relationships of interannual variability in upper tropospheric jets to ENSO in reanalyses, *J. Clim.*, 34, 9181–9200, 2021.
- Bognar, K., R. Alwarda, K. Strong, M.P. Chipperfield, J.R. Drummond, W. Feng, V. Fioletov, F. Goutail, B. Herrera, **G.L. Manney**, E.M. McCullough, L.F. Millán, A. Pazmino, K.A. Walker, T. Wizenberg, X. Zhao, Unprecedented spring 2020 ozone depletion in the context of 20 years of measurements at Eureka, Canada, *J. Geophys. Res.*, 126, e2020JD034365, <https://doi.org/10.1029/2020JD034365>, 2021.
- Wohltmann, I., P. von der Gathen, R. Lehman, M. Maturilli, H. Deckelmann, **G.L. Manney**, J. Davies, D. Tarasick, N. Jepsen, R. Kivi, N. Lyall, and M. Rex, Chemical evolution of the exceptional Arctic stratospheric winter 2019/2020 compared to previous Arctic and Antarctic winters, *J. Geophys. Res.*, 126, e2020JD034356. <https://doi.org/10.1029/2020JD034356>, 2021.
- Manney, G.L.**, N.J. Livesey, M.L. Santee, L. Froidevaux, A. Lambert, Z.D. Lawrence, L.F. Millán, J.L. Neu, W.G. Read, M.J. Schwartz, and R.A. Fuller, Record-low Arctic stratospheric ozone in 2020: MLS observations of chemical processes and comparisons with previous extreme winters. *Geophys. Res. Lett.*, 47, e2020GL089063, <https://doi.org/10.1029/2020GL089063>, 2020.
- Bernhard, G.H., V.E. Fioletov, J.-U. Grooß, I. Ialongo, B. Johnsen, K. Lakkala, **G.L. Manney**, R. Müller, and T. Svendby, Record-breaking increases in Arctic solar ultraviolet radiation caused by exceptionally large ozone depletion in 2020, *Geophys. Res. Lett.*, 47, e2020GL090844, <https://doi.org/10.1029/2020GL090844>, 2020.
- Lawrence, Z.D., and **G.L. Manney**, Does the Arctic Stratospheric polar vortex exhibit signs of preconditioning prior to sudden stratospheric warmings?, *J. Atmos. Sci.*, 77, 611–632, 2020.
- Lawrence, Z.D., J. Perlwitz, A.H. Butler, **G.L. Manney**, P.A. Newman, S.H. Lee, and E.R. Nash, The remarkably strong Arctic stratospheric polar vortex of winter 2020: Links to record-breaking Arctic oscillation and ozone loss, *J. Geophys. Res.*, 126, e2020JD034356. <https://doi.org/10.1029/2020JD034356>, 2020.

- Millán, L.F., **G.L. Manney**, and Z.D. Lawrence, Reanalysis intercomparison of potential vorticity and potential vorticity-based diagnostics, *Atmos. Chem. Phys.*, 21, 5355–5376, <https://doi.org/10.5194/acp-21-5355-2021>, 2021.
- Schwartz, M.J., M.L. Santee, H.C. Pumphrey, **G.L. Manney**, A. Lambert, N.J. Livesey, L. Millán, J.L. Neu, W.G. Read, F. Werner, Australian New Year's PyroCb impact on stratospheric composition, *Geophys. Res. Lett.*, in press, 2020.
- Wargan, K., B. Weir, G.L. Manney, S.E. Cohn, and N.J. Livesey, The anomalous 2019 Antarctic ozone hole in the GEOS Constituent Data Assimilation System with MLS observations, *J. Geophys. Res.*, 125, e2020JD033335, 2020.
- Wohltmann, I., P. von der Gathen, R. Lehman, M. Maturilli, H. Deckelmann, **G.L. Manney**, J. Davies, D. Tarasick, N. Jepsen, R. Kivi, N. Lyall, and M. Rex, Near complete local reduction of Arctic stratospheric ozone by severe chemical loss in spring 2020, *Geophys. Res. Lett.*, 47, e2020GL089547, 2020.
- Bognar, K., X. Zhao, K. Strong, C.D. Boone, A.E. Bourassa, D.A. Degenstein, J.R. Drummond, A. Duff, F. Goutail, P. Jeffery, E. Lutsch, **G.L. Manney**, C.T. McElroy, C.A. McLinden, L. F. Millán, A. Pazmino, C.E. Sioris, K. A. Walker, J. Zou, Updated validation of ACE and OSIRIS ozone and NO₂ measurements in the Arctic using ground-based instruments at Eureka, Canada, *J. Quant. Spectrosc. Radiat. Transfer*, 238, 2019.
- 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, *Atmos. Chem. Phys.*, 19, 577–601, 2019.
- Minschwaner, K., A.T. Giljum, **G.L. Manney**, I. Petropavlovskikh, B.J. Johnson, and A.F. Jordan, Detection and Classification of Laminae in Balloon-borne Ozone-sonde Profiles: Application to the Long Term Record from Boulder, Colorado, *Atmos. Chem. Phys.*, 19, 1853–1865, 2019.
- Olsen, M.A., **G.L. Manney**, and J. Liu, The ENSO and QBO impact on ozone variability and stratosphere-troposphere exchange relative to the subtropical jets, *J. Geophys. Res.*, 124, doi:10.1029/2019JD030435, 2019.
- Zhao, X., K. Bognar, V. Fioletov, A. Pazmino, F. Goutail, L. Millán, **G. Manney**, C. Adams, and K. Strong, Assessing the Impact of Clouds on UV-visible Total Column Ozone Measurements in the High Arctic, *Atmos. Meas. Tech.*, 12, 2463–2483, <https://doi.org/10.5194/amt-12-2463-2019>, 2019.
- Manney, G.L.**, and M.I. Hegglin, Seasonal and Regional Variations of Long-Term Changes in Upper Tropospheric Jets from Reanalyses, *J. Clim.*, 31, 423–448, 2018.
- Manney, G.L.**, and M.I. Hegglin, Corrigendum for “Seasonal and Regional Variations of Long-Term Changes in Upper Tropospheric Jets from Reanalyses”, *J. Clim.*, 1289–1293, 2018.
- Albers, J.R., J. Perlwitz, A.H. Butler, T. Birner, G.N. Kiladis, Z.D. Lawrence, **G.L. Manney**, A.O. Langford, and J. Dias, Mechanisms governing interannual variability of stratosphere-to-troposphere ozone transport, *J. Geophys. Res.*, 123, <https://doi.org/10.1002/2017JD026890>, 2018.
- 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.*, 18, 6801–6828, <https://doi.org/10.5194/acp-18-6801-2018>, 2018.
- Lawrence, Z.D. and **G.L. Manney**, Characterizing Stratospheric Polar Vortex Variability With Computer Vision Techniques, *J. Geophys. Res.*, 123, 1510–1535, 2018.
- Lawrence, Z.D., **G.L. Manney**, and K. Wargan, Reanalysis intercomparisons of stratospheric polar processing diagnostics, *Atmos. Chem. Phys.*, 18, 13,547–13,579, <https://doi.org/10.5194/acp-18-13547-2018>, 2018.
- 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.*, 10, 469–492, <https://doi.org/10.5194/essd-10-469-2018>, 2018.

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- 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.
- 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.
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Publications – SPARC Reanalysis Intercomparison Project Final Report (M. Fujiwara, G.L. Manney, L.J. Gray, J.S. Wright, editors)

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