

Curriculum vitae

Peter Hess
Biological and Environmental Engineering
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Educational Information

- 1988 University of Washington, Ph.D., Department of Atmospheric Sciences, Thesis title: "The Evolution and Variance of Nitrous Oxide in a General Circulation Model."
- 1983 University of Washington, M.S., Department of Atmospheric Sciences, Thesis title: "A Numerical Study of Parameterized Semi-Lagrangian Two Dimensional Stratospheric Tracer Transport and the Related Eulerian Transport."
- 1979 Cornell University, B.A., Physics.

Work History

- 2007-2008 Associate Professor (without tenure), Biological and Environmental Engineering, Cornell University, Ithaca New York
- 2005-2007 Section Head, Global Tropospheric Modeling, Atmospheric Chemistry Division, National Center for Atmospheric Research, Boulder, CO.
- 2000-present Scientist III, Atmospheric Chemistry Division, National Center for Atmospheric Research, Boulder, CO.
- 1993-2000 Scientist II, Atmospheric Chemistry Division, National Center for Atmospheric Research, Boulder, CO.
- 1990-1993 Scientist I, Atmospheric Chemistry Division, National Center for Atmospheric Research, Boulder, CO.
- 1988-1990 Postdoc, Advanced Study Program, National Center for Atmospheric Research, Boulder, CO.

Publications

Thesis

A Numerical Study of Parameterized Semi-Lagrangian Two Dimensional Stratospheric Tracer Transport and the Related Eulerian Transport, M.S. Thesis, 1983, University of Washington, 161 pp.

The Evolution and Variance of Nitrous Oxide in a General Circulation Model, Ph.D. Thesis, 1988, University of Washington, 163 pp.

External refereed journal articles

1. Hess, P. G., and J. R. Holton, 1985: Tracer transport by planetary waves: a comparison of explicit and parameterized models. *J. Atmos. Sci.*, **42**, 1580-1591.
2. Hess, P. G., and J. R. Holton, 1985: The origin of temporal variance in long-lived trace constituents in the summer stratosphere. *J. Atmos. Sci.*, **42**, 1455-1463.
3. Hess, P. G., 1990: Variance in trace constituents following the final stratospheric warming. *J. Geophys. Res.*, **95**, 13765-13779.
4. Hess, P. G., 1991: Mixing processes following the final stratospheric warming. *J. Atmos. Sci.*, **48**, 1625-1641.
5. Battisti, D., and P. G. Hess, 1991: The effect of parameterizing convection on the steady large-scale tropical circulation of an aqua planet. *Fisica de la Tierra*, **3**, 43-64, Ed. Univ. Compl. Madrid.
6. Hess, P. G., D. Battisti, and P. Rasch, 1993: The maintenance of the intertropical convergence zones on a water covered planet. *J. Atmos. Sci.*, **50**, 691-713.
7. Hess, P. G., H. Hendon, and D. Battisti, 1993: The relationship between mixed Rossby-gravity waves and convection in a general circulation model. *J. Meteor. Soc. Japan*, **71**, 321-338.
8. Lamarque, J.-F., and P. G. Hess, 1994: Cross-tropopause mass exchange and potential vorticity budget in a simulated tropopause folding. *J. Atmos. Sci.*, **51**, 2246-2269.
9. Hess, P. G., and D. O'Sullivan, 1995: A modeling study of the quasibiennial oscillation in ozone. *J. Atmos. Sci.*, **52**, 1539-1554.
10. Hess, P. G., N. Srimani, and Siri J. Flocke, 1996: Trajectories and related variations in the chemical composition of air for the Mauna Loa Observatory during 1991 and 1992. *J. Geophys. Res.*, **101**, 14543-14568.
11. Lamarque, J.-F., G. Brasseur, and P. G. Hess, 1996: Three-dimensional study of the relative contributions of the different nitrogen sources in the troposphere. *J. Geophys. Res.*, **101**, 22995-22968.
12. Hauglustaine, D. A., R. A. Ridley, S. Solomon, P. G. Hess, and S. Madronich, 1996: HNO₃/NO_x ratio in the remote troposphere during MLOPEX 2: evidence for nitric acid reduction on carbonaceous aerosols. *Geophys. Res. Lett.*, **23**, 2609-2612.

13. Hess, P. G., and S. Madronich, 1997: Tropospheric chemical oscillations. *J. Geophys. Res.*, **102**, 15949-15965.
14. Pan, L., S. Solomon, W. Randel, J.-F. Lamarque, P. G. Hess, J. Gille, E. W. Chiou, and P. McCormick, 1997: Hemispheric asymmetries and seasonal variations of the lowermost stratospheric water vapor and ozone derived from Sage II data. *J. Geophys. Res.*, **102**, 28177-28184.
15. Tie, X., and P. G. Hess, 1997: The effects of volcanic eruption on the ozone mass mass exchange between the stratosphere and the troposphere. *J. Geophys. Res.*, **102**, 25487-25500.
16. Ridley, B. A., E. L. Atlas, J. G. Walega, G. L. Kok, T. A. Staffelbach, J. P. Greenberg, P. G. Hess, F. E. Grahek, and D. D. Montzka, 1997: Aircraft measurements during the spring intensive of MLOPEX 2: peroxides, CO, O₃, NO_y, condensation nuclei, selected hydrocarbons, halocarbons, and alkyl nitrates between 0.5 and 9 km altitude. *J. Geophys. Res.*, **102**, 18935-18961.
17. Tie, X., G. Brasseur, P. G. Hess, and M. Riese, 1999: Hemispheric asymmetry of chemical species and its effect on stratospheric ozone: emphasis on halogen loading. *Adv. Space Res.*, **24**, 28177-28184.
18. Lamarque, J.-F., P. G. Hess, and X. Tie, 1999: Three-dimensional model study of the influence of stratosphere-troposphere exchange and its distribution on tropospheric chemistry. *J. Geophys. Res.*, **104**, 26363-26372.
19. Vukićević, T., and P. G. Hess, 2000: Analysis of tropospheric transport in the Pacific basin using the adjoint technique. *J. Geophys. Res.*, **105**, 7213-7230.
20. Hess, P. G., S. Flocke, J.-F. Lamarque, M. C. Barth, and S. Madronich, 2000: Episodic modeling of the chemical structure of the troposphere as revealed during the spring MLOPEX intensive. *J. Geophys. Res.*, **105**, 26809-26839, 2000.
21. Field, R. J., P. G. Hess, L. V. Kalachev, and S. Madronich, 2001: Characterization of oscillation and a period-doubling transition to chaos reflecting dynamic instability in a simplified model of tropospheric chemistry. *J. Geophys. Res.*, **106**, 7553-7565.
22. Hess, P. G.: Model and measurement analysis of springtime transport and chemistry of the Pacific basin in association with MLOPEX, 2001. *J. Geophys. Res.*, **106**, 12,689-12,717.
23. Barth, M. C., P. G. Hess, and S. Madronich, 2002: Effect of Marine Boundary Layer Clouds on Tropospheric Chemistry as Analyzed in a Regional Chemistry Transport Model. *J. Geophys. Res.*, **107**, 4126, doi:10.1029/2001JD000468.
24. Tie, X.X., L. Emmons, L. Horowitz, G. Brasseur, B. Ridley, E. Atlas, P. G. Hess, A. Klonecki, S. Madronich, R. Talbot, J. Dibb, D. Marbouty, and J. Hennessy, 2003: Effect of Sulfate aerosol on tropospheric NO_x and Ozone Budgets: Model Simulations and TOPSE Evidence, *J. Geophys. Res.*, **108**, 10.1029/2001JD001508.

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25. Lamarque, J.F., and P. G. Hess, 2003: Model analysis of the temporal and geographical origin of the CO distribution during the TOPSE campaign. *J. Geophys. Res.*, **108**, doi:10.1029/2002JD002077.
 26. Browell et al., 2003: Ozone, aerosol, potential vorticity, and trace gas trends observed at high latitudes from February to May, 2000, *J. Geophys. Res.*, **108**, 8369, doi:10.1029/2001JD001390, 2003.
 27. Klonecki, A., P. G. Hess, L. Emmons, L. Smith and J. Orlando, 2003: Seasonal changes in the transport of pollutants into the arctic troposphere: Model Study, *J. Geophys. Res.*, **108**, 10.1029/2002JD002199.
 28. L. K. Emmons, P. G. Hess, A. Klonecki, X.X. Tie, L. Horowitz, J.-F. Lamarque, D. Kinnison, G. Brasseur, C. Cantrell, B. Gandrud, B. Ridley, R. Shetter, E. Browell, J. Merrill and J. Hennessy, 2003: The budget of tropospheric ozone during TOPSE, *J. Geophys. Res.*, **108**,8372, doi:10.1029/2002JD002665.
 29. Hess, P. G. and T. Vukicevic, 2003: Intercontinental transport, chemical transformations and baroclinic systems, *J. Geophys. Res.*, **108**, doi:10.1029/2002JD002798.
 30. Lamarque, J.-F., and P. G. Hess, 2004, Arctic Oscillation modulation of the Northern Hemisphere spring tropospheric ozone, *Geophys. Res. Lett.*, doi:10.1029/2003GL019116, 31, 2004.
 31. Zhang, R., W. Lei, X. X. Tie, and P. G. Hess, 2004, Chemical characterization of Ozone Formation in the Houston-Galveston Area: A Chemical Transport Model Study, *J. Geophys. Res.*, 109,doi:10.1029/2003JD004219.
 32. Zhang, R. W. Lei, X. Tie, P. Hess, 2004, Industrial emissions cause extreme diurnal urban ozone variability, *Proc. Natl. Acad. Sci. USA*, 101, 6346-6350, 2004.
 33. Yudin, V. A., G. Petron, J.F. Lamarque, B. B. Khatatov, P. G. Hess, L. V. Lyjak, J. C. Gille, D. P. Edwards, M. N. Deeter and L. K. Emmons, Assimilation of the 2000-2001 CO MOPITT retrievals with optimized surface emissions, 2004, *Geophys. Res. Lett.*, 31, doi:10.1029/2004GL021037.
 34. Parrish, D. D., E. J. Dunlea, E. L. Atlas, S. Schauffler, S. Donnelly, V. Stroud, A. H. Goldstein, D. B. Millet, M. McKay, D. A. Jaffe, H. U. Price, P. G. Hess, F. Flocke, J.M. Roberst, 2005, Decadal trends in the photochemical environment of the temperate North Pacific in Spring, *J. Geophys. Res.*, doi:10.1029/2004JD004978.
 35. Lamarque, J.-F., P. G. Hess, L. Emmons, L. Buja, W. Washington and C. Granier, 2005, Tropospheric ozone evolution between 1890 and 1990, *J. Geophys. Res.*, 110, doi:10.1029/2004JD005402.
 36. Nevison, C. D., R. F. Keeling, R. F. Weiss, B. N. Popp, X. Jin, L. W. Porter and P. G. Hess, 2005, Southern Ocean Ventilation Inferred from Seasonal Cycles of Atmospheric N₂O and O₂/N₂ at Cape Grim, Tasmania, *Tellus 57B*, 218-229, 2005.

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37. Pfister, G., P. G. Hess, L. K. Emmons, J.-F. Lamarque, C. Wiedinmyer, D. P. Edwards, G. Petron, J. C. Gille, and G. W. Sachse, 2005, Constraints on Emissions for the Alaskan Wildfires 2004 using data assimilation and inverse modeling of MOPITT CO, 2005, *Geophys. Res. Lett.*, **32**, doi:10.1029/2005GL022995.
 38. Hess, P. G., 2005: On the relative role of convective and synoptic transport of tropospheric constituents, *J. Geophys. Res.*, **110**, doi:10.1029/2004JD005456.
 39. Lamarque, J.-F., et al., 2005, Assessing future nitrogen deposition and carbon cycle feedback using a multi-model approach: Analysis of nitrogen deposition, *J. Geophys. Res.*, **110**, doi:10.1029/2005JD005825.
 40. Lamarque, J.-F., J. T. Kiehl, P. G. Hess, W. D. Collins, L. K. Emmons, P. Ginoux, C. Luo, and X. X. Tie, Coupled chemistry-climate response to changes in aerosol emissions: global impact on the hydrological cycle and the tropospheric burdens of OH, ozone and NO_x, 2005, *Geophys. Res. Letter*, doi:10.1029/2005GL024412.
 41. Murazaki, K. and P.G. Hess, 2006, How does global warming contribute to ozone change over the U.S., *J. Geophys. Res.*, **111**,doi10.1029/2005JD005873.
 42. Rasch, P. J., D. B. Coleman, N. Mahowald, D. L. Williamson, S.J. Lin, B. A. Boville, and P. G. Hess, 2006, Characteristics of atmospheric transport using three numerical formulations of atmospheric dynamics in a single GCM framework, *J. Climate*, **11**, pp 2243-2266, doi:10.1175/JCLI3763.1.
 43. Granier, C., U. Niemeier, J. H. Jungclaus, L. Emmons, P. Hess, J. Lamarque, S. Walters, and G. P. Brasseur, Ozone pollution from future ship traffic in the Arctic northern passages, 2006, *Geophys. Res. Lett.*, **33**, L13807, doi:10.1029/2006GL026180.
 44. G. G. Pfister, L. K. Emmons, P. G. Hess, R. Honrath, J.-F. Lamarque, M. Val Martin, R. C. Owen, M. A. Avery, E. V. Browell, J. S. Holloway, P. Nedelec, R. Purvis, T. B. Ryerson, G. W. Sachse, H. Schlager, Ozone production from the 2004 North American Boreal Fires, 2006, *J. Geophys. Res.*, **111**, doi:1029/2006JD007695.
 45. A. Arellano and P. Hess, Sensitivity of Top-Down Estimates of CO sources to GCTM Transport, 2006, *Geophys. Res.Lett.*, **33**, doi: 10.1029/2006GL02731, 2006.
 46. Randerson, J., H. Liu, M. G. Flanner, S. D. Chambers, Y. Jin, P. G. Hess, G. Pfister, M. C. Mack, K. K. Treseder, L. R. Welp, F. S. Chapin, J. W. Harden, M. L. Goulden, E. Lyons, J. C. Neff, E.A.G. Schuur, C. S. Zender, The Impact of Boreal Forest Fires on Climate Warming, 2006, *Science*, **314**, pp 1130-1132, doi:10.1126/science.1132075.
 47. P. Hess and J.-F. Lamarque, Ozone source attribution and its modulation by the Arctic Oscillation during the spring months, 2007, *J. Geophys. Res.*, doi:10.1029/2006JD007557, 2007.
 48. L. Horowitz, G. Milly, R. Cohen, A. Perring, P. Wooldridge, P. Hess, L. Emmons, J.-F. Lamarque, 2007, Observational constraints on the chemistry of isoprene nitrates over the eastern United States, *J. Geophys. Res.*, doi:10.1029/2006JD007747, 2007.

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49. D. Kinnison, G. Brasseur, S. Walters, R. Garcia, D. Marsh, F. Sassi, B. Boville, V. Harvey, C. Randall, L. Emmons, J.-F. Lamarque, P. Hess, J. Orlando, X.X. Tie, W. Randel, L. Pan, A. Gettleman, C. Granier, T. Diehl, U. Niemeier, A. Simmons, 2007, Sensitivity of Chemical Tracers to Meteorological Parameters in the MOZART-3 Chemical Transport Model, *J. Geophys. Res.*, doi:10.1029/2006JD007879.
 50. Mittal, M. L., P. G. Hess, S. L. Jain, B. C. Arva and C. Sharma, Surface Ozone in the Indian Region, 2007. *Atmos. Environ.*, **41**, 6572-6584.
 51. Ridley, B., T. Zeng, Y. Wang, E. L. Atlas, E. V. Browell, P. G. Hess, J. J. Orlando, K. Chance and A. Richter, 2007, An Ozone Depletion Event in the Sub-Arctic Surface Layer Over Hudson Bay, Canada, *J. Atmos Chem*, bf 57, 255-280, doi:10.1007/s10874-007-9072-z.
 52. A. F. Arellano Jr., K. Raeder, J. L. Anderson, P. G. Hess, L. K. Emmons, D. P. Edwards, G. G. Pfister, T. L. Campos, and G. W. Sachse, 2007, Evaluating model performance of an ensemble-based chemical data assimilation system during INTEX-B field mission, *Atmos. Chem. Phys.* , **7**, 5695-5710, 2007.
 53. Heald, C., D. Henze, L. W. Horowitz, J. J. Feddema, J. F. Lamarque, A. B. Guenter, P. Hess, F. M. Vitt, J. H. Seinfeld, A. H. Goldstein and I. Fung, 2008, Predicted change in global secondary organic aerosol concentrations in response to future climate, emissions and land use change. *J. Geophys. Res.*, doi:10.1029/2007JD009092, 2008.
 54. Pfister, G., L. Emmons, P. G. Hess, J. F. Lamarque, J. J. Orlando, S. Walters, A. B. Guenther, P. I. Palmer and P. Lawrence, 2008, Contribution of isoprene to chemical budgets: A model tracer study with the NCAR CTM MOZART-4, *J. Geophys. Res.*, doi:10.1029/2007JD008948, 2008.
 55. Pfister, G., P. G. Hess, L. K. Emmons, P. J. Rasch and F. M. Vitt, 2008, Impact of the Summer 2004 Alaska Fires on TOA Clear-Sky Radiation Fluxes, *J. Geophys. Res.*, accepted.
 56. Lamarque, J. F., D. Kinnison, P. G. Hess and F. M. Vitt, 2008, Simulated lower stratospheric trends between 1970 and 2005: identifying the role of climate and composition changes, *J. Geophys. Res.*, accepted.

Other external refereed publications

57. Hess, P., Contributing Author, Hemispheric Transport of Air Pollutants, An Interim Report of the Task Force on Hemispheric Transport of Air Pollutants of the Convention on Long-range Transboundary Air Pollution, 2007.
58. Madronich, S., and P. G. Hess, 1994: The oxidizing capacity of the troposphere and its changes. In: *Proceedings of the Sixth European Symposium, Varese, 18- 22 October 1993, Vol. 1, Physico-chemical behavior of atmospheric pollutants*, G. Angeletti and G. Restelli, Eds., Luxembourg, pp 5-13.
59. Garcia, R., P. G. Hess, and A. Smith, 1999: Atmospheric dynamics and transport. In: *Atmospheric Chemistry and Global Change*, G. Brasseur, J. Orlando, and J. Tyndall, Eds., Oxford University Press, New York, Oxford.
60. Lamarque, J.-F. and P.G. Hess, Stratosphere-Troposphere exchange/Local Processes, in *Encyclopaedia of Atmospheric Sciences*, Ed. J. Holton, Academic Press, 2002.

Invited Talks

1. Hess, P. G., Summary of Ph.D. research, NASA Langley, VA, 1988.
2. Hess, P. G., Summary of Ph.D. research, CGD seminar, NCAR, Boulder CO, 1988.
3. Hess, P. G., Transport and distribution of chemical constituents in the middle atmosphere. Electrodynamics and Composition of the Mesosphere, Step Working Group 4, Nizhny Novgorod, Russia, March, 1992.
4. Hess, P. G., S. Flocke, J.-F. Lamarque, M. C. Barth, and S. Madronich, Description and results from a regional transport chemistry model. Missoula, MO, May, 1997.
5. Hess, P. G., Transport and chemistry in the Pacific basin: observations and modeling. Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, September, 1999.
6. "Transport and its Relation to Chemical Composition in the Remote Troposphere", University of California at Santa Barbara, May 5, 2000.
7. "Transport and Chemistry in the Remote Troposphere, The Subtropics and the Arctic: A model and Measurement Analysis", NOAA Aeronomy Laboratory, Boulder, Co., March 15, 2000.
8. "Pollution in the Remote Troposphere: Chemical and Transport Considerations", Texas A&M, May 2002.
9. "The Springtime Transition in Tropospheric Chemistry: The TOPSE Campaign and Beyond", Harvard, November 2002.
10. "Meeting Summary", Climate-Chemistry Meeting, Santa-Fe New Mexico, February, 2003.
11. "Use of Chemical Transport Models", INSTAAR, University of Colorado, Boulder, October, 2003. Hess, P. G.

12. "Use of Chemical Transport Models", INSTAAR, University of Colorado, Boulder, October, 2003. Hess, P. G.
13. "The interplay between tropospheric chemistry transport and chemistry: concepts and applications. NOAA ESRL/CSD seminar, Boulder, Colorado, April 14, 2006,
14. "U.S. Air Quality, Intercontinental Transport and Global Change", Cornell University, Ithaca New York, May 18, 2006.
15. "Climate-Chemistry Interactions", Cornell University, Ithaca New York, May 19, 2006.
16. "Atmospheric Chemistry-Climate Interactions" at the Art of Climate Modeling, ASP Summer Colloquia, June 13, 2006.
17. "Atmospheric Chemistry in a Changing World", Lamont Doherty Observatory and Department of Earth and Environmental Sciences at Columbia University, October 20, 2006.
18. "Chemical Data Assimilation and Forecasts for the INTEX-B Field Campaign", American Geophysical Union, Fall Meeting, San Francisco, December 15, 2006.
19. "Intercontinental Transport in a Changing Climate", HTAP Model Intercomparison Workshop, WMO Geneva Switzerland, January 27, 2007.

Community Service and Leadership

Workshops

- 1999 GTP workshop "Mixing and Reactive Turbulence." (Organization Committee)
- 2000 ACD/MMM workshop "Modeling Chemistry in Cloud and Mesoscale Models" (Organization Committee)
- 2000 NCAR chemical-WRF model workshop (Organizer).
- 2003 NCAR emission workshop (Organization Committee)
- 2003 MOZART meeting (Organizer)
- 2004 Information Technology Research meeting (Organizer)
- 2005 MOZART meeting (Organizer)

Other

- Co-Lead of the AC&C Atmospheric Chemistry and Climate, A joint initiative of IGBP-IGAC and WCRP-SPARC
- Co-Chair of CCSM Chemistry-Climate working group
- Co-Chair of WRF-chem working group
- Member of ITCT 2K4 science team
- Member of ITCT 2K2 science team
- Frequent reviewer of proposals and journal articles, including: *Journal of Atmospheric Sciences*, *Journal of Geophysical Research*, *Monthly Weather Review*, *Geophysical Research Letters*, *Annales Geophysicae*, *Global Biogeochemical Cycles*, *Journal of the Meteorological Society of Japan*.

Education and Outreach Activities

Significant Opportunities in Atmospheric Research and Science (SOARS) and Summer Employment Program (SEP) Proteges

- 1993 Doroteo Garcia (Advisor: SEP program)
- 1997 Rachel Vincent (Advisor: SOARS program)
- 1998 Zobeida Ocasio (Advisor: SOARS program)
- 1999 Zobeida Ocasio (Advisor: SOARS program)

Graduate Student Supervision and Mentoring

- 1990-1993 Jean-François Lamarque (Thesis advisor and committee member)
- 1999 W. Lei

Classes

- An Introduction to Atmospheric Chemistry
- Biofuels, The Environmental and Economic Consequences

Postdoc Supervision and Mentoring

- 1993-1997 J.-F. Lamarque (Primary Mentor)
- 1999-2001 A. Klonecki (Primary Mentor)
- 1999 A. Gettelman (ASP advisory committee member)
- 2002 M. Potosnak (ASP advisory committee member)
- 2002-2003 K. Murazaki (Primary Mentor)
- 2003-2005 G. Petron (Primary Mentor)
- 2005-2007 A. Avellano (Primary Mentor)
- 2005-2007 G. Pfister

Research Grants

Stratospheric Tropospheric Exchange, funding agency NASA, P.I.: G. Brasseur; co-P.I.s: P. Hess, S. Madronich and J.-F. Lamarque, \$328 K, 1994-1997.

ITR/AP&IM Development of a Generic Computational Framework for the Optimal Integration of Atmospheric Chemical Transport Models and Measurements Using Adjoints, P.I.: G. Carmichael; CO-P.I.s: P. Hess, J. Seinfeld, A. Sandu, T. Anderson, D. Daescu, 2.3M, 2002-2007.

Closing the Carbon Monoxide Budget: Variability in CO Emissions, P.I.: Louisa Emmons; CO-P.I.s: P. Hess, G. Petron, D. Edwards, J. Gille, W.M. Hao, 498K 2004-2006.(NASA)

NSF SGER Proposal, Evaluation of CCSM Constituent Transport Variability, P.I.: B. Sanso; Collaborators: D. Nychka, P. Hess and N. Mahowald, 25K, 2004-2005. (NSF)

TERRA/MOPITT Measurements of Tropospheric Carbon Monoxide in Support of Intex-NA, PI: D. Edwards, CO-P.I.s: Emmons, Hess, Nychka, Gille, 760K, 2004. (NASA)

Determining Fire Emissions from Satellite Observations and Global Modeling, PI Emmons, Co-P.I.s, Hess, Lamarque, Holland, Edwards, Randerson, 50.5K, 2005 (NCAR, biocomplexity)

Impacts of Atmospheric Chemistry on the biosphere: feedbacks on water and carbon cycles, PI, Hess, Co-P.I.s, Emmons, Holland, Lamarque, Rasch, Thornton, 50.5K, 2005 (NCAR, biocomplexity).

Connections between Regional Processes and Intercontinental Transport of Air Pollution, PI: T. Holloway (U. Wisconsin), Co-P.I.s, Emmons, Hess, 592K, 2006.(NASA)

Air Quality Measurements from Space: Defining an Optimum Observing Strategy, PI: D. Edwards, CO-P.I.s, Emmons, Hess, Martin, 747K, 2006.(NASA)

Fire at the intersection of Global Carbon and Water Cycles, P.I. Randerson, Mahowald, Foley, co-P.I.s, Hess, Bonan, Fedema, Thornton, 1500K, 2006. (NSF)

High-latitude climate feedbacks in CCSM3: Initiators of abrupt climate change?, Lawrence, Hess, Holland, Mahowald, Schimel, Thornton, 200K, 2006. (NCAR).

Chemical Forecasting and Analysis for ARCTAS using MOPITT measurements and the Community Atmosphere Model with Chemistry (CAM-Chem) P.I. L. Emmons, Co-I, D. Edwards, G. Pfister, A. Arellano, M. Deeter, D. Masters, J.-F. Lamarque, C. Wiedinmyer, M. Flanner and P. Hess, 500 K (NASA).