

Rebecca E. Morss

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EDUCATION

- Feb 1999 Ph.D., Atmospheric Science, Massachusetts Institute of Technology
- Jun 1993 B.A. with General and Departmental Honors, Chemistry, The University of Chicago
- 1992-2000 Graduate level coursework in public policy and social sciences at Harvard University, Massachusetts Institute of Technology, University of Chicago, and University of Colorado at Boulder

PROFESSIONAL EXPERIENCE

- 2009–present Scientist III
- 2005–2009 Scientist II
- 2002–2005 Scientist I
Mesoscale and Microscale Meteorology Division & Integrated Science Program
(formerly Institute for the Study of Society and Environment, Environmental and Societal Impacts Group); National Center for Atmospheric Research; Boulder, CO
- 2000 – 2001 Post-doctoral Fellow
Advanced Study Program; NCAR; Boulder, CO
- Jan–Feb 2000 Post-doctoral Associate
Joint Institute for the Study of Atmospheres and Oceans; University of Washington; Seattle, WA
- 1999 Post-doctoral Associate
- 1994–1998 Graduate Research Assistant
Program in Atmospheres, Oceans, and Climate; Massachusetts Institute of Technology; Cambridge, MA
- 1994 Research Intern
Science, Space, and Technology Committee; U.S. House of Representatives; Washington, DC

COMMUNITY SERVICE, LEADERSHIP, and EDUCATION ACTIVITIES

Service and Leadership – External

- 2009–2013 NOAA Science Advisory Board Environmental Information Services Working Group
- 2009–2012 American Meteorological Society Council (elected by a vote of the membership)
- 2009–2010 National Research Council Committee on Progress and Priorities of U.S. Weather Research and Research-to-Operations Activities
- 2007–2010 American Meteorological Society Ad Hoc Committee on Uncertainty in Forecasting
- 2008 Application review committee, Weather and Society * Integrated Studies Workshop
- 2006–2008 American Meteorological Society Annual Partnership Topic Committee on Feasibility of Multi-Partner, Multifunctional Mesoscale Observing Networks

2005–2009 American Meteorological Society Board on Enterprise Communication
 2005–2006 National Research Council Committee on Estimating and Communicating Uncertainty
 in Weather and Climate Forecasts
 2003–2006 Representative on Societal and Economic Impacts/Applications, North American
 THORPEX Committee
 2003–2005 NOAA THORPEX Science and Implementation Team
 2002–2005 THORPEX International Science Steering Committee
 2002–2005 Co-chair, International Societal and Economic Applications Subprogram, THORPEX:
 A Global Atmospheric Research Programme
 2000–2007 Contributing author for International THORPEX Science Plan, International
 THORPEX Implementation Plan, North American THORPEX Science Plan, U.S.
 THORPEX Science Plan, NOAA THORPEX Plan

Service and Leadership – Internal NCAR/UCAR

2009 NCAR Integrated Science Program Director Search Committee
 2008–2009 NCAR Workforce Management Plan Subcommittee on Professional Development /
 Work Environment
 2008–2009 Coordinator, NCAR ISSE seminar series on risk communication and uncertainty in
 decision making
 2008 Chair, NCAR ISSE Outstanding Accomplishment Award nomination committee
 2008 NCAR ISSE Strategic Plan Committee
 2008 NCAR Earth System Modeling Working Group on scientific research topics
 2006–2009 Co-organizer, NCAR MMM Dynamics Happy Hour
 2006–2007 NCAR ISSE Scientist II/III Search Committee
 2005–2007 Steering Committee, NCAR / Inter-American Institute Program
 2005 NCAR Scientist / Research Engineer I Search Committee
 2004–2005 NCAR ISSE Scientific Steering Committee
 2004 External Advisory Committee, NCAR Atmospheric Technology Division
 2003–2007 UCAR library book selection committee
 2003–2005 Internal Advisory Board, NCAR Initiative on Weather and Climate Impact
 Assessment Science
 2003–2004 Coordinated development of ISSE Charter, for input to NCAR reorganization
 2003–2004 Initiated and co-developed UCAR Outstanding Accomplishment Mentoring Award
 2002–2004 Co-developed NCAR/NOAA/USWRP Collaborative Program on the Societal Impacts
 and Economic Benefits of Weather Information
 2001–2003 UCAR Distinguished Achievement and Outstanding Accomplishments Awards Jury

Workshop / Conference / Symposium Organization

2009 Organizing Committee, National Research Council summer study workshop on
 Progress and Priorities of U.S. Weather Research and Research-to-Operations
 Activities
 2007–2008 Co-organizer, Symposium on Linkages among Societal Benefits, Prediction Systems,
 and Process Studies for 1–14-day Weather Forecasts, 2008 American
 Meteorological Society annual meeting
 2006 Co-convenor, fall 2006 American Geophysical Union meeting sessions on Creating
 Usable Science in the 21st Century: Strategies for More Effectively Connecting
 Science to Societal Needs
 2006 Co-organizer, Workshop on North American THORPEX Societal and Economic
 Research and Applications

- 2006 Co-chair, UCAR/NCAR Junior Faculty Forum on Future Scientific Directions: The Science of Communicating Uncertainty in Weather and Climate
- 2005–2006 Co-organizer of Disaster Simulation and Mitigation session and Organizing Committee, National Academies of Engineering First Indo-U.S. Frontiers of Engineering Symposium
- 2005–2006 Organizer, Academic session, Symposium on the Public/Private Sector Partnership, 2006 American Meteorological Society annual meeting
- 2005–2006 Organizing Committee, NCAR/Inter-American Institute Colloquium on Policy Planning and Decision Making Involving Climate Change and Variability
- 2005 Organizing Committee, THORPEX Workshop on a Pacific Predictability Campaign

Education, Outreach, and Teaching

- 2008–present Faculty Affiliate, Department of Environmental Studies, University of Colorado at Boulder
- Jun 2009 Multiple media interviews on the U.S. public’s use and value of weather forecasts, including interview on The Weather Channel
- Sep 2008 Guest Lecturer on Communicating Uncertainty, “Global Climate Change,” Colorado College
- Sep 2008 Multiple media interviews on Hurricane Ike evacuation and impacts
- 2007–present Scientific advisor, UCAR Education & Outreach development of NCAR Mesa Laboratory exhibit on scientific uncertainty
- 2007 Author of “Severe Weather” (p. 69-74) in *Heads Up! Early Warning Systems for Climate, Water, and Weather*, M. H. Glantz, Ed., Tsinghua University Press.
- Jan-May 2006 Co-developer and Guest Instructor, “Direct Studies for Undergraduate Research: Uncertainties and Societal Impacts of Hurricane Rita's Forecast,” Texas A&M University
- 2005–present Guest Lecturer, Weather and Society * Integrated Studies Workshops
- 2004, 2005 Science Co-Mentor, UCAR Significant Opportunities in Atmospheric Research and Science Program
- Aug 2003 Guest on Denver radio KNRC 1150AM, Topic: Extreme weather and climate events
- Jan 2002 Speaker and panel member, First American Meteorological Society Student Conference
- Oct 2001 Guest Lecturer on Numerical Weather Prediction and Predictability, “The Earth Climate System,” University of Colorado at Boulder
- Jul 2001 Moderator, U.S. Congressional Briefing: “Hurricanes: The Danger, The Impacts, The Outlook”
- 1992–1993 Teaching Assistant, University of Chicago Department of Mathematics

Supervisory and Mentoring Experience

- 2006–present Julie Demuth, NCAR Associate Scientist II/III
- 2004–2006 Asim Zia, NCAR Post-graduate Researcher
- 2004–2006 Liam Cavanaugh, NCAR Student Assistant (undergraduate student at University of Colorado – Boulder)
- 2005 Science Co-Mentor, Braxton Edwards, UCAR SOARS protégé
- 2004 Science Co-Mentor, Clarence Mann, UCAR SOARS protégé
- 2003 Maxine Cram Vasil, NCAR Student Assistant (graduate student at University of Colorado – Boulder)
- 2002 Joel Murray, NCAR Student Assistant (co-supervisor)

Editorial Boards and Professional Reviews

2007–present	Editorial Board (Subject Matter Expert on Societal and Economic Impacts), <i>Bulletin of the American Meteorological Society</i>
2007–present	Associate Editor, <i>Journal of Hydrology</i>
ongoing	Journal article reviews for <i>Atmosphere-Ocean</i> , <i>Atmospheric Environment</i> , <i>Atmospheric Science Letters</i> , <i>Bulletin of the American Meteorological Society</i> , <i>Climatic Change</i> , <i>Environmental Research Letters</i> , <i>EOS</i> , <i>Geoforum</i> , <i>Journal of Applied Meteorology</i> , <i>Journal of the Atmospheric Sciences</i> , <i>Journal of Climate</i> , <i>Monthly Weather Review</i> , <i>Natural Hazards</i> , <i>Quarterly Journal of the Royal Meteorological Society</i> , <i>Water Resources Management</i> , <i>Weather and Forecasting</i>
ongoing	Funding and fellowship proposal reviews for NSF, NOAA, U.K. National Environment Research Council, NCAR

INVITED MAJOR PRESENTATIONS

Mar 2009	Lamont-Doherty Earth Observatory; Palisades, NY
Mar 2009	Columbia University Center for Research on Environmental Decisions; New York, NY
Feb 2009	University of Wisconsin Climate, People, and the Environment Program; Madison, WI
Oct 2009	Policy Sciences Annual Institute; Boulder, CO
Sep 2008	University of Utah; Salt Lake City, UT
Apr 2008	NOAA Earth System Research Laboratory; Boulder, CO
Apr 2008	Workshop for the Creation of a National Capability for Conducting OSEs/OSSEs for the Ocean; Miami, FL
Apr 2008	University of Colorado Center for Science and Technology Policy Research; Boulder, CO
Feb 2008	National Weather Service Eastern Region MIC/HIC Meeting; Charlotte, NC
Dec 2007	NCAR Advanced Study Program; Boulder, CO
Jan 2007	Special Joint Session on Communicating Uncertainty, American Meteorological Society Annual Meeting; San Antonio, TX
Dec 2006	Public Policy Institute of California; San Francisco, CA
2005-2009	Weather and Society * Integrated Studies Workshops; Boulder, CO and Norman, OK
Apr 2005	National Science Foundation; Arlington, VA
Feb 2005	Cooperative Institute for Research in the Atmosphere; Fort Collins, CO
Nov 2004	Purdue University; West Lafayette, IN
Oct 2004	Santa Fe Institute; Santa Fe, NM
Aug 2004	USWRP Open Workshop on the Implementation of THORPEX; Boulder, CO
Oct 2003	Texas A&M University; College Station, TX
Sep 2003	Columbia University; New York, NY
Aug 2003	North American THORPEX Workshop; College Park, MD
Dec 2002	THORPEX International Science Plan Workshop; Monterey, CA
Oct 2002	Mesoscale Alpine Program Societal Impact Workshop; Bad Tölz, Germany
Apr 2001	National Center for Atmospheric Research; Boulder, CO
Nov 1999	University of Washington; Seattle, WA
May 1999	University of Oklahoma; Norman, OK
Mar 1999	University of Wisconsin; Madison, WI
Jan 1999	National Centers for Environmental Prediction; Camp Springs, MD
Nov 1998	Naval Research Laboratory; Monterey, CA

ongoing over 50 oral presentations at U.S. and international conferences and workshops (list available on request)

FUNDED RESEARCH GRANTS

- 2008–2010 “Collaborative Research: Examining the Hurricane Warning System: Content, Channels, and Comprehension.” PI (Co-PIs: H. D. O’Hair, B. Morrow, J. Demuth, J. Lazo, M. Jensen, C. Miller); funded by NOAA, NSF Infrastructure Management and Extreme Events program, and NSF Decision, Risk, and Management Sciences Program. [\$400,000]
- 2008–2011 “DRU – Collaborative Research: Warning Decisions in Extreme Weather Events: An Integrated Multi-Method Approach.” Co-PI (PI: J. Lazo; Co-PIs: A. Bostrom, K. Tierney); funded by NSF Human and Social Dynamics Program. [\$750,000]
- 2005–2006 “Towards a Focused NCAR-THORPEX Program.” Co-I (PI: D. Parsons); funded by NCAR Opportunity Fund. [\$75,700]
- 2004– “Collaborative Program on the Societal Impacts and Economic Benefits of Weather Information.” Co-PI (with W. Mahoney, B. Foote, R. Harriss, and others); funded by U.S. Weather Research Program / NOAA / NSF. Program ongoing under leadership of J. Lazo. [\$400,000+ annually]
- 2003–2005 “Superstorm 1993: A Case-Scenario Approach for Integrating Meteorological and Societal Research.” Co-PI (with M. Glantz, J. Tribbia); funded by NCAR Opportunity Fund and NSF. [\$150,000]
- 2001–2003 “Development of Diagnostic Approaches for Verifying Quantitative Precipitation Forecasts.” Co-I (PI: B. Brown); funded by U.S. Weather Research Program.

HONORS and AWARDS

- 2008 Nominated for UCAR Outstanding Publication Award (for Morss et al., *BAMS*, 2005)
- 2006, 2007 Nominated for UCAR Education and Outreach Outstanding Accomplishment Award (for Weather and Society * Integrated Studies Workshops)
- 2006 SERE Laboratory Significant Accomplishment Award (for NCAR / Inter-American Institute Colloquium)
- 2005 Selected participant, NCAR/UCAR Leadership Academy
- 2001 Selected participant, American Meteorological Society Summer Policy Colloquium
- 2000–2001 NCAR Advanced Study Program Post-doctoral Fellowship
- 1994–1997 MIT Program in Atmospheres, Oceans, and Climate Charney Prize
- 1994–1995 MIT Clare Boothe Luce Fellowship
- 1992–1993 University of Chicago Student Marshal
- Jun 1992 inducted to Phi Beta Kappa
- 1991–1993 Goldwater Scholarship for Excellence in Science and Mathematics Education
- 1989–1993 University of Chicago / Argonne National Laboratory full tuition scholarship

PUBLICATIONS

PhD Dissertation

“Adaptive observations: Idealized sampling strategies for improving numerical weather prediction.” Massachusetts Institute of Technology, Feb 1999. Advisor: Kerry Emanuel.

Refereed Journal Articles

- Morss, R. E., J. K. Lazo, and J. L. Demuth: Examining the use of weather forecasts in decision scenarios: Results from a U.S. survey with implications for uncertainty communication. Submitted to *Meteor. Applications*.
- Morss, R. E., and M. H. Hayden: Storm surge and “certain death”: Interviews with Texas coastal residents following Hurricane Ike. Submitted to *Weather, Climate, and Society*.
- Brunet, G., M. Shapiro, B. Hoskins, M. Moncrieff, R. Dole, G. N. Kiladis, B. Kirtman, A. Lorenc, B. Mills, R. Morss, S. Polavarapu, and D. Rogers: Toward a seamless process for the prediction of weather and climate: The advancement of sub-seasonal to seasonal prediction. *Bull. Amer. Meteor. Soc.*, submitted.
- Morss, R. E., 2009: Interactions among flood predictions, decisions, and outcomes: A synthesis of three cases. *Natural Hazards Review*, in press.
- Morss, R. E., C. Snyder, and R. Rotunno, 2009: Spectra and predictability in a quasigeostrophic model. *J. Atmos. Sci.*, **66**, 3115-3130.
- Lazo, J. K., R. E. Morss, and J. L. Demuth, 2008: 300 billion served: Sources, perceptions, uses, and values of weather forecasts. *Bull. Amer. Meteor. Soc.*, **90**, 785-798.
- Morss, R. E., J. L. Demuth, and J. K. Lazo, 2008: Communicating uncertainty in weather forecasts: A survey of the U.S. public. *Wea. Forecasting*, **23**, 974-991.
- Morss, R. E., and F. Zhang, 2008: Linking meteorological education to reality: A prototype undergraduate research study of public response to Hurricane Rita forecasts. *Bull. Amer. Meteor. Soc.*, **89**, 497-504.
- Morss, R. E., J. K. Lazo, B. G. Brown, H. E. Brooks, P. T. Ganderton, and B. N. Mills, 2008: Societal and economic research and applications for weather forecasts: Priorities for the North American THORPEX program. *Bull. Amer. Meteor. Soc.*, **89**, 335-346.
- Zhang, F., R. E. Morss, J. A. Sippel, T. K. Beckman, N. C. Clements, N. L. Hampshire, J. N. Harvey, J. M. Hernandez, Z. C. Morgan, R. M. Mosier, S. Wang, and S. D. Winkley, 2007: An in-person survey investigating public perceptions of and response to Hurricane Rita forecasts along the Texas Coast. *Wea. Forecasting*, **22**, 1177-1190.
- Morss, R. E., and E. Wahl, 2007: An ethical analysis of prediction and decision making: The case of the Red River flood of 1997. *Env. Hazards*, **7**, 342-352.
- Demuth, J. L., E. Gruntfest, R. E. Morss, S. Drobot, and J. K. Lazo, 2007: Weather and Society * Integrated Studies (WAS*IS): Building a community for integrating meteorology and social science. *Bull. Amer. Meteor. Soc.*, **88**, 1729-1737.
- Morss, R. E., and F. M. Ralph, 2007: Use of information by National Weather Service forecasters and emergency managers during CALJET and PACJET-2001. *Wea. Forecasting*, **22**, 539-555.
- Downton, M. W., R. E. Morss, O. V. Wilhelmi, E. C. Gruntfest, and M. L. Higgins, 2005: Interactions between scientific uncertainty and flood management decisions: Two case studies in Colorado. *Global Env. Change Part B: Env. Hazards*, **6**, 134-146.
- Morss, R. E., O. V. Wilhelmi, M. W. Downton, and E. Gruntfest, 2005: Flood risk, uncertainty, and scientific information for decision-making: Lessons from an interdisciplinary project. *Bull. Amer. Meteor. Soc.*, **86**, 1593-1601.
- Morss, R. E., and W. H. Hooke, 2005: The outlook for U.S. meteorological research in a commercializing world: Fair early, but clouds moving in? *Bull. Amer. Meteor. Soc.*, **86**, 921-936.

- Morss, R. E., K. A. Miller, and M. S. Vasil, 2005: A systematic economic approach to evaluating public investment in observations for weather forecasting. *Mon. Wea. Rev.*, **133**, 374–388.
- Morss, R. E., 2005: Problem definition in atmospheric science public policy: The example of observing system design for weather prediction. *Bull. Amer. Meteor. Soc.*, **86**, 181–191.
- Morss, R. E., and D. S. Battisti, 2004: Designing efficient observing networks for ENSO prediction. *J. Clim.*, **17**, 3074–3089.
- Morss, R. E., and D. S. Battisti, 2004: Evaluating observing requirements for ENSO prediction: Experiments with an intermediate coupled model. *J. Clim.*, **17**, 3057–3073.
- Kim, H. M., M. C. Morgan, and R. E. Morss, 2004: Evolution of analysis error and adjoint-based sensitivities: Implications for adaptive observations. *J. Atm. Sci.*, **61**, 795–812.
- Corazza, M., E. Kalnay, D. J. Patil, S.-C. Yang, R. Morss, M. Cai, I. Szunyogh, B. R. Hunt, and J. A. Yorke, 2003: Use of the breeding technique to estimate the structure of the analysis “errors of the day”. *Nonlin. Proc. Geophys.*, **10**, 233–243.
- Pielke, Jr., R. A., et al. (including R. Morss), 2003: The USWRP workshop on the weather research needs of the private sector. *Bull. Amer. Meteor. Soc.*, **84**, ES53–ES67.
- Morss, R. E., and K. A. Emanuel, 2002: Influence of added observations on analysis and forecast errors: Results from idealized systems. *Quart. J. Roy. Meteor. Soc.*, **128**, 285–321.
- Hamill, T. M., C. Snyder, and R. E. Morss, 2002: Analysis-error statistics of a quasi-geostrophic model using 3-dimensional variational assimilation. *Mon. Wea. Rev.*, **130**, 2777–2790.
- Morss, R. E., K. A. Emanuel, and C. Snyder, 2001: Idealized adaptive observation strategies for improving numerical weather prediction. *J. Atm. Sci.*, **58**, 210–232.
- Szunyogh, I., Z. Toth, R. E. Morss, S. Majumdar, B. Etherton, and C. H. Bishop, 2000: The effect of targeted dropsonde observations during the 1999 Winter Storm Reconnaissance Program. *Mon. Wea. Rev.*, **128**, 3520–3537.
- Hamill, T. M., C. Snyder, and R. E. Morss, 2000: A comparison of probabilistic forecasts from bred, singular-vector, and perturbed observation ensembles. *Mon. Wea. Rev.*, **128**, 1835–1851.
- Langland, R. H., Z. Toth, R. Gelaro, I. Szunyogh, M. A. Shapiro, S. Majumdar, R. E. Morss, G. D. Rohaly, C. Velden, N. Bond, and C. Bishop, 1999: The North Pacific Experiment (NORPEX-98): Targeted observations for improved North American weather forecasts. *Bull. Amer. Meteor. Soc.*, **80**, 1363–1384.
- Szunyogh, I., Z. Toth, K. A. Emanuel, C. Bishop, J. Woolen, T. Marchok, R. E. Morss, and C. Snyder, 1999: Ensemble-based targeting experiments during FASTEX: The effect of dropsonde data from the Lear jet. *Quart. J. Roy. Meteor. Soc.*, **125**, 3189–3217.
- Kash, P. W., G. C. G. Waschewsky, R. E. Morss, L. J. Butler, and M. M. Francl, 1994: Competing C-Br and C-C bond fission following $^1[n(O), \pi^*(C:O)]$ excitation in bromoacetone: Conformation dependence of nonadiabaticity at a conical intersection. *J. Chem. Phys.*, **100**, 3463–3475.

Refereed Reports and Book Chapters

- Morss, R. E., 2008: Evaluating societal benefits of a meteorological program: The CALJET and PACJET field experiments. *Weather and Society * Integrated Studies Compendium*, submitted.
- National Research Council Committee on Estimating and Communicating Uncertainty in Weather and Climate Forecasts (including R. E. Morss), 2006: *Completing the Forecast: Characterizing and*

Communicating Uncertainty for Better Decisions Using Weather and Climate Forecasts. The National Academies Press, 124 pp.

Non-refereed Articles and Book Reviews

Glantz, M. H., L. M. Cavanaugh, R. E. Morss, E. Gruntfest, and J. Tribbia, 2006: Will recent “super” storms lead to seasons of superstorms? *Bull. Amer. Meteor. Soc.*, **87**, 1173-1174.

Hacker, J., J. Hansen, J. Berner, Y. Chen, G. Eshel, G. Hakim, S. Lazarus, S. Majumdar, R. Morss, A. Poje, V. Sheremet, Y. Tang, and C. Webb, 2005: Future scientific directions: Predictability. *Bull. Amer. Meteor. Soc.*, **86**, 1733–1737.

Morss, R. E., 2005: Science fiction, science fact, and society: Meteorology in recent popular film and fiction. *Bull. Amer. Meteor. Soc.*, **86**, 691-694.

Morss, R. E., 2002: Review of “Living on the Edge of the Gulf: The West Florida and Alabama Coast” by D. M. Bush, W. J. Neal, O. H. Pilkey, *et al.*. *Bull. Amer. Meteor. Soc.*, **83**, 1505-1507.

Non-refereed Conference Publications

Morss, R. E., J. K. Lazo, and J. Demuth: Understanding the use of forecast uncertainty information in decision making: Results from a survey. Preprints, Fourth AMS Symposium on Policy and Socioeconomic Research, Jan 2009, Phoenix, AZ.

Brown, B. G., R. E. Morss, J. K. Lazo, H. E. Brooks, P. T. Ganderton, and B. N. Mills: Defining societal and economic research and applications (SERA) priorities related to developments in numerical weather prediction and THORPEX. Preprints, *18th AMS Conference on Numerical Weather Prediction*, Jun 2007, Park City, UT.

Demuth, J., R. E. Morss, J. K. Lazo, and A. E. Stewart: Assessing how the U.S. public understands and uses weather forecast uncertainty information. Preprints, *16th AMS Conference on Applied Climatology*, Jan 2007, San Antonio, TX.

Mills, B., R. Morss, J. Lazo, H. Brooks, B. Brown, and P. Ganderton: A societal and economic research and applications agenda for the North American THORPEX programme. Proceedings, *Second THORPEX International Science Symposium*, Dec 2006, Landshut, Germany.

Mills, B., and R. Morss: What is a high impact weather forecast? Proceedings, *First THORPEX International Science Symposium*, Dec 2004, Montreal, Canada.

Morss, R. E., and K. A. Miller: Evaluating the optimal level and mix of public investment in observations for weather prediction: An economic approach. Proceedings, *First THORPEX International Science Symposium*, Dec 2004, Montreal, Canada.

Zia, A., R. Morss, and J. Lazo: Societal value of improved Quantitative Precipitation Forecasts: A synthesis. Proceedings, *First THORPEX International Science Symposium*, Dec 2004, Montreal, Canada.

Davis, C., B. G. Brown, R. Bullock, M. Chapman, K. Manning, R. Morss, and A. Takacs: Verification techniques appropriate for cloud-resolving NWP models. Preprints, *20th AMS Conference on Weather Analysis and Forecasting / 16th Conference on Numerical Weather Prediction*, Jan 2004, Seattle, WA.

Bullock, R., B. G. Brown, C. A. Davis, M. Chapman, K. W. Manning, and R. Morss: An object-oriented approach to the verification of Quantitative Precipitation Forecasts: Part I-Methodology. Preprints, *17th AMS Conference on Probability and Statistics in the Atmospheric Sciences*, Jan 2004, Seattle, WA.

- Chapman, M., R. Bullock, B. G. Brown, C. A. Davis, K. W. Manning, R. Morss, and A. Takacs: An object oriented approach to the verification of Quantitative Precipitation Forecasts: Part II- Examples. Preprints, *17th AMS Conference on Probability and Statistics in the Atmospheric Sciences*, Jan 2004, Seattle, WA.
- Morss, R. E.: Assessing the needs of users of warm season quantitative precipitation forecasts in Colorado. Preprints, *AMS Symposium on the Impacts of Water Variability: Benefits and Challenges*, Feb 2003, Long Beach, CA.
- Downton, M. W., H. Cullen, R. Morss, O. Wilhelmi, and B. Rajagopalan: Problems of climate variability and uncertainty in flood hazard planning for the Colorado Front Range. Preprints, *AMS Symposium on the Impacts of Water Variability: Benefits and Challenges*, Feb 2003, Long Beach, CA.
- Toth, Z., I. Szunyogh, C. Bishop, S. Majumdar, R. Morss, J. Moskaitis, D. Reynolds, D. Weinbrenner, D. Michaud, N. Surgi, M. Ralph, J. Parrish, J. Talbot, J. Pavone, and S. Lord: Adaptive observations at NCEP: Past, present, and future. Preprints, *AMS Symposium on Observations, Data Assimilation, and Probabilistic Prediction*, Jan 2002, Orlando, FL.
- Morss, R. E., and D. S. Battisti: Observing networks for ENSO prediction: Experiments with a simplified model. Preprints, *5th AMS Symposium on Integrated Observing Systems*, Jan 2001, Albuquerque, NM.
- Kim, H. M., M. C. Morgan, and R. E. Morss: Estimation of uncertainties in atmospheric data assimilation using singular vectors. Preprints, *14th AMS Conference on Numerical Weather Prediction*, Jan 2001, Albuquerque, NM.
- Toth, Z., I. Szunyogh, C. Bishop, S. Majumdar, R. Morss, and S. Lord: The use of targeted observations in operational numerical weather forecasting. Preprints, *5th AMS Symposium on Integrated Observing Systems*, Jan 2001, Albuquerque, NM.
- Toth, Z., I. Szunyogh, S. Majumdar, R. Morss, B. Etherton, C. Bishop, S. Lord, M. Ralph, O. Persson, and Z.-X. Pu: Targeted observations at NCEP: Toward an operational implementation. Preprints, *4th AMS Symposium on Integrated Observing Systems*, Jan 2000, Long Beach, CA.
- Toth, Z., I. Szunyogh, S. Majumdar, R. Morss, B. Etherton, C. Bishop, and S. Lord: The 1999 Winter Storm Reconnaissance program. Preprints, *13th AMS Conference on Numerical Weather Prediction*, Sep 1999, Denver, CO.
- Szunyogh, I., Z. Toth, S. Majumdar, R. Morss, C. Bishop, and S. Lord: Ensemble-based targeted observations during NORPEX. Preprints, *3rd AMS Symposium on Integrated Observing Systems*, Jan 1999, Dallas, TX.
- Morss, R. E., K. A. Emanuel, and C. Snyder: Adaptive observations in a quasi-geostrophic model. Preprints, *12th AMS Conference on Numerical Weather Prediction*, Jan 1998, Phoenix, AZ.
- Toth, Z., I. Szunyogh, K. Emanuel, C. Snyder, J. Woollen, W. Wu, T. Marchok, R. Morss and C. Bishop: Ensemble-based targeted observations during FASTEX. Preprints, *12th AMS Conference on Numerical Weather Prediction*, Jan 1998, Phoenix, AZ.
- Emanuel, K. A., E. N. Lorenz, and R. E. Morss: Adaptive observations. Preprints, *11th AMS Conference on Numerical Weather Prediction*, Aug 1996, Norfolk, VA.