

KEVIN E. TRENBERTH

Affiliations: Distinguished Scholar

National Center for Atmospheric Research, Boulder, Colorado, USA
Honorary Academic, Department of Physics
University of Auckland, Auckland, New Zealand

ADDRESS: 127A Churchill Road, Rothesay Bay, Auckland, New Zealand

DATE AND PLACE OF BIRTH: 8 November 1944, Christchurch, New Zealand

EDUCATION:

B.Sc. (HONS First Class): 1966, University of Canterbury, Christchurch, New Zealand
Sc.D.: 1972, Massachusetts Institute of Technology, Cambridge, Massachusetts

PROFESSIONAL EXPERIENCE:

New Zealand Meteorological Service:

Meteorologist	1966–1977
Junior forecaster, research	1966–1968
M.I.T. graduate student	1968–1972
Research meteorologist	1972–1977
Superintendent -dynamic meteorology	1977

University of Illinois	1977 –1984
Associate Professor of Meteorology	1977–1982
Professor of Meteorology	1982–1984
Adjunct Professor	1984–1989

Editor, Monthly Weather Review	1981–1985
Associate Editor, Monthly Weather Review	1986–1988
Associate Editor, J. Climate	1987–1995
Editor, Earth Interactions	1996–1998

National Center for Atmospheric Research

Scientist III	1984–1986
Senior Scientist	1986–
Leader, Empirical Studies Group	1987
Leader, TOGA/CLIVAR activities	1986–2008
Head, Climate Analysis Section	1987–2011
Deputy Director, CGD	1991–1995
Distinguished Scholar	2019-

University of Auckland, *honorary academic, Faculty of Science* 2019-

PROFESSIONAL SOCIETIES:

American Association for the Advancement of Science	1978–
Council Delegate, Section on Atmospheric and Hydrospheric Sciences	1993–1996
Member at Large, Section on Atmospheric and Hydrospheric Sciences	2009–2013
American Meteorological Society	1969–

Royal Society of New Zealand	1972–1977
Meteorological Society of New Zealand	1980–
American Geophysical Union	1998–
The New York Academy of Sciences	1979–1981

LISTED IN:

Who's Who in America
 Who's Who in American Men and Women of Science
 Who's Who in Technology Today
 Who's Who in Technology
 Who's Who in Frontier Science and Technology
 Who's Who in the West
 Who's Who of Emerging Leaders in America
 Who's Who in Science and Engineering
 New Zealand Who's Who
 Who's Who in Australasia Pacific Nations
 The International Directory of Distinguished Leadership
 Men of Achievement
 International Leaders in Achievement
 5,000 Personalities of the World
 American Men and Women of Science
 Dictionary of International Biography
 Honored member Strathmore's Who's Who Registry
 2000 Outstanding Scientists of the 20th Century
 The Twentieth Century Award for Achievement
 Featured as one of the top ten climate scientists, compiled by the Financial Times of London, 22 Nov 2009.
<https://doi.org/www.ft.com/cms/s/2/fl1d9f856-d4ad-11de-a935-00144feabdc0.html>
 Highly cited researcher, Thomson Reuters, Web of Science, 2014...,17,18,19,20,21.

AWARDS:

New Zealand Research Fellowship	1968–1972
NSF research grants	1978–1988
NOAA research grants	1986–
NASA research grants	1989–
Fellow American Meteorological Society	1985–
Fellow American Association for the Advancement of Science	1994–
Honorary Fellow Royal Society of New Zealand Te Apārangi	1995–
NCAR Best Publication Award Nominee	1988, 1989, 1992, 1993, 1994, 2008, 2012
NCAR Outstanding Education Performance Award Nominee	1996
NCAR Distinguished Achievement Award	2003
NCAR Education and Outreach award nominee	2007, 2008
Keuhnast annual lecture, Univ. Minnesota, 15 Oct.	1998
American Meteorological Society Editors Award (J. Climate)	1989
Jule G. Charney award, American Meteorological Society,	2000
Highly Cited Researcher (top 25 Geosciences), ISI.	2002-15
Symons Lecture, Royal Meteorological Society, London, 21 May	2004
Fellow American Geophysical Union	2006
American Geophysical Union Editor's citation for excellence in reviewing,	2007
Massachusetts Marine Educators award of Certificate of Appreciation	2007
Shared Nobel Peace Prize that went to the IPCC 2007	2007

Atmospheric Science Librarians International 2007 ASLI CHOICE award for the 2007 IPCC WG I assessment volume.	2007
Yoshi Ogura lecture, Univ. Illinois at Champaign-Urbana, 30 Apr.	2008
Honorary fellow of the Institute of Green Professionals, 15 Oct.	2008
Prince Sultan Bin Abdulaziz International Prize for Water: Surface water prize (joint award with Aiguo Dai for \$133,000), Riyadh, Saudi Arabia,	January 2013.
AGU's 2013 Climate Communication Prize (\$25,000)	December 2013
Honorable mention, 2014 Colorado Governor's Award for High-Impact Research in the Sustainability category for the Global Energy and Water Exchanges (GEWEX) Project.	Oct 2014.
AGU's Roger Revelle Medal for 2017	December 2017
Honorary member New Zealand Meteorological Society	December 2017
John Ludwick lecture, Old Dominion University, Norfolk, Va	30 April-2 May 2018
Bownocker medal and lectures, The Ohio State University,	27-28 September 2018
Julian E. Mack Lecture, The University of Wisconsin-Madison,	Oct 4-5, 2018.
Tzvi Gal-Chen Memorial Lecture and medal 2018, University of Oklahoma,	27 Oct, 2018.
Edward Kidson medal, Meteorological Society of New Zealand,	December, 2018
NCAR Distinguished Scholar	November 2019
Trenberth Symposium , given by American Meteorological Society in (delayed from 2021 by pandemic).	January 2022
<i>A booklet for the 2022 AMS Kevin E. Trenberth Symposium, designed by A. Dai and J. W. Hurrell with materials from Kevin Trenberth, published by AMS, Boston, 2021. Available from https://annual.ametsoc.org/index.cfm/2022/program-events/conferences-and-symposia/kevin-e-trenberth-symposium/</i>	

PROFESSIONAL ACTIVITIES:

1. Principal committees or panels

- University of Illinois Senate, 1979–1984.
- NCAR panel on NCAR Community Climate Model, 1980
- NOAA-EPOCS (Equatorial Pacific Ocean Climate Studies) Advisory Panel, 1980–83.
- NOAA-EPOCS council member, 1983–1985.
- TOGA (NOAA, NSF) ad hoc proposal review panel, 6–8 February 1985
- Science review of the Air Resources Laboratory of NOAA, 18–20 March 1987.
- Member “NOAA Panel on Climate and Global Change”, 1987–2006
 - Member Executive Council 1991–2006.
 - Renamed “NOAA Climate and Global Change Working Group” 2003–2005
 - Renamed “NOAA Climate Working Group” 2005–2006.
- Member “Climate Trends Panel”, National Climate Program Office, September 1988–1990.
- Member “NOAA Panel on Climate and Global Change Working Group on Data Management” 1989–90.
- Visiting lecturer; appointed to Graduate School, University of Colorado (May 1990).
 - Member Ph.D. committees, 1990–1992; 1994–2000.
- Member Appointments Review Group, NCAR, January 1992–95.
- Member Technical Advisory Committee “Reporters' Guide to Science of Global and Climate Change”, October 1992–1994
- Council Delegate American Association for the Advancement of Science, Section on Atmospheric and Hydrospheric Sciences. (Elected) 1993–96
- Member review panel, Mission to the Planet Earth (MTPE), NASA. June 15-18, 1993, Washington D.C.
- Member Climate Modeling Analysis and Prediction (CMAP) Science Advisory Council. 1993–98.
- Member Climate System Modeling Advisory Board, UCAR/NSF. 1998–2000.

UCAR Office for Interdisciplinary Earth Studies (OIES) Steering Committee, 1993–94.

Member Center for Ocean-Land-Atmosphere Studies (COLA) Scientific Advisory Committee, 1994–99.
Chair 1995, 1998-99.

Member of drafting group to define the International Research Institute for seasonal to interannual climate prediction Network Consultative Group (INCG). 1997.

Member NOAA Council on Long-term Monitoring, 1998–2003; reconstituted new name NOAA Climate Monitoring Working Group 2003–05.

Member review panel for NCEP Climate Prediction Center. 1997–98.

Member Scientific Steering Committee for 20th anniversary of the US-China bilateral workshop and symposium. 1999.

Member NOAA Climate Observing System Council. 1999–2005.

Earth and Sky Radio Science advisor, 1999– .

Member NOAA Science Advisory Board Panel on Strategies for Climate Monitoring, 2000–01.

Member NOAA Science Advisory Panel for the Climate Change Data Detection (CCDD) program. 2001–05.

Member Research Advisory Executive Committee for *The Climate Report*. Maryam Golnaraghi Editor. June 2001–03.

Lead author, with Tom Spence, on “Climate Observing System” for the Presidential Climate Change Research Initiative, August 2001.

Member committee to decide awardee of Latsis Prize (Europe). 2001.

Chairman, Byrd Polar Research Center External Review Team, 31 October, 1 November 2002, Columbus Ohio.

Member ad hoc UCAR panel workshop on "Integrated Earth System Observations", Smithsonian Inst. Washington D.C. 12-15 Aug, 2003.

Member organizing committee for the Workshop on Ongoing Analysis of the Climate System, 18-20 August 2003, Boulder, CO.

Member Climate Change Science Program reanalysis implementation plan working group 2004.

Member ad hoc NOAA working group on paleoclimate, 2003.

Member External Advisory Committee for Atmospheric Technology Division, NCAR 2004-05.

Member US Interagency Committee on Global Earth Observing System of Systems (GEOSS) 2004

Member NASA CERES Climate Model and Analysis Advisory Group 2003–

Member American Geophysical Union Roger Revelle Medal Selection Committee. 2006-08.

Chair, panel to review of NOAA’s Climate Observations and Analysis Program, April 11-13, 2007. “*Report on the Climate Working Group review of NOAA’s Climate Observations and Analysis Program*, April 11-13, 2007” 35 pp.

Member AGU panel on AGU position statement on data preservation and availability. 2008-2009

Member NASA MERRA Advisory Board 2007–2009

Member at Large, American Association for the Advancement of Science, Section on Atmospheric and Hydrospheric Sciences. (Elected) 2009–2013

Member AGU Climate Communication Prize committee 2015-2019

Member Protect Our Winter Science Alliance. 2014-

Member AGU College of Fellows Sub-Committee on AGU Centennial, 2017-

International

Committee to report on possible effects of halomethanes on the ozone layer (New Zealand), 1975.

Program committee of Australasian conference on Climate and Climatic Change. Monash University, Clayton, Victoria, Australia, 7–12 Dec. 1975.

Member for New Zealand on the working group of the Global Data Processing Systems of the Commission for Basic Systems of the World Meteorological Organization, 1976–77.

Member, Committee on Space Research (COSPAR) "Integrated Earth System Science Roadmap" Study Group; July 2013-16.

Member ISSI Working group on “Consistency of Integrated Observing Systems monitoring the energy flows in the Earth System” International Space Science Institute, Bern Switzerland, 2014-15.

Intergovernmental Panel on Climate Change (IPCC):

Scientific Assessment of Climate Change, WMO/UNEP),
1990, 1992: contributor, reviewer multiple chapters and volumes
1995: WG I Convening Lead Author Chapter 1, Lead Author Technical Summary;
2001: WG I Lead Author Chapter 7, Lead Author Technical Summary, Lead Author Summary for Policy Makers;
2001 Synthesis Report: Lead Author;
2007: WG I Coordinating Lead Author Chapter 3; contributor Technical Summary, Summary for Policy Makers.
2007: WG II contributor and reviewer
2013: WG I Review Editor (chapter 14).

World Climate Research Programme (WCRP):

TOGA: Member International Tropical Oceans Global Atmosphere Scientific Steering Group (SSG) 1989–94.

CLIVAR: International Climate Variability and Predictability (CLIVAR) Member SSG 1995–2004.
Member CLIVAR 2004 International Scientific Conference committee, 2002-04.
Member organizing committee for International CLIVAR workshop on Ocean Reanalysis 2004.
Co-chair CLIVAR SSG 1996–99.
Co-chair “Consistency between planetary energy balance and ocean heat storage (CONCEPT-HEAT)” working group, 2014-18
Executive Committee member CLIVAR Open Science Conference 2015-16

CLIVAR/PAGES/IPCC Workshop “A multi-millennia perspective on drought and implications for the future”, Tucson, AZ November 18-21, 2003. Co-convener with Jon Overpeck.

JSC: Member Joint Scientific Committee 1999–2006. Officer (member Exec. Committee) 2003–2006.

WOAP: Chair WCRP Observation and Assimilation Panel (WOAP) 2004–2010.
Member Third International Reanalysis Conference organizing committee. 2006-08. Tokyo, Japan.
Member Fourth International Reanalysis Conference organizing committee. 2010-12. Maryland, USA.

WCRP Modeling Panel: Member 2004–09.

COPEs: Member Task Force on Coordinated Observation and Prediction of the Earth System (COPEs) 2003-04

GEWEX: Member Global Energy and Water Cycle Experiment/Global Energy and Water Exchanges (GEWEX) Scientific Steering Group 2007– 2014; Chair GEWEX SSG 2010–13; Co-chair Seventh International Scientific Conference on the Global Water and Energy Cycle, The Hague, The Netherlands, July 2014.

WCRP Open Science Conference committee member, 2009-2011 (held Denver October 2011).

Global Climate Observing System (GCOS):

Member Atmospheric Observation Panel for Climate of the Global Climate Observing System. 1994–99.

Lead Author and Member of team of experts to write
The Second Report on the Adequacy of the Global Observing System for Climate in Support of the UNFCCC. 2002-2003; (GCOS 82)
Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC, 2003-2004 (GCOS 92)
Progress Report on the Implementation of the Global Observing System for Climate in Support of the UNFCCC 2004-2008, (GCOS-129)
Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC, 2010 update (GCOS 138)

Member Scientific Committee Inter-American Meteorological Congress, Brasilia, 20–24 October 1986.

Member ECMWF ReAnalysis (ERA) Project Advisory Group. February 1993–2004.

American Meteorological Society

AMS Committee on Southern Hemisphere Meteorology, 1981–1986.

Member of program committee of First International Conference on Southern Hemisphere Meteorology, San Jose dos Campos, Brazil; 31 July–6 August 1983.

Program chairman Second International Conference on Southern Hemisphere Meteorology, 1984–1986.

Chairman, AMS Committee on the Southern Hemisphere, 1985–1987.

Member Program Committee of Third International Conference on Southern Hemisphere Meteorology and Oceanography, Buenos Aires, Argentina 13–17 November 1989.

Member Program Committee AMS Special Session on Climate Variations, Anaheim, CA 7–9 February 1990.

Member AMS Committee on Climate Variations, January 1991–1994.

Member AMS Committee on Atmospheric Research Awards Committee. 2001–2004.

Member, AMS Board on Global Strategies, Commission on the Weather and Climate Enterprise, 2013-18.

Member, AMS Centennial Committee, 2015-

National Academy of Sciences

Member of Committee on Earth Sciences of the Space Science Board, 1982–1985. [Co-author of: *A Strategy for Earth Science from Space in the 1980's and 1990's Part II: Atmosphere and Interactions with the Solid Earth, Oceans, and Biota*. National Academy Press, 1985, 149pp.]

Member TOGA Advisory Panel, Board on Atmospheric Sciences and Climate, 1984–1987. [Co-author of *U.S. Participation in the TOGA Program. A Research Strategy*. National Academy Press, 1986, 24pp.]

Member Polar Research Board 1986–1990.

Member Climate Research Committee, Board on Atmospheric Sciences and Climate, 1987–1990.

Member Global Ocean Atmosphere Land System (GOALS) Panel, 1994–98.

Corresponding member Panel on Climate Observing System Status, Board on Atmospheric Sciences and Climate, 1998–99.

Member Climate Research Committee Panel on Reconciling Temperature Observations. Board on Atmospheric Sciences and Climate, 1999–2000.

Member Committee on Global Change Research, Division of Earth and Life Sciences. 1999–2002.

Member NRC Panel on “Evaluation of climate change indicators for EPA”. Washington D.C. 2004.

Member writing team “*Climate Change: Evidence and Causes*”, 33pp. National Academy Press
<https://doi.org/nas-sites.org/americasclimatechoices/events/a-discussion-on-climate-change-evidence-and-causes/> and <https://doi.org/royalsociety.org>.

1. Invited participation in workshops or conferences

Principal lecturer, Colloquium, summer 1978, NCAR. The General Circulation: Theory, modeling and observations.

Member of working group on SPOCS (South Pacific Ocean Climate Studies) Workshop, University of Washington, March 1980.

Member of National Academy of Sciences, Climate Board, panel to formulate the Southern Oscillation Program, July 1981.

National Academy of Sciences, Climate Board, workshop on Southern Oscillation, Boulder, CO, 14–16 Sept. 1981.

National Academy of Sciences, Board on Atmospheric Sciences and Climate, workshop on Southern Oscillation–El Niño, Princeton, NJ, 11–15 Oct. 1982. Group leader. [*El Niño and the Southern Oscillation: A scientific plan*. National Academy Press, 1983, 72pp.]

Invited speaker and chairman of session IAMAP Third Scientific Assembly, Hamburg, F.R. Germany, 17–28 August 1981.

WMO–CAS/JSC Expert study meeting on long-range forecasting, GFDL, Princeton, NJ, December 1982.

National Academy of Sciences, Board on Atmospheric Sciences and Climate, TOGA/Pacific Drafting workshop 11–18 May 1983, Miami, FL.

National Academy of Sciences, Polar Research Board, workshop on Potential CO₂–induced changes in the environment of West Antarctica, 5–7 July 1983, Madison, WI.

Invited Speaker and chairman of session First International Conference on Southern Hemisphere Meteorology, San Jose dos Campos, Brazil, 31 July–6 August 1983.

Session chairman National Academy of Sciences, Board on Atmospheric Sciences and Climate, El Niño–Southern Oscillation workshop, Miami, FL, 3–4 Nov. 1983.

Invited speaker, and workshop chairman National Center for Atmospheric Research, workshop on climate variations and research, NCAR, Boulder, CO, 28 Nov.–2 Dec. 1983.

Invited speaker TOGA Indian Ocean–Monsoon Climate Program Workshop, 14–16 Feb. 1984, Scripps Institution of Oceanography, La Jolla, CA.

Invited speaker FGGE Workshop, 9–20 July 1984, National Academy of Sciences Study Center, Woods Hole, MA. [FGGE advisory panel of U.S. Committee for GARP, Board on Atmospheric Sciences and Climate, N.A.S.].

Invited speaker and chairman of session “Scientific seminar on global diagnostic studies based on data collected during the Global Weather Experiment”, Helsinki, Finland, 28–31 August 1984. Chairman of session to write summary document.

WMO–ICSU International Conference on the International Variability of the Tropical Oceans and Global Atmosphere (TOGA), Paris, 17–22 Sept. 1984. Represented U.S. TOGA Panel. Participated in drafting International TOGA *Plan for the TOGA Scientific Programme*.

AMS Third Conference on Climate Variations and Symposium on Contemporary Climate: 1850–2100. Los Angeles, CA, 8–11 January 1985. Session chairman, and wrote part of summary report for BAMS.

JIMAR (NOAA) review participant (January 1985).

TOGA/WOCE Data Management Panel meeting, invited participant 5–6 June 1985, Boulder, CO.

Invited speaker IAMAP/IAPSO Joint Assembly 5–16 August 1986, Honolulu, Hawaii.

TOGA Circulation Workshop. 16–18 October 1985, Boulder, CO. Discussion leader.

Invited speaker and chair of session Second International Conference on Southern Hemisphere Meteorology, Wellington, New Zealand, 1–5 December 1986.

U.S. Environmental Protection Agency Workshop on CO₂. Invited participant. Boulder, CO, 25–26 February 1987.

Invited speaker Fourth Conference on Climate Variations: Climate Dynamics Update. Baltimore, MD. 10–13 March 1987.

Invited speaker NCAR Summer Colloquium 1987: Dynamics of low-frequency phenomena in the atmosphere. 7–24 July 1987.

Invited speaker IUGG XIX General Assembly, Vancouver, Canada, 9–22 August 1987. Union 15 Symposium.

Invited speaker Symposium on ozone depletion, greenhouse gases and climate change. NAS Board on Atmospheric Science and Climate, 23 March 1988, Washington, D.C.

UCAR Annual Members Meeting, Boulder, 12–13 October 1988. Science briefing.

Invited speaker Joint BASC, NCPO, Resources of the Future: Strategic Planning Seminar on “The Drought of 1988 and Beyond”, 18 October 1988, Washington, D.C.

Invited speaker Fall AGU meeting, 5–9 December 1988, San Francisco.

Invited speaker UCAR/OIES Climate Systems Modeling Initiative, 25–27 January 1989, Boulder.

Invited speaker EPOCS Advisory Council Meeting, Miami, FL 7–10 February 1989.

Fourth International Meeting on Statistical Climatology, Rotorua, New Zealand, 27–31 March 1989.
Session chairman.

Invited paper and chair of Working Gp I: Observations at DOE Workshop, Amherst, MA, 7–12 May 1989.

Invited paper Fifth Scientific Assembly of the International Association of Meteorology and Applied Physics (IAMAP). 31 July–12 August 1989, Univ. Reading, United Kingdom.

Colloquium speaker on “The 1988 North American Drought” at NASA Goddard Space Flight Center, Greenbelt, MD, 4 October 1989.

Invited paper, OCEANS '89, Seattle, Washington, 19–21 September 1989.

Invited speaker, Workshop on “Climatic variability and its environmental impact”. Buenos Aires, Argentina, 6–10 November 1989.

Invited paper and session chair, Third International Conference on Southern Hemisphere Meteorology and Oceanography. Buenos Aires, Argentina, 13–17 November 1989.

Invited speaker and chair of two sessions, AMS Symp. Global Change Systems, 5–6 February 1990, and AMS special session on climate variations, joint session on hydrology and climate variations, 7–9 February 1990, Anaheim, CA.

Invited plenary lecture on global warming, American Association for Advancement of Science (AAAS). Annual meeting in New Orleans 15–20 February 1990.

Invited speaker “Discussion of Greenhouse Warming Science Controversies”, COSEPUP, NAS meeting 24 January 1990.

Invited plenary speaker on meteorological aspects of climate variations, Canadian Meteorological and Oceanographic Society annual meeting, 28 May–1 June 1990, Victoria, B.C., Canada.

Invited lead speaker at Workshop on 1988 North American Drought, University of Maryland, 30 April–2 May 1990, Washington, D.C.

Colloquium speaker on “Global warming and recent climate change: Observation and modeling”, Johns Hopkins University, 5 October 1990.

Invited speaker National Research Council colloquium “Managing water resources under conditions of climate uncertainty”, Phoenix, AZ 14–16 November 1990.

Invited speaker at international global change workshop on “Earth system response to global change: Northern and southern hemisphere contrasts”, La Serena, Chile 2–4 December 1990.

Invited speaker, NMC/NCAR Reanalysis workshop, Washington, 25–26 April 1991.

Invited participant, CSMP workshop, Boulder, 20–21 May 1991.

Invited speaker, Co-organizer of, and writer of text for Coupled Climate System Modeling: Summer Workshop. U. Wisconsin–Madison 14–27 July 1991.

Chair of session at IAMAP symposium, IUGG, Vienna, Austria, 11–24 August 1991.

Invited speaker and session chair, Fifth Conference on Climate Variations, Denver, 14–18 October 1991.

Invited speaker, workshop on Long-term Monitoring of Global Climate Forcings and Feedbacks. GISS, New York, 2–4 February 1992.

Invited speaker, Interdecadal Variability Workshop, CCCO, Honolulu, 18–20 February 1992.

Invited lead speaker, Twelfth Conference on Probability and Statistics in the Atmospheric Sciences, Toronto, Canada, 22–26 June 1992.

Invited speaker, Workshop on Decade to century timescales of climate variability. National Academy of Sciences, Irvine, CA., Sept. 21–24, 1992.

Invited lead speaker, International symposium on Climate change and Northern Fish populations, Victoria, B.C., Canada. October 13–16, 1992.

Invited speaker and student mentor. Workshop on Coupled Climate System Modelling: A Southern Hemisphere perspective, Macquarie University, Sydney, Australia, 6–19 February, 1993.

Invited speaker at Global Ocean Atmosphere Land System (GOALS) workshop, National Academy of Sciences, Honolulu, Hawaii, 28 February–3 March 1993.

Invited lead speaker, Fourth International Conference on Southern Hemisphere Meteorology and Oceanography, Hobart, Tasmania, Australia, 29 March–2 April 1993.

Invited speaker CLIVAR SSG-1 meeting, Lamont Doherty Earth Observatory, 6-9 July 1993.

Invited panel member, Climate Diagnostics Workshop, 4 November 1993.

Member of Panel discussion “Issues relating to the Midwest flood of 1993”. Climate Diagnostics Workshop. 4 Nov. 1993.

Invited Distinguished Lecturer, Center for Ocean-Land-Atmosphere Studies, Washington D.C., 1 Feb. 1994.

Invited speaker Workshop on Data Sets for Terrestrial Biosphere Modeling, Boulder, CO, 9–11 May 1994.

Invited speaker NOAA/UCAR Summer Institute on Climate and Global Change, Steamboat Springs, CO, 13–17 June 1994.

Invited lecturer NCAR Summer Colloquium on Applications of Statistics to Modeling the Earth's Climate System, Boulder CO, 6–19 July 1994.

Invited speaker, breakout group chairman at meeting on Long-term Climate Monitoring for GCOS. Asheville, NC, 9–11 January 1995.

Invited speaker, Intl. TOGA Conf., Melbourne, Australia, 3-7 April 1995.

Invited speaker, IUGG XXI General Assembly, Boulder CO, 14 July 1995.

Invited speaker, WCRP Workshop on air-sea flux fields for forcing ocean models and validating GCMs, ECMWF, Reading, U.K., 24-27 October 1995.

Invited speaker, Climate prediction & Insurance Risk Conference. Bermuda, 1-4 November 1995.

Invited participant: International forum on Forecasting El Niño: Launching an International Research Institute. Washington D.C. 6-8 November 1995.

Invited speaker, Seventh Symposium on Global Change Studies. Atlanta, (2 talks) 28 January-2 February 1996.

Invited speaker, Symposium on Global Ocean-Atmosphere-Land System (GOALS). Atlanta, 28 January-2 February 1996.

Invited speaker, Symposium on Climate Change: The second Assessment Report of the IPCC. AAAS Annual meeting, Baltimore MD, February 10, 1996.

Keynote address, 1996 annual meeting NOAA Climate Monitoring and Diagnostics Laboratory, Boulder, March 6-7 1996.

Invited speaker, JCESS/CLIVAR Workshop on Decadal Climate Variability, Columbia MD, 22-24 April 1996.

Invited speaker, Intl. wkshp Ocean Climate Variations from Seasons to Decades with Special Emphasis on Pacific Ocean Buoy Network. Mutsu City, Japan, 29-31 May 1996.

Invited lecturer, Monsoon workshop, Trieste, Italy 15-26 July 1996.

Invited lecturer, Aspen Global Change Institute, Aspen CO 30 July-8 August 1996.

Invited lecturer, CLIVAR/PAGES workshop on Annual Records of Tropical Systems (ARTS) Kauai, HI. 27 Sept-1 Oct 1996.

Invited speaker, van Loon symposium, NCAR Boulder CO. 21-22 October 1996.

Invited speaker, Joint Scientific and Technological Committee (JSTC) for GCOS meeting, Victoria BC. 30-31 Oct. 1996.

Invited speaker, Global water vapor Project (GVaP) meeting, Geneva. 12-15 November 1996.

Invited speaker, Thirteenth Conf. on Hydrology. Amer. Meteor. Soc., Long Beach CA. 2-7 Feb 1997.

Invited speaker, three papers, Eighth Symp. on Global Change Studies. Amer. Meteor. Soc., Long Beach CA. 2-7 Feb 1997.

Invited speaker, First symposium on Integrated Observing Systems Amer. Meteor. Soc., Long Beach CA. 2-7 Feb 1997.

Invited speaker, Chair breakout group in Workshop on Indices and Indicators for Climate Extremes, Asheville, NC. 3-6 June 1997.

Invited speaker, Seminar on International Information Network Contributions to Global Change Research. "GOIN" (Global Observation Information Network) 23 June 1997.

Invited speaker, IAMAS/IAPSO 1997 Joint Assembly, Melbourne, Australia. 1-9 July 1997.

Invited speaker, NCAR Advanced Study Program summer colloquium on El Niño systems. Boulder, 20 July–1 August 1997.

Invited keynote speaker and session chair, Fifth Symposium on the Biogeochemistry of Wetlands, Royal Holloway College, Univ. London, 16-19 Sept, 1997.

Invited plenary speaker, Science Summit on Climate Change. Washington D.C. Sept. 30, 1997.

Invited speaker, Scientific Colloquium at NASA/Goddard, Washington D.C. October 10, 1997.

Program committee, chair of session chair of panel discussion at First Intl. Conference on Reanalysis. 27-31 Oct. 1997, Silver Spring, Maryland.

Invited participant, Second Annual NOAA strategic planning workshop. Washington D.C. Feb 11 1998.

Invited participant, IPCC workshop on Rapid nonlinear Climate Change, Noordwijkerhout, Netherlands, 31 Mar–2 Apr 1998.

Invited participant/speaker, U.S. Global Change Research Project retreat Airlie Center, Warrenton VA. 20-21 May 1998.

Invited lecturer, Third NOAA Climate and Global Change Summer Institute, Steamboat Springs, CO. 15-18 June 1998.

Invited speaker, COARE 98 conference, Boulder CO. 7-14 July 1998.

Invited participant and discussant, A review of the causes and consequences of cold events: A La Niña Summit. Boulder CO. 15-17 July 1998.

Invited speaker, Geophysical Statistics Project Summer Colloquium "Statistics for understanding atmosphere and ocean". 18-24 July 1998.

Invited speaker, Intl. Symp. Triangle '98, Kyoto, Japan, Sept 29-Oct 2, 1998.

Invited participant, workshop on Global Change Science Requirements for Long-term Archives and Data Continuity. Boulder CO, 28-30 Oct. 1998.

Keynote invited talk "The evolution of CLIVAR Science", International CLIVAR Conference, UNESCO, Paris, France, 2-4 Dec. 1998

Invited participant and speaker, PAGES/CLIVAR Data Workshop January 15-17, 1999, Boulder.

Invited speaker, Tenth Symposium on Global Change Studies. 11-15 Jan. 1999. Dallas TX.

Invited speaker, Second Hayes Symposium on seasonal to interannual climate variability – The 1997/98 ENSO cycle. 12-15 Jan. 1999. Dallas TX.

Invited speaker, UNISPACE-III Forum on "Climate Variability and Global Change." 19-30 July, 1999. Vienna, Austria.

Invited speaker, Second International Conference on Reanalyses, 23-27 August 1999, Reading, U.K.

Invited speaker, Symposium on climate, environmental change and regional impacts. September 21-24, 1999, Beijing, China.

Invited speaker, Chapman Conference on Water Vapor, 12-15 October 1999, Potomac, MD.

Invited participant and speaker, PAGES/CLIVAR Workshop, 8-12 Nov 1999, Venice, Italy.

Invited speaker, NCAR ASP Colloquium, 17-28 July 2000, Boulder CO. "Decadal variability in the atmosphere over the Pacific: observations", and Chair Panel on "ENSO and global warming".

Invited keynote speaker, Commission on Climatology International Symposium, Climate Change and Variability, and their Impacts. Aug 9-13, 2000, Seoul, Korea.

Invited speaker, NRC/NAS workshop on “Predictability and Limit-of-prediction for hydrological systems”, Committee on Hydrological Sciences, Boulder, CO. 21-22 Sept, 2000.

Speaker and organizer of NCAR workshop on Precipitation Processes in the Climate System, 26 September, 2000, FL. “Why and how does precipitation change”

Invited speaker Sino–US Workshop on Climate Change and Modeling. 15-16 January 2001, Shanghai, China.

Invited speaker, WCRP/SCOR Workshop on Intercomparison and Validation of Ocean–Atmosphere flux fields, 21-25 May 2001. Washington D.C.

Invited speaker, International Association for Meteorology and Atmospheric Science conference, Innsbruck, Austria, 10-18 July 2001.

Invited speaker, Woods Hole Oceanographic Institute summer colloquium, Woods Hole, 1-3 August 2001.

Invited speaker, Climate and Ozone Programme Conference. Programme Board of the Committee for Research on Change of Climate and the Ozone Layer of the Norwegian Research Council. Bergen, Norway, 27-29 November 2001.

Invited speaker, Fifth NOAA Summer Institute for the Postdoctoral program in Climate and Global Change. 17-21 June, 2002, Steamboat Springs, CO. “New estimates of fresh water discharge from land into the ocean, and issues of how to get that right in models.” Also leader of session debate on “How can the science community most effectively communicate with governments and the private sector to supply sound research results as an input to policy-making.”

Invited lecturer in course at Colorado University “Global climate change and society”. R. Pielke Jr. 27 June 2002, 1.5 hours.

Invited distinguished lecturer, Woods Hole Oceanographic Institute. 24 September, 2002.

Invited keynote speaker and panelist for Climate Change Science Program planning workshop for scientists and stakeholders, 3-5 December, 2002, Washington D.C. Keynote address: *Interactions between data, observations and modeling*, panelist: *Resolution of disparities in tropospheric temperature records*.

Invited speaker, 7th International Conference on Southern Hemisphere Meteorology and Oceanography, Wellington, New Zealand. “Heat budgets and poleward atmospheric energy transports”. 24 March 2003.

Invited distinguished Vetlesen lecturer, University of Rhode Island, “The global hydrological cycle and new estimates of freshwater discharge from land into the ocean” 22 May 2003.

Invited speaker, workshop on "Integrated Earth System Observations", Smithsonian Inst. Washington D.C. 12-15 Aug, 2003.

Invited keynote speaker, chair of working group, workshop on Ongoing Analysis of the Climate System, 18-20 August 2003, Boulder, CO.

Invited talks at IPCC scoping meeting, September 1-4, 2003, Potsdam Germany

- “Scope for Chapter 3: Observations: Atmospheric, land and marine climate change.” WGI
- “Technology Issues in WGI: Climate data records from observations” Cross cutting theme on Technology (all WGs)
- “The global hydrological cycle: How should precipitation change as climate changes?” Cross cutting theme on Water. All WGs.

Invited talk “Report on workshop on “Ongoing Analysis of the Climate System”, Boulder, August 2003”, NOAA Climate Monitoring Working Group (CMWG), September 17-19, 2003, Chicago, IL.

Invited talk “The need for a new network of high quality radiosondes”, NOAA Climate Monitoring Working Group (CMWG), September 17-19, 2003, Chicago, IL.

Invited lead speaker, CLIVAR/PAGES/IPCC Workshop “A multi-millennia perspective on drought and implications for the future”, Tucson, AZ November 18-21, 2003.

Invited presentation “Long-Lived Data Collections Workshop”, National Science Board, March 23, 2004, Washington D.C.

Invited speaker at Office of Climate Observation Annual System Review workshop, “IPCC (2007) AR4 the next assessment WGI, Relevance for ocean observations”, Washington DC. April 13-14, 2004.

Symons lecture, “The flow of energy through the Earth's climate system”, Royal Meteorological Society, London, England, 19 May 2004.

Keynote talk “Monitoring and prediction of the Earth’s Climate: A future perspective” at the International CLIVAR Science Conference, Baltimore, MD 21-25 June, 2004,

Invited talk “Anticipated and observed trends in the global hydrological cycle”. Aspen Global Change Inst. workshop on “Aerosols and the hydrological cycle” July 11-17, 2004, Aspen, CO.

Invited participant in NRC Workshop on Earth Observations and Applications from Space: A Community Assessment and Strategy for the Future, Woods Hole, 23-25 Aug, 2004.

Keynote address, CAHMDA II workshop on “The Terrestrial Water Cycle: Modeling and Data Assimilation Across Catchment Scales.” Princeton University, Princeton, 27-29 October, 2004.

Invited talk at IGWCO/GEWEX/UNESCO workshop on global trends in water cycle variables and their relevance for IPCC assessments. Paris, France, Nov. 3-5, 2004.

Invited talk, CLIVAR Ocean Reanalysis Workshop on “COPEs and the WGOA”, NCAR Boulder CO, 8-10 Nov, 2004

Invited talk, CLIVAR Global Synthesis and Observation Panel (GSOP) meeting, on “COPEs and the WGOA”, Boulder CO, 10-12 Nov, 2004

Invited panelist AMS “Living with a Limited Water Supply” symposium, panel on “Water in the 21st Century: Outstanding issues and research challenges.” San Diego, 10 Jan 2005.

Invited talk at AMS 16th Symposium on Global Change and Climate Variations, session on "Climate Change Assessment Activities of the IPCC and the CCSP" “The CLIVAR/PAGES/IPCC workshop on a multi-millennia perspective on drought and implications for the future” San Diego, 11 Jan 2005.

Invited talk at AMS Lorenz Symposium “The general circulation revisited”. San Diego. 13 Jan 2005.

Invited keynote speaker, Chapman Conference on Tropical-Extratropical Climatic Teleconnections, A Long-Term Perspective. “The Role of the Tropics in the Global Energy and Water Cycles and Implications for Teleconnections”. Honolulu, Hawaii. 8-11 February 2005.

Invited plenary talk 5th International Scientific Conference on the Global Energy and Water Cycle (GEWEX) “Estimates of the global water budget and its changes using observational and model data”. 20-24 June 2005, Costa Mesa CA.

Invited talk to U.S. CLIVAR meeting 15-17 August 2005, Keystone, CO, on WCRP COPEs.

Invited seminar, Aeronomy Lab, NOAA (and CDC and CMDL) 14 September, 2005 “Anticipated and observed trends in the global hydrological cycle”.

Invited keynote lead talk “WCRP perspective on reanalysis and reprocessing for climate”, Workshop on “The development of Improved Observational Datasets for Reanalysis”, 28-30 September, 2005, Washington DC.

Invited presentation to Climate Research Committee, National Research Council, 4 October, 2005. “Observations and their analysis for WCRP/COPEs”. Washington, DC.

Invited speaker at the Bob Dickinson symposium, “Hurricanes and global warming” 17-18 October 2005, Atlanta, GA.

Invited speaker and participant at the National Science Board hurricane workshop, 7 February, 2006. “Issues in hurricane research”

Invited speaker Western Coalition of Arid States meeting, 21-24 February 2006, Denver, “Observations of global climate change and drought”.

Invited seminar, Centre for Atmospheric Research, University of Canterbury, Christchurch, New Zealand, 24 March, 2006.

Invited seminar, School of Earth Sciences, Victoria University, Wellington, New Zealand, “Changes in hurricanes and storms with climate change” 27 March, 2006.

Invited presenter and participant in meeting with New Zealand government senior officials, politicians and policy experts, organized by the Royal Society of New Zealand, the Wellington Club, Wellington, New Zealand, 30 March 2006.

Invited speaker Center for Health and the Global Environment, Harvard Medical School, Course for Congressional Staff “Environmental Change: The Science and Human Health Impacts” April 18-19, 2006, Cosmos Club, Washington, D.C.

Invited speaker, 8th International Conference on Southern Hemisphere Meteorology and Oceanography. Foz do Iguacu, Brazil, 24-28 April, 2006. Chaired session.

Invited speaker, “The role of hurricanes in the climate system”. IMAGE Theme of the Year Workshop on “*Multi-scale processes for low frequency variability, climate, and climate change response*”. May 15-19, 2006; Boulder CO.

Invited speaker, “Achieving Satellite Instrument Calibration for Climate Change (ASIC³) Workshop”. May 16-18, 2006, National Conference Center, Washington, DC.

Invited speaker, Global Climate Observing System “Workshop on "Reference Upper Air Observations for the Global Climate Observing System: Potential Technologies and Networks”, May 22-24, 2006, Seattle, Washington.

Seminar, Univ. Washington, “Hurricanes and climate change”, 24 May 2006, Seattle Washington.

Invited talk, WCRP reanalysis conference, “Observations and their analysis for WCRP/COPES.” ECMWF, Reading, U.K. 19-22 June, 2006.

Invited talk, “What is the role of hurricanes in global climate”. David Anderson, retirement seminar, ECMWF, Reading U.K., 23 June 2006.

Talk on status of comments on Chapter 3, IPCC AR4 Plenary meeting, Bergen, Norway, 25-28 June 2006.

Invited talk, “The role of hurricanes in climate” NOAA Postdoc retreat, Steamboat Springs, 9-13 July, 2006.

Invited talk “Attribution of Recent Increases in Atlantic Hurricane Activity”. 31st Annual Climate Diagnostics Workshop, Boulder, CO, 23-27 October, 2006, and participation in Forum of Panel of Experts on outstanding attribution questions.

Invited talk on WOAP activities at WCRP Modeling Panel meeting, 23-24 October 2006, Boulder, CO.

Invited plenary talk at Earth System Science Partnership Open Science Conference on Global Environmental Change: Regional Challenges, “Relation to International Environmental Assessments and Conventions”. Beijing, China, 9-12 November, 2006.

Invited distinguished lecture, Univ. Utah, “The role of tropical storms in climate and climate change”, Salt Lake City, 28 November, 2006.

Invited keynote talk, “Progress Toward Integrated Earth System Analysis” 11th Conference on Integrated Observing and Assimilation Systems for Atmosphere, Oceans and Land Surface (IOAS-AOLS), "Toward an Integrated Earth System Analysis" 14-18 January 2007 at the American Meteorological Society Annual Meeting in San Antonio, Texas.

Invited talk, “The atmospheric hydrological cycle: Advances facilitated by Gene Rasmusson”, *Rasmusson symposium, 18 January 2007* at the American Meteorological Society Annual Meeting in San Antonio, Texas.

Plenary talk on climate observations and the IPCC at the IPCC AR4 WG I meeting in Paris, 29 Jan to 1 February 2007.

Talk to NCAR Director’s Committee mtg, 15 February, 2007 on IPCC findings.

Invited talk, “*Global water budget estimates and uncertainties*” Workshop on Satellite Observations of the Global Water Cycle, Beckman Center of the National Academies, Irvine, CA, March 7-9, 2007.

Invited seminar “*Hurricanes and global warming*” University of Wisconsin, Madison. 23 April 2007.

Invited talk, “*Effects of Mount Pinatubo volcanic eruption on the hydrological cycle as an analog of geoengineering*” AGU conference, Acapulco, Mexico, 21-25 May, 2007.

Invited talk, “*The water and energy budgets of hurricanes and implications for climate change*” First International summit on hurricanes and climate change, May 27-June 1, 2007, Crete, Greece.

Invited talk, “*IPCC Fourth Assessment report- Ocean observations*” NOAA Climate Observations mtg 5-7 June 2007, Washington, DC.

Invited talk “*Hurricanes and global climate change*” Select Committee Congressional staff of Committee on energy independence and global warming, visit to NCAR 20 August 2007.

Invited talk “*Report on the Climate Observations and Analysis Review*” to NOAA Science Advisory Board, Mystic, CT, 24 August 2007.

Invited seminar, Yale University, “*Hurricanes and climate change*”. New Haven, CT, 12 September 2007.

Invited talk, “*Issues from IPCC AR4 WG 1, Atmospheric modeling and observations*”, GCOS/WCRP/IBGP IPCC workshop on *Learning from the IPCC Fourth Assessment* October 4-6, 2007, Sydney, Australia.

Invited talk, *An imperative: Building a climate information system to enable adaptation to regional climate change*. National Research Council workshop on Future priorities for the U.S. CCSP, Committee on Strategic Advice on the U.S. CCSP. Oct. 15-17, 2007, Washington DC.

Invited speaker, *An imperative: Building a climate information system to enable adaptation to regional climate change*. COSMIC-Formosat conference, Boulder CO 22-24 October, 2007.

Invited speaker, *Observations of climate*. American Statistical Association conference on “A statistical consensus on global warming”. Boulder, CO. 26-27 October 2007.

Invited speaker, *A comparison of vertically-integrated water and energy cycle diagnostics from several reanalyses*. Third WCRP International Conference on Reanalyses, Tokyo, Japan, 28 Jan- 1 Feb 2008.

Invited talk, *Extremes in climate models*. GEWEX SSG meeting, Buenos Aires, Argentina, 4-9 February, 2008.

Invited talk, *WCRP Observations and Assimilation Panel*. GEWEX SSG meeting, Buenos Aires, Argentina, 4-9 February, 2008.

Invited talk, “Weather and climate in the 21st century: what do we know? And what don’t we know?” Amer. Meteor. Soc. Policy Forum: “What about water? A reality check for the 21st century”. Washington, DC, 26-27 Mar, 2008.

Invited keynote talk at the QUEST Hydrological Cycle meeting, on “*How may the spatial and temporal characteristics of precipitation change under global warming, and what are the fundamental processes that will constrain those changes?*” Totnes, Devon, U.K. as telecon. 21 April 2008.

Invited talk, World Climate Modelling Summit for Climate Prediction, “*Exploiting and evaluating models with observations*”, Reading, U.K., 6-9 May 2008.

Invited keynote speaker in the American Geophysical Union’s 2008 spring meeting in the Union session on “Understanding and Predicting Water and Energy Cycle Changes”, on “*Earth’s changing energy and water cycles*”. Fort Lauderdale, FL, 28 May 2008.

Invited keynote speaker, “*The flow of energy through the Earth’s climate system*”, workshop on “Variability of the Global Atmospheric Circulation During the Past 100 Years” 15-20 June 2008, Monte Verità, Switzerland.

Invited discussant, NOAA Climate Working Group retreat on the NOAA strategic Plan for a National Climate Service. Vail, CO, June 23-26 2008.

Invited lecturer, European Space Agency summer school, Frascati (Rome), Italy, 4-14 August 2008:
 3 lectures: 1) *The flow of energy through the Earth’s climate system*.
 2) *The global water cycle and its changes*.

3) *Climate change and an imperative: building a climate information system to enable adaptation to regional climate change.*

- Invited speaker, two talks, “*Storage and movement of heat in the ocean*”, “*User requirements and applications: IPCC*”; NOAA Climate Observation Division 6th Annual System Review, Washington, DC, 3-5 September 2008.
- Invited speaker, Global Climate Observing System Steering Committee meeting XVI, Geneva, 14-17 October, 2008.
- Invited speaker, “*The importance and challenges of closing the water budget*” U.S.-Canada GEO bilateral workshop on ice and water. 28-30 October 2008, Arlington, VA.
- Invited speaker, “*Climate and weather forecasting using numerical models*”. Chevron Fellows METamorphosis conference, Galveston, TX, 5 Nov. 2008.
- Invited distinguished Climate Center Lecturer, Columbia University: 3 lectures 1) *The flow of energy through the climate system*, Lamont-Doherty Earth Observatory 17 November, 2) *The flow of energy through the climate system: observations and model performance*, NASA/Goddard Institute for Space Studies in New York City, 19 November; 3) *The global water cycle and its changes*, The International Research Institute for Climate and Society, 20 November 2008.
- Invited speaker “*Climate change: Updated scientific assessment relevant to security*”, Military Advisory Board for the CNA. National Renewable Energy Lab., Golden, 8 January 2009.
- Invited speaker, “*Climate change: Updated scientific assessment relevant to health.*” Institute of Medicine of the National Academies, Roundtable on Environmental Health Sciences, Research and Medicine, Washington, D.C. 15-16 January 2009.
- Invited speaker, “*Attributing climate variations events: The role of energy*”, and “*Attributing climate variations as part of a climate information system*” NCAR First international meeting on Attribution of Climate Events. NCAR, Boulder, 26 Jan 2009.
- Invited speaker, “*WOAP perspective on GCOS*”, Expert meeting on updating the GCOS IP. Geneva, Switzerland, 2-5 February, 2009
- Invited talk “*Climate research and NCAR and climate change*” Civil Applications Committee, NCAR, 14 May 2009
- Invited talk and panel member, *Impact of anthropogenic CO₂ and other greenhouse gases on climate since 1940*. American Association of Petroleum Geologists annual meeting special session on Global Climate Change: the science behind CO₂ and temperature, Denver, CO 9 June 2009
- Invited talk to NCAR Undergraduate Leadership Workshop “*Climate change and the IPCC*”, 15 June 2009, Boulder.
- Invited talk “*Global climate change, an update*” to the 101st annual conference of the Association of American State Geologists, Park City, UT. 22 June 2009
- Invited plenary talk “An observational perspective on changes in the global hydrological cycle” 2009 Royal Meteorological Society conference, Reading, U.K. 27 June-2 July 2009.
- Invited talk “*A dry land and water cocktail: shaken not stirred*”, 2009 Royal Meteorological Society conference, Reading, U.K. 27 June-2 July 2009.
- Invited talk “*Changes in precipitation and runoff in a changing climate*” to Gordon Research Conference on Radiation, New London, NH, 4-9 July 2009.
- Invited talk NCAR symposium on Health and Climate “*Climate change: Updated scientific assessment relevant to health*” 13 July 2009, Boulder. (given by John Fasullo)
- Invited lecturer for NCAR ASP summer colloquium on Marine Ecosystems and climate: modeling and analysis of observed variability. “*The Earth’s climate system: variability and change*” 3 Aug 2009, Boulder.
- Invited talk at the GEWEX/iLEAPS international conference “Water in a changing climate”, “*Aspects of a climate observing system: energy and water*”, 24-28 August 2009, Melbourne, Australia.

Invited plenary lecture “*IPCC and Attribution and Prediction of Climate*” OceanObs’09 conference, Venice, Italy, 21 September, 2009.

Invited seminar “*The flow of energy through the climate system: Observations and model performance.*” Jet Propulsion Laboratory, Pasadena, CA, 7 Oct, 2009

Invited seminar “*Changes in climate extremes*” Univ. of Calgary, Calgary, Canada, 26 Oct 2009.

Invited talk, “*Tracking Earth’s global energy*”, Amer. Geophys. Union, San Francisco, Dec 16, 2009

Invited lead talk at National Academy of Sciences workshop on *The global Change and Extreme Hydrology: Testing conventional wisdom, “Understanding changes in precipitation and runoff with a changing climate.*” 5-6 January 2010, Washington, DC.

Invited lead talk at The third Kaplan symposium–Challenges of the global water shortage. “*Potential impacts of climate change on precipitation*”. 11-13 April, 2010, Ma’agan, Israel.

Invited keynote talk “*The Earth’s climate system: Variability and change*”, International symposium on “Climate Change Effects on Fish and Fisheries”, Sendai, Japan, 26-29 April 2010 (via DVD and Skype)

Invited talk to NCAR ASP Summer Colloquium on “Forecast Verification in the atmospheric sciences”, “*Analyses and reanalyses for climate*” 8 June 2010, NCAR.

Invited talk to NCAR Journalism Fellowship Agenda “*Climate change*” 14 June 2010, and Invited participant in Round Table discussion (2 hours), 16 June, 2010

Invited talk to the 2010 Undergraduate Leadership workshop, “*Climate change*”, NCAR, June 14, 2010

Invited panelist 35th annual Natural Hazards Research and Applications Workshop, session on “Translating climate predictions into adaptation decisions”, Broomfield, CO., July 13, 2010

Invited talk to NCAR ASP Summer Colloquium on “Asia in the 21st century” “*Changes in precipitation with climate change*”, 5 August, 2010, NCAR.

Rapporteur report for WG I, Attribution workshop, Broomfield, CO 17-18 Aug 2010

Leader of breakout working group, CLIVAR workshop *Decadal Variability, Predictability, and Prediction: Understanding the Role of the Ocean*, NCAR, Boulder 20-23 Sept 2010.

Invited keynote opening talk at the WCRP-UNESCO (GEWEX/CLIVAR/IHP) Workshop on “*Metrics and methodologies of estimation of extreme climate events*” (Paris, UNESCO headquarters, 27-29 September 2010).

Discussion leader for 90 minutes in plenary at WCRP-UNESCO (GEWEX/CLIVAR/IHP) Workshop on “*Metrics and methodologies of estimation of extreme climate events*” (Paris, UNESCO headquarters, 27-29 September 2010).

Invited keynote talk “*The scientific evidence for global climate change and ramifications for society.*” “Asphalt Rubber –Engineering, Environment and Economy” conference, 11-12 October, 2010, Oporto, Portugal.

Invited talk “*GEWEX matters including the pan-GEWEX meeting.*” WGNE meeting, Tokyo, Japan 18-22 October, (by Skype, for 50 minutes)

Invited talk “*Ocean observations and the IPCC*”, NOAA Ocean Climate Observations (OCO) Annual System Review and Climate Observing System Council (COSC) meeting, Silver Spring, MD Oct 27-29, 2010.

Invited opening talk “*An overview of atmospheric reanalyses*” Workshop on Evaluation of Reanalyses–Developing and Integrated Earth System Analysis (IESA) Capability. Baltimore, MD. Nov. 1-3, 2010.

Invited talk “*Building a Climate Information System*”, Third Atmospheric Circulation Reconstructions over the Earth (ACRE) workshop, Baltimore MD, Nov 3-5, 2010.

Invited talk: “*Evolution of GEWEX*”, NCAR Water System Program Retreat, Boulder, 7 Dec, 2010.

Invited talks (2) ISSI workshop "Observing and modeling Earth's energy flows", Bern, Switzerland, 10-14 January 2011. (i) *The flow of energy through the climate system and its replication in climate models;*(ii) *Closing the Earth’s energy budget.*

Invited 90 minute lectures (3) to ERCA, European Research Course on the Atmospheres, 17-18 January 2011, Grenoble, France. (i) *Impact of climate changes on precipitation*; (ii) *The flow of energy through the climate system and changes with global warming*; (iii) *Analyses and reanalyses for climate*

Invited speaker, AMS special session on WCRP Projects, Conf. Climate Variability and Change, AMS 91st Annual mtg, “*The New GEWEX*”, 25 January 2011, Seattle, WA.

Speaker, AMS 23rd Conf. Climate Variability and Change “*Promoting climate information and communication of climate change*” AMS 91st Annual Meeting, 23-27 January 2011 Seattle, WA.

Invited speaker GEOS-IPCC workshop: *A workshop on the data needs of the climate impacts, adaptation and vulnerability research community*, WMO, Geneva, 1 – 4 February 2011 (i) *Data needs and priorities of the research community* (ii) *Managing data to support assessments: continuity of measurements*.

Invited speaker Simon Fraser University: *The role of the ocean in climate*. 15 March 2011. Vancouver, BC, Canada.

Invited speaker WOAP Workshop on Evaluation of Satellite-Related Global Climate Datasets, *Diagnostic studies and data issues*. 18-20 April 2011. Frascati (Rome), Italy.

Invited speaker NRC Committee on A National Strategy for Advancing Climate Modeling, *Observing systems: Evaluating and Improving Models*. 27-28 April 2011, NCAR, Boulder, CO.

Invited speaker, Tokio Marine’s 2011 Summit on Global Warming and Climate Change, *The climate extremes of 2010-11 and their attribution*. 29 April 2011, Atlanta, GA

Invited talk: *Developments in GEWEX*. CLIVAR SSG, Paris 1-5 May 2011.

Invited lecturer NCAR Advanced Study Program colloquium on “Statistical assessment of extreme weather phenomena under climate change. *Physical understanding of changes in extremes in precipitation with climate change*. 6 June, 2011 (90 minutes). NCAR, Boulder.

Invited lecture: *Drought and floods*. NCAR Journalism Fellowship meeting, 7 June 2011. (1 hour). NCAR Boulder.

Seminar: *The Russian Heat Wave and other Climate Extremes of 2010*; Australian Bureau of Meteorology, 28 June 2011, Melbourne, Australia

Seminar: *Tracking Earth’s energy: From El Niño to global warming*. NIWA, Wellington, New Zealand, 14 July 2011.

Invited talk: Climate variability and water: Today and future prospects. American Chemistry Society annual meeting, symposium on “A sustainable future: Interface of energy, food, water and climate sustainability”, Denver, 30 Aug 2011.

Invited keynote talk “*Tracking Earth Energy: from El Niño to global warming*”. SORCE Science Meeting “Decadal cycles in the sun, sun-like stars, and Earth’s climate system”, Sedona, AZ 13-16 Sept 2011.

Invited lead speaker “*The Russian heat wave and other climate extremes of 2010*”, Geological Society of America annual meeting, session on “Extreme climate and weather events: Past, present and future” Minneapolis, MN, 11 Oct 2011.

Invited keynote address “*Challenges of a sustained climate observing system*”, World Climate Research Programme Open Science Conference, Denver, CO, 24-28 October 2011.

Invited speaker, “*Climate change and extremes in 2010 and 2011*”. 23rd Annual Steamboat Weather Summit. Steamboat Springs, CO, 15-20 January 2012.

Invited speaker, “*Role of the southern ocean in climate change*”, Climate Reality Project, on board ***National Geographic Explorer***, in Antarctica, Jan 28-Feb 6, 2012.

Invited speaker, “*Challenges for observing and modeling the global water cycle*”, ISSI. Workshop on *The Earth’s Hydrological Cycle*, International Space Science Institute (ISSI) in Bern Switzerland, 6-10 February 2012.

Invited speaker, “*Challenges for observing and modeling the global water cycle*” AGU Chapman Conference on Remote Sensing of the Terrestrial Water Cycle, Kona, Hawaii, 19 –22 February 2012

Invited speaker, “*Grand Scientific Challenges in GEWEX*” CliC SSG meeting, Innsbruck, Austria, by Skype 12 March, 2012.

Invited speaker, “*Changing water availability in the presence of climate change*” In “Water: Integrated assessment, governance and management in changing conditions at global, regional and transboundary levels” session of the GEC Conference “Planet under Pressure: New Knowledge towards Solutions”, 26-29 March 2012, London, UK

Invited speaker, “*An evaluation of reanalysis transports between ocean and land*”, Fourth Intl Reanalysis Conf., 7-11 May 2012, Silver Spring, MD.

Invited speaker, “Climate change and extreme weather”. Morss Colloquium “The Ocean and Earth’s Changing Water Cycle”, May 16-18, 2012. Woods Hole Oceanographic Institute, Woods Hole, MA.

Invited panelist on 2 panels, Aspen Environment Institute June 23-25, 2012, Aspen, CO.

Invited speaker, “*Climate change and extremes of the hydrological cycle*”, NERC Research Programmes “Changing water cycle” workshop, U. Reading, Reading, U.K. 26-28 June 2012.

Invited speaker, International Finance Corporation (IFC) climate change course, *Changing precipitation and water availability in the presence of climate change*. NCAR 11-12 July 2012.

Invited speaker Summer School on Dynamical Core Model Intercomparison Project (DCMIP), 7/30/2012-8/10/2012, NCAR, FL2 Boulder, CO.

Invited speaker, “*Changing precipitation and water availability in the presence of climate change*”. SIESD Summer School, National Center for Earth-surface Dynamics (NCED), University of Minneapolis, Minnesota, 9-10 August 2012.

Invited speaker, “*Climate Change: What We Know and Implications for the Future?*” “American Sociology Association meeting, Thematic session “Global Warming and the Prospects for Real Utopias”, 17 Aug 2012, Denver, CO.

Invited speaker, “*GEWEX*”, pan-GASS workshop, NCAR, Boulder, CO, 10 Sept 2012

Invited speaker, “*Observations for the evaluation of the multi-scale aspects of the water cycle in models*”, DOE workshop on “Observations for the evaluation of the multi-scale aspects of the water cycle in models”, Washington DC, 24-26 Sept. 2012.

Invited speaker, “*Regional energy and water cycles: Transports from Ocean to Land*”, AGU, San Francisco, 3-7 December, 2012

Keynote invited talk: “*Estimating the effects of climate change on the global hydrological cycle with a clear explanation of the global water budget*” 5th International Conf. on Water Resources and Arid Environments. Riyadh, Saudi Arabia, 7-9 Jan 2013

Invited talk, *Introduction to climate science*, CU Scripps Fellows, 8 Feb 2013.

Invited talk, *Challenges of a sustained climate observing system*, NRC Committee on Earth Science and Applications from Space, mtg in Washington DC, by webinar, 7 Mar 2013

Invited talk, “*Global warming, coming ready or not?*”, Colorado University, Program on Atmospheric and Ocean Sciences 14 March 2013

Invited talk to NRDC visitors, “Global warming, coming ready or not!”, 5 Apr, 2013. NCAR

Invited speaker, “Extreme weather and climate change”, EPA Region 8 2013 Climate Change Speaker Series, Denver, CO. April 8, 2013.

Invited speaker, *GEWEX and the need for new water-cycle observations*. Water cycle Missions for the Next Decade meeting, NASA, 29-30 April 2013, Baltimore, Md.

Invited speaker, *GEWEX Report*. CLIVAR SSG meeting, Kiel, Germany 6-9 May 2013

Invited speaker, *GEWEX Report*. WCRP JSC meeting, Brasilia, Brazil, 26-31 May 2013.

Invited speaker, *GEWEX Report*. GEWEX wkshop on Water Resources, Saskatoon, Canada 5-7 June 2013

Invited speaker, *GEWEX Report*. GEWEX workshop on Precipitation, Fort Collins, CO 24-26 June 2013

Invited speaker and Panelist, “*Challenges of a sustained observing system*”, Third workshop on “Understanding climate change from data”, Northwestern University, Evanston, IL, 15-16 Aug. 2013.

Invited speaker, *The GEWEX Science Conference*. Joint GDAP/GHP meeting, Rio de Janeiro, Brazil.

Invited keynote speaker, “*Requirements for an End-to-end Climate Observing System*”, Occultations for Probing Atmosphere and Climate – International Radio Occultation Working Group Workshop (OPAC-IROWG 2013), Seggau Castle, Leibnitz, Austria, 5-11 Sept, 2013.

Invited speaker, “*Earth’s energy imbalance*” Workshop on the Role of Oceans in Multi-decadal Climate Variability” Beijing, China, Sep. 21-22 2013.

Invited speaker, “*Earth’s energy imbalance: The apparent hiatus in warming?*” Beijing Symposium on Global Change-2013, Beijing, China, Sep. 23-25, 2013.

Invited keynote speaker, “*Earth’s energy imbalance and implications for ocean heat content.*” Ocean surface topography science team meeting, Oct. 10, 2013, Boulder, CO.

Invited talk GLASS meeting in Exeter, UK 16 Oct 2013. “*GEWEX Grand Science Questions, WCRP Grand Challenges, and the GEWEX Science Conference*”. 1 hour by webex.

Invited Seminar, “*Earth’s energy imbalance*”, Wichita State University, Wichita, KS, 14 Nov 2013.

Invited speaker, “*Ocean heat uptake, the apparent hiatus in global warming, and climate sensitivity*”, Workshop “*Uncertainty in climate change: A conversation with climate scientists and economists*”, Yale University, 21 Nov. 2013.

Invited keynote talk: “*Climate change and water from the globe to Utah*”, 2014 Spring Runoff Conference, Utah State University, Logan UT. 1-2 April, 2014.

Invited “Frontiers in Global Change Research” Seminar Speaker, “*Seasonal aspects of the hiatus in global warming*”, Pacific Northwest National Laboratory, Richland WA, 22 April, 2014.

Invited speaker, Harvard University, “*The hiatus in global temperature rise*” Cambridge, MA, May 2-3, 2014.

Invited speaker, “*Earth’s energy imbalance*”. Working Group on Energy imbalance in the climate system, International Space Science Institute, Bern, Switzerland, 11-13 June, 2014.

Invited speaker, “*Climate change: It’s about the data isn’t it?*” Fourth Workshop on understanding climate change from data. NCAR, Boulder, CO, 30 June-2 July 2014.

Invited speaker, “*Where is global warming?*” Tokio Marine’s Ninth Summit on Global Warming and Climate Change. Atlanta, GA; 8 Aug. 2014.

Invited colloquium speaker: *Earth’s energy balance revisited*. Michigan State University, East Lansing MI, 18 Sept, 2014.

Invited speaker, “*Seasonal aspects of the recent hiatus is surface warming*”, Session 1 “*Clouds, Circulation and Climate Sensitivity*”, “*The Climate Symposium 2014*” Darmstadt, Germany. 13-17 Oct. 2014.

Invited speaker, “*The changing water cycle: A GEWEX Perspective*”, Session 2 “*The Changing Water Cycle*”, “*The Climate Symposium 2014*” Darmstadt, Germany. 13-17 Oct. 2014.

Invited talk, “*Challenges in Large-Scale Water Availability Changes*” American Geophysical Union, Observed and Projected Climate Change Impacts on Water Resources and Agriculture I session, San Francisco, 15 Dec. 2014.

Invited talk, “*How Does Drought Change With Climate Change*” American Geophysical Union, Drought and Its Impacts on Terrestrial Ecosystems: Current Understanding and Future Prospects I session, San Francisco, 16 Dec. 2014.

Invited speaker, “*The cost of CMIP-6*” CMIP-6 workshop, Univ. Maryland, MD, 9-10 Feb. 2015.

Invited speaker, “*Reanalyses continue to get better and are useful for diagnosing feedbacks: A case study of radiation vs temperatures.*” *Shukla Symposium on Predictability in the Midst of Chaos*. 23-24 April 2015, Rockville, MD.

Invited speaker, “*Earth’s energy imbalance*”, Dept. Environmental Sci., Rutgers University, NJ. 1 May 2015.

Invited talk “*Earth’s energy imbalance*”, International Space Science Institute, Bern, Switzerland, 18-19 June, 2015

Invited talk, “*Attribution of extreme climate events*” IUGG, Prague, Czechoslovakia, 23 June-2 July 2015.

Invited talk, “*Climate feedbacks and relationships between TOA radiation and temperatures on Earth*” IUGG, Prague, Czechoslovakia, 23 June-2 July 2015.

Invited speaker, “*Climate Feedbacks and Relationships Between Top-of-Atmosphere Radiation and Temperatures on Earth*”; Radiation & Climate Gordon Research Conference, *Towards Understanding the Interactions Between Radiation, Clouds, Aerosol, Precipitation and Climate*; Bates College, Lewiston, ME. July 26-31, 2015.

Invited speaker, “*Sun and Earth’s climate*” HAO: Past, Present and Future: A celebration of 75 years of solar science excellence. Boulder CO. 1-3 Sept., 2015.

Invited keynote speaker, “*Approaches to addressing the Earth’s energy imbalance*”. CLIVAR CONCEPT-HEAT Workshop on energy flow through the climate system; MetOffice, Exeter, UK; 29 September - 1 October 2015.

Invited speaker, “*Attribution of climate extreme events*”, 2 hour webinar to National Research Council Committee on [Extreme Weather Events and Climate Change Attribution](#). 14 October, 2015.

Overview talk “*Co-variability of top-of-atmosphere radiation, temperature and precipitation: observations and models.*” Earth Observation for Water Cycle Science 2015 conference, European Space Agency, Frascati, Italy, 20-23 October 2015.

Invited speaker and panelist, “*Future of the IPCC*”, GFDL’s 60th Anniversary Symposium. 2-3 November, 2015, Princeton, NJ.

Invited speaker, “*The intersection of El Niño and climate change.*” El Niño 2015 conference, International Research Institute for Climate and Society, Columbia university, Lamont Doherty Earth Observatory, Palisades, NY, 17-18 Nov. 2015.

Invited talk, “*Relationships Among Top-of-atmosphere Radiation and Atmospheric State Variables in Observations and CESM*” American Geophysical Union, Improved Understanding of the Surface Energy Balance and the Spatiotemporal Variation of Its Components I session, San Francisco, 15 Dec. 2015.

Invited talk and member of Panel, “*Was there a hiatus in the rise of global mean surface temperatures and is it over?*” American Geophysical Union, US CLIVAR Session on the Global Energy Balance, Ocean Heat Content, and the Warming Hiatus; 17 Dec. 2015.

Invited talk: “*Attribution of extreme climate events*”, International Detection and Attribution Group (IDAG) meeting, NCAR, Boulder, CO. Feb 1-3, 2016.

Invited keynote plenary talk, “*Insights into Earth’s Energy Imbalance from multiple sources*”, 50th Canadian Meteorological and Oceanographic Society Congress, Fredericton, New Brunswick, 29 May-2 June, 2016.

Invited talk, “*Attribution of extreme climate events*”, 50th Canadian Meteorological and Oceanographic Society Congress, Fredericton, New Brunswick, 29 May-2 June, 2016.

Invited keynote talk, “*Insights into Earth’s Energy Imbalance from multiple sources*”, Eric Wood Symposium, Princeton University, Princeton, NJ, 1-2 June, 2016.

Invited talk, “*Weather and Climate Extremes: Attribution and Risk*” NCAR, Boulder, CO, 30 June 2016, <https://doi.org/scied.ucar.edu/events/Climate2016>

Invited speaker NASA/Goddard Space Flight Center Scientific Colloquium, Greenbelt, MD, *Implications of Earth’s energy imbalance for surface fluxes and especially ocean heat transports*. 12 Oct, 2016.

Invited speaker, University of Toronto, *Insights into Earth’s Energy Imbalance from multiple sources*, Toronto, Canada. 20 Oct. 2016.

Invited speaker, University of Delaware, *Insights into Earth’s Energy Imbalance from multiple sources*, Newark, DE, 31 Oct. 2016.

Invited seminar U. Reading *Insights into Earth’s Energy Imbalance from multiple sources*. 21 Nov, 2016, Reading, U.K.

Invited seminar U. Oxford “*Intermittency in precipitation: duration, frequency, intensity and amounts using hourly data*” 22 Nov 2016, Oxford, U.K.

Invited talk Royal Society meeting “*Storylines as an alternative way of representing uncertainty in climate change*”. “*Availability of water: too much or too little*”. Chichester Hall, UK. 22-24 Nov. 2016.

Invited participant US Army War College symposium “*Climate impact on national security*” in Carlisle, PA Nov 27-Dec 1, 2016.

Invited talk, AGU, “*A new estimate of surface fluxes and implications, especially for ocean heat transports*” San Francisco, CA. 14 Dec, 2016.

Invited keynote talk NCAR Water Cycle Retreat, “*Intermittency in precipitation: duration, frequency, intensity and amounts using hourly data*” 17 Jan 2017, Boulder CO

Invited talk AMS “*The vital need for a climate information system*”, Weather water and Climate Enterprise, 25 Jan 2017, Seattle, WA

Invited talk and panelist, The University of Alabama and the National Water Center, 2nd Annual Water Policy Summit April 6 & 7, 2017. '*Climate Change: Hydrologic Extremes*', Tuscaloosa, AL

Invited panelist for the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) 31 May-1 June 2017, Bonn, Germany.

Invited seminar, "*The flow of energy through the climate system*", Texas A&M University, 13 September 2017, College Station TX.

Invited seminar, "*Challenges of a sustained climate information system*", NOAA, Boulder, CO., 19 Oct. 2017.

Invited speaker/panelist "*Turning observations into climate information*". Global Environmental Monitoring and Measurement session of The Optical Society (OSA) and The International Photonics Coalition. NCAR (Center Green), Boulder, CO 7 Nov 2017.

Invited talk, Station Scientist session AMS annual meeting "*Are recent hurricane (Harvey, Irma, Maria) disasters natural?*" Austin, TX. 10 Jan. 2018.

Invited talk, Environmental Defense Fund meeting of lawyers, "*Extreme weather and the changing climate*". Hotel Boulderado, Boulder, CO, 27 Feb. 2018.

Invited keynote talk, "*Changes in Hydrological Extremes with Climate Change, including Atlantic hurricanes in 2017*" Extremes 2018, Hannover Herrenhausen, Hannover, Germany, 5-9 March 2018.

Invited talk, "*Why tracking Earth's Energy Imbalance is an imperative.*" International GEWEX Conference, Canmore, Alberta, Canada 5-11 May 2018.

Invited seminar, "*Are Recent Hurricane (Harvey, Irma, Maria) Disasters Natural?* (MMM/ACOM/CGD Joint seminar), NCAR, Boulder, CO 17 May 2018.

Invited talk, "*Implications of Earth's Energy Imbalance and ocean heat content for ocean heat transports*" AOGS, Honolulu, HI, 3-10 June, 2018.

Invited keynote talk, "*Extreme weather and the changing climate*" 7th Global Conference on Global Warming, Izmir, Turkey, June 24-28, 2018.

Invited keynote talk, "*The changing Earth's Energy Imbalance*", 2018 Earth Radiation Budget workshop, NCAR, Boulder, CO, 10-13 September, 2018.

Invited Bownocker lecture and medal, "*The changing Earth's Energy Imbalance*", Ohio State University, 27 September, 2018, Columbus, OH.

Invited colloquium, "*The changing flow of energy through the Earth's climate system*", Auckland University, Auckland, New Zealand, 2 November, 2018.

Invited talk, "*The changing flow of energy through the Earth's Climate System*" WCRP workshop on "The Earth Energy Imbalance and its implications" held in Toulouse, France, 13-17 November, 2018.

Invited talk, "*Evolution of ocean heat content related to ENSO*" CSHOR ENSO Symposium, CSIRO, Hobart, Australia, 29-31 Jan 2019.

Invited lectures, University of Denver Sturm College of Law; mostly 2nd year law students. 8 March 2019. 2 1-hour lectures on climate science and climate policy. Kristi Disney Bruckner, J.D., LL.M Executive Director; Sustainable Development Strategies Group.

Invited keynote lecture. "*Mitigating and living with "natural" hazards: hydrological and climatological.*" Frontier Forum on Geophysics for a Sustainable Future - An American Geophysical Union Centennial Celebration in China. Beijing, China, 5-6 June 2019. Also Panel discussion.

Invited seminar, *The changing flow of energy through the Earth's Climate System*, Institute of Atmospheric Physics, Beijing, China, 6 June 2019

Invited lectures, University of Denver Sturm College of Law; mostly 2nd year law students. 18 October 2019. 2 1-hour lectures on climate science and climate policy. Kristi Disney Bruckner, J.D., LL.M Executive Director; Sustainable Development Strategies Group.

Invited keynote talk, "*Mitigating and living with 'natural' hazards.*" New Zealand Meteorological Society conference, 25-27 Nov, 2019. Wellington, New Zealand.

Invited talk, “*Earth’s changing energy balance*”. American Geophysical Union, San Francisco, 9 Dec. 2019.
Also redone as a webinar on 3 March 2020 under the series "From the Past, Into the Future,"

[Earth’s Changing Energy Budget](#)

Invited talk, “*Time series of ocean meridional heat transport and the role of the Indonesian Throughflow*”,
American Geophysical Union, San Francisco, 12 Dec. 2019

2. Invited general or public lectures

Invited speaker on global warming CISM/CGU (Canadian Geophysical Union) '90 Congress 22–25 May
1990, Ottawa, Canada.

LASERS (Learning about Science Easily and Readily Series) talks “*Children of the Tropics: El Niño and
La Niña*”. NCAR, 2 and 9 December 1993

Invited speaker, Press conference Summit of Eight: G-8 scorecard on global warming. Denver CO, 21 June
1997.

Invited featured speaker, Town Meeting on Global Warming. New Orleans, LA. Oct 3, 1997.

Invited participant, The White House Conf. on Climate Change: The challenge of Global Warming.
Washington D.C., Oct 6. 1997.

Invited participant, Workshop on “*Is there a causal link between decline of amphibian populations and
global climate change.*” Colorado Univ., Boulder CO. 8 May 1998.

Invited speaker (Capitol Hill Briefing), Hart Senate Office Building. Washington DC. 3 June 1998.

Invited lecturer, Project LEARN. Boulder CO. 8 June 1998.

Invited presentation to The Forum for Environmental Law, Science, Engineering and Finance (a.k.a.
F.E.L.S.E.F. or "FailSafe"(TM)) “*The latest scientific evidence about climate change and the latest
economic impact analyses about Kyoto*”, 1450 G Street, N.W., Washington D.C. 13 October 1998.

Invited 6th Annual Kuehnast Lecture, University of Minnesota, 15 October, 1998.

Invited speaker, SOLAR '98 - “*Creating the Right Climate*”, Proc. 36th Annual Conf. of the Australian and
New Zealand Solar Energy Society. Christchurch, New Zealand 25-27 Nov 1998. By video conf.

Invited speaker, Denver/Boulder chapter of the Amer. Meteor. Soc: “*Assessment of recent climate
variations*” Dec. 16 1998.

Invited lecture, Smithsonian Institution, March 31, 1999, Washington D.C.

Invited speaker, Special session on Global Warming, at 1999 American Nuclear Society winter meeting, 16
Nov. 1999, Long Beach CA.

Invited speaker, Human Health and Global Environmental Change course, Harvard Medical School, October
12, 2000. “*The Science of Global Climate Change*”

Invited speaker, USGCRP seminar, “*The Earth's Surface Temperature in the 20th Century: Coming to
Grips with Satellite and Surface-Based Records of Temperature*” Wednesday, May 17, 2000,
Dirksen Senate Office Bldg, Washington D.C.

Invited speaker, The Scripps Howard Institute on the Environment, May 22-27 2000, Boulder. “*Mysteries of
climate variability*”.

Invited speaker, PLAN - Boulder County luncheon, June 2, 2000, University Club, Boulder “*Global
warming is happening*”

Invited speaker, Korean Meteorological Administration ceremony on opening new Climate Change
Information Center, Aug 10, 2000, Seoul, Korea.

Lecturer, Course through Denver University “*Global warming and the American Economy*”, December 11-
15, 2000. 4 Lectures and several discussion groups.

Invited speaker Royal Society of New Zealand, 21 Feb 2001. “*Global climate change and the IPCC*”.
Wellington, New Zealand.

Invited keynote speaker, “Swiss Global Change Day” April 5, 2001, Bern, Switzerland. *“How should rainfall change as climate changes: Prospects for increases in extremes?”*

Invited talk/campus wide public lecture: Albrecht/Earth Day lecture *“Global warming is happening”*. April 23, 2001, Univ. Missouri, Columbia.

Distinguished lecturer, Ford Research Lab, (50th Anniversary), Dearborn MI, May 7, 2001.

Invited speaker, Symposium on "Energy and Climate Change", hosted by the Denver World Affairs Council, August 28th, 2001, Denver.

Invited speaker, Prince of Wales' Business & the Environment Programme. Racine, Wisconsin from 29 October to 2 November 2001.

Invited presentation at First Annual NCAR Climate and Global Change Workshop (for teachers); 29 July 2002. *“El Niño and La Niña - An example of a coupled air-sea process that affects global change.”*

Invited speaker, 52nd Pugwash Conference on 'Science-Sustainability-Security', University of California, La Jolla, CA. August 10-14 2002.

Invited speaker and panelist, The 13th Annual South Platte Forum. Oct 23-24, 2002, Longmont, CO.

Invited talk, local chapter of the Amer. Met. Soc. *Drought and Global Climate Change: Is 2002 a glimpse of the future?* 20 Nov. 2002, Boulder CO.

Invited public talk, Te Papa, Wellington, New Zealand, evening 24 March, 2003 *“The importance of water in climate variability and climate change”*.

Invited keynote address, International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection workshop, May 28-31, 2003, Denver, CO. *“The science of global climate change”*.

Invited JPL-wide public lecture, part of Earth and Space Science Colloquium series, *“The flow of energy through the Earth's climate system”*, April 23, 2004, Pasadena, CA.

Invited distinguished lecturer (Public lecture), University of Oklahoma *“Manifestations of global climate change on accelerating the hydrological cycle: Prospects for increases in extremes.”* Norman OK, January 26, 2005.

Panel member and speaker *"Katrina: a hurricane of issues."* Present Tense Films and Discussion, Boulder Theatre, 11 September, 2005 (Public event about 300 present).

Invited public seminar on Capitol Hill: American Meteorological Society's Environmental Science Seminar Series, *Hurricanes: Are They Changing and Are We Adequately Prepared for the Future?* Dirksen Senate Office Building, Room G-50, Washington D.C., Oct. 25, 2005.

Invited speaker at the Peter Schroeder Colloquium, Michigan State University, 3 November, 2005 *“The flow of energy through the Earth's climate system and implications for climate change.”*

Public lecture, Michigan State University. 2 November, 2005. *“Changes in hurricanes and storms with climate change”*.

Invited public lecture, University of Canterbury, Christchurch, New Zealand, “Science Prestige lecture” *“The Science of global climate change and human influences”*, 24 March 2006.

Invited presenter Public Forum event, *“Hurricanes and climate change”* Wellington, New Zealand, sponsored by School of Earth Science, Victoria University and ICLEI-A/NZ. 27 March 2006.

Invited speaker, Climate Change and Governance Conference, Te Papa, Wellington, New Zealand, 28-29 March, 2006, *“Observed changes to the climate and their causes”* and participant in Panel Discussion.

Invited speaker at Public climate seminar led by ABC TV Channel 7 (Mike Nelson). *“Climate change and water in the West”*. April 12, 2006, Omni, Broomfield CO.

Invited public seminar, Northwest Fisheries Science Center, *“Global climate change and drought in the West”* 25 May 2006, Seattle, Washington.

Invited talk *“The Earth's climate system: variability and change.”* NCAR summer colloquium on Climate and Health. 16-21 July 2006. Boulder, CO.

Invited talk, “*Science of climate change*”. Joint Inter-American Institute (IAI) - NCAR Advanced Study Program (ASP) Colloquium “Policy Planning and Decision Making Involving Climate Change and Variability”, September 11 – 22, 2006. Boulder CO.

Invited talk, “*Global warming and climate changes: The scientific evidence and the possible ramifications upon our resources and future lifestyle.*” 2006 Special District Association of Colorado Annual Conference, Keystone, CO. Sept. 21, 2006. (90 minutes).

Invited talk, “*Global climate change and water in the West*”. National Wildlife Federation. Golden CO. Sept. 27, 2006.

Invited public lecture, University of Utah, “*Observed changes in climate, their causes, and what it means*”. Salt Lake City, 29 November, 2006.

Invited keynote address, “*Le Réchauffement Global L’analyse du GIEC*” (Global warming, the analyses of the Group of Inter-agency Experts on Climate Development = IPCC). Colloque: Changement Climatique: La Caraïbe en danger! Martinique, 11-13 December, 2006

Invited talk “*Global warming is unequivocal*” to VIVA! (Vibrant, Intellectually Vigorous Adults). VIVA! is a self-directed, lifelong learning institute of the University College, University of Denver. Denver CO, 19 February 2007 (90 minutes).

Invited lecture 1.25 hours at Colorado University in course “*Discovering Climate Change*” Russ Monson, Department of Ecol & Evol Biol. 22 February 2007.

Invited talk to Coast Guard Academy, New London, CT. “*Global warming is unequivocal*” 26 Feb. 2007.

Invited Public lecture, “*Global warming is unequivocal*” Harriot College of Arts and Sciences Lecture, East Carolina University. 19 April 2007.

Invited Public lecture, “*Global warming is unequivocal*” University of Wisconsin, Madison. 23 April 2007.

Invited Public lecture, “*Global warming is unequivocal*” Hochstein School of Music, Rochester, New York. 25 April 2007.

Invited keynote address (1 hour) “*Climate and weather forecasting: Issues and prospects for prediction of climate on multiple time scales*” at 27th Annual International Symposium on Forecasting (ISF) in New York City, 26 June 2007.

Invited keynote plenary talk, “*Global warming is unequivocal*”, *Transport–The next 50 years* conference, Christchurch, New Zealand, 25-27 July, 2007.

Invited talk, “*My career and climate change research*”, Linwood College, Christchurch, New Zealand, July 31, 2007.

Invited keynote talk (1 hour) “*Global warming is unequivocal*” to 22nd International Conference on Amorphous and Nanocrystalline Semiconductors. Breckenridge, CO 21 August 2007.

Invited Colloquium lecture, Yale University, “*Global warming is unequivocal*”. New Haven, CT, 12 September 2007.

Invited Public lecture “*Global warming affects us all: What must be done?*” Ecoarts event; Energy & Environmental Security Initiative, 24 September, 2007, Boulder, CO.

Invited Public ESSL/NCAR lecture, “*Global warming, coming ready or not.*” NCAR, Boulder, 18 October 2007.

Invited public lecture “*Global warming is unequivocal*”. Embry-Riddle Aeronautic University, Daytona Beach, FL. 5 November, 2007.

Invited public lecture “*The latest update on climate change and the 4th IPCC assessment.*” Channel 7 (Mike Nelson) Wild Weather Seminar 2007; The Wildlife Experience IMAX Theater, Parker, CO. 13 Nov. 2007.

Invited public lecture, “*Global warming, coming ready or not.*” University of Alabama, Tuscaloosa, AL, 6 Dec. 2007.

Invited public lecture “*Global warming is unequivocal*”. Seagate, Longmont, CO, 10 Jan 2008.

Invited lecture, “*Global warming, coming ready or not.*” Denver University College of Law, Denver. 17 Jan 2008.

Invited lecture “*Global warming is unequivocal*”. IEEE Aerospace conference, Big Sky, MT, 5 March 2008.

Invited public lecture “*Global warming, coming ready or not.*” Sustainable Mountain Living, Estes Park, CO. 1 April 2008. (2 hours)

Invited public lecture “*Global warming: The physical science basis*” Measuring Up conference, UCAR, Boulder, CO. 10 April 2008.

Invited participation in Public Forum: “*How serious is climate change? How serious are we about addressing it?*” Three person panel at Colorado University moderated by Richard Brenne, 2 hours. 17 April 2008.

Invited speaker, 2008 EDUCAUSE Center for Applied Research (ECAR) Summer Symposium, “*Global warming affects us all; What must be done*”, St. Julien Hotel, Boulder, CO, 10 June 2008.

Keynote address, “*Climate change and extreme weather events*”, Catastrophe Modeling Forum, New York, NY., 11-12 June 2008.

Invited talk, “*Climate change, coming ready or not*”, AIG Investments, New York, NY, 13 June 2008.

Panelist, “*Facts about our changing climate*” AMS Broadcast Meteorologist Conference, Denver, CO 28 June 2008.

Invited speaker/panelist “*Global warming*”, Democratic National Convention, Denver, CO 27 August, 2008.

Invited keynote speaker, “*Global warming: Coming ready or not*”, North American Powertrain Executive Management meeting (about 200),. Chicago, Il, 3 September 2008.

Panelist (one of four) for teleconference briefing for Broadcast Meteorologists on “U.S. Climate Science Program Report Updates” focused on changing extremes in climate. Oct. 7, 2008; Q and A for 85 minutes.

Invited public lecture, “*Global warming, coming ready or not!*”, Washington, DC, sponsored by District of Columbia Chapter of the American Meteorological Society, 29 October, 2008.

Invited public lecture, “*Global warming, coming ready or not!*”, University of Houston, Houston, 4 November 2008.

Invited lecture “*Global warming is unequivocal*”, to “Elk Resources” geologists at NCAR, 21 Nov. 2008. Paul E. Belanger, Ph.D., Geologist; Elk Resources, LLC; 1401 17th St., Ste 700; Denver, CO 80202

Invited keynote speaker, “*The flow of energy through the climate system and changes with global warming*”, Annual meeting of the American Physical Society (evening lecture), Pittsburgh, PA 16 March 2009.

Invited panelist (one of 4) on climate change to Offshore Technology Conference, 6 May 2009, Houston, TX. [Over 300 in audience for 2.5 hour panel discussion and presentation.]

Invited public lecture University of Otago, Dunedin, New Zealand. “*The flow of energy through the Earth’s climate system: observations and model performance in the Southern Hemisphere*”. 31 Aug, 2009.

Invited talk “*Global warming: Coming ready or not*” to Global General Gathering of the Triple Nine Society (GGG999) (whose members are all above the 99.9 percentile in intelligence), 7 Sept 2009, Denver, CO.

Invited panelist in public forum: “*Preserving our planet: Climate and Energy. A call to action*” as the second Chautauqua Grant Convergence. Sept, 12, 2009, Boulder, CO.

Invited talk, Rocky Mountain Chapter Explorer’s Club, “*Global Warming: Coming Ready or Not*”, 8 October 2009, Boulder, CO.

Invited public lecture, “*Global Warming: Coming Ready or Not!*”, Sponsored by the Institute for Pure and Applied Mathematics (IPAM), UCLA, May 5, 2010, Los Angeles, CA.

Invited public “Visher lecture”, “*The scientific evidence for global climate change and ramifications for society.*” Indiana University, 17 September 2010, Bloomington, IN.
<https://doi.org/themester.indiana.edu/events/trenberth.shtml>

Invited keynote public lecture at State University of New York at Albany “*The scientific evidence for global climate change and ramifications for society.*” 3 October, 2010, on the occasion of the celebration of the 50th anniversary of the Dept of Atmospheric Science, Albany, NY.

Invited public lecture to AIChE Rocky Mountain Section (American Institute of Chemical Engineers) “*Global Warming – Coming Ready or Not?*”, Univ. Colorado, Boulder, CO on March 15th 2011.

Invited public lecture: *The Russian Heat Wave and other Climate Extremes of 2010*, In assoc. with The University of Victoria, Wellington, New Zealand , 15 Jul 2011.

Invited public lecture: “*Global warming: Coming Ready or Not!*” Osher Lifelong Learning Institute (OLLI) at the University of Denver; Jefferson Unitarian Church. Golden, CO. 27 Sept, 2011.

Invited public lecture, *Global warming: Coming Ready or Not!*” Metro State University, Denver, 7 March, 2012.

Invited lecture “*Perspectives on climate issues*” in Science and Public Policy at CU-Boulder (Physics 3000); Michael Ritzwoller, 1.25 hours. 13 March 2012.

Invited lecture and panelist, “*Climate change and extreme weather*”. Drought or Deluge? The Ocean and the Earth’s Changing Water Cycle”. Redfield Auditorium, Woods Hole, 17 May 2012. 2 hours.
https://doi.org/www.livestream.com/whoitv/video?clipId=pla_0da58105-4459-4224-8d93-387e72bc0eea&utm_source=lslibrary&utm_medium=ui-thumb

Invited Public lecture, “*Global warming, coming ready or not!*”, Ridgfield Public Library, New Jersey, 31 Aug, 2012. (2.5 hours with many questions)

Invited public lecture, “*Climate extremes and climate change: The Russian heat wave and other recent extremes*” Stanford University, San Francisco, CA, 4 Oct, 2012.

Invited public lecture “*Climate extremes and climate change*”, University of New South Wales, Sydney, Australia, 16 October, 2012.

Invited banquet speaker, “*The new normal*”, NOAA 37th Climate Diagnostics and Prediction Workshop, Fort Collins, 22-25 Oct 2012.

Invited speaker, “Climate change and extremes”, Boulder City Council, Broadcast live on Channel 8, 2 April, 2013. Available on line: <https://doi.org/vimeo.com/63349024>

Telepress Conference; Webex: **Climate Change & Ocean Warming**: 11:00AM EST, April 11; Kevin Trenberth and Josh Willis; 1 hour, setup by Climate Nexus.

Invited public lecture, (TED talk), Seattle Science Festival, Seattle on Saturday 15 June 2013 in the www.seattlesciencefestival.org, I am on about beginning minute 34.
<https://doi.org/www.youtube.com/watch?v=beKLrwCvkO0&feature=youtu.be&t=2m14s>

Invited Presentation “*Global warming, coming ready or not!*” to the Sonoran Institute Board, 1.5 hours, 29 June 2013, Boulder, CO.

Keynote talk, ggg999 meeting, Denver 30 Aug 2013 “[Look Out the Window, Global Warming Signs Are Here](https://doi.org/www.youtube.com/watch?v=L_LTM_e7Mfc&list=PLc-WD36KUoif0urxlpvhrd0T26_QI0IVA&index=9)” https://doi.org/www.youtube.com/watch?v=L_LTM_e7Mfc&list=PLc-WD36KUoif0urxlpvhrd0T26_QI0IVA&index=9

Invited speaker, “*How human-induced climate change affects weather extremes.*” University of Rio de Janeiro, Rio de Janeiro, Brazil, 2 September, 2013.

Invited panelist, Performing Arts Center (PAC), Naropa University Graduate Theater program, following “*Moons of Jupiter*” play and discussion of global environmental issues. Boulder, 18 October 2013.

Invited keynote speaker, “*Earth’s energy imbalance*”, American Physical Society, Four Corners Section, conference, University of Denver, Denver, CO, 18-19 October 2013.

Invited after dinner speaker, “*Climate change and weather extremes in Colorado*”, Colorado Mountain Club, annual meeting Boulder Group, Boulder, CO., 9 Nov 2013.

Invited speaker and panelist at Conference on World Affairs, Colorado University, “*Climate Change: It's the Data, not the Politics*” 11 April 2014, Boulder CO.

Webinar: *Extreme Weather: Climate Change Impact, Adaptation and Mitigation*; Presenters Kevin Trenberth and Paty Romero-Lankao. Climate Webinars for Educators: Massive Open Online Course; CIRES Outreach and Education, Colorado University, and UCAR. 16 April 2014; 90 minutes live. 350 signed up. <https://doi.org/new.livestream.com/lmac/extremeweathermitigation>

Invited public lecture (Peter Schroder lecture): *Climate change: It's about the data isn't it?* Michigan State University, East Lansing MI, 18 Sept, 2014.

Invited lecture: *Climate change: It's about the data isn't it?* Fourth International Workshop on Climate Informatics (CI 2014), NCAR, Boulder, CO., 25 Sept, 2014.

Invited lead panelist: “*What are the possibilities for creating a sustainable water supply in the future*”, UN Day 2014, Colorado University, 26 October, 2014. [2 hour event, 3 panelists].

Invited public lecture: “*Climate change: Coming ready or not!*” Colorado Foothills World Affairs Council meeting, Mount Vernon Country Club, Nov. 18, 2014. <https://www.youtube.com/watch?v=RKUlhgjU8Y>

Invited lecture, IPCC Chapter 14: Climate Phenomena and their Relevance for Future Regional Climate Change. Reading the IPCC Report - A CIRES-ATOC Seminar Series. Colorado University, Boulder, CO. 9 Dec., 2014.

Invited public lecture, “*Climate disruption in the wild west region*” 2015 Wild West Citizen’s Climate Lobby Regional conference, Jefferson Unitarian Church, Golden, CO. 7 Feb., 2015

Invited talk and panelist, “*Climate disruption in the U.S.!*” 2015 Solar Power Colorado conference, Broomfield, CO, 23-25 February 2015.

Invited public lecture “*Climate disruption in the U.S.: The fifty shades of climate change*” North Jersey Public Policy lecture March 26, 2015 Ramapo College of NJ, Mahwah, NJ 07480.

Invited student lecture, “*Fifty shades of climate change*”, Research Experiences Undergraduate program, Colorado School of Mines, Golden, CO, 10 July 2015.

Invited lecture, “*How human induced climate change affects us all*”, Rubberized Asphalt conference, RAR2015 Keynote lecture, Las Vegas, NV, 5 October, 2015.

Invited talk and panelist, “*Attribution of climate extreme events*” Tokio Marine's Tenth Summit on Global Warming and Climate Change, Fairmont Mayakoba, Playa del Carmen, Mexico 8-9 October 2015.

Invited speaker, “*Fifty shades of climate change*” Envirofest 2015, October 15, 4:30-9:30 at the Lakewood Cultural Center, Lakewood, CO.

Invited speaker NCAR Explorer Series public Lecture; 20 and 23 Jan 2016. “*What’s going on with El Niño?*” Mesa Lab. NCAR, Boulder CO. <https://ncar.ucar.edu/diversity-education-outreach/kevin-trenberth> https://doi.org/video.ucar.edu/mms/ncar/explorer_series_kevin_trenberth.mp4. Available also: UCARConnect's YouTube channel. A version with American Sign Language interpretation. <https://www.youtube.com/watch?v=fSDdkRFdtTQ> ; <https://doi.org/ucar.us4.list-manage1.com/track/click?u=289033ba2718c3aa3d2b2e76f&id=d55014f82e&e=518491ab42>

Invited speaker, “*Global Warming is Alive and Well (not that this is a good thing)*”, The Audubon Society of Greater Denver and the Sierra Club 2016 Legislative Forum, First Plymouth Congregational Church, Englewood, CO, February 27, 2016

Invited panelist and speaker, MIT Alumni “View from the Top” event, Denver Museum of Nature and Science, Denver, CO 6 April 2016

Invited keynote talk to 2016 Boulder Climate Leaders Workshop, “*Global Warming is Alive and Well (not that this is a good thing)*”, Downtown Boulder, CO, 28 April 2016

Invited public talk: “*El Niño 101*”, SilverSneakers, YMCA of Boulder Valley, Boulder, CO, 26 May 2016.

Invited keynote lecture: *Weather and Climate Extremes: Attribution and Risk*. Climate Change 2016 workshop Broadcast via UCARLive at <https://doi.org/ucarconnect.ucar.edu/live>. NCAR, Boulder, CO., 29 June, 2016.

Invited presenter at a global webinar: “El Niño’s impact on human geography: What we thought, what we learned”. “*2015-16 manifestations of El Niño*” World Wide Human Geography Data, <https://doi.org/wwhgd.org>. 3 Aug., 2016

Invited keynote speaker, *Weather and Climate Extremes: Risks, Resilience, and Attribution* June 30th - July 2nd, 2016, NCAR, Boulder, CO.

Invited public lecture, “*Global Warming is Alive and Well (not that this is a good thing)*”, 30 Oct, 2016; Beth Evergreen Synagogue, Evergreen, CO.

Discussion panel, “*The climate crisis and its solutions*” 2.5 hours, with Al Gore and Henry Pollack, Climate Reality Project training at Colorado Convention Center, over 1000 in attendance. 3 March 2017. <https://www.climaterealityproject.org/>

Invited public lecture and panel, “*Global Warming is Alive and Well (not that this is a good thing)*”, Vail Symposium, 9 March 2017, Vail CO. [Vail Symposium - Convening Locally, Thinking Globally](#)

Invited lecture to over 400 high school students at Ridgewood High School, “*What’s with the weird weather?*” March 28, 2017, Ridgewood, NJ, 07450.

Invited Public Lecture, NCAR Explorer Series, Denver Public Library, “*What’s with the weird weather*”, Denver, CO, 20 April 2017.

Invited public lecture, “*Global Warming is Alive and Well (not that this is a good thing)*”, Community Activism for Progress and Equity (C.A.P.E.) meeting, Mercury Café, Denver, CO, 21 April 2017.

Invited keynote talk (lunch speaker), ‘*The Fifty Shades of Climate Change*’, Rocky Mountain Chapter ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Technical Conference, Denver West Sheraton Hotel, Lakewood, CO. 28 Apr. 2017.

Invited public lecture, “*Climate Change: Prospects for how water issues will shape the world in which we live*”, Temple Sinai, Denver, CO, 25 Oct. 2017.

Invited speaker and panelist, OSA Light, Energy and the Environment Congress 7 November 2017; NCAR (Center Green), Boulder, Colorado.

Invited public lecture (and panelist) “*The science of climate change*”. Fort Lewis College Climate Symposium, Durango, CO, 9 Nov. 2017.

Invited public lecture to TV Broadcasters, “*Extreme weather and the changing climate*”. Steamboat Springs, CO, 25 Jan. 2018.

Invited talk, Charney-Lorenz centennial symposium, “*Ed Lorenz was no Tarzan, but he loved the outdoors, and he had Jane*. MIT, 1-2 February 2018.

Invited Lecture at Denver University, Global Climate Change Law & Policy Seminar at DU Sturm College of Law, “*Extreme weather and the changing climate*”, 2 hours, 9 Feb. 2018.

Invited talk, Environmental Defense Fund meeting of lawyers, “*Extreme weather and the changing climate*”. Hotel Boulderado, Boulder, CO, 27 Feb. 2018

Invited public talk and panel: “*Climate extremes and climate change*” Vail Symposium, 15 March 2018, Vail CO. [Vail Symposium - Convening Locally, Thinking Globally](#)

Invited lecture, “*Changes in climate extremes with climate change*” NWS/Broadcaster’s Denver Climate Change Roundtable Saturday, April 14th. 2018. Metropolitan State University of Denver Campus, Science Building,

Invited public “Earth Day”, talk at “*Changes in climate extremes with climate change*” 27 April, 2018. Oppenheimerfunds, New York, NY. https://players.brightcove.net/24488480001/r1QcbJ5Fx_default/index.html?videoId=5778493290001

Invited public “Ludwick” lecture, “*Changes in climate extremes with climate change*” 1 May 2018, Old Dominion University, Norfolk, VA.

Invited public lecture, “*Climate systems and change*”, Community Event with GEWEX Scientists, 5 May 2018, Canmore Collegiate High School, Alberta, Canada.

Invited Bownocker public lectures and medal, “*Changes in extremes with climate change*”, Ohio State University, 27-28 September, 2018, Columbus, OH.

Julian E. Mack Lecture, “*The changing Earth’s Energy Imbalance*”, The University of Wisconsin-Madison, Oct 4-5, 2018.

Tzvi Gal-Chen Memorial Lecture and medal 2018, “*The changing Earth’s Energy Imbalance*”, University of Oklahoma, 27 Nov, 2018.

Invited lecture “*Changes in climate extremes with climate change*” First New Zealand Capital, Auckland, New Zealand, 4 February 2019 [live to all branches throughout NZ]

Invited lecture “*Changes in climate extremes with climate change*” Temple Sinai, Denver, CO, 27 March 2019.

Invited lecture “*Changes in climate extremes with climate change*” Town and Gown meeting, 8 April, 2019, Boulder, CO.

Invited lecture, AGU annual meeting San Francisco, “Earth’s changing energy budget”.

Invited lectures, University of Denver Sturm College of Law; mostly 2nd year law students. 4 Oct 2020 (3 Oct Denver time). 2 1-hour lectures on climate science and climate policy. Kristi Disney Bruckner, J.D., LL.M Executive Director; Sustainable Development Strategies Group

AGU 2020, zoom, Cheng, Trenberth et al. "Improved estimates of changes in upper ocean salinity and the water cycle" Dec 2020

March 2020: webinar for AGU, repeat of 2019 AGU lecture. “Earth’s changing energy budget”.

Invited keynote talk, “The changing water cycle”, 12 Aug 2020 by zoom. International Association of Chinese Youth in Water Sciences, Beijing. CYWATER.

Vietnam webinar “Run of the Show”. 2 hour interview and webinar to Vietnam journalists,. 17 Nov 2020 <https://wetransfer.com/downloads/38506a3235d0fd6dde4976a2ca895d3620201118134114/7e02d8a3db8c90f457ed24d3d2e907d120201118134131/ad5f27> translated into Vietnamese and featured on Ministry of Environment website.

2020 International Symposium on Water, Ecology and Environment, ISWEE 2020, Keynote talk The Changing Flow of Energy through the Climate System. Dec 6, 2020, by zoom.

NZ Met Soc conference, Nov 25, 2020, Christchurch, An update on The Changing Flow of Energy through the Climate System.

Invited talk, special session AAAS annual meeting, 11 February 2021 (zoom): Consequences of Earth's Energy Imbalance for marine ecosystems.

Spotlight Video:
 Consequences of Earth's Energy Imbalance for Marine Ecosystems
<https://www.dropbox.com/s/ht63dymrx8x6ta0/AM21-27215-Consequences%20of%20Earth%27s%20Energy%20Imbalance%20for%20Marine%20Ecosystems-Trenberth.mp4?dl=0>

Panel Discussion Video:
 Oceanic Responses to the Climate: Recognizing Changes and Extremes
https://www.dropbox.com/s/8wxd6ylnvz9vszz/AM21-27215-2-11_Oceanic%20Reponses%20to%20the%20Climate.mp4?dl=1

Invited seminar, University of Maryland (zoom), The Changing Flow of Energy through the Climate System. 16 Feb. 2021 <https://go.umd.edu/trenberth>, https://www.youtube.com/watch?v=Uz8DNZY5_Tw

Invited seminar, University of Canterbury, Christchurch, The Changing Flow of Energy through the Climate System. 25 Feb. 2021

Invited webinar: *Global Warming Affects Us All: What Must Be Done?* Blackbeam United Cosmos Organization (www.bmuco.org), 2 Aug 2021 by zoom. 45 minutes.

Invited keynote talk. “*The changing flow of energy through the climate system*” TUBA World Conference on Energy Science and Technology, 8-12 August 2021, Turkey Academy of Sciences, virtual conference.

Invited lectures, University of Denver Sturm College of Law; mostly 2nd year law students. 2 Oct 2021 (1 Oct Denver time). 2 1-hour lectures on climate science and climate policy. Plus discussion (2.25 h). Kristi Disney Bruckner, J.D., LL.M Executive Director; Sustainable Development Strategies Group.

Extended interview (90 minutes) on Night Dreams Talk Radio (live), 10 p.m. EDT 22 October, 2021 with Gary Anderson (host) <https://doi.org/www.nightdreamstalkradio.com/>

Invited keynote talk, Inaugural Australasian Decarbonization Conference. Deciphering carbon emissions and climate change. 3 Nov, 2021, Auckland (virtual)

Invited talk to Cosmos Club (based in Washington DC) by zoom. “The Changing Flow of Energy Through the Climate System” May 3, 2022, 5 pm Co-sponsors: Climate Change Mitigation and Adaptation Group, Natural Resources Group, Economics Group. D James Baker host.

Invited “Eminent Speaker” keynote talk “*Climate Change is happening!*” to RAR2022 Málaga Conference: Rubberized Asphalt. www.rar2022.net 26-29 June 2022, Málaga, Spain.

OTHER PROFESSIONAL ACTIVITIES:

Participation in many other conferences and workshops.

Reviewer of papers (through 2015) for:

AAAS book Detection CO₂ Induced Climate Change
American Chemical Society
American Geophysical Union Monograph
American Meteorological Society Monographs
Annals Association for American Geographers
Atmosphere Ocean
The Atmosphere–Ocean System
Bulletin of the American Meteorological Society
Cambridge University Press
Climatic Change
Climate Dynamics
Climate Research
D. C. Heath, Canada Ltd book
Dynamics of Atmospheres and Ocean
Earth's Future
Environmental Science & Technology
Estuarine coastal and shelf science
Environmental Research Letters
Environmental Science & Technology
Environmental Science & Policy
Geophysical Research Letters
IAMAP Symposium Series
International Space Science Institute
Intergovernmental Panel on Climate Change
International J. Climatology
J. Advances in Modeling Earth Systems
J. Applied Meteorology
J. Atmospheric Sciences
J. Climate and Applied Meteorology
J. Climate
J. Climatology
J. Geophysical Research
J. Hydrometeorology
J. Meteor. Soc. Japan
J. Royal Statistical Society

Reviewer of proposals for:

Atmospheric Environmental Service, Canada.
Calspace
Cambridge University Press book proposals
Global Climate Observing System
Hadley Centre
National Environmental Research Council (UK)
German Science Foundation
University of Illinois Research Board

J. Tech.
Meteorology and Atmos. Phys.
Monthly Weather Review
National Academy of Sciences
National Geographic
National Research Council
Nature
Nature climate change
Nature Geosciences
Nature Communications
Nature Sci Rep.
New Zealand Consumer Magazine
New Zealand J. Science
New Zealand Meteor. Service Technical Reports
NOAA Professional Paper Series
O. Acta
PNAS
Procedia Environmental Sciences
Quarterly J. Royal Meteorological Society
Quarterly J. Royal Society of New Zealand
Reidel book chapter
Reports to the Nation series, NOAA.
Second World Climate Conference
Science
Science Advances
Science for Fourth to Eighth graders
Surveys in Geophysics
Surveys in Geophys. and Space Sci.
Tellus
Theoretical and Applied Climate
Weather and Forecasting
WIREs climate change
World Meteorological Organization

National Research Council
National Science Foundation
National Climate Assessment
NASA
NCAR
New Zealand Research Council
New Zealand Marsden Fund
NOAA
NCPO
TOGA, GOALS, CLIVAR, GEWEX
World Bank

Delivered seminars:

Within New Zealand Meteorological Service	1972–1977	6
Outside of New Zealand Meteorological Service	1972–1977	13
Within University of Illinois	1977–1984	12
Outside of University of Illinois	1977–1984	12

Public Service and Other Activities (to 2014):

Participation on radio talkback shows, radio programs, and local television news

Appearances on national TV News: CBS Evening News 1/3/89; CBS Morning Program 1/4/89; NBC Today Show 1/26/89, 3/16/93, NBC Nightly News 4/7/97, NBC Dateline 4/29/97, ABC Evening News 7/2/97, Lehrer News Hour (8 minutes) 12/4/1997,

<https://drive.google.com/file/d/1zi0ls1p0ZiITEVKkamM7pvIbdR1zbYs9/view?usp=sharing>

CBS Evening News 1/9/98, NBC Nightly News 10/21/99, MSNBC 12/28/99, NBC Nightly News and MSNBC 4/1/2000, CNN 24-25 August 2000.

CNN 16 October 2000, CNN: “America's Best” profile of Dr Lonnie Thompson, August 01; ABC News with Peter Jennings, Ned Potter, 13 May 2002; ABC News with Peter Jennings, May 2004. CNN Science show, Camille Feanny:24 and 25 July 2004; interview and commentary on heat waves in Europe 2003. ABC 20/20, 23 September 2005 “Hurricanes and global warming”. May 2006 HBO “Too Hot Not to Handle”. Dozens in January – February 2007 (post IPCC). Lou Dobbs, CNN 12 May 2008. Many others.

Also many appearances on local TV.

Featured on TV shows:

Beyond Tomorrow 1988,

Program on 1993 US flooding,

NHK/Japan Broadcasting Corp. Sept 1993.

Australian ABC TV *Four Corners* 1997,

El Niño BBC and Discover Channel Nov 1997– Feb 1998.

Earth in the Hot Seat, AE 8/16/99;

Understanding Weather, The Learning Channel 11/14/99 and several other times, also Channel 4, U.K.;

Assignment TV New Zealand, 19 April 2000;

What's up with the weather. Frontline/NOVA PBS special 4/18/00;

Planet Earth 2000. ABC News special, 22 April 2000;

TV New Zealand, *Good Morning* (live) 21 Feb 2001.

Globus on German Public Television/NDR, First Channel. Christine Gerberding. April 12, 2002.

Asahi TV, “*Spaceship the Earth*”, July 9, 2003. Mika Yamamoto.

Stonehaven Production Services documentary, “*The End of Eden*” on PBS (February 2005), October 7, 2003. Michael Taylor.

NHK TV Japan, July and November 2005.

KBDI *Global Agenda* half-hour discussion program on climate change, Oct. 26, 2005. Alison Hill producer.

PBS nationwide: *Global Warming: The Signs and The Science*, a one-hour documentary, South Carolina

ETV and Stonehaven Productions. Nov 2, 2005 (and other broadcasts).

NBC Nightly News “*Hurricanes and climate*” 7 September 2008.

PBS NewsHour, live interview for about 6 minutes with Judy Wooruff: 2 July 2012

https://doi.org/www.pbs.org/newshour/bb/weather/july-dec12/climate_07-02.html;

CBS Evening News, Chip Reed. 3 July 2012: Lead story [https://doi.org/www.cbsnews.com/8301-18563_162-](https://doi.org/www.cbsnews.com/8301-18563_162-57466244/heat-wave-raises-warning-signs-for-climate-change-scientists/)

[57466244/heat-wave-raises-warning-signs-for-climate-change-scientists/](https://doi.org/www.cbsnews.com/8301-18563_162-57466244/heat-wave-raises-warning-signs-for-climate-change-scientists/)

NBC Nightly News, Oct, 30, 2012: Sandy, <https://doi.org/video.msnbc.msn.com/nightly-news/49616092/#49616092>

CNN 1 hour documentary “*The coming storms*”: 5 Jan 2013.

Documentary: 1.5 hours, “*Greedy Lying Bastards*”, opened 8 March 2013.

BBC TV *Tornado Earth Juice*; 5/30/13; 4 minute interview. <https://doi.org/www.youtube.com/watch?v=8VU-YxBvuFk>

NBC Nightly News, Jan 8 2014; Anne Thompson interview. <https://doi.org/www.nbcnews.com/video/nightly-news/54016372/#54016372>

ABC News (national) 6 March 2014; Interview on the Return of El Nino. Clayton Sandell. 1:23

<https://doi.org/abcnews.go.com/WNT/video/return-el-nino-22811597>

NBC News May 22, 2014; Global Warming Linked to Frigid U.S. Winter, Scientist Says
By John Roach; <https://doi.org/www.nbcnews.com/science/environment/global-warming-linked-frigid-u-s-winter-scientist-says-n111676>

ABC News, 13 August 2014; Clayton Sandell via World News; <https://doi.org/abcnews.go.com/US/heavy-downpours-increasing-due-global-warming-scientists/story?id=24965926>

Australia ABC News documentary; 16 Oct 2014 air time; The global warming pause
<https://doi.org/www.abc.net.au/catalyst/stories/4107264.htm>

NBC News, 19 Nov, 2014; Freezing on East Coast? Blame a Super Typhoon and Maybe Global Warming. By Miguel Llanos; <https://doi.org/www.nbcnews.com/science/environment/freezing-east-coast-blame-super-typhoon-maybe-global-warming-n252111>

Many interviews on National Public Radio, and other radio programs.

Numerous quotes and work featured in major newspaper and magazine articles.

Major (2 page) newspaper article in “The Press” New Zealand, 28 December 1976

Interviews featured in: N.Y. Times, TIME, U.S. News and World Report, Science, Earth, Science News, Nature, Scientific American, Playboy, Forbes. Mother Jones,

Contributor to many issues of National Geographic (May 1998, March 1999, Oct 2000, Feb. 2001, Sep. 2004, special report April 2008 “*Changing Climate*”)

Talks to Rotary Clubs

Speaker at conventions, meetings etc. (“after dinner speaker”)

Judge at Illinois Junior Academy of Science Expositions

Judge at Boulder Schools' Science Fair

Briefings on climate change for Congressional staff, Washington D.C., 24 Jun 1996, 20 Oct 1997.

Briefings on global climate change for members of State Dept, EPA, USGCRP 11 Jan 1998.

Briefing for NSF, NOAA and NASA program managers on CLIVAR Status. 11 Jan 1998.

Featured interview “Engineering Earth with Kevin Trenberth” and Megan Sever in *Geotimes*, December 2007 pp 38-40.

UNEP's online interactive feature *Ask Today's Expert* from 7 to 8 September 2008.

Yale Forum on climate Change and the Media Rutgers' Francis and NCAR's Trenberth; *June, 2013. Two Expert -- and Diverging – Views on Arctic's Impact on Weather 'Whiplash'* Video interview.

<https://doi.org/www.yaleclimatemediaforum.org/2013/06/video-of-two-expert-and-diverging-views-on-arctics-impact-on-weather-whiplash-francis-trenberth/>

NPR; The 'Consensus' View: Kevin Trenberth's Take On Climate Change by Richard Harris Aug. 23, 2013 5:47 PM <https://doi.org/www.npr.org/2013/08/23/214198814/the-consensus-view-kevin-trenberths-take-on-climate-change>

“*Inquiring Minds*”. Feb 21, 2014; 1 hour interview host Chris Mooney and guests Kevin Trenberth and Jennifer Francis. <https://itunes.apple.com/us/podcast/inquiring-minds/id711675943?mt=2>

Webinar *Extreme Weather: Climate Change Impact, Adaptation and Mitigation*; 16 April 2014; 90 minutes live. Presenters Kevin Trenberth and Paty Romero-Lankao; Climate Webinars for Educators: Massive Open Online Course; CIRES Outreach and Education, Colorado University, and UCAR
<https://doi.org/new.livestream.com/lmac/extremeweathermitigation>

Testimony

Colorado Legislature/Water Conservation Board “Water Forum”, 14 July 1988, Colorado Capitol, Denver
Western Interstate Energy Board, 1 December 1988, Tempe, Arizona

The role of clouds in climate change, U.S. Senate Committee on Commerce, Science and Transportation, Washington, D.C., 7 October 1991.

Climate change and temperatures. The U. S. Senate Committee on Commerce, Science, and Transportation, The United States Senate, May 17, 2000.

The 2001 Assessment of Climate Change. The U. S. Senate Committee on Environment and Public Works, The United States Senate, Room 628 of the Dirksen Senate Building, 9:30 a.m., May 2, 2001.

Observations of climate change: The 2007 IPCC Assessment. Committee on Science and Technology, United States House of Representatives, Room 2318 of the Rayburn House Office Building, 10:00 a.m., February 8, 2007.

Observations of climate change: The 2007 IPCC Assessment. The U. S. Senate Committee on Environment and Public Works, The United States Senate, Dirksen Senate Building, 1:30 p.m. May 2, 2007.

Observations of climate change: The 2007 IPCC Assessment. Committee on Energy and Commerce, United States House of Representatives, Rayburn House Office Building, 9:00 a.m., February 9, 2007.

Colorado General Assembly, Hearing on House Bill 08-1164, Capitol Building, Denver, 8 April, 2008. CO Public Utilities Commission Docket No. 07A-447E, 28 April, 2008 15 pp.

An update on human-induced climate change. The U. S. Senate Committee on Environment and Public Works, The United States Senate, Room 406 of the Dirksen Senate Building, 10:00 a.m., July 22, 2008.

An update on human-induced climate change to the Colorado Air Quality Commission hearings, 17 Sept. 2009, Denver CO.

Testimony in Denver at the Colorado Capitol before the House Energy and Environment committee on HB19-1261, the Climate Action Plan to Reduce Pollution, sponsored by Speaker KC Becker. 5 April 2019. I was on the first expert panel of 4 for best part of an hour.

University of Illinois Teaching experience:

ATMOS 222 Weather Processes
ATMOS 406 Dynamical Weather Prediction
ATMOS 441 Dynamics of Climate and Climate Change
ATMOS 497 Geophysical Fluid Dynamics
ATMOS 397 Statistical Methods in Meteorology
ATMOS 491 Seminar in Atmospheric Sciences
ATMOS 499 Thesis Research

University committees:

Graduate College Engineering and Physical Sciences area Subcommittee 1979–81.
University of Illinois Senate 1979–84.
Committee on Educational Policy 1980–84.
Chairman subcommittee A (Engineering and Physical Sciences) 1981–82.

Departmental committees:

Chairman Graduate Studies Committee 1978–82.
Chairman miscellaneous ad hoc committees.
Participant in many other committees.

Students supervised:

M.S. degree

Daniel A. Paolino, Jr., May 1980
Gary Swanson, September 1980
Won-Tae K. Shin, August 1983
John R. Christy, May 1984

Ph.D. degree

Shyh-Chin Chen, October 1986
John R. Christy, July 1987

Other:

Graduate faculty member 1979–
Supervisor of graduate students

Supervisor of undergraduate (Independent Plan of Study) student (who received honorable mention AMS Undergraduate Scholarships 1984, Gerald Bell).
Special graduate faculty seminar participant (September 1981)

PROFESSIONAL ACTIVITIES

Research grants and contracts

- Title: Predictability of Short-Term Climate Fluctuations
Sponsor: National Science Foundation
Period: 1 November 1978 – 30 April 1980
Amount: \$32,600
Capacity: Principal Investigator
- Title: Predictability of Short-Term Climate Fluctuations
Sponsor: National Center for Atmospheric Research
Period: 1978 – 1982
Amount: \$20K CRU
Capacity: Principal Investigator
- Title: Interannual Variability of the Atmospheric Circulation in the Southern Hemisphere
Sponsor: National Science Foundation
Period: 1 November 1979 – 30 April 1983
Amount: \$142,000
Capacity: Principal Investigator
- Title: The Global and Southern Hemisphere Atmospheric General Circulation
Sponsor: National Science Foundation
Period: 1 November 1982 – 30 April 1986
Amount: \$175,460
Capacity: Principal Investigator, 3rd year Co-P.I. with Dr. Mankin Mak
- Title: Southern Hemisphere General Circulation Studies
Sponsor: National Center for Atmospheric Research
Period: 1982 – 1985
Amount: \$20K CRU + 8 GAU
Capacity: Principal Investigator
- Title: The Global Atmospheric General Circulation
Sponsor: National Science Foundation
Period: 1 November 1985 – 30 April 1988
Amount: \$97,400
Capacity: Principal Investigator, Dr. Mankin Mak Co-PI.
- Title: Interannual Variability of the Global Atmospheric Circulation
Sponsor: TOGA Project Office (NOAA)
Period: 19 May 1986 – May 1989
Amount: \$304,800
Capacity: Principal Investigator
- Title: Interannual Variability of the Global Atmospheric Circulation
Sponsor: TOGA Project Office (NOAA)
Period: May 19, 1989 – May 1992
Amount: \$318,000
Capacity: Principal Investigator
- Title: Case study of the drought of 1988 on regional and global scale
Sponsor: NASA
Period: 1 July 1989 – 31 March 1993
Amount: \$90,000 (180K), 120,000, 60,000 = \$450,000
Capacity: Co-Investigator (R. Dickinson P.I.), NCAR leader 1990–93
- Title: NCAR project to interface modeling on global and regional scales with Earth Observing System (Eos) observations
Sponsor: NASA (Eos Interdisciplinary proposal)
Period: 1 July 1989 – 1999
Amount: \$1,097,000 1992
Capacity: Co-Investigator
- Title: Interannual Variability of the Global Atmospheric Circulation
Sponsor: TOGA Project Office (NOAA)
Period: May 19, 1992 – May 1995
Amount: \$330,000
Capacity: Principal Investigator
- Title: Interannual Variability of the Global Atmospheric Circulation
Sponsor: GOALS/Climate and Global Change Program (NOAA)
Period: April 1995 – March 1999
Amount: \$570,100
Capacity: Principal Investigator
- Title: Global climate datasets for model validation and diagnostic studies
Sponsor: Climate and Global Change Program (NOAA) and NASA
Period: April 1997 – March 2000
Amount: \$324,700
Capacity: Principal Investigator
- Title: Interannual Variability of the Global Atmospheric Circulation
Sponsor: NOAA Climate and Global Change Program
Period: May 1999 – February 2003
Amount: \$580,300
Capacity: Principal Investigator

Title: Global climate datasets for model validation and diagnostic studies
Sponsor: Climate and Global Change Program (NOAA) and NASA
Period: September 2000– August 2003
Amount: \$380,000
Capacity: Principal Investigator

Title: Interannual Variability of the Global Atmospheric Circulation
Sponsor: NOAA Climate and Global Change Program
Period: March 2003 – February 2006
Amount: \$425,050
Capacity: Principal Investigator

Title: Quantifying fresh water fluxes, runoff and precipitation in the global water cycle and applying them to evaluate the CCSM.
Sponsor: National Science Foundation Water Cycle Research
Period: Feb 2003 - February 2006
Amount: \$386,064
Capacity: Co-Principal Investigator with Aiguo Dai.

Title: Evaluation of ERA-40 reanalyses and the vertical structure of the atmosphere.
Sponsor: Climate and Global Change Program (NOAA)
Period: April 2004– March 2007
Amount: \$427,500
Capacity: Principal Investigator

Title: The flow of energy through the coupled ocean-atmosphere system.
Sponsor: NOAA Climate and Global Change Program
Period: June 2006– May 2010
Amount: \$527,100
Capacity: Principal Investigator

Title: Diagnostics in support of MERRA.
Sponsor: NASA
Period: January 2006– December 2006
Amount: \$25,000
Capacity: Principal Investigator

Title: Evaluation of new reanalyses and the vertical structure of the atmosphere.
Sponsor: NOAA Climate and Global Change Program
Period: August 2007– July 2010
Amount: \$390,044
Capacity: Principal Investigator

Title: Diagnostics in support of MERRA: The Flow of Moisture and Energy through the Coupled Climate System (08-MAP-14)
Sponsor: NASA MAP
Period: June 2009-May 2013
Amount: \$133,184, \$182,944, \$220,331, \$225,197
Capacity: Principal Investigator

Title: Diagnostics of the water and energy cycles.
Sponsor: NASA
Period May 2011-Apr. 2014
Amount: \$420,649
Capacity: Principal Investigator

Title: An Informed Guide to Climate Data Sets with Relevance to Earth System Model Evaluation
Sponsor: NSF EASM
Period: Mar. 2011-Feb. 2014
Amount: \$899,973
Capacity: Co-PI

Title: Collaborative Research to Narrow Uncertainties in Precipitation and the Hydrological Cycle in Climate Models
Sponsor: DOE: Office of Biological & Environmental Research within Office of Science
Period: 08/15/2014 to 08/14/2018
Amount: \$507,012
Capacity: Principal Investigator

LIST OF PUBLICATIONS

The total (October 2022) is 71 books or book chapters, and 296 journal articles, 23 Tech. Notes, 117 proceedings or preprints, and 87 other articles, plus four videos, for a total of 594 publications plus 4 videos, and many articles/blogs and podcasts. On the Web of Science, there are 51,775 citations and an H index of 101 (101 publications have 101 or more citations). On Google Scholar, there are > 121,900 citations and an *H index of 129* (or 88 since 2017).

Videos

Guillemot C. J., and K. E. Trenberth, 1992: ENSO: SST monthly mean anomalies Pacific Sector. Jan. 1982–July 1992, 8 minutes (long version) and 5 minutes (short version), plus handout.

Guillemot C. J., and K. E. Trenberth, 1995: ENSO: SST monthly mean anomalies Pacific Sector. Jan. 1982–1994, 4 minutes 20 seconds, plus handout.

Henson, R. and K. E. Trenberth, 1998: Children of the Tropics: El Niño and La Niña. Learning about Science Easily and Readily Series (LASERS), NCAR, Online paper with movie clips:
<https://doi.org/www.ucar.edu/communications/lasers/elnino/>

Books

Trenberth, K. E., 1988: “Global temperature trends.” In *Ozone Depletion, Greenhouse Gases, and Climate Change*, National Academy Press, Washington, D.C., 85–97.

Trenberth, K. E., 1989: TOGA and atmospheric processes. *Understanding Climate Change*, Proc. of IUGG Symp. 15, *Geophys. Monogr.* No. 52, IUGG Vol. 7. A. Berger, R. E. Dickinson, and J. W. Kidson (Eds). Amer. Geophys. Union, Washington, D.C. 117–125.

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Radio Ecoshock Podcast 29 January 2022

Alex Smith

<https://www.ecoshock.org/2022/01/hot-oceans-escaping-consumerism-trenberth-harris.html>

Anyone can listen to using these permanent links:

https://www.ecoshock.net/downloads/ES_Trenberth22.mp3 (larger file, CD quality)

https://www.ecoshock.net/downloads/ES_Trenberth22_LoFi.mp3

Sept 2022

Alex Smith radio@ecoshock.org 10 Sept 22

https://www.ecoshock.net/downloads/ES_Trenberth_ENSO_220907.mp3
https://www.ecoshock.net/downloads/ES_Trenberth_ENSO_220907_LoFi.mp3

The blog about our interview is here:

<https://www.ecoshock.org/2022/09/weather-madness.html>

One Planet podcast

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