Curriculum Vitae

Matthew H. Hitchman

Research interests: global climate change, volcanic aerosol, ozone layer, the middle atmosphere, atmospheric dynamics, climatological analysis of satellite data, regional analysis of in situ data, mesoscale to global chemical transport modeling, and dynamics of mixing across the tropopause.

Education: University of Washington, Atmospheric Sciences, B.S. 1978; Ph.D. 1985

Research Positions:

1985-1986	Postdoctoral Research Associate, University of Washington
1986-1988	Scientist I, National Center for Atmospheric Research
1988-1992	Assistant Professor of Meteorology, University of Wisconsin - Madison
1992-1996	Associate Professor of Atmospheric and Oceanic Sciences
10/95-1/96	Visiting Professor, Kyoto University, Japan
1997-2000	Chair, AOS Department
Spring 2006	Sabbatical, University of Reading, United Kingdom
1996-present	Professor of Atmospheric and Oceanic Sciences, U.W.-Madison

Professional Societies: American Meteorological Society, American Geophysical Union, Phi Beta Kappa

Awards: Excellence in reviewing, AGU 1999, 2006; Vilas Associates Award 2003-2005.

Teaching (* = active)

AOS 100, Weather and Climate, Fall 1989, Spring 1990, Spring 1993, Fall 2003
AOS 121, Atmospheric Environment and Society, Fall 2001
*AOS 171, Global Change: Atmospheric Issues and Problems, Fall 2002, Spring 1994-2015
AOS 323, Atmospheric Science III, Fall 1989, Fall 1990, Fall 1991, Fall 1992
*AOS 405, Senior Capstone Seminar, Spring 1998, 2003, 2004, 2007, 2008, 2010, 2013, 2015
AOS 472, Scientific Basis for Global Change, Spring 2000
AOS 601, Physics of Atmosphere and Ocean, Fall 1995
*AOS 610, Geophysical Fluid Dynamics, Spring 1992, Fall 1994, Fall 1998, Fall 2004-2014
AOS 611, Geophysical Fluid Dynamics II, Spring 2002
*AOS 705, The Middle Atmosphere, Spring 1989, Spring 1991, Fall 1993, Fall 1996, Fall 2009, Fall 2012
AOS 712, The General Circulation, Spring 1996, Fall 2000
*AOS 801, Rotating Tank Laboratory, Spring 2011, Fall 2013
*AOS 900, Seminar in Meteorology: Current and Classical Problems, Spring 2014
AOS 901, Readings in Dynamical Oceanography, Fall 1993
AOS 907, Seminar: Ph.D. Research Presentations, Spring 1997, Fall 2003, Fall 2005
AOS 915, Dynamics Seminar, Fall 1989, Spr 1990, Fall 1990, Spr 1991, Fall 1991, Spr 1992, Fall 2005, Fall 2008, Fall 2010

Ph.D. completed: Charles R. Trepte, 1993; John A. Knox, 1996; Gregory A. Postel, 1999; V. Lynn Harvey, 2001; Amihan S. Huesmann, 2004; Marcus L. Buker, 2004; Monica Harkey, 2009; Marek J. Rogal, 2009.

Current Ph.D. students: Ross Dixon

M.S. completed: Kenneth Bywaters, 1990; William Sea, 1992; Megan McKay, 1992; Chia-Yi Yao, 1994; Lynn Harvey, 1994; Gregory Postel, 1994; Keiko Yumi, 1996; Joleen Kugi, 1996; Marcus Buker, 1997; Marek Rogal, 2004; Andrew Parker, 2007; Elizabeth Klusinske, 2008; Nicholas Zachar, 2008; Morgan Franklin, 2008; Emily Niebuhr 2009; Shellie Rowe, 2014

Current M.S. students: Marc Collins, Nathaniel Loeb

Post-Doctoral Research Associates: Charles R. Trepte, Philip A. Politowicz, Susan Nossal, Gregory A. Postel, V. Lynn Harvey, Chieko Kittaka, Marcus L. Buker, and Amihan S. Huesmann, Marek J. Rogal

Refereed Publications and Book Chapters

1. Joung, C.-H., and M. H. Hitchman, 1982: On the role of successive downstream development in East Asian polar air outbreaks. *Mon. Wea. Rev.*, **110**, 1224-1237.
2. Coy, L. and M. H. Hitchman, 1984: Kelvin wave packets and flow acceleration: a comparison of modeling and observations. *J. Atmos. Sci.*, **41**, 1875-1880.
3. Leovy, C. B., C.-R. Sun, M. H. Hitchman, E. E. Remsberg, J. M. Russell III, L. L. Gordley, J. C. Gille, and L. V. Lyjak, 1985: Transport of ozone in the middle stratosphere: evidence for planetary wave breaking. *J. Atmos. Sci.*, **42**, 230-244.
4. Hitchman, M. H. and C. B. Leovy, 1985: Diurnal tide in the equatorial middle atmosphere as seen in LIMS temperatures. *J. Atmos. Sci.*, **42**, 557-561.
5. Leovy, C. B. and M. H. Hitchman, 1985: Dynamical phenomena in the equatorial middle atmosphere during northern winter 1978-1979. In *Proceedings of the First National Workshop on the Global Weather Experiment, Current Achievements and Future Directions, Vol. 2, part 2.* National Academy Press, Washington D. C., 1985, pp. 581-591.
6. Hitchman, M. H. and C. B. Leovy, 1986: Evolution of the zonal mean state in the equatorial middle atmosphere during October 1978 - May 1979. *J. Atmos. Sci.*, **43**, 3159-3176.
7. Hitchman, M. H., C. B. Leovy, J. C. Gille, and P. L. Bailey, 1987: Quasi-stationary, zonally asymmetric circulations in the equatorial middle atmosphere. *J. Atmos. Sci.*, **44**, 2219-2236.
8. Brasseur, G. and M. H. Hitchman, 1987: The effect of breaking gravity waves on the distribution of trace species in the middle atmosphere. In *Transport Processes in the Middle Atmosphere*, Reidel Publishing Co, pp.215-228.
9. Hitchman, M. H. and G. Brasseur, 1988: Rossby wave activity as an interactive tracer in a 2-D model: parameterization of wave driving and eddy diffusivity. *J. Geophys. Res.*, **93**, 9405-9417.
10. Hitchman, M. H. and C. B. Leovy, 1988: Estimation of the Kelvin wave contribution to the semiannual oscillation. *J. Atmos. Sci.*, **45**, 1462-1475.
11. Brasseur, G. and M. H. Hitchman, 1988: Stratospheric response to trace gas pertur-

bations: changes in ozone and temperature distributions. *Science*, **240**, 634-637.
12. Brasseur, G., M. H. Hitchman, P. C. Simon, and A. De Rudder, 1988: Ozone reduction in the 1980's: A model simulation of anthropogenic and solar perturbations. *Geophys. Res. Lett.*, **15**, 1361-1364.
13. Hitchman, M. H., J. C. Gille, C. D. Rodgers, and G. Brasseur, 1989: The separated polar winter stratopause: A gravity wave driven climatological feature. *J. Atmos. Sci.*, **46**, 410-422.
14. Brasseur, G., M. H. Hitchman, S. Walters, M. Dymek, E. Falise, and M. Pirre, 1990: An interactive chemical dynamical radiative two-dimensional model of the middle atmosphere. *J. Geophys. Res.*, **95**, 5639-5656.
15. O'Sullivan, D. J. and M. H. Hitchman, 1992: Inertial instability and Rossby wave breaking in a numerical model. *J. Atmos. Sci.*, **49**, 991-1002.
16. Fritts, D. C., L. Yuan, M. H. Hitchman, L. Coy, E. Kudeki, and R. F. Woodman, 1992: Dynamics of the equatorial mesosphere observed using the Jicamarca MST radar during June and August 1987. *J. Atmos. Sci.*, **49**, 2353-2371.
17. Hitchman, M. H., K. W. Bywaters, D. C. Fritts, L. Coy, E. Kudeki, F. Surucu, 1992: Ten day mean winds and momentum fluxes in the stratosphere and mesosphere over Jicamarca, Peru during June and August 1987. *J. Atmos. Sci.*, **49**, 2372-2383.
18. Trepte, C. R. and M. H. Hitchman, 1992: Tropical stratospheric circulation diagnosed in satellite aerosol data. *Nature*, **355**, 626-628.
19. Hitchman, M. H., M. A. McKay, and C. R. Trepte, 1993:"Circulation deduced from aerosol data averaged by season and phase of the quasibiennial oscillation". In *Coupling Processes in the Lower and Middle Atmosphere*, Kluver Academic Publishers, pp. 25-34.
20. Hitchman, M. H., M. McKay, and C. R. Trepte, 1994: A Climatology of Stratospheric Aerosol, *J. Geophys. Res.*, **99**, 20,689-20,700.
21. Langford, A. O., T. J. O'Leary, M. H. Proffitt, and M. H. Hitchman, 1994: Transport of the Pinatubo Volcanic Aerosol to a Northern Midlatitude Site. *J. Geophys. Res.*, **100**, 9007-9016.
22. Harvey, V. L., and M. H. Hitchman, 1996: A climatology of the Aleutian High. *J. Atmos. Sci.*, **53**, 2088-2101.
23. Politowicz, P. A. and M. H. Hitchman, 1997: Exploring the effects of forcing quasibiennial oscillations in a two-dimensional model. *J. Geophys. Res.*, **102**, 16,481-16,497.
24. Hitchman, M. H., 1996: "The Stratosphere", in *McGraw-Hill Scientific Encyclopedia*.
25. Hitchman, M. H., J. M. Kugi, G. A. Postel, C.-Y. Yao, V. Lynn Harvey, E. Kudeki, C. Fawcett, D. C. Fritts, D. Riggin, D. Ortland, 1997: Mean Winds in the Tropical Stratosphere and Mesosphere During January 1993, March 1994, and August 1994. *J. Geophys. Res.,*, **102**, 26,033-26,052.
26. D. Riggin, D. C. Fritts, C. Fawcett, E. Kudeki, and M. Hitchman, 1997: Radar observations of gravity waves over Jicamarca, Peru during the CADRE campaign. *J. Geophys. Res.*, **102**, 26,263-26,282.
27. Fritts, D., ... , M. H. Hitchman, et al., 1997: Equatorial dynamics observed by rocket, radar, and satellite during the CADRE/MALTED campaign: 2. Mean and wave structures, coherence, and variability. *J. Geophys. Res.*, **102**, 26,191-26,216.

28. Collimore, C. C., M. H. Hitchman, and D. W. Martin, 1998: Is there a quasi-biennial oscillation in tropical convection? *Geophys. Res. Letts.*, **25**, 333-336.
29. Postel, G. A., and M. H. Hitchman, 1999: Climatology of Rossby Wave Breaking Along the Subtropical Tropopause. *J. Atmos. Sci.*, **56**, 359-373.
30. Harvey, V. L., M. H. Hitchman, R. B. Pierce, T. D. Fairlie, 1999: Tropical high aerosol in the Aleutian anticyclone. *J. Geophys. Res.*, **104**, 6281-6290.
31. Hitchman, M. H., M. L. Buker, and G. J. Tripoli, 1999: Influence of synoptic waves on column ozone during Arctic summer 1997. *J. Geophys. Res.*, **104**, 26,547-26,563.
32. Postel, G. A., and M. H. Hitchman, 2001: Observational diagnosis of a Rossby wave breaking event along the subtropical topopause. *Mon. Wea. Rev.*, **129**, 25555-2569.
33. Huesmann, A., and M. H. Hitchman, 2001: The stratospheric quasi-biennial oscillation in the NCEP reanalysis: Climatological structures. *J. Geophys. Res., 106*, 11,859-11870.
34. Harvey, V. L., R. B. Pierce, T. D. Fairlie, and M. H. Hitchman, 2002: A climatology of stratospheric polar vortices and anticyclones, *J. Geophys. Res.*, 29 October 2002.
35. Hitchman, M. H., M. L. Buker, G. J. Tripoli, E. V. Browell, W. B. Grant, T. J. McGee, and J. F. Burris, 2003: Non-orographic generation of arctic PSCs during December 1999. *J. Geophys. Res.*, **108**, SOL 68, 1-16.
36. Huesmann, A. S., and M. H. Hitchman, 2003: The 1978 shift in the NCEP reanalysis stratospheric quasibiennial oscillation. *Geophys, Res. Letts.*, **30**, 2, 1048.
37. Collimore, C. C., D. W. Martin, M. H. Hitchman, A. Huesmann, and D. Waliser, 2002: On the relationship between the QBO and tropical deep convection. *J. Climate*, **16**, 2552-2568.
38. Hitchman, M. H., M. L. Buker, G. J. Tripoli, R. B. Pierce, J. A. Al-Saadi, E. V. Browell, M. A. Avery, 2004, A modeling study of an East Asian convective complex during March 2001. *J. Geophys. Res.*, **109**, D15S14.
39. Pierce, R. B., M. H. Hitchman, et al., 2003, Regional air quality modeling system (RAQMS) predictions of the tropospheric ozone budget over East Asia. *J. Geophys. Res.*, **108**, 8825.
40. Kittaka, C., et al., 2004: A three?dimensional regional modeling study of the impact of clouds on sulfate distributions during TRACE?P. *J. Geophys. Res.*, **109**, D15S11.
41. Snyder, P. J., J. A. Foley, M. H. Hitchman and C. L. Delire, 2004, Analyzing the effects of tropical deforestation on climate using a detailed three-dimensional energy budget: An application to Africa. *J. Geophys. Res.*, **109**.
42. Martin, D. W., C. C. Collimore, and M. H. Hitchman, 2004, El Nino and La Nino in highly reflective cloud. *J. Climate*, **18**.
43. Harvey, V. L., R. B. Pierce, M. H. Hitchman, C. E. Randall, and T. D. Fairlie, 2004: On the distribution of ozone in stratospheric anticyclones. *J. Geophys. Res.*, **109**, D24308.
44. Buker, M. L., M. H. Hitchman, et al., 2005, Resolution dependence of cross-tropopause ozone transport over East Asia. *J. Geophys. Res.*, **110**, D03107.
45. Wang, P.-H., J. Fishman, L. Harvey, and M. Hitchman, 2006, Southern tropical zonal ozone wave-1 and the Hadley circulation from SAGEII observations (1985-2002). *J. Geophys. Res.*, **111**, D08305.

46. Hitchman, M. H., and A. S. Huesmann, 2007: A seasonal climatology of Rossby wave breaking in the layer 330-2000 K. *J. Atmos. Sci.*, **64**, 1922-1940.
47. Hitchman, M. H., and A. S. Huesmann, 2009: Effect of the Quasibiennial Oscillation on Rossby Wave breaking in the stratosphere and tropopause layer, *J. Atmos. Sci.*, **66**, 935-946.
48. Büker, M. L., M. H. Hitchman, G. J. Tripoli, R. B. Pierce, E. V. Browell, and J. A. Al-Saadi, 2008: Long-range convective ozone transport during INTEX. *J. Geophys. Res.*, **113**, D14S90, doi:10.1029/2007JD009345.
49. Tuck, A. F., D. J. Donaldson, M. H. Hitchman, E. C. Richard, H. Tervahattu, V. Vaida, and J. C. Wilson, 2008: On geoengineering with sulphate aerosols in the tropical upper troposphere and lower stratosphere, *Climatic Change*, **90(3)**, 315-331.
50. Harvey, V. L., C. E. Randall, and M. H. Hitchman, 2009: Breakdown of potential vorticitybased equivalent latitude as a vortex-centered coordinate in the polar winter mesosphere, *J. Geophys. Res.*, **114**, D22105, doi:10.1029/2009JD012681.
51. Hitchman, M. H., and M. J. Rogal, 2009: Influence of tropical convection on the Southern Hemisphere ozone maximum during the winter to spring transition, *J. Geophys. Res.*, **114**, doi:10.1029/2009JD012883.
52. Hitchman, M. H., and M. J. Rogal (2010), ENSO influences on Southern Hemisphere column ozone during the winter to spring transition, J. Geophys. Res., 115, D20104, doi:10.1029/2009JD012844.
53. Rogal, M., M. H. Hitchman, M. L. Buker, G. J. Tripoli, I. Stajner, and H. Hayashi (2010), Modeling the effects of Southeast Asian monsoon outflow on subtropical anticyclones and midlatitude ozone over the Southern Indian Ocean, J. Geophys. Res., 115, D20101, doi:10.1029/2009JD012979.
54. France, J. A., V. L. Harvey, C. E. Randall, M. H. Hitchman, and M. J. Schwartz (2012), A climatology of stratopause temperature and height in the polar vortex and anticyclones, *J. Geophys. Res.*, **117**, D06116, doi:10.1029/2011JD016893.
55. Rowe, S. M., and M. H. Hitchman, 2014: On the role of inertial instability in stratosphere troposphere exchange near midlatitude cyclones, *J. Atmos. Sci., in press.*
56. Welhouse, L. J., M. A. Lazzara, L. M. Keller, G. J. Tripoli, and M. H. Hitchman, 2015: Composite Analysis of the effects of ENSO events on Antarctica. *Submitted to J. Clim.*

Selected service activities

AOS Department Chair, August 1997 - 2000.

Graduate School Research Committee Member, 2004 - 2007.

Physical Sciences Divisional Committee Member, 2007-2010, 2015.

Served on Advisory Council for Space Science and Engineering Center, Climate People and Environment Program, and Board of Directors for Cooperative Institute for Meteorological Satellite Studies. Affiliate of the Nelson Institute, Member of Program Committee for Air Resources Management certificate program.

UCAR Members Representative for UW-Madison; served on UCAR Nominating, University Relations, and Membership Committees.

Member, Science Team for SAGE II, UARS, STRAT, POLARIS, SOLVE, TRACE-P, INTEX, and Aura.

Review ∼20 journal articles and proposals each year.

Grants Principal Investigator on more than $5 million in federal grants while at the University of Wisconsin - Madison.