Curriculum Vitae
Matthew H. Hitchman

Research interests: Dynamics and transport in the upper troposphere / lower stratosphere, climatological analysis of global data sets, volcanic aerosol, ozone layer, regional analysis of in situ data, inertial instability, mesoscale convection

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

Professional Experience:

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, Atmospheric and Oceanic Sciences
1996-present	Professor of Atmospheric and Oceanic Sciences, U.W.-Madison
Spring 2006	Sabbatical, University of Reading, United Kingdom
Spring 2019	Sabbatical, Kyoto University, Japan

Professional Societies:

American Meteorological Society, American Geophysical Union, Phi Beta Kappa

Awards:

Excellence in reviewing, AGU 1999, 2006
UW – Madison Vilas Associates Award 2003-2005
Spring 2016 - AOS Graduate Student Award for Excellence in Teaching

Current Courses Offered:

AOS 171, Global Change: Atmospheric Issues and Problems
AOS 405, Senior Capstone Seminar
AOS 610, Geophysical Fluid Dynamics I
AOS 611, Geophysical Fluid Dynamics II
AOS 705, The Middle Atmosphere
AOS 712, The General Circulation

Graduate Students Advised:

Ph.D.: 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

M.S.: 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; Elliot Shiben 2017; Nathaniel Loeb 2017; Taylor Wilmot 2019

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. Young, 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 perturbations: 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 1980s: 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. Martin, D. W., C. C. Collimore, and M. H. Hitchman, 2003: El Nino and La Nino in highly reflective cloud. *J. Climate*, **16**, 2252-2568.
41. 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.
42. 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**, 2156-2202.
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. Buker, 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.

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.
51. Hitchman, M. H., and M. J. Rogal, 2009: Influence of tropical convection on the South- ern Hemisphere ozone maximum during the winter to spring transition, *J. Geophys. Res.*, **114**.
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.
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.
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
55. Rowe, S. M., and M. H. Hitchman, 2015: On the role of inertial instability in stratosphere troposphere exchange near midlatitude cyclones. *J. Atmos. Sci.*, **72**, 2131- 2151.
56. Welhouse, L. J., M. A. Lazzara, L. M. Keller, G. J. Tripoli, and M. H. Hitchman, 2016: Composite Analysis of the effects of ENSO events on Antarctica. *J. Clim.*, **29**, 1797-1808.
57. Rowe, S. M., and M. H. Hitchman, 2016: On the relationship between inertial instability, poleward momentum surges, and jet intensifications near midlatitude cyclones. *J. Atmos. Sci.*, **73**, 2299-2315.
58. Hitchman, M. H., and S. M. Rowe, 2017: On the similarity of upper tropospheric potential vorticity dipoles in tropical and midlatitude deep convection. *J. Atmos. Sci.*, **74**, 2593-2613.
59. Hitchman, M. H., and S. M. Rowe, 2019: On the 3D structure and formation of UTLS jetlets associated with potential vorticity dipoles in tropical cyclones. *Mon. Wea. Rev.,* **147**, 4107-4125.
60. Dzambo, A. M., M. H. Hitchman, K.-W. Chang, 2019: The influence of gravity waves on the tropical tropopause layer over Darwin, Australia. *Atmosphere*, **10**, 778.
61. Lu, H., M. H. Hitchman, L. J. Gray, J. Anstey, and S. M. Osprey, 2020: On the role of Rossby wave breaking in the quasi-biennial modulation of the stratospheric polar vortex during boreal winter. *Quart. J. Royal Meteorol. Soc.,* **146**, 1939-1959.
62. Rowe, S. M., and M. H. Hitchman, 2020: The destruction of a stratospheric potential vorticity intrusion due to inertial instability in the UTLS as it relates to the 20 August 2018 Southern Wisconsin extreme flooding event. *Mon. Wea. Rev.,* **148**, 4397–4414.
63. Hitchman, M. H., and S. M. Rowe, 2020: Reply to Comment on "On the structure and formation of UTLS PV dipole/jetlets in tropical cyclones by convective momentum transport". *Mon. Wea. Rev.,* **148**, 4697.
64. Hitchman, M. H., S. Yoden, P. H. Haynes, S. Tegtmeier, and V. Dabas, 2021: An observational history of the direct influence of the stratospheric quasi-biennial oscillation on the tropical and subtropical upper troposphere and lower stratosphere. *J. Meteorol. Soc. Jpn.,* **99(2)**, 239-267.

65. Haynes, P., P. Hitchcock, M. Hitchman, S. Yoden, H. Hendon, G. Kiladis, K. Kodera, and I. Simpson, 2021: The influence of the stratosphere on the tropical troposphere. *J. Meteor. Soc. Japan*, **99(4),** 803-845.
66. Hitchman, M. H., and S. M. Rowe, 2021: On the formation of tropopause folds and constituent gradient enhancement near westerly jets. *J. Atmos. Sci.,* **78**, 2057-2074.

Selected service activities:

AOS Department Chair, August 1997 - 2000
Graduate School Research Committee, 2004 - 2007
Physical Sciences Divisional Committee, 2007-2010, 2015
UW - Madison Faculty Senate
UCAR Member Representative for UW-Madison 1995-2021
Science Team: SAGE II, UARS, STRAT, POLARIS, SOLVE, TRACE-P, INTEX, Aura
Steering Committee, Stratospheric and Tropospheric Influences on Tropical Convective Systems (SATIO-TCS), a Stratospheric Processes and their Role in Climate (SPARC) initiative
Review 15-20 journal articles and proposals per year