MICHAELA IMELDA HEGGLIN

Contact information:

Lyle Building 302A Department of Meteorology University of Reading Reading RG6 6BX United Kingdom

 $\begin{array}{l} {\rm m.i.hegglin@reading.ac.uk} \\ {\rm +44~118~378~6693} \end{array}$

SUMMARY

Lecturer in Atmospheric Chemistry with expertise in Earth observations, atmospheric chemistry and transport, air pollution, chemistry-climate coupling, and chemistry-climate model evaluation; with significant number of peer-reviewed and well-cited publications, leadership positions within WCRP SPARC, and strong involvement in the WMO/UNEP Scientific Assessments of Ozone Depletion reports.

DEGREES

- Ph.D. (Dr. Sc. ETH), Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland (May 2004)
- M.Sc. in Environmental Sciences (Dipl. Umwelt-Natw. ETH), ETH Zurich, Switzerland (October 2000)

EMPLOYMENT

Apr 2015 – present	Lecturer in Atmospheric Chemistry, Department of Meteorology, University of Reading, Reading, United Kingdom
May 2012 – Mar 2015	Senior Research Fellow in Atmospheric Chemistry, Department of Meteorology, University of Reading, Reading, United Kingdom
Jan 2012 – Apr 2012	Head of company, hegglin scientific, Menzingen, Switzerland
Jul 2006 – Dec 2011	Research Associate, Department of Physics, University of Toronto, Toronto, ON, Canada (working with Prof. Theodore G. Shepherd and Prof. Dylan B. A. Jones)
Sep 2005 – Jun 2006	Postdoctoral Fellow, Department of Physics, University of Toronto, Toronto, ON, Canada (working with Prof. Theodore G. Shepherd)
Jun 2004 – Jul 2005	Postdoctoral Fellow, Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland (working with Prof. Thomas Peter)
May 2001 – May 2004	Ph.D. student, Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland (Supervisors: Dr. Dominik Brunner, Prof. Johannes Staehelin, Prof. Thomas Peter)
Feb 2001 – Apr 2001	Visiting Scientist, Max-Planck-Institute for Chemistry Department of Atmospheric Chemistry, Mainz, Germany (working with Dr. Horst Fischer and Prof. Jos Lelieveld)
Sep 2000 – Dec 2000	Research Assistant, Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland (working with Dr. Ulrich Krieger, Dr. Thomas Koop, and Prof. Thomas Peter)

LANGUAGES

Swiss German and Romantsch (native languages); German, French, English (fluent); Latin (proficient); Italian, Spanish (basic knowledge)

PROFESSIONAL MEMBERSHIPS (PAST&CURRENT)

European Geophysical Union (EGU) American Geophysical Union (AGU) American Meteorological Society (AMS) Canadian Meteorological and Oceanographic Society (CMOS)

TEACHING AND SUPERVISION

At University of Reading, United Kingdom:

- Lecture PH103 Global Environmental Chemistry (autumn term 2014; 2015)
- Supervision of Katherine Turrell (Master thesis project, summer 2013: Is there a link between the NAO and wind storm damage to forests?)
- Co-supervision (with William Collins) of Mathew Davies (Master thesis project, summer 2013: Will wetlands give off more methane in the future?)
- Co-supervision of Postdoctoral Fellow Christopher Lee (to substitute for Andrew Charlton-Perez during paternity leave, autumn 2013)
- Co-supervision (with Keith Shine) of Postdoctoral Fellow Ramiro Checa-Garcia (SMURPHS project, 2016-2018)
- WCD contributions (2014, 2015, 2016)

At University of Toronto, Canada:

Supervision of summer students (Sarah Nickerson, 2006; Ming Fu, 2008; Rafael Krichevsky, 2009)

At ETH Zurich, Switzerland:

- Teaching assistant in *Tropospheric Chemistry* (SS 2003, in German)
- Teaching assistant in *Stratospheric Chemistry* (WS 2002/03, in German)
- Substitute during lectures in *Environment III* and *Introduction to Meteorology, Atmospheric Physics and Chemistry* (WS 2002 and 2003, in German)

SIGNIFICANT RESPONSIBILITIES

Throughout my career, I have been strongly involved in the World Climate Research Programme's (WCRP) Stratosphere-troposphere Processes and their Role in Climate (SPARC) project and have been asked to take on leadership positions in several SPARC activities such as CCMVal, Data Initiative, CCMI, and S-RIP. These activities involve overseeing, coordinating and providing vision to international science teams with the goal to enhance and promote SPARC science. Through SPARC, I also got strongly involved in the writing of the quadrennial WMO/UNEP Scientific Ozone Assessments (equivalent to the IPCC report in climate science). More recently I also got to be on the AerChemMIP scientific steering committee, which will establish my first direct links to IPCC.

– Scientific Steering Committee Aerosols and Chemistry Modeling Intercomparison Project (AerChemMIP, from Jul 2015)

- Coordinating lead author (CLA) of the 'Twenty Q&As about the Ozone Layer' of the 2014 WMO/UNEP Ozone Assessment (2013-2015)
- Co-lead of the SPARC Chemistry-Climate Model Initiative, CCMI, (with Jean-Francois Lamarque, NCAR, from Jun 2013)
- Co-lead of the SPARC Data Initiative (with Susann Tegtmeier, IFM-GEOMAR, from Oct 2009)
- Member of the PREMIER Mission Advisory Group (MAG) during Phase A of the European Space Agency (ESA) Earth Explorer satellite selection procedure (May 2009-Mar 2013)
- Coordinating lead author (CLA) of the 'Twenty Q&As about the Ozone Layer' of the 2010 WMO/UNEP Ozone Assessment (with David Fahey, NOAA, 2009-2011)
- Co-lead author (with Andrew Gettelman, NCAR) of chapter 7 'The UTLS' of the SPARC CCMVal Report (Chemistry-Climate Model Validation, Eds.: V. Eyring, T. G. Shepherd, D. Waugh, 2007-2010)

OTHER RELEVANT EXPERIENCE

My research expertise has led to international esteem expressed in the fact that I have been asked to serve on several advisory and review committees for University programmes or proposed and current satellite missions from major international space agencies (ESA, NASA, and CSA). A highlight in this respect was my role in the Mission Advisory Group for PREMIER (see above), a satellite mission proposed to fly as ESA's Earth Explorer 7. The activity culminated in the presentation on PREMIER I gave at the final user consultation meeting. More generally, I have shown scientific leadership by serving on several science committees, organizing workshops and science sessions at international conferences, and taking responsibility in reviewing manuscripts, PhD theses, and science proposals.

- SPARC representative at WCRP WDAC meeting (no. 4), ECMWF, Reading, United Kingdom (2-3 July, 2015).
- Scientific co-organizer (with Jean-Francois Lamarque, NCAR, Michael Schulz, Norwegian Meteorological Institute, and Stefan Kinne, MPI Hamburg) of the 2015 AerChemMIP/CCMI Science Workshop in Rome, Italy (7/8-9 October, 2015; 230/115 attendees).
- Scientific organizer (together with Jean-Francois Lamarque, NCAR) of the 2014 CCMI Science Workshop in Lancaster, UK (20-22 May, 2014; 130 attendees).
- Scientific organizer of a Royal Meteorological Society National Meeting on 'The upper troposphere and lower stratosphere and its role in climate', University of Reading, Reading, United Kingdom (March 19, 2014; 80 attendees).
- Member of SCISAT-1 mission review panel for the Canadian Space Agency (Jan-Mar 2014).
- Member of scientific advisory board for the ATMO research programme at KIT, Karlsruhe, Germany (from Feb 2014).
- Co-Investigator, 'UTLS Composition in the Jet/Tropopause Context' (ROSES-2013 AST call for proposals, PI: G. L. Manney, from Dec 2013)
- Science Advisor CATS-SHOW-STEAMR UTLS satellite mission (Canadian and UK Space Agencies, Swedish National Space Board, SNSB) (from Dec 2013)
- Member Scientific Committee, ESA Living Planet Symposium, Edinburgh, United Kingdom (9-13 Sep, 2013).

- Team member of the 'Study group on the added-value of chemical data assimilation in the stratosphere and upper-troposphere' (led by Richard Menard and Quentin Errera) (International Space Science Institute, ISSI, International Team Program) (2013-2014).
- Member of the SPARC CCMI Steering Committee (Leads: Veronika Eyring and Jean-Francois Lamarque) (from Apr 2013).
- Member of the SPARC S-RIP Working Group (Leads: Masatomo Fujiwara and David Jackson) (from May 2012).
- Local organizer and member of the scientific organizing committee, SPARC Brewer-Dobson Workshop, Grindelwald, Switzerland (24-29 June, 2012; 100 attendees)
- Member of the International Commission on the Middle Atmosphere (ICMA, 2011-2019)
- Science team member of iATMOS a UTLS satellite mission proposal to NASA's Venture program (PI: William J. Randel) (2011)
- Co-convenor (with Michelle Santee, John Daniel, and Phil Rasch) of the poster session 'Atmospheric composition and forcings' at the WCRP Open Science Conference in Denver (Oct, 2011)
- Co-Investigator, 'UTLS Transport in the Climate System' (ROSES-2010 AST call for proposals, PI: G. L. Manney, 2010-2013)
- Co-convenor (with Mark Baldwin) of the session 'Stratospheric Ozone and Climate' at the AGU Meeting of the Americas, Foz de Iguacu, Brazil (2-6 Aug, 2010)
- Team leader of the 'Atmospheric Trace Gas Data Set Inter-Comparison Project' (International Space Science Institute, ISSI, International Team Program) (2010-2011)
- Member of the Canadian Space Agency's CASS mission definition team (from July 2010)
- Co-author of chapter 2 'Stratospheric ozone and surface ultraviolet radiation' of the 2010 WMO/UNEP Ozone Assessment (2009-2010)
- Collaborator, 'Modelling and Climate Implications of Stratopause and Tropopause Evolution' (Aura Science Team element of NASA's ROSES-2007 call for proposals, PI: G. L. Manney, 2007-2010)
- Collaborator, STEP mission concept study (Stratosphere-Troposphere Exchange Processes, Canadian Space Agency, PI: D. Degenstein, 2007-2009)
- Member of the Organizing Committee, Community Workshop 'Science from Suborbital Vehicles (Balloons, Aircraft, Sounding Rockets)', Toronto, ON, Canada, sponsored by the Canadian Space Agency (Feb 2007)
- Science team member of SPURT aircraft campaign (trace gas transport in the tropopause region, an AFO2000 research project funded by the German Federal Ministry of Education and Research (BMBF), 2001-2004)

OTHER SCHOLARLY ACTIVITIES

- Reviewer for Atmospheric Chemistry and Physics, Journal of Geophysical Research, Journal of the Atmospheric Sciences, Geophysical Research Letters, Journal of the Meteorological Society of Japan, the UNEP EEAP 2010 and 2015 assessment reports, the Encyclopedia of Environmental Management, Nature Geoscience, Quarterly Journal of the Royal Meteorological Society, Environmental Research Letters, Nature, NSF US, NSERC Canada, and FWF Austria grant applications, the WMO/UNEP Scientific Ozone Assessment 2014, Oxford press book review Environmental Chemistry.

- Examinator for external PhD theses.
- Referee for NSF and Future Earth project proposals, NERC fellowship applications, and promotions.

PUBLICATIONS

Web-of-Science citations (February 2016): 976 total, average 32.5 per paper, h-index of 17.

In Preparation or Submitted:

- Miyazaki, K., T. Iwasaki, Y. Kawatani, C. Kobayashi, S. Sugawara, and M. I. Hegglin, Inter-comparison of stratospheric mean-meridional circulation and eddy mixing among six reanalysis datasets, *Atmos. Chem. Phys. Discuss.*, 15, 27749-27803, doi:10.5194/acpd-15-27749-2015, 2015.
- **Hegglin, M. I.**, S. Tegtmeier, and the SPARC Data Initiative Team, SPARC Data Initiative: Comparison of aerosol climatologies from international limb satellite sounders, in preparation.
- Hegglin, M. I., S. Tegtmeier, and the SPARC Data Initiative Team, SPARC Data Initiative: Overview, in preparation.
- Manney, G. L., Z. Lawrence, M. I. Hegglin, et al., Intercomparison of upper tropospheric/lower stratospheric (UTLS) jet climatologies in different reanalyses, in preparation.
- Lawrence, Z., G. L. Manney, M. I. Hegglin, et al., Atmospheric modes and their impact on upper tropospheric/lower stratospheric (UTLS) jets in different reanalyses, in preparation.
- Manney, G. L., and M. I. Hegglin, Trends and variability of upper tropospheric/lower stratospheric (UTLS) jets in different reanalyses, in preparation.

Peer-Reviewed Journal Publications:

- [31] Tegtmeier, S., Hegglin, M. I., Anderson, J., Funke, B., Gille, J., Jones, A., Smith, L., von Clarmann, T., and Walker, K. A.: The SPARC Data Initiative: comparisons of CFC-11, CFC-12, HF and SF6 climatologies from international satellite limb sounders, *Earth Syst. Sci. Data*, 8, 61-78, doi:10.5194/essd-8-61-2016, 2016.
- [30] Schwartz, M. J., G. L. Manney, M. I. Hegglin, N. J. Livesey, M. L. Santee, W. H. Daffer, Climatology and variability of trace gases in extratropical double-tropopause regions from MLS, HIRDLS, and ACE-FTS measurements, J. Geophys. Res. Atmos., 120, doi:10.1002/2014JD021964, 2015.
- [29] Hegglin, M. I., D. Plummer, J. Scinocca, T. G. Shepherd, J. Anderson, L. Froidevaux, B. Funke, D. Hurst, A. Rozanov, J. Urban, T. v. Clarmann, K. A. Walker, R. Wang, S. Tegtmeier, and K. Weigel, Variation of stratospheric water vapour trends with altitude from merged satellite data, *Nat. Geosci.*, doi: 10.1038/NGEO2236, 2014.
- [28] Neu, J. L., M. I. Hegglin, S. Tegtmeier, et al., The SPARC Data Initiative: Comparison of upper troposphere/lower stratosphere ozone climatologies from limb-viewing instruments and the nadir-viewing Tropospheric Emission Spectrometer, J. Geophys. Res. Atmos., 119, 6971–6990, doi:10.1002/2013JD020822, 2014.
- [27] Shepherd, T. G., D. Plummer, J. Scinocca, M. I. Hegglin, C. Reader, V. Fioletov, E. Remsberg, T. von Clarmann, H. J. Wang, Reconciliation of halogen-induced ozone loss with the total-column ozone record, *Nat. Geosci.*, 7 (6), 443–449, doi: 10.1038/NGEO2155, 2014.

- [26] Manney, G. L., M. I. Hegglin, W. H. Daffer, S. Pawson, M. J. Schwartz, Climatology and variability of upper tropospheric/lower stratospheric (UTLS) jets from MERRA reanalysis. Part I: Climatology, J. Clim., doi:10.1175/JCLI-D-13-00243.1, 2014.
- [25] Tegtmeier, S., M. I. Hegglin, and the SPARC Data Initiative Team, SPARC Data Initiative: Comparison of ozone climatologies from international limb satellite sounders, J. Geophys. Res., doi:10.1029/2013JD019877, 2013.
- [24] Toohey, M., M. I. Hegglin, and the SPARC Data Initiative Team, Characterizing sampling bias in the trace gas climatologies of the SPARC Data Initiative, J. Geophys. Res., doi:10.1029/2013JD020298, 2013.
- [23] Hegglin, M. I., S. Tegtmeier, and the SPARC Data Initiative Team, SPARC Data Initiative: Comparison of water vapour climatologies from international limb satellite sounders, J. Geophys. Res., doi:10.1029/2013JD019614, 2013.
- [22] Fujiwara, M., J. Suzuki, A. Gettelman, M. I. Hegglin, H. Akiyoshi, and K. Shibata, Wave activity in the tropical tropopause layer in seven reanalysis and four chemistry climate model data sets, J. Geophys. Res., 117, D12105, doi:10.1029/2011JD016808, 2012.
- [21] Manney, G. L., M. I. Hegglin, W. H. Daffer, M. L. Santee, E. A. Ray, S. Pawson, M. J. Schwartz, C. D. Boone, L. Froidevaux, N. J. Livesey, W. G. Read, and K. A. Walker, Jet characterization in the upper troposphere/lower stratosphere (UTLS): applications to climatology and transport studies, *Atmos. Chem. Phys.*, 11, 6115-6137, doi:10.5194/acp-11-6115-2011, 2011.
- [20] Gettelman, A., P. Hoor, L. L. Pan, W. J. Randel, M. I. Hegglin, and T. Birner, The extra tropical upper troposphere and lower stratosphere, *Rev. Geophys.*, 49, RG3003, doi:10.1029/2011RG000355, 2011.
- [19] Hegglin, M. I., A. Gettelman, et al., Multi-model assessment of the upper troposphere and lower stratosphere: extra-tropics, J. Geophys. Res., 115, D00M09, doi:10.1029/2010JD013884, 2010.
- [18] Hoor, P., H. Wernli, M. I. Hegglin, and H. Bönisch, Transport timescales and tracer properties in the extratropical UTLS, Atmos. Chem. Phys., 10, 7929-7944, doi:10.5194/acp-10-7929-2010, 2010.
- [17] Ray, E. A., et al., Evidence for changes in stratospheric transport and mixing over the past three decades based on multiple data sets and tropical leaky pipe analysis, *J. Geophys. Res.*, 115, D21304, doi:10.1029/2010JD014206, 2010.
- [16] Gettelman, A., M. I. Hegglin, et al., Multi-model assessment in the upper troposphere and lower stratosphere: tropics and trends, J. Geophys. Res., 115, D00M08, doi:10.1029/2009JD013638, 2010.
- [15] Morgenstern, O., et al., Review of present-generation stratospheric chemistry-climate models and associated external forcings, J. Geophys. Res., doi:10.1029/2009JD013728, 2010.
- [14] Hegglin, M. I., and T. G. Shepherd, Large climate-induced changes in UV index and stratosphere-to-troposphere ozone flux, Nature Geoscience 2, 687-691, 2009.
 This paper was highlighted by Nature [461:148, 2009] and featured in Nature Geoscience 'News&Views' [D. S. Stevenson, 2:677, 2009] and Frontiers in Ecology and Environment 'Dispatches' [J. Bradbury, 8:401, 2009]

- [13] Manney, G. L., R. S. Harwood, I. A. MacKenzie, K. Minschwaner, D. R. Allen, M. L. Santee, K. A. Walker, M. I. Hegglin, A. J. Lambert, H. C. Pumphrey, P. F. Bernath, C. D. Boone, and W. H. Daffer, Satellite observations and modelling of transport during the 2006 major stratospheric sudden warming, *Atmos. Chem. Phys.*, 9, 4775-4795, 2009.
- [12] Hegglin, M. I., C. D. Boone, G. L. Manney, K. A. Walker, A global view of the extratropical tropopause transition layer from Atmospheric Chemistry Experiment Fourier Transform Spectrometer O₃, H₂O, and CO, J. Geophys. Res., 114, D00B11, doi:10.1029/2008JD009984, 2009.
- [11] Hegglin, M. I., C. D. Boone, G. L. Manney, T. G. Shepherd, K. A. Walker, P. F. Bernath, W. H. Daffer, P. Hoor, and C. Schiller, Validation of ACE-FTS satellite data in the upper troposphere/lower stratosphere (UTLS) using non-coincident measurements, *Atmos. Chem. Phys.*, 8, 1483-1499, 2008.
- [10] Hegglin, M. I., and T. G. Shepherd, O₃-N₂O correlations from the Atmospheric Chemistry Experiment: Revisiting a diagnostic of transport and chemistry in the stratosphere, J. Geophys. Res., 112, D19301, doi:10.1029/2006JD008281, 2007.
- [9] Paetz, H. W., A. Volz-Thomas, M. I. Hegglin, D. Brunner, H. Fischer, and U. Schmidt, In-situ comparison of the NO_y instruments flown in MOZAIC and SPURT, Atmos. Chem. Phys., 6, 2401-2410, 2006.
- [8] Hegglin, M. I., D. Brunner, Th. Peter, P. Hoor, H. Fischer, J. Staehelin, M. Krebsbach, C. Schiller, U. Parchatka, and U. Weers, Measurements of NO, NO_y, N₂O, and O₃ during SPURT: Implications for transport and chemistry in the lowermost stratosphere, *Atmos. Chem. Phys.*, 6, 1331-1350, 2006.
- [7] Krebsbach M., C. Schiller, D. Brunner, G. Günther, M. I. Hegglin, D. Mottaghy, M. Riese, N. Spelten, and H. Wernli, Seasonal cycles and variability of O₃ and H₂O in the UT/LMS during SPURT, Atmos. Chem. Phys., 6, 109-125, 2006.
- [6] Engel, A., H. Bönisch, D. Brunner, H. Fischer, H. Franke, G. Günther, C. Gurk, M. Hegglin, P. Hoor, R. Königstedt, M. Krebsbach, R. Maser, U. Parchatka, Th. Peter, D. Schell, C. Schiller, U. Schmidt, N. Spelten, T. Szabo, U. Weers, H. Wernli, Th. Wetter, and V. Wirth, Highly resolved observations of trace gases in the lowermost stratosphere and upper troposphere from the SPURT project: An overview, Atmos. Chem. Phys., 6, 283-301, 2006.
- [5] Fischer H., M. Lawrence, Ch. Gurk, P. Hoor, J. Lelieveld, M. I. Hegglin, and D. Brunner, Model simulations and aircraft measurements of vertical, seasonal and latitudinal O₃ and CO distributions over Europe, *Atmos. Chem. Phys.*, 6, 339-348, 2006.
- [4] Hegglin, M. I., D. Brunner, Th. Peter, J. Staehelin, V. Wirth, P. Hoor, and H. Fischer: Determination of eddy-diffusivity in the lowermost stratosphere, *Geophys. Res. Lett.*, 32, L13812, doi:10.1029/2005GL022495, 2005.
- [3] Hoor, P., C. Gurk, D. Brunner, M. I. Hegglin, H. Wernli, and H. Fischer: Seasonality and extent of extratropical TST derived from in-situ CO measurements during SPURT, Atmos. Chem. Phys., 4, 1427–1442, 2004.
- [2] Hegglin, M. I., D. Brunner, H. Wernli, C. Schwierz, O. Martius, M. Krebsbach, C. Schiller, N. Spelten, P. Hoor, H. Fischer, U. Parchatka, U. Weers, J. Staehelin, and Th. Peter, Tracing troposphere to stratosphere transport within a mid-latitude deep convective system. *Atmos. Chem. Phys.*, 4, 741-756, 2004.

 Hegglin, M. I., U. K. Krieger, T. Koop, and T. Peter, Technical Note: Organics-induced fluorescence in Raman studies of sulfuric acid aerosols, *Aerosol Science and Technology*, 36, 510-512, 2002.

Non-Peer-Reviewed Publications:

- [6] Hegglin M. I., et al., IGAC/SPARC Chemistry-Climate Model Initiative (CCMI) 2014 Science Workshop, SPARC Newsletter, 43, 32–35, 2014.
- [5] Eyring, V., et al., CCMI, SPARC Newsletter, 40, 48–66, 2013.
- [4] ESA, Report for Mission Selection: PREMIER, *ESA SP-1324/3* (3 volume series), European Space Agency, Noordwijk, The Netherlands, 2012.
- [3] Alexander, M. J., V. Eyring, **Hegglin, M. I.**, et al., World Climate Research Programme Open Science Conference – The SPARC Perspective, *SPARC Newsletter*, **38**, 1–8, 2012.
- [2] Hegglin, M. I. and S. Tegtmeier, The SPARC Data Initiative, SPARC Newsletter, 36, 22–23, 2011.
- Hoor, P., H. Bönisch, D. Brunner, A. Engel, H. Fischer, C. Gurk, G. Günther, M. I. Hegglin, M. Krebsbach, R. Maser, Th. Peter, C. Schiller, U. Schmidt, N. Spelten, H. Wernli and V. Wirth, New insights into upward transport across the extratropical tropopause derived from extensive in situ measurements during the SPURT project, SPARC Newsletter, 22, 29–31, 2004.

Peer-Reviewed Reports:

- [9] SPARC, 2015: SPARC Data Initiative report on the assessment of stratospheric trace gas and aerosol climatologies from satellite limb sounders. M. I. Hegglin and S. Tegtmeier (Eds.), SPARC Report No. 7, WCRP-16/2016, will become available at www.sparcclimate.org/publications/sparc-reports/.
- Contributor to Assessment for Decision-Makers: [8] Scientific Assessment of Ozone Depletion: World Meteorological Organization, Global Ozone Research 2014,and Monitoring ProjectReport No. 56, Geneva, Switzerland, 2014. (available http://www.esrl.noaa.gov/csd/assessments/ozone/2014/assessment_for_decisionatmakers.pdf)
- [7] Michaela I. Hegglin (Lead Author), David W. Fahey, Mack McFarland, Stephen A. Montzka, and Eric R. Nash, Twenty Questions and Answers About the Ozone Layer: 2014 Update, Scientific Assessment of Ozone Depletion: 2014, 84 pp., World Meteorological Organization, Geneva, Switzerland, 2015. (available at http://www.esrl.noaa.gov/csd/assessments/ozone/2014/twentyquestions2014update.pdf)
- [6] Contributor to Pawson, S., and W. Steinbrecht (Lead Authors), A.J. Charlton-Perez, M. Fujiwara, A.Yu. Karpechko, I. Petropavlovskikh, J. Urban, and M. Weber, Update on global ozone: Past, present, and future, Chapter 2 in Scientific Assessment of Ozone Depletion: 2014, Global Ozone Research and Monitoring Project Report No. 55, World Meteorological Organization, Geneva, Switzerland, 2014.
- [5] Coauthor to Plumb, A. and R. Stolarski (Lead Authors), The Theory of Estimating Lifetimes Using Models and Observations, Chapter 2 of SPARC Report on Lifetimes of Stratospheric Ozone-Depleting Substances, Their Replacements, and Related Species, SPARC Report No. 6, WCRP-15/2013, 2013. (available at http://www.sparcclimate.org/publications/sparc-reports/sparc-report-no6/)

- [4] Fahey, D. W., and M. I. Hegglin (Coordinating Lead Authors), Twenty Questions and Answers About the Ozone Layer: 2010 Update, Scientific Assessment of Ozone Depletion: 2010, 72 pp., World Meteorological Organization, Geneva, Switzerland, 2011. (available at http://www.esrl.noaa.gov/csd/assessments/ozone/2006/twentyquestions.html)
- [3] Coauthor to Douglass, A. and V. Fioletov (Coordinating Lead Authors), Stratospheric ozone and surface ultraviolet radiation. Chapter 2 of Scientific Assessment of Ozone Depletion: 2010, Global Ozone Research and Monitoring Project-Report No. 52, 516 pp., World Meteorological Organization, Geneva, Switzerland, 2011.
- [2] Coauthor to Baldwin, M. P. and N. P. Gillett (Lead Authors), Effects of the stratosphere on the troposphere, Chapter 10 of SPARC Report on the Evaluation of Chemistry-Climate Models, SPARC Report No. 5, WCRP-132, WMO/TD-No. 1526, 2010. (available at http://www.sparc-climate.org/publications/sparc-reports/sparc-report-no5/)
- Gettelman, A. and M. I. Hegglin (Lead Authors), Upper Troposphere and Lower Stratosphere. Chapter 7 of SPARC Report on the Evaluation of Chemistry-Climate Models, SPARC Report No. 5, WCRP-132, WMO/TD-No. 1526, 2010. (available at http://www.sparcclimate.org/publications/sparc-reports/sparc-report-no5/)

PhD and Diploma Thesis:

- Hegglin, M. I., 2004. Airborne NO_y-, NO-, and O₃-measurements during SPURT: Implications for atmospheric transport. Ph.D. thesis No. 15553, ETH Zurich, Switzerland.
- Hegglin, M. I., 2000. Fluoreszenz an Schwefelsäuretröpfchen. Diploma thesis at IACETH, ETH, Zurich, Switzerland.

PRESENTATIONS

(Only first-authored contributions are listed)

Conference talks

Sep 2016	(Invited) Changes in stratospheric composition and their relation to temperature over the past 35 years, Trends in the Middle Atmosphere Workshop, Kühlungsborn, Germany.
May 2016	(Invited) Tropospheric ozone, the obscuring factor in quantifying stratospheric ozone recovery, Ozone research – quo vadis?, ETH Symposium, Zurich, Switzerland.
Feb 2016	(Invited) Stratospheric water vapour from observations, SHARP workshop, Berlin, Germany.
Oct 2015	(Solicited) CCMI ozone and water vapour databases for CMIP6, AerChemMIP workshop, Frascati/Rome, Italy.
Jun 2015	(Invited) Vertically resolved stratospheric water vapour trends, IUGG, Prague, Czech Republic.
Jun 2015	(Invited) Long-term trends of ozone in the stratosphere, IUGG, Prague, Czech Republic.
Feb 2015	(Keynote lecture) The IGAC/SPARC Chemistry-Climate Model Initiative, Symposium on Coupled Chemistry-Meteorology/Climate Modeling (CCMM), WMO headquarters, Geneva, Switzerland.
Sep 2014	(Invited) DA products in support of SPARC activities, 10th SPARC Data Assimilation workshop, NOAA Center for Weather and Climate Prediction (NCWCP), College Park, Maryland, USA.

Aug 2014	(Invited) (cancelled participation due to political situation in host country) Improv- ing climate data records using a combined model-measurement approach, COSPAR, Moscow, Russia.
Mar 2014	(Invited) IGAC/SPARC Chemistry-Climate Modeling Initiative, NCEO National Meeting, London, United Kingdom.
Sep 2013	Solving the stratospheric water vapour entry-value puzzle using a combined model-measurement approach, ESA Living Planet Symposium, Edinburgh, United Kingdom.
May 2013	Resolving the stratospheric water vapour entry-value puzzle using a combined model- measurement approach, CMOS, Saskatoon, Canada.
May 2013	(Invited) Stratospheric satellite data for model evaluation, CCMI Meeting, Boulder, USA.
Mar 2013	PREMIER – Science Part I, Earth Explorer 7 User Consultation Meeting, Graz, Austria.
Aug 2012	The SPARC Data Initiative: A multi-instrument comparison of stratospheric limb measurements, Quadrennial Ozone Symposium, Toronto, Canada.
May 2012	(Invited) Scientific questions and model evaluation for the UTLS, IGAC/SPARC Global Chemistry-Climate Modeling and Evaluation Workshop, Davos, Switzerland.
May 2012	The SPARC Data Initiative, NCEO National Meeting, Oxford, United Kingdom.
Aug 2010	(Invited) The extra-tropical UTLS from space-based instruments, AGU meeting of the Americas, Foz do Iguacu, Brazil.
Aug 2010	Climate-induced changes in UV, AGU meeting of the Americas, Foz do Iguacu, Brazil.
Jun 2010	(Invited) Climate-change induced changes in UV radiation and stratospheric ozone fluxes into the troposphere, CMOS, Ottawa, Canada.
Jun 2010	Simulating the Past, Present and Future of the Upper Troposphere and Lower Stratosphere (UTLS), CMOS, Ottawa, Canada.
Jun 2010	PREMIER, CMOS, Ottawa, Canada.
Oct 2009	PREMIER, SPARC SSG meeting, Kyoto, Japan.
Oct 2009	(Invited) CCMVal overview: The extra-tropical UTLS in chemistry-climate models (co-authored by Andrew Gettelman), Extratropical UTLS Workshop, NCAR, Boulder, USA.
Oct 2009	First global view of the Extratropical Tropopause Transition Layer (ExTL) from the ACE-FTS, Extratropical UTLS Workshop, NCAR, Boulder, USA.
Jul 2009	Climate-induced changes in UTLS ozone and their impacts on the troposphere, IAMAS/MOCA, Montreal, Canada.
Jul 2009	A global view on the extratropical tropopause transition layer from the ACE-FTS, IAMAS/MOCA, Montreal, Canada.
Jun 2009	Trends in stratospheric ozone fluxes into the troposphere in a changing climate, Middle Atmosphere Meeting, AMS, Stowe, USA.
Mar 2009	Needs of the Chemistry-Climate Modelling community regarding H_2O measurements, SPARC Water Vapour Workshop, Toronto, Canada.
Oct 2008	Validation of chemistry-climate models in the upper troposphere/lower stratosphere using solar occultation observations from the ACE-FTS, CEOS Atmospheric Composition Constellation Workshop, GISS, New York, USA.

Sep 2008	(Invited) Toward a global view of extratropical UTLS tracer distributions, SPARC General Assembly, Bologna, Italy.
Jul 2008	Validation of ACE-FTS ozone in the upper troposphere/lower stratosphere using
	non-coincident measurements, Quadrennial Ozone Symposium, Tromsø, Norway.
Sep 2007	The benefits of in-line advection – Assessing the transport characteristics of the CMAM-DAS, SPARC Data Assimilation Working Group Workshop, Toronto, Canada.
Aug 2007	The Extratropical Tropopause Transition Layer (ExTL) as seen from ACE, Middle Atmosphere Meeting, AMS, Portland, United States.
Jul 2007	O_3 - N_2O correlations: Revisiting a diagnostic of transport and chemistry in the stratosphere, IUGG, Perugia, Italy.
Jul 2007	Validating ACE-FTS in the upper troposphere/lower stratosphere (UTLS), IUGG, Perugia, Italy.
Jun 2007	O_3 - N_2O correlations: Revisiting a diagnostic of transport and chemistry in the stratosphere, SPARC CCMVal Workshop, Leeds, United Kingdom.
Jun 2007	Validation of Chemistry Climate Models in the upper troposphere/lower strato- sphere (UTLS) using ACE satellite data, Canadian Association of Physicists (CAP), Saskatoon, SK, Canada.
Feb 2007	The dream of a Canadian high-altitude research aircraft, CSA Suborbital Workshop, Toronto, Canada.
May 2006	O ₃ -N ₂ O correlations from satellite measurements as validation diagnostic for Chemistry-Climate Models, CMOS Congress, Toronto, Canada.
May 2006	(Invited) La région de la TS/SI de la perspective de mesures en avion, ACFAS colloque sur la moyenne atmosphère, Montréal, Canada.
Sep 2005	Monitoring the UTLS – meeting a challenge? CSA, Niche Mission Workshop, Montreal, Canada.
Apr 2002	Deep convective injection into the LMS at mid-latitudes, EGU, Nice, France.
Project Wo	rkshop talks
Oct 2015	(Solicited) CCMI ozone and water vapour databases for CMIP6, WGCM 19, Dubrovnik, Croatia.
Oct 2015	(Invited) Stratospheric Essential Climate Variables (ECVs), CCI Collocation Meeting, ESA, ESRIN, Frascati, Italy.
Mar 2015	(Invited) Past stratospheric water vapour changes and implications for the strato- spheric circulation, DLR, Oberpfaffenhofen, Germany.
Feb 2014	(Invited) SPARC Data Initiative: Water vapour comparisons, SPARC WAVAS-II Workshop, Jet Propulsion Laboratory / Caltech, Pasadena, CA, USA.
Feb 2013	SPARC Data Initiative: Water vapour comparisons, SPARC Data Requirements Workshop, ESRIN, Frascati, Italy.
Feb 2013	SPARC Data Initiative: Aerosol comparisons, SPARC Data Requirements Workshop, ESRIN, Frascati, Italy.
Dec 2012	CMAM20 – SPARC Data Initiative water vapour comparisons, University of Toronto, ON, Canada.

Nov 2012 (Invited) SPARC Data Initiative: A multi-instrument comparison of stratospheric aerosol measurements, SSRIC, Institute for Space Science, ISSI, Bern, Switzerland.

O ₃ -fluxes from CCMVal - a multi-model comparison, C-SPARC workshop, Toronto, ON, Canada.
Climate-induced changes in ultraviolet index and stratosphere-to-troposphere ozone flux, C-SPARC workshop, Toronto, ON, Canada.
Validation of Chemistry Climate Models in the upper troposphere/lower strato- sphere within CCMVal, C-SPARC workshop, Toronto, ON, Canada.
ACE-FTS observations in the UTLS and their use for Chemistry Climate Model validation, ACE Workshop, Waterloo, ON, Canada.
The Extratropical Tropopause Transition Layer (ExTL) seen from ACE and in CMAM, C-SPARC Workshop, Toronto, ON, Canada.
An Update on the Validation of the ACE-FTS in the UTLS, ACE Workshop, Waterloo, ON, Canada.
Validating ACE-FTS in the UTLS, ACE Workshop, Waterloo, ON, Canada.
O ₃ -N ₂ O correlations: A reanimated test of stratospheric transport and chemistry in CCMs, C-SPARC Workshop, Toronto, ON, Canada.
Tracer-tracer correlations from ACE: Exploring transport and chemistry in the stratosphere and in the CMAM, ACE Workshop, Waterloo, ON, Canada.
Validation of UTLS tracer distributions in CMAM with SPURT aircraft measurements, Global Chemistry for Climate (GCC) Workshop, Toronto, ON, Canada.
Tracer-tracer correlations in the UTLS region observed during the SPURT project, GCC Workshop, University of Toronto, Department of Physics, Toronto, ON, Canada.

Invited Seminars

Jun 2015	Past stratospheric water vapour changes and implications for the stratospheric cir- culation, Imperial College London, UK.
Apr 2014	The IGAC/SPARC Chemistry-Climate Model Initiative: Investigating outstanding science questions, NOAA, CO, USA.
Dec 2013	Improving climate data records using a combined model-measurement approach, Jet Propulsion Laboratory / Caltech, Pasadena, CA, USA.
Nov 2012	The upper troposphere and lower stratosphere and its role in chemistry-climate coupling, Cambridge University, Cambridge, United Kingdom.
Mar 2012	The upper troposphere and lower stratosphere and its role in chemistry-climate coupling, McGill University, Montréal, Canada.
Dec 2011	Towards a one-atmosphere view of chemistry-climate coupling, Department of Physics, Imperial College, London, United Kingdom.
Nov 2011	Chemistry-climate coupling in the atmosphere, Department of Chemistry, University of Reading, Reading, United Kingdom.
Oct 2011	The upper troposphere/lower stratosphere: A frontier for measurements, models, and theory, AOPP, Department of Physics, University of Oxford, United Kingdom.
Feb 2011	Ozone in the upper troposphere/lower stratosphere (UTLS) – Why do we care?, NIWA, Christchurch, New Zealand.
Feb 2011	Ozone in the upper troposphere/lower stratosphere (UTLS) – Why do we care?, NIWA, Lauder, New Zealand.
Dec 2010	Climate change and the ozone layer: Connections and surface impacts, Department of Earth, Atmospheric and Planetary Sciences, MIT, Cambridge, MA, USA.

Oct 2010	Ozone in the upper troposphere/lower stratosphere (UTLS) – Why do we care?, FZJ, Jülich, Germany.
Sep 2010	Ozone in the upper troposphere/lower stratosphere (UTLS) – Why do we care?, IAC, ETH Zurich, Switzerland.
Sep 2010	Climate change and the ozone layer: connections and surface impacts, IFM GEO-MAR, Kiel, Germany.
May 2010	Climate change and the ozone layer: Connections and surface impacts, Depart- ment of Physical and Environmental Sciences, University of Toronto Scarborough, Toronto, Canada.
Jul 2009	Characterization of the tropopause region using in-situ and remote measurements, University of Mainz, Mainz, Germany.
Nov 2008	Toward a global perspective on extratropical upper troposphere/lower stratosphere tracer distributions, Department of Physics, New Mexico Tech, NM, USA.
Jan 2008	A global perspective on the extratropical tropopause transition layer from the ACE- FTS satellite data, Max-Planck-Institute for Chemistry Department of Atmospheric Chemistry, Mainz, Germany.
Jan 2008	Validation of satellite data in the upper troposphere/lower stratosphere using non- coincident measurements, Research Institute, Karlsruhe, Germany.
Nov 2006	The extratropical UTLS: New perspectives from aircraft and satellite measurements, NCAR, Boulder, CO, USA.
Nov 2005	How trace gas measurements tell stories about dynamical processes, Environment Canada, Toronto, ON, Canada.
Nov 2004	NO, NO_y , and O_3 measurements during SPURT: Implications for transport and chemistry, Max-Planck-Institute for Chemistry Department of Atmospheric Chemistry, Mainz, Germany.

Poster contributions

Jan 2014	Solving the stratospheric water vapour entry puzzle, SPARC General Assembly,
	Queenstown, New Zealand.
Jan 2014	Highlights of the SPARC Data Initiative: Part 1, SPARC General Assembly, Queen-
	stown, New Zealand.
Oct 2011	The SPARC Data Initiative: An overview, WCRP Open Science Conference, Denver,
	Colorado, USA.
Oct 2011	The SPARC Data Initiative: Comparisons of water vapour, CH ₄ , CO, and related short-lived species climatologies, WCRP Open Science Conference, Denver, Colorado, USA.
Oct 2011	PREMIER - Impact of high spatial and temporal satellite measurements on chemistry-climate model validation, WCRP Open Science Conference, Denver, Col- orado, USA.
Dec 2010	Multi-model prediction of climate-induced changes in ozone and reactive nitrogen fluxes into the troposphere, AGU, San Francisco, USA.
Jun 2007	Validation of the global UTLS in CCMs using ACE satellite data, CCMVal Workshop, Leeds, United Kingdom.
Nov 2005	Validation of UTLS tracer distributions in the Canadian Middle Atmosphere Model with SPURT aircraft measurements, CCMVal Workshop, Boulder, Colorado, USA.

- Aug 2004 A new 2D advection-diffusion model simulating trace gas distributions in the lowermost stratosphere, SPARC General Assembly, Victoria, BC, Canada.
- Aug 2004Troposphere-to-stratosphere transport and its impact on lowermost stratospheric
NO $_y$ and O $_3$, SPARC General Assembly, Victoria, BC, Canada.
- Apr 2003 Tracing troposphere-to-stratosphere transport processes above a convective system at mid-latitudes, EGU, Nice, France.