

Benjamin David Santer

Atmospheric Scientist
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Professional Address

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Date and Place of Birth

June 3, 1955, Washington DC

Education

Ph.D., 1987, Climatology, Climatic Research Unit, University of East Anglia, Norwich, UK
NATO Research Studentship, 1977, Chemical Oceanography, University of East Anglia, Norwich, UK
B.Sc. (First Class Honors), 1976, Environmental Sciences, University of East Anglia, Norwich, UK

Dissertation

Regional Validation of General Circulation Models (Supervisor: Prof. T.M.L. Wigley)

Honors and Awards

- 2016** Excellence in Reviewing Award, *Geophysical Research Letters*
- 2016** Climate Generation, ClimateGen-10 Climate Scientist Award
- 2016** Excellence in Publication Award, Basic Science category, Lawrence Livermore National Laboratory (for B.D. Santer, S. Solomon, C. Bonfils, M.D. Zelinka, J.F. Painter, F. Beltran, J.C. Fyfe, G. Johannesson, C. Mears, D.A. Ridley, J.-P. Vernier, and F.J. Wentz, *Geophysical Research Letters*, 2015: "Observed multi-variable climate signals of late 20th and early 21st century volcanic activity")
- 2016** Presentation of Third Yanai Lecture, UCLA¹
- 2013** Presentation of 2013 Plummer Lecture, Georgia State University
- 2011** Distinguished Member of Technical Staff, Lawrence Livermore National Laboratory
- 2011** Member, US National Academy of Sciences
- 2011** Fellow, American Geophysical Union
- 2008** Science and Technology Award, Lawrence Livermore National Laboratory ("for key contributors to the *Scientific Assessment Reports of the Intergovernmental Panel on Climate Change*")
- 2008** Lectureship, Dan and Carole Burack President's Distinguished Lecture Series, University of Vermont (for academic year 2008-2009)
- 2008** Inclusion of the 1995 *Climate Dynamics* paper by B.D. Santer *et al.* ("Towards the detection and attribution of an anthropogenic effect on climate") as one of 21 "landmark studies" in "*Climate Change and Anthropogenic Greenhouse Warming: A Selection of Key Articles, 1824-1995*", a compilation produced by the US National Science Digital Library²

¹See: <https://www.atmos.ucla.edu/yanai>

²See: <http://wiki.nsdsl.org/index.php/PALE:ClassicArticles/GlobalWarming>

- 2007** Contributor to all five Scientific Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC); as Convening Lead Author of the chapter on *"Detection of Climatic Change, and Attribution of Causes"* (in 1995), and as Contributing Author to a total of six chapters in the 1990, 2001, 2007, and 2013 Reports. The IPCC was awarded the 2007 Nobel Peace Prize (jointly with Al Gore) for its efforts to *"build up and disseminate greater knowledge about man-made climate change"*
- 2007** Selection as *"highly cited author in the field of global warming"* by Essential Science Indicators³
- 2005** Distinguished Scientist Fellowship, US Dept. of Energy, Office of Biological and Environmental Research
- 2003** Editors' Citation for Excellence in Refereeing, *Geophysical Research Letters*
- 2003** Edward Teller Fellowship, Lawrence Livermore National Laboratory
- 2002** Ernest Orlando Lawrence Award (for Environmental Science and Technology), US Dept. of Energy
- 2002** Editors' Citation for Excellence in Refereeing, *Journal of Geophysical Research (Atmospheres)*
- 2001** Outstanding Scientific Paper Award, US Dept. of Commerce, Environmental Research Laboratories, National Oceanic and Atmospheric Administration (for D.J. Gaffen, B.D. Santer, J.S. Boyle, J.R. Christy, N.E. Graham and R.J. Ross, *Science*, 2000: *"Multi-decadal changes in the vertical structure of the tropical troposphere"*)
- 2000** Inclusion in *"Scientists at Work: Profiles of Today's Groundbreaking Scientists from Science Times"* (edited by Laura Chang)
- 1998** John D. and Catherine T. MacArthur Fellowship
- 1998** Norbert Gerbier-MUMM International Award, World Meteorological Organization (for B.D. Santer *et al.*, *Nature*, 1996: *"A search for human influences on the thermal structure of the atmosphere"*)
- 1997** Outstanding Scientific Paper Award, US Dept. of Commerce, Environmental Research Laboratories, National Oceanic and Atmospheric Administration. (for B.D. Santer *et al.*, *Nature*, 1996: *"A search for human influences on the thermal structure of the atmosphere"*)
- 1975** Project prize, best undergraduate research project, School of Environmental Sciences, University of East Anglia
- 1974** Ford Travel Scholarship

Research Interests

Identification of the "fingerprints" of anthropogenic and natural external forcing in observational climate records; use of statistical methods in the evaluation of climate model performance

Professional Employment and Research Projects

- 8/1992–** Atmospheric Scientist, Physical and Life Sciences Directorate, Lawrence Livermore National Laboratory, Livermore, CA (statistical methods in climate model validation, climate-change detection and attribution studies, supervision of post-docs)
- 1987-1992** Post-doc and Research Scientist, Max-Planck Institute for Meteorology, Hamburg, Germany (detection of human-caused climate change, analysis of equilibrium and transient response to CO₂ forcing, paleoclimate studies, model validation and intercomparison, supervision of graduate students)
- 1983-1987** Research Associate, Climatic Research Unit, University of East Anglia, Norwich, UK. Employed under research contracts with the US Department of Energy and Lawrence Livermore National Laboratory (validation of climate model control run results using Monte Carlo techniques, use of model data in climate impact analysis, quality control of observed surface temperature data, teaching)
- 1980-1983** Project Engineer in the Department of New Technologies, Air Pollution and Climatology Section, Dornier System GmbH, Friedrichshafen, Germany. Employed under research contracts with the European Community, Federal German Ministry for Research and Technology, Federal German Environmental Agency and NATO (impacts of greenhouse-gas-induced climate change, comparison of ambient air

³See: <http://www.esi-topics.com/nhp/2007/january-07-BenjaminDSanter.html>

quality legislation in NATO countries, satellite measurement of meteorological parameters, technical translations)

1978-1979 Junior Research Associate, University of East Anglia, School of Environmental Sciences, Norwich, UK (investigation of eutrophication in the Norfolk Broads)

Professional Affiliations

American Geophysical Union and American Meteorological Society

Highlights of Professional Activities

- 1990** Contributor to Chapter 8 (*"Detection of the Greenhouse Effect in the Observations"*) of 1990 First Assessment Report of the Intergovernmental Panel on Climate Change
- 1/1992** Expert witness at German Bundestag Enquete Commission Hearings on Greenhouse-Gas-Induced Climate Change, Jan. 16-17, Bonn, Germany
- 1992-1993** Consultant to Battelle Pacific Northwest Laboratory. Provided technical assistance in the development of a research strategy for detecting climate change due to anthropogenic emissions of greenhouse gases
- 1994-1995** Convening Lead Author for Chapter 8 (*"Detection of Climatic Change, and Attribution of Causes"*) of 1995 Second Assessment Report of the Intergovernmental Panel on Climate Change
- 1995-1998** Member of Climate Variability and Predictability (CLIVAR) Numerical Experimentation Group (NEG-2)
- 1995-2001** Member of Science Advisory Panel for NOAA *"Climate Change, Data and Detection"* Program
- 1996–** Editorial board, *Climatic Change*
- 1999-2000** Member of National Research Council panel on *"Reconciling Observations of Temperature Change"*
- 2000-2001** Contributing Author to Chapter 12 (*"Detection of Climate Change, and Attribution of Causes"*) of 2001 Third Assessment Report of the Intergovernmental Panel on Climate Change
- 2001-2004** Member of Climate Modeling Advisory Panel, Goddard Institute for Space Studies
- 2003-2009** Co-Chair of Climate Change Working Group, Community Climate System Model
- 2003-2008** Member of Science Review Group, Hadley Centre for Climate Prediction and Research
- 2003-2007** Member of Scientific Steering Committee, NCAR Community Climate System Model
- 2004-2006** Convening Lead Author, Chapter 5 of US Climate Change Science Program Report on *"Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences"*
- 2006-2007** Contributing Author to Chapter 1 (*"Historical Overview of Climate Change Science"*), Chapter 9 (*"Understanding and Attributing Climate Change"*) and Chapter 10 (*"Global Climate Projections"*) of 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change
- 2008-2009** Lead Author, "Global Climate Change" section of Unified Synthesis Product, US Climate Change Science Program
- 5/2010** Testimony before House Select Committee on Energy Independence and Global Warming (hearing on *"Climate Science in the Political Arena"*)
- 11/2010** Testimony before House Committee on Science and Technology, Subcommittee on Energy and Environment (hearing on *"A Rational Discussion of Climate Change: The Science, the Evidence, the Response"*)
- 11/2011** Congressional briefing, House Committee on Natural Resources, Nov. 14, 2011
- 2011–** Member of jury, Stephen Schneider Award for Climate Science Communication
- 2012–** Member of the Board of Directors, National Center for Science Education
- 2012-2013** Member of drafting committee, American Geophysical Union position statement on climate change
- 2013-2014** Member, UK Royal Society/US National Academy of Sciences committee for drafting of joint position statement on climate change

- 1/2014** Presenter to American Physical Society (APS) sub-committee charged with reviewing/updating official APS position statement on climate change
- 2015–** Member, American Geophysical Union James B. Macelwane Medal Committee
- 2015–** Member of the Board of Directors, Climate Generation
- 2016–** Member of the Board of Directors, Juneau Icefield Research Program

Peer-Reviewed Publications⁴

- 1985**
- 1 **Santer, B.D.**, 1985: The use of general circulation models in climate impact analysis - a preliminary study of the impacts of a CO₂-induced climatic change on western European agriculture. *Climatic Change*, **7**, 71-93
- 1990**
- 2 Mikolajewicz, U., **B.D. Santer**, and E. Maier-Reimer, 1990: Ocean response to greenhouse warming. *Nature*, **345**, 589-593
- 3 **Santer, B.D.**, and T.M.L. Wigley, 1990: Regional validation of means, variances and spatial patterns in GCM control runs. *Journal of Geophysical Research*, **95**, 829-850
- 4 Wigley, T.M.L., and **B.D. Santer**, 1990: Statistical comparison of spatial fields in model validation, perturbation, and predictability experiments. *Journal of Geophysical Research*, **95**, 851-865
- 1991**
- 5 Lautenschlager, M., and **B.D. Santer**, 1991: Atmospheric response to a hypothetical Tibetan ice-sheet. *Journal of Climate*, **4**, 386-394
- 1992**
- 6 Cubasch, U., K. Hasselmann, H. Höck, E. Maier-Reimer, U. Mikolajewicz, **B.D. Santer**, and R. Sausen, 1992: Time-dependent greenhouse warming computations with a coupled ocean-atmosphere model. *Climate Dynamics*, **8**, 55-69 ([336 references](#))
- 1993**
- 7 **Santer, B.D.**, T.M.L. Wigley, and P.D. Jones, 1993: Correlation methods in fingerprint detection studies. *Climate Dynamics*, **8**, 265-276
- 1994**
- 8 **Santer, B.D.**, W. Brüggemann, U. Cubasch, K. Hasselmann, H. Höck, E. Maier-Reimer, and U. Mikolajewicz, 1994: Signal-to-noise analysis of time-dependent greenhouse warming experiments. Part 1: Pattern analysis. *Climate Dynamics*, **9**, 267-285
- 9 Cubasch, U., **B.D. Santer**, A. Hellbach, G. Hegerl, H. Höck, E. Maier-Reimer, U. Mikolajewicz, A. Stössel, and R. Voss, 1994: Monte Carlo climate change forecasts with a global coupled ocean-atmosphere model. *Climate Dynamics*, **10**, 1-19

⁴The number of citations is given for publications with more than 100 references (based on ResearcherID). Current h-index = 48 (ResearcherID) and 58 (Google Scholar). “Highly cited” papers (according to data from Essential Science Indicators) are explicitly identified. “Highly cited” signifies that as of May/June 2016, the paper “received enough citations to place it in the top 1% of the academic field of Geosciences based on a highly cited threshold for the field and publication year”.

- 10 Lal, M., U. Cubasch, and **B.D. Santer**, 1994: Effect of global warming on Indian monsoon simulated with a coupled ocean-atmosphere general circulation model. *Current Science*, **66**, 430-438

1995

- 11 **Santer, B.D.**, U. Mikolajewicz, W. Brüggemann, U. Cubasch, K. Hasselmann, H. Höck, E. Maier-Reimer, and T.M.L. Wigley, 1995: Ocean variability and its influence on the detectability of greenhouse warming signals. *Journal of Geophysical Research*, **100**, 10693-10725
- 12 **Santer, B.D.**, K.E. Taylor, T.M.L. Wigley, J.E. Penner, P.D. Jones, and U. Cubasch, 1995: Towards the detection and attribution of an anthropogenic effect on climate. *Climate Dynamics*, **12**, 77-100 ([130 references](#))
- 13 Cubasch, U., **B.D. Santer**, and G.C. Hegerl, 1995: Klimamodelle - wo stehen wir? *Physikalische Blätter*, **51**, 269-276
- 14 Cubasch, U., G. Hegerl, A. Hellbach, H. Höck, U. Mikolajewicz, **B.D. Santer**, and R. Voss, 1995: A climate change simulation starting at an early time of industrialization. *Climate Dynamics*, **11**, 71-84

1996

- 15 Barnett, T.P., **B.D. Santer**, P.D. Jones, R.S. Bradley, and K.R. Briffa, 1996: Estimates of low frequency natural variability in near-surface air temperature. *The Holocene*, **6**, 255-263
- 16 Hegerl, G.C., H.v. Storch, K. Hasselmann, **B.D. Santer**, U. Cubasch, and P.D. Jones, 1996: Detecting anthropogenic climate change with an optimal fingerprint method. *Journal of Climate*, **9**, 2281-2306 ([198 references](#))
- 17 **Santer, B.D.**, K.E. Taylor, T.M.L. Wigley, T.C. Johns, P.D. Jones, D.J. Karoly, J.F.B. Mitchell, A.H. Oort, J.E. Penner, V. Ramaswamy, M.D. Schwarzkopf, R.J. Stouffer, and S. Tett, 1996: A search for human influences on the thermal structure of the atmosphere. *Nature*, **382**, 39-46 ([303 references](#))
- 18 **Santer, B.D.**, K.E. Taylor, T.M.L. Wigley, T.C. Johns, P.D. Jones, D.J. Karoly, J.F.B. Mitchell, A.H. Oort, J.E. Penner, V. Ramaswamy, M.D. Schwarzkopf, R.J. Stouffer, S. Tett, J.S. Boyle, and D.E. Parker, 1996: Human effect on global climate? *Nature*, **384**, 523-524
- 19 **Santer, B.D.**, T.M.L. Wigley, T.P. Barnett, and E. Anyamba, 1996: Detection of Climate Change, and Attribution of Causes, in *Climate Change 1995: The Science of Climate Change*, edited by J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg and K. Maskell, Cambridge University Press, Cambridge, 407-443
- 20 Wigley, T.M.L., **B.D. Santer**, J.F.B. Mitchell, and R.J. Charlson, 1996: Climate change report. *Science*, **271**, 1481-1482

1997

- 21 Jones, P.D., T.J. Osborn, T.M.L. Wigley, P.M. Kelly, and **B.D. Santer**, 1997: Comparison between the microwave sounding unit temperature record and the surface temperature record from 1979 to 1996: Real differences or potential discontinuities? *Journal of Geophysical Research*, **102**, 30135-30145

1998

- 22 Barnett, T.P., G.C. Hegerl, **B.D. Santer**, and K.E. Taylor, 1998: The potential effect of GCM uncertainties and internal atmospheric variability on greenhouse signal detection. *Journal of Climate*, **11**, 659-675
- 23 Wigley, T.M.L., R.L. Smith, and **B.D. Santer**, 1998: Anthropogenic influence on the autocorrelation structure of hemispheric-mean temperatures. *Science*, **282**, 1676-1679
- 24 Wigley, T.M.L., P.J. Jaumann, **B.D. Santer**, and K.E. Taylor, 1998: Relative detectability of greenhouse-gas and aerosol climate change signals. *Climate Dynamics*, **14**, 781-790

1999

- 25 Barnett, T.P., M. Chelliah, K. Hasselmann, G.C. Hegerl, P.D. Jones, E. Rasmusson, C. Ropelewski, and **B.D. Santer**, 1999: Detection and attribution of recent climate change: A status report. *Bulletin of the American Meteorological Society*, **80**, 2631-2659 ([113 references](#))

- 26 Gates, W.L., J.S. Boyle, C. Covey, C.G. Dease, C.M. Doutriaux, R.S. Drach, M. Fiorino, P.J. Gleckler, J.J. Hnilo, S.M. Marlais, T.J. Phillips, G.L. Potter, **B.D. Santer**, K.R. Sperber, K.E. Taylor, and D.N. Williams, 1999: An overview of the results of the Atmospheric Model Intercomparison Project (AMIP I). *Bulletin of the American Meteorological Society*, **80**, 29-55 ([419 references](#))
- 27 **Santer, B.D.**, J.J. Hnilo, J.S. Boyle, C. Doutriaux, M. Fiorino, D.E. Parker, K.E. Taylor, and T.M.L. Wigley, 1999: Uncertainties in observationally-based estimates of temperature change in the free atmosphere. *Journal of Geophysical Research*, **104**, 6305-6333 ([123 references](#))
- 28 M.I. Hoffert, K. Caldeira, C. Covey, P.B. Duffy and **B.D. Santer**, 1999: Solar variability and the Earth's climate. *Nature*, **401**, 764
- 29 Wigley, T.M.L., R.L. Smith, and **B.D. Santer**, 1999: The autocorrelation function and human influences on climate. Response to comment by Tsonis and Elsner, *Science*, **285**, 495a

2000

- 30 Gaffen, D.J., **B.D. Santer**, J.S. Boyle, J.R. Christy, N.E. Graham and R.J. Ross, 2000: Multi-decadal changes in the vertical structure of the tropical troposphere. *Science*, **287**, 1242-1245
- 31 National Research Council, 2000: *Reconciling observations of global temperature change*. National Academy Press, Washington, DC, 85 pp
- 32 **Santer, B.D.**, and T.M.L. Wigley, 2000: Reply to S. Fred Singer. *EOS, Transactions, American Geophysical Union*, **81**, 35,40
- 33 **Santer, B.D.**, T.M.L. Wigley, J.S. Boyle, D.J. Gaffen, J.J. Hnilo, D. Nychka, D.E. Parker, and K.E. Taylor, 2000: Statistical significance of trend differences in layer-average temperature time series. *Journal of Geophysical Research*, **105**, 7337-7356 ([288 references](#))
- 34 **Santer, B.D.**, T.M.L. Wigley, D.J. Gaffen, L. Bengtsson, C. Doutriaux, J.S. Boyle, M. Esch, J.J. Hnilo, P.D. Jones, G.A. Meehl, E. Roeckner, K.E. Taylor and M.F. Wehner, 2000: Interpreting differential temperature trends at the surface and in the lower troposphere. *Science*, **287**, 1227-1232
- 35 Wigley, T.M.L., **B.D. Santer**, and K.E. Taylor, 2000: Correlation approaches to detection. *Geophysical Research Letters*, **27**, 2973-2976

2001

- 36 Duffy, P.B., C. Doutriaux, I.K. Fodor, and **B.D. Santer**, 2001: Effect of missing data on estimates of near-surface temperature change since 1900. *Journal of Climate*, **14**, 2809-2814
- 37 Govindasamy, B., K.E. Taylor, P.B. Duffy, **B.D. Santer**, A.S. Grossman and K.E. Grant, 2001: Limitations of the equivalent CO₂ approximation in climate change experiments. *Journal of Geophysical Research*, **106**, 22593-22603
- 38 **Santer, B.D.**, T.M.L. Wigley, C. Doutriaux, J.S. Boyle, J.E. Hansen, P.D. Jones, G.A. Meehl, E. Roeckner, S. Sengupta, and K.E. Taylor, 2001: Accounting for the effects of volcanoes and ENSO in comparisons of modeled and observed temperature trends. *Journal of Geophysical Research*, **106**, 28033-28059

2002

- 39 Hansen, J., M. Sato, L. Nazarenko, R. Ruedy, A. Lacis, D. Koch, I. Tegen, T. Hall, D. Shindell, **B.D. Santer**, P. Stone, T. Novakov, L. Thomason, R. Wang, Y. Wang, D. Jacob, S. Hollandsworth, L. Bishop, J. Logan, A. Thompson, R. Stolarski, J. Lean, R. Willson, S. Levitus, J. Antonov, N. Rayner, D. Parker, and J. Christy, 2002: Climate forcings in GISS SI2000 simulations. *Journal of Geophysical Research* **107**(D18), 4347, [doi:10.1029/2001JD001143](https://doi.org/10.1029/2001JD001143) ([228 references](#))

2003

- 40 **Santer, B.D.**, R. Sausen, T.M.L. Wigley, J.S. Boyle, K. AchutaRao, C. Doutriaux, J.E. Hansen, G.A. Meehl, E. Roeckner, R. Ruedy, G. Schmidt, and K.E. Taylor, 2003: Behavior of tropopause height and atmospheric

temperature in models, reanalyses, and observations: Decadal changes. *Journal of Geophysical Research*, **108(D1)**, 4002, [doi:10.1029/2002JD002258](https://doi.org/10.1029/2002JD002258)

- 41 **Santer, B.D.**, T.M.L. Wigley, G.A. Meehl, M.F. Wehner, C. Mears, M. Schabel, F.J. Wentz, C. Ammann, J. Arblaster, T. Bettge, W.M. Washington, K.E. Taylor, J.S. Boyle, W. Brüggemann, and C. Doutriaux, 2003: Influence of satellite data uncertainties on the detection of externally-forced climate change. *Science*, **300**, 1280-1284
- 42 **Santer, B.D.**, M.F. Wehner, T.M.L. Wigley, R. Sausen, G.A. Meehl, K.E. Taylor, C. Ammann, J. Arblaster, W.M. Washington, J.S. Boyle, and W. Brüggemann, 2003: Contributions of anthropogenic and natural forcing to recent tropopause height changes. *Science*, **301**, 479-483 ([223 references](#))
- 43 **Santer, B.D.**, T.M.L. Wigley, G.A. Meehl, M.F. Wehner, C. Mears, M. Schabel, F.J. Wentz, C. Ammann, J. Arblaster, T. Bettge, W.M. Washington, K.E. Taylor, J.S. Boyle, W. Brüggemann, and C. Doutriaux, 2003: Response to J.R. Christy and R.W. Spencer. *Science*, **301**, 1047-1049
- 44 Sausen, R., and **B.D. Santer**, 2003: Use of changes in tropopause height to detect human influences on climate. *Meteorologische Zeitschrift*, **12**, 131-136
- 45 Smith, R.L., T.M.L. Wigley and **B.D. Santer**, 2003: A bivariate time series approach to anthropogenic trend detection in hemispheric mean temperatures. *Journal of Climate*, **16**, 1228-1240

2004

- 46 Gillett, N.P., **B.D. Santer**, and A.J. Weaver, 2004: Quantifying the influence of stratospheric cooling on satellite-derived tropospheric temperature trends. *Nature*, **432**, [doi:10.1038/nature03209](https://doi.org/10.1038/nature03209)
- 47 **Santer, B.D.**, T.M.L. Wigley, A. Simmons, P. Kållberg, G. Kelly, S. Uppala, C. Ammann, J.S. Boyle, W. Brüggemann, C. Doutriaux, M. Fiorino, C. Mears, G.A. Meehl, R. Sausen, K.E. Taylor, W.M. Washington, M.F. Wehner, and F.J. Wentz, 2004: Identification of anthropogenic climate change using a second-generation reanalysis. *Journal of Geophysical Research*, **109**, [doi:10.1029/2004JD005075](https://doi.org/10.1029/2004JD005075)
- 48 **Santer, B.D.**, M.F. Wehner, T.M.L. Wigley, R. Sausen, G.A. Meehl, K.E. Taylor, C. Ammann, J. Arblaster, W.M. Washington, J.S. Boyle, and W. Brüggemann, 2004: Response to comment on "Contributions of anthropogenic and natural forcing to recent tropopause height changes". *Science*, **303**, 1771c

2005

- 49 Barnett, T.P., F. Zwiers, G. Hegerl, M. Allen, T. Crowley, N. Gillett, K. Hasselmann, P.D. Jones, **B.D. Santer**, R. Schnur, P. Stott, K.E. Taylor, and S.F.B. Tett, 2005: Detecting and attributing external influences on the climate system: A review of recent advances. *Journal of Climate*, **18**, 1291-1314 ([117 references](#))
- 50 Barnett, T.P., D. Pierce, K. AchutaRao, P. Gleckler, **B.D. Santer**, J. Gregory, and W. Washington, 2005: Penetration of human-induced warming signal into the world's oceans. *Science*, **309**, 284-287 ([257 references](#))
- 51 Eyring, V., N.R.P. Harris, M. Rex, T.G. Shepherd, D.W. Fahey, G.T. Amanatidis, J. Austin, M.P. Chipperfield, M. Dameris, P.M. de F. Forster, A. Gettleman, H.F. Graf, T. Nagashima, P.A. Newman, S. Pawson, M.J. Prather, J.A. Pyle, R.J. Salawitch, **B.D. Santer**, and D.W. Waugh, 2005: A strategy for process-oriented validation of coupled chemistry-climate models. *Bulletin of the American Meteorological Society*, **86**, 1117-1133
- 52 **Santer, B.D.**, T.M.L. Wigley, C. Mears, F.J. Wentz, S.A. Klein, D.J. Seidel, K.E. Taylor, P.W. Thorne, M.F. Wehner, P.J. Gleckler, J.S. Boyle, W.D. Collins, K.W. Dixon, C. Doutriaux, M. Free, Q. Fu, J.E. Hansen, G.S. Jones, R. Ruedy, T.R. Karl, J.R. Lanzante, G.A. Meehl, V. Ramaswamy, G. Russell, and G.A. Schmidt, 2005: Amplification of surface temperature trends and variability in the tropical atmosphere. *Science*, **309**, 1551-1556 ([174 references](#))
- 53 Wigley, T.M.L., C.M. Ammann, **B.D. Santer**, and S.C.B. Raper, 2005: The effect of climate sensitivity on the response to volcanic forcing. *Journal of Geophysical Research*, **110**, D09107, [doi:10.1029/2004JD005557](https://doi.org/10.1029/2004JD005557)
- 54 Wigley, T.M.L., C.M. Ammann, **B.D. Santer**, and K.E. Taylor, 2005: Using the Mount Pinatubo volcanic eruption to determine climate sensitivity: Comments on "Climate forcing by the volcanic eruption of Mount Pinatubo", by David H. Douglass and Robert S. Knox. *Geophysical Research Letters*, **32**, L20709, [doi:10.1029/2005GL023312](https://doi.org/10.1029/2005GL023312)

2006

- 55 AchutaRao, K.M., **B.D. Santer**, P.J. Gleckler, K.E. Taylor, D.W. Pierce, T.P. Barnett, and T.M.L. Wigley, 2006: Variability of ocean heat uptake: Reconciling observations and models. *Journal of Geophysical Research*, **111**, C05019, [doi:10.1029/2005JC003136](https://doi.org/10.1029/2005JC003136)
- 56 Collins, W.D., M. Blackmon, C. Bitz, G. Bonan, C.S. Bretherton, J.A. Carton, P. Chang, S. Doney, J.J. Hack, J.T. Kiehl, T. Henderson, W.G. Large, D. McKenna, **B.D. Santer**, and R.D. Smith, 2006: The Community Climate System Model: CCSM3. *Journal of Climate*, **19**, 2122-2143 ([1,395 references](#); [highly cited](#))
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- 7 **Santer, B.D.**, 1988: Validation of sea-level pressure simulated by the ECMWF T21 model for the Northern Hemisphere, in *Climate Simulations with the ECMWF T21 Model in Hamburg*, edited by H. von Storch, Meteorologisches Institut der Universität Hamburg, Large Scale Atmospheric Modelling Report No. 4, Hamburg, 65-98

1990

- 8 **Santer, B.D.**, T.M.L. Wigley, M.E. Schlesinger, and J.F.B. Mitchell, 1990: Developing climate scenarios from equilibrium GCM results. *Max-Planck-Institut für Meteorologie Report No. 47*, Hamburg, Germany, 14 pp.
- 9 Lautenschlager, M., and **B.D. Santer**, 1990: Atmospheric response to a hypothetical Tibetan ice-sheet. *Max-Planck-Institut für Meteorologie Report No. 46*, Hamburg, Germany, 14 pp.
- 10 Mikolajewicz, U., **B.D. Santer**, and E. Maier-Reimer, 1990: Ocean response to greenhouse warming. *Max-Planck-Institut für Meteorologie Report No. 49*, Hamburg, Germany, 14 pp.
- 11 Sausen, R., U. Cubasch, F. Lunkeit, M. Böttinger, J.M. Oberhuber, K. Hasselmann, E. Roeckner, E. Maier-Reimer, R. Podzun, U. Mikolajewicz, G. Lütgens, **B.D. Santer**, and D. Schriever, 1990: Simulation des transienten CO₂-Treibhauseffektes mit gekoppelten Atmosphäre-Ozean Modellen ("Simulation of the transient enhanced greenhouse effect with coupled atmosphere-ocean models"). *Report to German Ministry of Research and Technology*, Meteorologisches Institut der Universität Hamburg and Max-Planck-Institut für Meteorologie, Hamburg.

1991

- 12 Cubasch, U., K. Hasselmann, H. Höck, E. Maier-Reimer, U. Mikolajewicz, **B.D. Santer**, and R. Sausen, 1991: Time-dependent greenhouse warming computations with a coupled ocean-atmosphere model. *Max-Planck-Institut für Meteorologie Report No. 67*, Hamburg, Germany, 18 pp.
- 13 Jones, P.D., S.C.B. Raper, B.S.G. Cherry, C.M. Goodess, T.M.L. Wigley, **B.D. Santer**, P.M. Kelly, R.S. Bradley, and H.F. Diaz, 1991: An updated global grid point surface air temperature anomaly data set: 1851-1990. *Oak Ridge National Laboratory Environmental Sciences Division Publication No. 3520*, Oak Ridge, Tennessee, 346 pp.
- 14 Sausen, R., U. Cubasch, F. Lunkeit, J.M. Oberhuber, **B.D. Santer**, U. Mikolajewicz, E. Maier-Reimer, and K. Hasselmann, 1991: Transient simulation of coupled atmosphere-ocean model response to greenhouse-gas forcing, in *Proceedings of the 15th Annual Climate Diagnostics Workshop*. US Dept. of Commerce, National Oceanic and Atmospheric Administration, 326-330.

1992

- 15 **Santer, B.D.**, W. Brüggemann, U. Cubasch, K. Hasselmann, H. Höck, E. Maier-Reimer, and U. Mikolajewicz, 1992: Orthogonality of signal and noise in time-dependent greenhouse warming experiments, in *Proceedings of the Fifth International Conference on Statistical Climatology*, 22-26 June 1992, Toronto, Canada, 451-462.
- 16 Cubasch, U., **B.D. Santer**, A. Hellbach, G. Hegerl, H. Höck, E. Maier-Reimer, U. Mikolajewicz, A. Stössel, and R. Voss, 1992: Monte Carlo climate change forecasts with a global coupled ocean-atmosphere model. *Max-Planck-Institut für Meteorologie Report No. 97*, Hamburg, Germany, 51 pp.
- 17 Jones, P.D., **B.D. Santer**, and T.M.L. Wigley, 1992: Fingerprint detection using spatial correlation techniques, in *Proceedings of the Fifth International Conference on Statistical Climatology*, 22-26 June 1992, Toronto, Canada, 437-444.

1993

- 18 **Santer, B.D.**, W. Brüggemann, U. Cubasch, K. Hasselmann, H. Höck, E. Maier-Reimer, and U. Mikolajewicz, 1993: Signal-to-noise analysis of time-dependent greenhouse warming experiments. Part 1: Pattern analysis. *Max-Planck-Institut für Meteorologie Report No. 98*, Hamburg, Germany, 51 pp.
- 19 **Santer, B.D.**, U. Cubasch, U. Mikolajewicz, and G. Hegerl, 1993: The use of general circulation models in detecting climate change induced by greenhouse gases. *PCMDI Report No. 10*, Lawrence Livermore National Lab., Livermore, California, 30 pp.
- 20 Pennell, W.T., T.P. Barnett, K. Hasselmann, H. von Storch, W.R. Holland, T.R. Karl, G.R. North, M.C. MacCracken, **B.D. Santer**, M.E. Moss, G. Pearman, E.M. Rasmusson, W.K. Smith, P. Switzer, F. Zwiers, 1993: The detection of anthropogenic climate change, in *Proceedings of the AMS Fourth Symposium on Global Change Studies*, 17-22 January 1993, Anaheim, California, 21-28.

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- 21 **Santer, B.D.**, 1994: The detection of greenhouse-gas-induced climate change. *US Dept. of Energy Research Summary No. 29*, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 4 pp.
- 22 **Santer, B.D.**, U. Mikolajewicz, W. Brüggemann, U. Cubasch, K. Hasselmann, H. Höck, E. Maier-Reimer, and T.M.L. Wigley, 1994: Ocean variability and its influence on the detectability of greenhouse warming signals. *PCMDI Report No. 14*, Lawrence Livermore National Lab., Livermore, California, 73 pp.
- 23 Cubasch, U., G. Hegerl, A. Hellbach, H. Höck, U. Mikolajewicz, **B.D. Santer**, and R. Voss, 1994: A climate change simulation starting at an early time of industrialization. *Max-Planck-Institut für Meteorologie Report No. 124*, Hamburg, Germany, 33 pp.
- 24 Hegerl, G.C., H.v. Storch, K. Hasselmann, **B.D. Santer**, U. Cubasch, and P.D. Jones, 1994: Detecting anthropogenic climate change with an optimal fingerprint method. *Max-Planck-Institut für Meteorologie Report No. 142*, Hamburg, Germany, 59 pp.
- 25 Mikolajewicz, U., U. Cubasch, G.C. Hegerl, H. Höck, E. Maier-Reimer, **B.D. Santer**, and S. Schultz, 1994: Changes in oceanic circulation of the North Atlantic as a result of an increase in atmospheric greenhouse gas concentrations. *ICES Marine Science Symposium*, **198**, 292-296.

1995

- 26 **Santer, B.D.**, K.E. Taylor, T.M.L. Wigley, J.E. Penner, P.D. Jones, and U. Cubasch, 1995: Towards the detection and attribution of an anthropogenic effect on climate. *PCMDI Report No. 21*, Lawrence Livermore National Lab., Livermore, California, 78 pp.
- 27 **Santer, B.D.**, K.E. Taylor, T.M.L. Wigley, J.E. Penner, P.D. Jones, and U. Cubasch, 1995: Are sulfate aerosols masking a greenhouse warming signal? In: *Proceedings of the 19th Annual Climate Diagnostics Workshop*. US Dept. of Commerce, National Oceanic and Atmospheric Administration, 49-52.
- 28 **Santer, B.D.**, K.E. Taylor, T.M.L. Wigley, P.D. Jones, D.J. Karoly, J.F.B. Mitchell, A.H. Oort, J.E. Penner, V. Ramaswamy, M.D. Schwarzkopf, R.J. Stouffer, and S. Tett, 1995: A search for human influences on the thermal

structure of the atmosphere. *PCMDI Report No. 27*, Lawrence Livermore National Lab., Livermore, California, 26 pp.

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- 29 Barnett, T.P., **B.D. Santer**, and K.E. Taylor, 1996: The potential effect of GCM uncertainties on greenhouse signal detection. *Scripps Institution of Oceanography Reference Series No. 96-7*, 22 pp.

1998

- 30 **Santer, B.D.**, 1998: The Kyoto treaty: A coming of age for the human race. *New Perspectives Quarterly*, **15**, 14-15.

2000

- 31 **Santer, B.D.**, J.J. Hnilo, J.S. Boyle, C. Doutriaux, M. Fiorino, D.E. Parker, K.E. Taylor, and T.M.L. Wigley, 1999: Uncertainties in observationally-based estimates of temperature change in the free atmosphere. *PCMDI Report No. 57*, Lawrence Livermore National Lab., Livermore, California, 29 pp.
- 32 **Santer, B.D.**, T.M.L. Wigley, J.S. Boyle, D.J. Gaffen, J.J. Hnilo, D. Nychka, D.E. Parker, and K.E. Taylor, 2000: Statistical significance of trend differences in layer-average temperature time series. *PCMDI Report No. 59*, Lawrence Livermore National Lab., Livermore, California, 20 pp.

2001

- 33 **Santer, B.D.**, T.M.L. Wigley, C. Doutriaux, J.S. Boyle, J.E. Hansen, P.D. Jones, G.A. Meehl, E. Roeckner, S. Sengupta, and K.E. Taylor, 2001: Accounting for the effects of volcanoes and ENSO in comparisons of modeled and observed temperature trends. *PCMDI Report No. 67*, Lawrence Livermore National Lab., Livermore, California, 67 pp.

2002

- 34 Karl, T.R., J. Christy, **B.D. Santer**, F. Wentz, D. Seidel, J. Lanzante, K. Trenberth, D. Easterling, M. Goldberg, J. Bates, and C. Mears, 2002: Understanding recent atmospheric temperature trends and reducing future uncertainties. Contribution to Strategic Plan for US Climate Change Science Program, Washington DC, 21 pp.

2004

- 35 Eyring, V., N.R.P. Harris, M. Rex, T.G. Shepherd, D.W. Fahey, G. Amanatidis, J. Austin, M.P. Chipperfield, M. Dameris, P. Forster, A. Gettelman, H.F. Graf, T. Nagashima, P.A. Newman, M.J. Prather, J.A. Pyle, R.J. Salawitch, **B.D. Santer**, and D.W. Waugh, 2004: Comprehensive summary of the workshop on "Process-oriented validation of coupled chemistry-climate models". *Stratospheric Processes and their Role in Climate, Newsletter* **23**, 5-11.

2009

- 35 Duffy, P. **Santer, B.D.**, and Wigley, T.M.L., 2009: Interpretations of climate change data. *Physics Today*, **62 (11)**, 10-11.

2010

- 36 **Santer, B.D.**, 2010: Close encounters of the absurd kind.
<http://www.realclimate.org/index.php/archives/2010/02/close-encounters-of-the-absurd-kind/>
- 37 **Santer, B.D.**, 2010: A Eulogy to Stephen Schneider.
<http://www.realclimate.org/index.php/archives/2010/07/a-eulogy-to-stephen-schneider/>
- 38 **Santer, B.D.**, 2010: Testimony for House Select Committee on Energy Independence and Global Warming, Hearing on "Climate Science in the Political Arena", May 20, 2010.

- 39 **Santer, B.D.**, 2010: Testimony for House Committee on Science and Technology, Subcommittee on Energy and Environment, Hearing on “*A Rational Discussion of Climate Change: The Science, the Evidence, the Response*”, November 17, 2010. Available at:
<http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/111710Santer.pdf>

2014

- 40 **Santer, B.D.**, and P.R. Ehrlich, 2014: Stephen Henry Schneider (1945-2010). National Academy Press. Available at: <http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/schneider-stephen.pdf>
- 41 **Santer, B.D.**, 2014: “The Shape of Things to Come for California’s Climate and Agriculture.” University of California Giannini Foundation of Agricultural Economics *ARE Update* **18(1)**, 1-4.

2015

- 40 **Santer, B.D.**, and C.A. Mears, 2015: Human effects on climate are reality, not science fiction. Available at: http://www.opr.ca.gov/docs/Santer_Mears_response.pdf
- 41 **Santer, B.D.**, 2015: Lessons from Madrid for next climate talks. *Nature*, **527**, 165.

2016

- 42 **Santer, B.D.**, 2016: Recent letter not by qualified climate scientist. Available at: http://www.contracostatimes.com/letters/ci_29346696/tri-valley-letters-recent-letter-not-by-qualified
- 43 **Santer, B.D.**, and C.A. Mears, 2016: A response to the “Data or Dogma?” hearing. Available at: <http://skepticalscience.com/Response-Data-or-Dogma-hearing.html>
- 44 **Santer, B.D.**, 2016: Remarks made at Chevron Annual Meeting of Chevron Shareholders. Available at: <http://blog.ucsusa.org/guest-commentary/chevron-shareholder-meeting>
- 45 **Santer, B.D.**, K. Emanuel, R. Weymann, G. Field, and 372 members of the US National Academy of Sciences, 2016: An open letter regarding climate change from concerned members of the U.S. National Academy of Sciences. Available at: <http://responsiblescientists.org>
- 46 **Santer, B.D.**, 2016: Statement of purpose. Available at: <http://www.centralcoastclimatescience.org/essays.html>
Also at: <http://www.yaleclimateconnections.org/2016/11/ben-santer-statement-of-purpose/>
- 47 **Santer, B.D.**, 2016: Open letter to President-elect Donald Trump. Available at: <http://www.cnbc.com/2016/12/22/trump-climate-change-take-action.html>

2017

- 48 **Santer, B.D.**, M. England, E. Hawkins, M. Mann, G. Meehl, Y. Kosaka, and S.-P. Xie, 2017: Letter to Lamar Smith. Available at: <https://www.climate-lab-book.ac.uk/2017/letter-to-lamar-smith/#more-5019>

Other Professional Activities

1	1982	
	July	Participant, Second International School of Climatology on "Climate and Energy: Carbon Dioxide". Erice, Sicily
2	1983	
	September	Invited participant, UNEP/ICSU/WMO Study Conference on "CO ₂ and the Biosphere". Villach, Austria
3	October	Invited participant, Federal German Climatology Conference, Bad Sooden-Allendorf, Germany
4	1984	
	October	Participant, Ninth Annual Climate Diagnostics Workshop, Corvallis, OR
5	1986	
	June	Participant, NATO Advanced Study Institute on "Physically-Based Modelling and Simulation of Climate and Climatic Change", Erice, Sicily
6	October	Invited participant, Conference on "Man and Climate: Anthropogenic Influences on Atmosphere and Climate", Loccum, Germany
7	December	Invited lecturer, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. "Regional validation of General Circulation Models of the atmosphere: The application of Preisendorfer and Barnett Monte Carlo techniques"
8	1987	
	March	Invited lecturer, Max-Planck-Institut für Meteorologie, Hamburg, Germany: "Regional validation of GCMs using Preisendorfer and Barnett Monte Carlo techniques"
9	June	Invited lecturer, Hooke Institute for Atmospheric Research, Oxford, UK: "Regional validation of GCMs using Preisendorfer and Barnett Monte Carlo techniques"
10	1988	
	September	Participant, Workshop on Systematic Errors in Models of the Atmosphere, Toronto, Canada: "Regional validation of means, variances, and spatial patterns in GCM control runs"
11	December	Invited lecturer, German-French Society for Science and Technology, Munich, Germany: "CO ₂ - Die suche nach dem Signal" ("CO ₂ - The search for the signal")
12	1989	
	February	Participant, Workshop on Development of Regional Climate Scenarios for Impact Assessment, IIASA, Laxenburg, Austria
13	May	Invited lecturer, DOE Workshop on Greenhouse-Gas-Induced Climatic Change, Amherst, MA: "Multivariate methods for the detection of greenhouse-gas-induced climatic change"
14	May	Invited lecturer, Climate System Research Program, Texas A&M University, College Station, TX: "Multivariate methods for the detection of greenhouse-gas-induced climatic change"
15	August	Participant, EPA Scenarios Advisory Meeting, NCAR, Boulder, CO: "Developing climate scenarios from GCM equilibrium results"
16	September	Participant, First International Conference on Modelling of Global Climate Change and Variability, Hamburg, Germany: "An attempt to detect the greenhouse-gas signal in a GCM equilibrium simulation"
17	1990	
	January	Participant, IPCC Workshop on Comparison of Transient Simulations with Observations, NASA, Washington DC
18	February	Invited lecturer, Humboldt Universität, East Berlin: "An attempt to detect the greenhouse-gas signal in GCM equilibrium simulations"
19	August	Invited lecturer, Electric Power Research Institute, Palo Alto, CA: "Ocean response to greenhouse warming"
20	August	Invited lecturer, Lawrence Livermore National Laboratory, Livermore, CA: "Recent research activities at the Max-Planck Institute for Meteorology in Hamburg"

21	August	Invited lecturer, University of Arizona, Tree Ring Laboratory, Tucson, AZ: "Ocean response to greenhouse warming"
22	October	Participant, 15 th Annual Climate Diagnostics Workshop, Asheville, NC: "Coupled model simulation of the transient response to greenhouse gas forcing"
23	November	Invited lecturer, Commission of the European Community Workshop on Socio-Economic Effects of Climate Change in Europe, Brussels, Belgium: "Changes in climate and sea level"
1991		
25	November	Invited lecturer, First Demetra Meeting on Climate Variability and Global Change, Chianciano Terme, Italy: "Selecting components of a greenhouse-gas fingerprint"
26	December	Participant, Dahlem Workshop on Global Changes in the Perspective of the Past, Berlin, Germany
1992		
27	January	Invited lecturer, Freie Universität Berlin, Germany: "Signal-to-noise analysis of transient greenhouse warming experiments"
28	April	Invited lecturer, Dept. of Statistics, North Carolina State University, Raleigh, NC: "Signal-to-noise analysis of transient greenhouse warming experiments"
29	April	Invited lecturer, Lawrence Livermore National Laboratory, Livermore, CA: "Signal-to-noise analysis of transient greenhouse warming experiments"
30	June	Invited lecturer, Fifth International Conference on Statistical Climatology, Toronto, Canada: "Orthogonality of signal and noise in time-dependent greenhouse warming experiments"
31	September	Participant, Second International Conference on Modelling of Global Climate Change and Variability, Hamburg, Germany: "Orthogonality of signal and noise in time-dependent greenhouse warming experiments"
32	October	Participant, Conference on Agricultural Dimensions of Global Climate Change, Cornell University, Ithaca, NY: "Issues in detection of climate change using General Circulation Models"
1993		
33	January	Invited lecturer, Climate System Research Program, Texas A&M University, College Station, TX: "Application of optimal detection methods to time-dependent greenhouse warming experiments"
34	August	Invited lecturer, Max-Planck-Institut für Meteorologie, Hamburg, Germany: "Estimates of detection time for ocean greenhouse warming signals"
35	October	Invited lecturer, Goddard Space Flight Center, Greenbelt, MD: "Signal-to-noise analysis of time-dependent greenhouse warming experiments"
1994		
36	March	Invited lecturer, Max-Planck-Institut für Meteorologie, Hamburg, Germany: "Are sulfate aerosols masking a greenhouse warming signal?"
37	March	Invited lecturer, National Research Council Board on Atmospheric Sciences and Climate, Irvine, CA: "Are sulfate aerosols masking a greenhouse warming signal?"
38	June	Invited lecturer, Bureau of Meteorology Research Centre, Melbourne, Australia: "Detecting sulfate aerosol and CO ₂ signals in the observed temperature record"
39	July	Invited lecturer, 12 th Conference of the Australian Statistical Society, Melbourne, Australia: "Statistical methods in climate change detection studies"
40	July	Invited lecturer, Commonwealth Scientific and Industrial Research Organization, Division of Atmospheric Research, Melbourne, Australia: "Statistical methods in climate change detection studies"
41	July	Invited lecturer, Workshop on Studies of Observed and Modelled Climate Variations, Cooperative Research Centre for Southern Hemisphere Meteorology, Melbourne, Australia: "An Introduction to COMPARE - the use of Monte Carlo methods in model validation and for assessing significance in climate change experiments"
42	July	Invited lecturer, NCAR Colloquium on Statistical Methods in Atmospheric Sciences, Boulder, CO: "Fingerprint methods in climate change detection studies"
43	September	Organizer, IPCC Workshop on "Detection of Climate Change, and Attribution of Causes", Livermore, CA

44	October	Participant, Workshop on Global Coupled General Circulation Models, Scripps Institution of Oceanography, La Jolla, CA
45	November	Participant, First IPCC Lead Authors' Drafting Meeting, Sigtuna, Sweden
1995		
46	January	Invited lecturer, Conference on the "Global Climate Observing System", Asheville, NC
47	March	Participant, Second IPCC Lead Authors' Drafting Meeting, Brighton, UK
48	May	Participant, First International AMIP Scientific Conference, Monterey, CA: "Statistical Evaluation of AMIP Model Performance"
49	June	Geophysical Fluid Dynamics Laboratory, Princeton, NJ: "Have sulfate aerosols masked regional-scale features of a greenhouse warming signal?"
50	July	International Union of Geodesy and Geophysics, Boulder, CO: "An overview of recent multivariate climate change detection studies"
51	July	Participant, Third IPCC Lead Authors' Drafting Meeting, Asheville, NC
52	September	Third International Conference on Modelling of Global Climate Change and Variability, Hamburg, Germany: "Have sulfate aerosols masked regional-scale features of a greenhouse warming signal?"
53	September	First International Science Conference on Global Analysis, Interpretation, and Modelling, Garmisch-Partenkirchen, Germany: "The search for a model-predicted signal in observed records of temperature change"
54	November	University of Washington, Seattle, WA: "The search for a model-predicted temperature-change signal in observed records of temperature change"
55	November	Fifth Session of Working Group I of the Intergovernmental Panel on Climate Change, Madrid, Spain: "Detection of climate change and attribution of causes"
56	November	World Meteorological Organization Training Seminar on Climate Change Issues, Madrid, Spain: "Climate change detection and attribution"
57	December	Hadley Centre for Climate Prediction and Research, Bracknell, United Kingdom: "A search for the human influence on the thermal structure of the atmosphere"
58	December	Hadley Centre for Climate Prediction and Research, Bracknell, United Kingdom: "Statistical evaluation of AMIP model performance"
1996		
59	January	Seventy-Sixth Annual Meeting of American Meteorological Society, Atlanta, GA: "Detection of climate change and attribution of causes"
60	February	American Association for the Advancement of Science, 1996 Annual Meeting, Baltimore, MD: "Towards detection and attribution of anthropogenic climate change"
61	February	Environmental Programs Scientific Advisory Committee, Lawrence Livermore National Lab, Livermore, CA: "Detection of anthropogenic climate change"
62	March	Seventeenth Session, Joint Scientific Committee of the World Climate Research Programme, Toulouse, France: "Detection of anthropogenic climate change"
63	May	Invited seminar, US Global Change Research Program, Washington, DC: "The search for a fingerprint of human activities in observed climate records"
64	July	Environmental Programs Director's Review, Lawrence Livermore National Lab, Livermore, CA: "The search for a fingerprint of human activities in observed climate records"
65	August	Participant, Aspen Global Change Institute, Aspen, CO: "Detection and attribution assessment in IPCC proceedings, and the nightmare media aftermath"
66	November	Invited lecture, Muskie Symposium on the Environment and International Affairs, Bates College, Lewiston, ME: "The search for an anthropogenic signal: have human activities influenced global climate?"
1997		
67	April	Keynote speaker, Tandy Technology Scholars Awards Ceremony, New Orleans, LA: "The search for a fingerprint of human activities in global climate records"
68	April	Invited lecture, Fifth US-Dutch International Symposium on Air Pollution in the 21 st Century, Noordwijk, Holland: "Detection of climate change and attribution of causes"

69	May	Lecture to Energy Directorate Advisory Committee, Lawrence Livermore National Laboratory, Livermore, CA: "The search for a human-induced signal in observed climate records"
70	May	Invited lecture, Lawrence Berkeley National Laboratory, Berkeley, CA: "The search for a human-induced signal in observed climate records"
71	June	Invited lecture, Climate System Model Workshop, Breckenridge, CO: "Uncertainties in estimates of 'observed' atmospheric temperature change: Implications for climate-change detection studies"
72	August	Invited lecture, Conference on the World Climate Research Programme: Achievements, Benefits and Challenges, Geneva, Switzerland: "Detection of climate change and attribution of causes"
73	September	Invited lecture, Union of Concerned Scientists, Science Summit on Climate Change, Washington DC: "Climate change detection – The discernibility of a human signal"
74	November	Invited lecture, ICF Program, Lawrence Livermore National Laboratory, Livermore, CA: "The discernibility of a human-induced signal in observed climate records"
75	November	Invited lecture, Stanislaus Environment Education Project, Modesto, CA: "Global warming: natural or human-induced?"
76	December	Invited lecture, American Geophysical Union, San Francisco, CA: "Physical interpretation of differences between near-surface and lower tropospheric temperature trends in the NCEP and ERA reanalyses"
77	December	Invited lecture, American Geophysical Union, San Francisco, CA: "Uncertainties in 'observational' estimates of temperature change in the free atmosphere"
1998		
78	January	Lecture, Joint Institute for Study of Atmosphere and Oceans, Seattle, WA: "Physical interpretation of differences between near-surface and lower tropospheric temperature trends in the NCEP and ERA reanalyses"
79	January	Colloquium, Dept. of Atmospheric Sciences, Univ. of Washington, Seattle, WA: "Uncertainties in 'observational' estimates of temperature change in the free atmosphere"
80	February	Inaugural lecture, Environmental Studies Program, Bates College, Lewiston, ME: "Climate change: natural or human-induced?"
81	February	Public lecture, Bates College, Lewiston, ME: "A personal perspective on political reaction to the IPCC's 'discernible human influence' conclusion"
82	March	Invited lecture, Euroclivar "Beyond Discernibility" meeting, Hadley Centre, Bracknell, UK: "Uncertainties in 'observational' estimates of temperature change in the free atmosphere"
83	March	Invited lecture, Symposium on Understanding Climate Change (in Honor of Syukuro Manabe), Princeton, NJ: "Uncertainties in 'observational' estimates of temperature change in the free atmosphere"
84	May	Invited lecture, Physics Dept., University of California at Davis, Davis, CA: "Climate change: natural or human-induced?"
85	May	Invited lecture, Pacific Union College, Angwin, CA: "Climate change: natural or human-induced?"
1999		
86	January	Invited lecture, Explorers Club, San Francisco, CA: "Climate change: natural or human induced?"
87	May	Invited lecture, Global Climate Change Science Workshop, California Energy Commission, Sacramento, CA: "Climate change – natural or human-induced?"
88	May	Lecture, Earth and Environmental Sciences Directorate Science Advisory Committee, Lawrence Livermore National Lab, Livermore, CA. "Interpreting differences between temperature changes at the Earth's surface and in the lower troposphere"
89	June	Keynote speaker, Conference on Global Climate Change, Trieste, Italy: "Interpreting differences between temperature changes at the Earth's surface and in the lower troposphere"
90	July	Lecture, International Union of Geophysics and Geodesy, Birmingham, UK: "Interpreting differences between temperature changes at the Earth's surface and in the lower troposphere"
91	August	Invited lecture, Dept. of Atmospheric Sciences, Univ. of Washington, Seattle, WA: "Interpreting differences between temperature changes at the Earth's surface and in the lower troposphere"
92	October	Invited lecture, Northern California Geological Society, Orinda, CA: "Climate change: natural or human induced?"

2000		
93	April	Invited lecture, Valley Study Group, Pleasanton, CA: "Climate change: natural or human induced?"
94	November	Invited lecture, University of California at Davis, Davis, CA: "Accounting for the effects of volcanoes and ENSO in comparisons of modeled and observed temperature trends"
95	December	Invited lecture, American Geophysical Union, San Francisco, CA: "A brief history of Chapter 8 of the IPCC's Second Assessment Report"
2001		
100	January	Invited lecture, Workshop on Enhancing Caribbean Climate Data Collection and Processing Capability, University of the West Indies, Mona, Jamaica: "Projections of climate change in the Caribbean Basin from General Circulation Models"
101	January	Keynote address, Pure and Applied Science Conference, University of the West Indies, Mona, Jamaica: "Climate change: Natural or human-induced?"
102	February	Invited lecture, University of Michigan, Dept. of Atmospheric, Oceanic and Space Sciences, Ann Arbor, MI: "Accounting for volcano and ENSO effects in comparisons of modeled and observed temperature trends"
103	February	Keynote address, Doctoral Student Conference, Yale University, New Haven, CT: "Investigating the causes of climate change"
104	March	Presentation, Valley Montessori School, Livermore, CA: "Volcanoes, and what they tell us"
105	May	Invited lecture, American Geophysical Union Spring Meeting, Boston, MA: "Accounting for volcano and ENSO effects in comparisons of modeled and observed temperature trends"
106	September	Invited lecture, US Dept. of Energy Pollution Prevention Award Ceremony, Oakland, CA: "Studying the causes of climate change"
107	October	Presentation, US Dept. of Energy Climate Change Prediction Program, San Diego, CA: "Detection and attribution research at PCMDI"
108	November	Participant, Climate Modeling Advisory Panel, Goddard Institute for Space Studies, New York, NY
2002		
109	June	Invited lecture, Geophysical Fluid Dynamics Laboratory, Princeton, NJ: "Using tropopause height changes to identify human effects on global climate"
110	July	Lecture, Community Climate System Model Workshop, Breckenridge, CO: "Diagnosis of tropopause height behavior in PCM climate-change experiments"
111	August	Invited lecture, Energy Modeling Forum, Workshop on Climate-change Impacts and Integrated Assessment VIII, Snowmass, CO: "Model verification and instrumental climate records"
112	August	Invited lecture, Lawrence Berkeley National Laboratory, Berkeley, CA: "Model evaluation research at PCMDI"
113	September	Invited lecture, National Climatic Data Center, Asheville, NC: "Model evaluation research at PCMDI"
114	October	Invited lecture, 10 th Anniversary Kuehnast Lecture Program, University of Minnesota, Minneapolis, MN: "Studying the nature and causes of climate change"
115	October	Acceptance speech, E.O. Lawrence Award Ceremony, National Academy of Sciences, Washington DC
116	December	Invited talk, Planning Workshop, US Climate Change Science Program, Washington DC: "Resolution of disparities in tropospheric temperature records"
117	December	Invited talk, Director's Distinguished Lecture Series, Lawrence Livermore National Laboratory, Livermore, CA: "A brief history of climate-change detection research at the Program for Climate Model Diagnosis and Intercomparison"
2003		
118	January	Invited talk, University of California President's Council Meeting, Lawrence Livermore National Laboratory, Livermore, CA: "A brief history of climate-change detection research at the Program for Climate Model Diagnosis and Intercomparison"
119	February	Invited talk, Neyman lecture series, Dept. of Statistics, University of California at Berkeley, Berkeley, CA: "Some statistical issues relevant to the detection of human-induced climate change"
120	March	Invited talk, CosmoCaixa Foundation, Madrid, Spain: "Una discusión sobre el Cambio Climático" ("Understanding the causes of climate change")

121	April	Invited talk, Energy and Environment Directorate Review Committee, Lawrence Livermore National Laboratory, Livermore, CA: "A brief history of climate-change detection research at the Program for Climate Model Diagnosis and Intercomparison"
122	April	Invited "Earth Day" lecture, Lawrence Livermore National Laboratory, Livermore, CA: "Recent developments in climate-change detection and attribution research"
123	April	Invited talk, Lamont-Doherty Earth Observatory, Palisades, NY: "Has the troposphere warmed over the satellite era?"
124	April	Lecture, <i>ad hoc</i> Detection Group, Duke University, Durham, NC: "Summary of recent detection and attribution research at PCMDI"
125	June	Invited talk, Statistical and Applied Mathematical Sciences Institute, Boulder, CO: "Some statistical issues relevant to the detection of human-induced climate change"
126	June	Lecture, Community Climate System Model Workshop, Breckenridge, CO: "Contributions of anthropogenic and natural forcing to recent tropopause height changes"
127	July	Invited lecture, Gordon Conference on Solar Radiation and Climate, Colby-Sawyer College, New London, NH: "Recent developments in climate-change detection and attribution research"
128	July	Invited lecture, IRCCSI/SNRI/CEC Societal Impacts Workshop, Tenaya Lodge, CA: "A brief history of climate-change detection research at PCMDI"
129	August	Invited lecture, World Federation of Scientists, 30 th Session of International Seminars on Planetary Emergencies, Erice, Sicily: "New fingerprints of human effects on climate"
130	October	Invited lecture, Workshop on Vertical Temperature Trends, National Climatic Data Center, Asheville, NC: "Assessing consistency between simulated and observed atmospheric temperature trends"
131	November	Invited lecture, Workshop on Process-Oriented Validation of Coupled Chemistry-Climate Models, Garmisch-Partenkirchen, Germany: "Statistical methods in model evaluation"
132	December	Lecture, Valley Montessori School, Livermore, CA: "Why should we care about climate change?"
2004		
133	January	Invited lecture, Environmental Science and Engineering Seminar Series, California Institute of Technology, Pasadena, CA: "Are changes in tropopause height a fingerprint of human effects on climate?"
134	January	Invited lecture, Environmental Science and Engineering Department, California Institute of Technology, Pasadena, CA: "A brief history of Chapter 8 of the IPCC's Second Assessment Report"
135	February	Invited lecture, Climate and Energy Funders Group and Consultative Group on Biodiversity, Funders Strategy Meeting on Climate Change and Energy, Golden Gate Club, San Francisco, CA: "Climate change: Emerging science, and challenges for funding agencies"
136	March	Invited lecture, NASA/Goddard Space Flight Center Seminar Series, Greenbelt, MD: "Changes in tropopause height and atmospheric temperature in a second-generation reanalysis"
137	April	Invited lecture, Haagen-Smit Symposium on Climate Change, Lake Arrowhead, CA: "Climate change detection and attribution: A personal view of the emerging science"
138	April	Lecture, <i>ad hoc</i> detection group, Oxford University, Oxford, UK: "An update on recent detection and attribution activities at PCMDI"
139	June	Invited lecture, Ninth Electric Power Research Institute Global Change Research Seminar, Washington DC: "Climate change detection and attribution: A personal view of the emerging science"
140	June	Invited lecture, First Annual Conference on Climate Change, Sacramento, CA: "Climate change detection and attribution: A personal view of the emerging science"
141	June	Invited lecture, American Association for the Advancement of Science, Pacific Division, Symposium of Future Climate Change: Implications for Western Environments, Utah State University, Logan, UT: "Changes in tropopause height: A new fingerprint of human effects on climate"
142	July	Lecture, 9 th Annual CCSM Workshop, Climate Change Working Group Meeting, Santa Fe, NM: "Detecting climate change fingerprints against total natural variability noise"
143	August	Invited lecture, 129 th American Association of Physics Teachers Annual Meeting, Sacramento, CA: "Fossil fuels and global warming concerns"
144	August	Invited lecture, 3rd SPARC General Assembly, Victoria, British Columbia, Canada: "Are recent tropopause height changes a useful fingerprint of human effects on climate?"

145	August	Invited lecture, Conference on “Hydrogen - Fueling the Clean Air Future”, Palm Desert, CA: “Recent developments in climate change detection and attribution research”
146	September	Invited lecture, Symposium on “Climate Change: Past, Present and Future”, University of Iceland, Reykjavik, Iceland: “Identifying human influences on global climate” (Presentation to Carl XVI Gustaf, King of Sweden)
147	September	Lecture, Workshop on Vertical Temperature Trends, Hadley Centre for Climate Prediction and Research, Exeter, UK: “Identification of anthropogenic climate change using a second-generation reanalysis”
148	September	Invited presentation to public meeting of California Environmental Protection Agency Air Resources Board, Los Angeles, CA: “Recent developments in climate change detection and attribution research”
149	October	Invited lecture, International Sustainability Days Conference, Stanford University, Palo Alto, CA: “New developments in climate science: Progress in detection and attribution research”
150	October	Presentation, Science Team Meeting of US D.O.E. Climate Change Prediction Program, Seattle, WA: “Progress in detection and attribution of climate change: Results from the <i>ad hoc</i> Detection and Attribution Group”
151	December	Invited lecture, Energy and Environment Colloquium, Lawrence Livermore National Laboratory, Livermore, CA: “Identifying human effects on global climate”
2005		
152	February	Invited lecture, Whole Earth Systems Conference (in celebration of Steve Schneider’s 60th birthday), Stanford University, Palo Alto, CA: “What does ‘D&A’ (detection and attribution) evidence tell us?”
153	February	Invited lecture, Annual Meeting, American Association for the Advancement of Science, Washington DC: “What does ‘D&A’ (detection and attribution) evidence tell us?”
154	February	Presentation to National Research Council Review Panel, Chicago, IL: “Overview of Chapter 5 of US Climate Change Science Plan Report on “Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences”
155	March	Invited talk, Energy and Environment Directorate Review Committee, Lawrence Livermore National Laboratory, Livermore, CA: “An update on surface/troposphere temperature reconciliation”
156	April	Invited lecture, Rosenstiel School of Marine and Atmospheric Sciences, Miami, FL: “Tropical lapse rates: A constraint on uncertainties in MSU and radiosonde estimates of tropospheric temperature change?”
157	June	Invited lecture, Electric Power Research Institute 10 th Annual Global Change Research Seminar, Washington DC: “Reconciling climate observations”
158	June	Invited lecture, 10 th Annual Community Climate System Model Workshop, Breckenridge, CO: “The IPCC historical forcing runs: PCMDI analyses of an ensemble of opportunity”
159	September	Invited lecture, Second Annual Climate Change Research Conference, Sacramento, CA: “Has the troposphere warmed since 1979?”
160	September	Invited lecture, 2005 World Sustainable Building Conference, Tokyo, Japan: “Scientific aspects of the climate system and climate change”
161	October	Invited lecture, 2005 Chemistry-Climate Modeling Workshop, Boulder, CO: “Overview of the IPCC climate simulations and assessment needs”
162	November	Presentation to University of California Regent Norman J. Pattiz, Lawrence Livermore National Lab, Livermore, CA: “Climate change research at LLNL”
163	December	Presentation to Bernard Bigot, French High Commissioner of Atomic Energy, Lawrence Livermore National Lab, Livermore, CA: “Climate change research at LLNL”
164	December	Invited presentation, Acterra, Palo Alto, CA: “Global warming: What we know and what’s being done about it”
2006		
165	January	Invited lecture, University of Texas, Institute for Geophysics, Austin, TX: “Causes of ocean surface temperature changes in Atlantic and Pacific tropical cyclogenesis regions”
166	January	Invited lecture, University of Texas, Dept. of Physics, Austin, TX: “The case for a human influence on global climate”
167	March	Invited lecture, Canadian CLIVAR Network Workshop, Victoria, Canada. “Temperature changes in the free atmosphere: Confronting models with data, and data with models”
168	March	Lecture, Fairlands Elementary School, Pleasanton, CA: “Why should we care about climate change?”
169	April	Invited lecture, Cornerstone Research, Menlo Park, CA: “Identifying human influences on global climate”

170	May	Public briefing on Synthesis and Assessment Product 1.1 of the US Climate Change Science Plan, US Department of Commerce, Washington, DC: "Chapter 5: How well can the observed vertical temperature changes be reconciled with our understanding of the causes of these changes?"
171	May	Invited lecture, Stanford University, Palo Alto, CA: "Identifying human influences on global climate: A personal perspective on detection and attribution studies"
172	June	Lecture, 11 th Annual Community Climate System Model Workshop, Breckenridge, CO: "Causes of ocean surface temperature changes in Atlantic and Pacific tropical cyclogenesis regions"
173	August	Invited lecture, International Workshop on Countermeasures to Urban Heat Islands, Tokyo, Japan. "Global climate change: Possible implications for urban environments"
174	September	Keynote speech, Third Annual Climate Change Research Conference, Sacramento, CA: "Recent advances in detection and attribution studies"
175	September	Invited lecture, University of California President's Council on Laboratory Affairs, Livermore, CA: "Causes of ocean surface temperature changes in hurricane formation regions"
176	October	Invited lecture, 2006 Lecture Series on Global Climate Change, Seymour Center at Long Marine Laboratory, Santa Cruz, CA: "Identifying human influences on global climate"
177	November	Presentation to PCMDI Advisory Committee, Livermore, CA: "Detection and attribution research at PCMDI: Recent highlights, and challenges for the future"
178	November	Presentation to Athenian School Applied Science Class, Livermore, CA: "Identifying human influences on global climate"
179	November	Invited lecture, Purdue Climate Change Research Center Distinguished Lecture Series, Purdue University, IN. "Identifying human influences on global climate"
2007		
180	January	Invited lecture, Faculty Resources Network Workshop on "Global Warming: Science, Policy, Curriculum". University of the Sacred Heart, San Juan, Puerto Rico, "Global Climate Change I: Foundations"
181	January	Invited lecture, Faculty Resources Network Workshop on "Global Warming: Science, Policy, Curriculum". University of the Sacred Heart, San Juan, Puerto Rico, "Global Climate Change II: Current research"
182	January	Presentation to Symposium on "Climate Change in the Caribbean", University of Puerto Rico-Rio Piedras, Puerto Rico. "Projections of climate change in the Caribbean Basin from global circulation models"
183	January	Invited lecture, American Meteorological Society's Environmental Science Seminar Series, Washington DC: "The case for a human effect on global climate: How do we know that human activities are important?"
184	February	Presentation to Dr. David L. Goodstein, Vice-Provost, California Institute of Technology, Lawrence Livermore National Lab, Livermore, CA: "Identifying human influences on global climate: How do we know that human activities are important?"
185	February	Invited lecture, Unitarian Universalist Church, Palo Alto, CA: "Identifying human influences on global climate"
186	March	Presentation to Susan Hackwood, Executive Director, California Council on Science and Technology, Lawrence Livermore National Lab, Livermore, CA: "Identifying human influences on global climate: How do we know that human activities are important?"
187	March	Presentation to Environmental Risk Assessment Class, University of San Francisco, San Francisco, CA: "Uncertainties in climate model simulations"
188	April	Lecture, Rosenstiel School of Marine and Atmospheric Sciences, Miami, FL: "Identification of human-induced changes in atmospheric moisture content"
189	April	Invited presentation, Earth Day Symposium, The Athenian School, Danville, CA: "Identifying human influences on global climate: How do we know that human activities are important?"
190	April	Invited lecture, Mathematical Sciences Research Institute, Symposium on Climate Change, Berkeley, CA: "Identifying human-induced climate change: An example"
191	May	Presentation to US Dept. of Energy Livermore Site Office, Lawrence Livermore National Laboratory, Livermore, CA: "Identifying human influences on global climate: How do we know that human activities are important?"
192	May	Invited presentation, Electric Power Research Institute 12 th Global Climate Change Research Seminar, Washington DC: "Recent work on detection and attribution"
193	June	Invited presentation, Valley Study Group, Pleasanton, CA: "Identifying human influences on global climate: How do we know that human activities are important?"

194	June	Lecture, 12 th Annual Community Climate System Model Workshop, Breckenridge, CO: "Identification of human-induced changes in atmospheric moisture content"
195	June	Invited presentation, US State Dept. Conference on "Risky Climate: Disaster Preparedness and Foreign Policy in the 21 st Century", Arlington, VA: "Building confidence in projections of future climate change"
196	August	Keynote speech, Consortium on Climate, Energy, Environment at Lawrence Livermore National Laboratory (C-CELL), Livermore, CA: "Identifying human influences on global climate: How do we know that human activities are important?"
197	September	Invited presentation, News Executives Roundtable: Covering Climate Change. Graduate School of Business, Stanford University, Stanford, CA: "How do scientists know human activities are influencing the global climate?"
198	September	Presentation, Fourth Annual California Climate Change Conference, Sacramento, CA: "Identification of human-induced changes in atmospheric moisture content"
199	September	Keynote speech, 2007 Grantham Prize Seminar on the State of Environmental Journalism, Metcalf Institute for Marine and Environmental Reporting, University of Rhode Island, Narragansett, RI: "Causes of recent climate change, and the climatic shape of things to come"
200	September	Invited talk, Climate Change and Policies: Economic Impacts on Energy Producers in the Western US, San Ramon, CA: "How do we know that human activities influence global climate?"
201	September	Presentation to 9 th grade "Forensic Science" class, Granada High School, Livermore, CA: "Global warming: Whodunnit?"
202	October	Invited talk, American Statistical Association Workshop on "A Statistical Consensus on Global Warming", Boulder, CO: "Detection and attribution of climate change"
203	October	Invited lecture, American Meteorological Society's Environmental Science Seminar Series, Washington DC: "Identifying human-caused changes in atmospheric moisture content"
204	November	Invited lecture, Stanford Linear Accelerator Center Colloquium Series, Menlo Park, CA: "How do we know that human activities have influenced global climate?"
205	December	Keynote speech, Annual Meeting of Pew Fellows Program in Marine Conservation, Morro Bay, CA: "The search for a human-caused climate change signal in the world's oceans"
2008		
206	January	Presentation to Annual Meeting of International Detection and Attribution Group, Boulder, CO: "Human-induced changes in the hydrological cycle of the Western US"
207	January	Presentation to Annual Meeting of International Detection and Attribution Group, Boulder, CO: "Detection and attribution research at PCMDI: Research activities and future work"
208	March	Invited lecture, 2008 American Physical Society Meeting, New Orleans, LA: "Objective methods for detecting climate change and attributing causes"
209	March	Invited lecture, University of Michigan, Ann Arbor, MI: "How do we know that human activities have influenced global climate?"
210	April	Invited lecture, Miami Science Museum FYI Lecture Series, Miami, FL: "Effects of human activity on global climate change: What do we know, and how do we know it?"
211	April	Keynote lecture, Second Annual Electric Aircraft Symposium, San Francisco, CA: "How do we know that human activities have influenced global climate?"
212	April	Presentation to Global Security Directorate Review Committee, Lawrence Livermore National Laboratory, Livermore, CA: "The history and future of climate change research at LLNL"
213	May	Fourth Fred Keeley lecture on Environmental Policy (previous lecturers: Bruce Babbitt, Paul Ehrlich, and Jane Lubchenco), University of California at Santa Cruz, Santa Cruz, CA: "Climate fingerprints: How do we know human activities have influenced global climate change?"
214	May	Presentation to Chemistry, Materials, Earth and Life Sciences Directorate Review Committee, Lawrence Livermore National Laboratory, Livermore, CA: "The history and future of climate change research at LLNL"
215	July	Invited lecture, University of Adelaide, Adelaide, Australia: "How do we know that human activities have influenced global climate?"
216	July	Invited presentation, Energy Modeling Forum, Snowmass, CO: "Making use of climate information from large multi-model archives: Lessons for integrated assessment?"

217	September	Presentation, Fifth Annual California Climate Change Conference, Sacramento, CA: "Including model quality information in detection and attribution studies: One model, one vote?"
218	November	Lecture, Rosenstiel School of Marine and Atmospheric Sciences, Miami, FL: "Including model quality information in detection and attribution studies: One model, one vote?"
2009		
219	January	Invited lecture, Marine Geology and Geophysics Seminar, Oregon State University, Corvallis, OR: "Including model quality information in detection and attribution studies: One model, one vote?"
220	January	Invited lecture, Geosciences/College of Oceanic and Atmospheric Sciences "Global Climate Change" lecture series, Oregon State University, Corvallis, OR: "How do we know that human activities have influenced global climate?"
221	January	Invited lecture, Laboratory Energy Research and Development Working Group, Washington DC: "Consistency of modeled and observed temperature trends in the tropical troposphere".
222	February	Presentation to University of Vermont Statistics Journal Club, Burlington, VT: "Consistency of modeled and observed temperature trends in the tropical troposphere"
223	February	Invited lecture, University of Vermont, Burlington, VT: "Including model quality information in detection and attribution studies: One model, one vote?"
224	February	Dan and Carole Burack Distinguished Lecture Series, University of Vermont, Burlington, VT: "How do we know that human activities have influenced global climate?"
225	February	Invited lecture, Earth Science Seminar Series, Jet Propulsion Laboratory, Pasadena, CA: "Including model quality information in detection and attribution studies: One model, one vote?"
226	February	Invited lecture, Environmental Science and Engineering Seminar Series, California Institute of Technology, Pasadena, CA: "Including model quality information in detection and attribution studies: One model, one vote?"
227	February	16 th Charles and Thomas Lauritsen Memorial Lecture, California Institute of Technology, Pasadena, CA: "How do we know that human activities have influenced global climate?" (Previous lecturers: Aage Bohr, Sir Fred Hoyle, Luis W. Alvarez, Victor F. Weisskopf, John Archibald Wheeler, Sir Denys Wilkinson, Frank Press, Steven Weinberg, Hans A. Bethe, Edwin H. Land, Sir Martin Rees, Richard L. Garwin, Sidney Drell, Ken Deffeyes, and Matthew R. Simmons)
228	March	Invited lecture, Berkeley Atmospheric Science Center Seminar Series, University of California at Berkeley, Berkeley, CA: "Including model quality information in detection and attribution studies: One model, one vote?"
229	April	Invited lecture, 20 th Anniversary Symposium, Program for Climate Model Diagnosis and Intercomparison, Bethesda, MD: "The history and future of climate change detection and attribution research"
230	April	After-dinner lecture, W.L. Gates Symposium, Bethesda, MD: "Larry Gates, the founding of PCMDI, and the rise of the MIPs"
231	April	Invited lecture, Climate Change Science Workshop, Field Museum, Chicago, IL: "Human influence? How do we know?"
232	April	Invited lecture, Third Annual CAFE Electric Aircraft Symposium, Hiller Aviation Museum, San Carlos, CA: "Current update on climate science"
233	April	Invited talk, "All Hands on Green" Conference and Green Jobs Expo, City College of San Francisco, San Francisco, CA: "Current update on climate science"
234	May	Invited lecture, Environmental Risk Management Course, University of San Francisco, San Francisco, CA: "Living with uncertainties in climate models: Lessons from the CMIP-3 archive"
235	May	Invited lecture, Environmental Forum, Woods Institute for the Environment, Stanford University, Palo Alto, CA: "The MSU debate, climate auditing, and the Freedom of Information Act"
236	June	Lecture, Wigley Symposium, National Center for Atmospheric Research, Boulder, CO: "Scientific adventures with Tom: Detecting human-induced climate change, and the great MSU debate"
237	July	Invited lecture, Statistics Department, Stanford University, Palo Alto, CA: "The history and future of climate change detection and attribution research"
238	September	Invited lecture, Workshop on Climate Feedbacks and Future Remote Sensing Observation, Keck Institute for Space Studies, Pasadena, CA: "Observational constraints on the water vapor feedback: A search for the Hall effect"

239	September	Invited lecture, Keck Institute for Space Studies, Pasadena, CA: "The MSU debate, climate auditing, and the Freedom of Information Act"
240	September	Invited talk, Rotary Club, Livermore, CA: "Current update on climate science"
241	September	Invited presentation to the Board of Directors, Apache Corporation, Denver, CO: "How do we know that human activities have influenced global climate?"
242	September	Lecture, Working Group on Coupled Modeling, Cavallo Point, Sausalito, CA: "The International Detection and Attribution Group (IDAG)"
243	October	Invited remote lecture, Texas A&M University, College Station, TX: "The MSU debate, climate auditing, and the Freedom of Information Act"
244	December	Invited lecture, American Geophysical Union Fall Meeting, San Francisco, CA: "Global climate change impacts in the United States: Summary of the 'Global Climate Change' chapter"
245	December	Invited lecture, American Geophysical Union Fall Meeting, San Francisco, CA: "Incorporating model quality information in detection and attribution studies"
2010		
246	January	Invited lecture, Director's Distinguished Lecture Series, Lawrence Livermore National Lab, Livermore, CA: "The MSU debate, climate auditing, and the Freedom of Information Act"
247	January	Keynote lecture, IPCC Expert Meeting on "Assessing and Combining Multi-Model Climate Projections", Boulder, CO: "The difficulties involved in identifying the 'best' model from a large, multi-model archive"
248	February	Invited lecture, Continuing Studies Class on the Copenhagen Meeting, Stanford University, Palo Alto, California: "The MSU debate, climate auditing, and the Freedom of Information Act"
249	April	Invited lecture, UC Berkeley Law School, Berkeley, CA: "The MSU debate, climate auditing, and the Freedom of Information Act"
250	May	Invited lecture, Workshop on Climate Change Science for Broadcast Meteorologists and Weathercasters, Rosenstiel School for Marine and Atmospheric Sciences, Miami, FL: "The scientific evidence for a 'discernible human influence' on global climate"
251	August	Presentation to Dr. William F. Brinkman, Director, US Dept. of Energy Office of Science, Lawrence Livermore National Lab, Livermore, CA: "Climate change detection and attribution"
252	August	Invited presentation, Bay Area Air Quality Management District Climate Change Forum, San Francisco, CA: "A tribute to Stephen H. Schneider"
253	September	Invited presentation, Workshop on "Current Challenges in Computing: Climate Modeling", Napa, CA: "On the difficulty of separating forcing and response errors in model evaluation studies"
254	September	18 th Annual Lecture, Kuehnast Lecture Series, University of Minnesota, Chaska, MN: "The strengths and weaknesses of different climate models: Providing guidance to policymakers and impact analysts"
255	September	Keynote presentation, Climate Adaptation Summit, University of Minnesota, Chaska, MN: "Which climate model is best?"
256	October	Invited presentation, Workshop on "The Interface of Science, Technology & Security: Areas of Most Concern, Now and Ahead", Asia-Pacific Center for Security Studies, Honolulu, HI: "Climate change in the 21 st century: Areas of concern"
257	October	Invited presentation, the California Council on Science and Technology and the National Academy of Sciences, Joint Meeting on "Trust and Accountability in Science and Technology", the Beckman Center, Irvine, CA: "What climate models can and cannot do"
258	October	Invited lecture, Stanford University, Palo Alto, CA: "On the difficulty of separating forcing and response errors in model evaluation studies"
259	October	Invited presentation, Third METamorphosis Conference, Chevron, San Ramon, CA: "The scientific basis for a discernible human influence on global climate"
260	November	Invited panel discussion (with Noah Diffenbaugh), Climate One, The Commonwealth Club, San Francisco, CA: "Science as a contact sport"
261	November	Invited lecture, Distinguished Scientist Seminar Series, Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA: "A life in climate science: From identification of a 'discernible human influence' on climate to identification of the 'top ten' climate models"

262	November	Invited lecture, class on “Introduction to Environmental Science and Policy”, University of California at Davis, Davis, CA: “A personal perspective on key issues in climate science”
263	December	Invited lecture, American Geophysical Union Fall Meeting, Session on “Predictive Modeling and Uncertainty Quantification for Systematic Evaluation of Climate Models and Data-Guided enhancements of Regional Climate Projections”, San Francisco, CA: “Interpreting the latitudinal structure of differences between modeled and observed temperature trends”
264	December	Invited lecture, American Geophysical Union Fall Meeting, Session on “Climate Change Adaptation: Education and Communication”, San Francisco, CA: “Can models replicate observed temperature trends over the past decade?”
2011		
265	January	Invited lecture, Department of Atmospheric and Oceanic Science Seminar Series, University of California at Los Angeles, Los Angeles, CA: “Understanding the causes of differences between modeled and observed temperature trends”
266	February	Invited lecture, Phi Beta Kappa Northern California Association, 25 th Asilomar Conference, Asilomar, CA: “The scientific basis for a “discernible human influence” on global climate”
267	March	Invited lecture, American Physical Society, Physics of Sustainable Energy Conference, University of California at Berkeley, Berkeley, CA: “Studying the causes of recent climate change”
268	March	Invited talk, Leadership Summit on Climate Science Communication, The Pew Charitable Trusts, Washington DC: “The environment of climate science communication”
269	April	Invited talk, George Washington Carver Middle School, Miami, FL: “How scientists study the causes of climate change”
270	April	Invited talk, CAFE Electric Aircraft Symposium V, Santa Rosa, CA: “Climate science: An update”
271	May	Invited talk, IEEE Oakland/East Bay Life Members Affinity Group, Dublin, CA: “How do we know that human activities have affected global climate?”
272	June	Invited talk, Industrial Advisory Board Meeting, Lawrence Livermore National Laboratory, Livermore, CA: “The scientific evidence for a “discernible human influence” on global climate”
273	July	Invited talk, Institutional Education Committee Lecture Series, Lawrence Livermore National Laboratory, Livermore, CA: “Studying the nature and causes of climate change”
274	July	Invited lecture (Museum Talk), Bohemian Grove, Monte Rio, CA: “The causes of recent climate change: Separating fact from fiction”
275	August	Invited talk, 2011 Stephen Henry Schneider Symposium, Boulder, CO: “Steve Schneider and the genesis of the ‘balance of evidence’ statement”
276	August	Invited talk, 2012-2012 Program on Uncertainty Quantification: Climate Modeling Workshop, Pleasanton, CA: “Accounting for signal and noise uncertainties in multi-model detection and attribution studies”
277	September	Presentation, US Dept. of Energy Climate and Earth System Modeling Principal Investigators’ Meeting, Washington DC: “Separating signal and noise in atmospheric temperature changes: The importance of timescale”
278	September	Invited lecture, Frontiers in Global Change Research Lecture Series, Pacific Northwest National Laboratory, Richland, WA: “A life in climate science: From identification of a ‘discernible human influence’ on climate to identification of the ‘top ten’ climate models”
279	October	Invited lecture, Climate and National Security Speaker Series, Sandia National Laboratory, Albuquerque, NM: “Studying the causes of 20 th century climate change, and areas of concern for the 21 st century”
280	October	Invited lecture, CERES Science Team Meeting, Lawrence Livermore National Laboratory, Livermore, CA: “Muted tropospheric warming since 1998: ‘Evidence of absence’ of a human effect on global climate?”
281	October	Invited lecture, Rawlins Environmental Literacy Lecture Series, California State University Chico, Chico, CA: “The causes of recent climate change: Separating fact from fiction”
282	October	Sixth Annual Carolina Climate Change Seminar, University of North Carolina, Chapel Hill, NC: “The scientific evidence for a ‘discernible human influence’ on global climate”
283	October	Technical Seminar, University of North Carolina, Chapel Hill, NC: “Separating signal and noise in atmospheric temperature changes: The importance of timescale”

284	November	Invited lecture, Symposium for Professor Klaus Hasselmann, Hamburg, Germany: "Klaus Hasselmann's 'discernible influence' on climate change detection and attribution research"
285	November	Invited presentation, House Natural Resources Committee, Washington DC, Nov. 14: "A brief introduction to the scientific evidence for a 'discernible human influence' on global climate"
286	November	Invited lecture, Pacific Club Distinguished Lecture Series (co-sponsored by World Affairs Council), Newport Beach, CA: "How do we know that human activities have affected global climate?"
287	December	Invited lecture, American Geophysical Union Fall Meeting, San Francisco, CA: "Assessing the reliability of model-based estimates of high- and low-frequency variability"
288	December	Stephen Schneider Global Environmental Change Lecture, American Geophysical Union Fall Meeting, San Francisco, CA: "A tribute to Stephen H. Schneider and an example of setting the scientific record straight"
289	December	Invited lecture, American Geophysical Union Fall Meeting, San Francisco, CA: "Atmospheric temperature changes in CMIP-5 simulations of forced and unforced climate change"
2012		
290	February	Invited lecture, Climate Reality Project, Berkeley, CA: "How do we know that human activities have affected global climate?"
291	March	Invited lecture, Unitarian Universalist Church and Acterra, Palo Alto, CA: "The causes of recent climate change: Separating fact from fiction"
292	April	Invited lecture, Distinguished Lecture Series, Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT: "A life in climate science: From identification of a 'discernible human influence' on climate to identification of the 'top ten' climate models"
293	April	Lecture, American Security Project, Lawrence Livermore National Lab, Livermore, CA: "Climate change research at LLNL: Studying causes and identifying areas of concern"
294	April	Invited lecture, Cornerstone Research, Menlo Park, CA: "The causes of recent climate change: Separating fact from fiction"
295	May	Presentation to Thomas and Susan d'Aquino, Lawrence Livermore National Lab, Livermore, CA: "Climate change research at LLNL: Studying causes and identifying areas of concern"
296	May	Invited lecture, California Air Pollution Control Officers Association Spring Membership Meeting, Squaw Valley, CA: "The case for a discernible human influence on global climate"
297	May	Invited lecture, Environmental Forum, Woods Institute for the Environment, Stanford University, Palo Alto, CA: "A life in climate science: From identification of a 'discernible human influence' on climate to identification of the 'top ten' climate models"
298	May	Invited lecture, Workshop on "Frontiers in the Detection and Attribution of Climate Change", Banff International Research Station, Banff, Canada: "Identifying a discernible human influence on global climate: A personal perspective on the application of the Hasselmann fingerprint method"
299	June	Invited lecture, Geophysical Fluid Dynamics Laboratory Seminar Series, Princeton, NJ: "Identifying human influence on atmospheric temperature: Are results robust to current uncertainties?"
300	August	Invited lecture, Juneau Icefield Research Program, Camp 18, Juneau Icefield, AK: "The causes of recent climate change: Separating fact from fiction"
301	August	Invited lecture, Juneau Icefield Research Program, Camp 18, Juneau Icefield, AK: "The genesis of the 'balance of evidence' statement in the 1995 IPCC Second Assessment Report"
302	August	Invited lecture, Juneau Icefield Research Program, Camp 18, Juneau Icefield, AK: "The MSU debate, climate auditing, and the Freedom of Information Act"
303	September	Invited lecture, Earth, Atmospheric, and Planetary Sciences Department Lecture Series, Massachusetts Institute of Technology, Cambridge, MA: "Identifying human influence on atmospheric temperature: Are results robust to current uncertainties?"
304	October	Invited lecture, Workshop on Climate Science for Minnesota Broadcast Meteorologists, Science Museum of Minnesota, St. Paul, MN: "Attribution: How do we know there is a human influence on global climate?"
305	October	Invited lecture, U.C. Davis John Muir Institute of the Environment, Davis, CA: "How do we know there is a human influence on global climate?"
306	October	Invited lecture, Sierra Nevada College, School for Environmental Sciences, Incline Village, NV: "How do we know there is a human influence on global climate?"

307	November	Invited presentation, Missile Defense Agency, Lawrence Livermore National Lab, Livermore, CA: "Climate change detection and attribution"
308	December	Invited presentation, American Geophysical Union Fall Meeting, San Francisco, CA: "Identifying human influence on atmospheric temperature: Are results robust to current uncertainties?"
2013		
309	January	Remote presentation to Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, NC: "Identifying human influence on atmospheric temperature: Are results robust to current uncertainties?"
310	January	Invited lecture, Amador Fire Safe Council, Jackson, CA: How do we know there is a human influence on global climate?"
311	February	Invited lecture, University of California at Berkeley, Geography 171 Class ("Climate of the World"), Berkeley, CA: "How do we know there is a human influence on global climate?"
312	February	AEED seminar, Lawrence Livermore National Laboratory, Livermore, CA: "Human and natural influences on the changing thermal structure of the atmosphere"
313	March	2013 Plummer Lecture, Georgia State University, Atlanta, GA: "The search for human 'fingerprints' in observed records of climate change"
314	March	Invited lecture, Geosciences Department, Georgia State University, Atlanta, GA: "Exploring the causes of changes in the thermal structure of the atmosphere"
315	March	Invited lecture, Climate Smart-Agriculture: Global Science Conference, University of California at Davis, Davis, CA: "How do we know it's us?"
316	April	Invited lecture, Climate Change, Water and Society (IGERT) First Annual Workshop, Sacramento, CA: "The search for human fingerprints in observed records of climate change"
317	April	Invited lecture, Principia College, Elmhurst, IL: "How do we know it's us?"
318	April	Invited lecture, Oak Ridge National Laboratory, Oak Ridge, TN: "A life in climate science: From identification of a 'discernible human influence' on climate to identification of the 'top ten' climate models"
319:	April	Invited lecture, Climate Change Science Institute, Oak Ridge National Laboratory, Oak Ridge, TN: "Human and natural influences on the changing thermal structure of the atmosphere"
320	May	Lecture, Atmospheric Seminar Series, Lawrence Livermore National Laboratory, Livermore, CA: "The recent 'warming hiatus': Scientific surprise or expected behavior?"
321	June	Lecture, Defense Science Study Group, Lawrence Livermore National Laboratory, Livermore, CA: "Climate fingerprinting research at LLNL"
322	July	Invited plenary lecture, 2013 Annual Meeting of the Society for Industrial and Applied Mathematics, San Diego, CA: "The search for a human influence on the changing thermal structure of the atmosphere"
323	August	Invited lecture, 2013 Joint Statistical Meetings, Session on Climate Change Detection and Attribution, Montréal, Canada: "Identifying human influences on atmospheric temperature: Are results robust to uncertainties?"
324	August	Invited lecture, Third Workshop on Understanding Climate Change from Data, Northwestern University, Evanston, IL: "The search for a human influence on the changing thermal structure of the atmosphere"
325	September	Invited lecture, Workshop on Climate Change Science for Southwestern Broadcast Meteorologists and Weathercasters, University of Arizona, Tucson, AZ: "Causation and attribution: Human influence? Natural? How do scientists know?"
326	November	Invited "Breakfast Club" lecture, the Jonathan Club, Los Angeles, CA: "The ultimate detective story: Identifying human fingerprints in observed records of climate change"
327	November	Invited lecture, Dept. of Soil, Water, and Climate, University of Minnesota, St. Paul Campus, MN: "Volcanic masking of human-caused warming"
328	December	Invited lecture, American Geophysical Union Fall Meeting, session on "Remote Sensing of Earth System Variability and Change", San Francisco, CA: "Human and natural influences on the changing thermal structure of the atmosphere"
2014		
329	January	Invited presentation to American Physical Society sub-committee charged with reviewing/updating APS position statement on climate change (together with Isaac Held, Bill Collins, Judy Curry, John Christy, and Dick

		Lindzen). Center for Urban Science and Progress, New York University, New York, NY: "Detection and attribution evidence, and the recent "stasis": Input to the American Physical Society climate change workshop"
330	February	Invited presentation, University of St. Thomas, St. Paul, MN: "A discernible human influence on global climate"
331	February	Invited presentation, New York City/Long Island Chapter of the American Meteorological Society, Columbia University, New York, NY: "A life in climate science: From identification of a 'discernible human influence' on climate to identification of the 'top ten' climate models"
332	February	Invited presentation, Lamont-Doherty Earth Observatory, Palisades, NY: "Volcanic contribution to decadal changes in tropospheric temperature"
333	March	Invited presentation, Conference "Climate Science and Policy Through the Looking Glass", University of California at Santa Cruz, Santa Cruz, CA (untitled)
334	March	Invited presentation, Claremont McKenna College, Marian Miner Cook Athenaeum, Claremont, CA: "The evidence for a discernible human influence on global climate"
335	March	Invited presentation, W.M. Keck Science Center, Claremont McKenna College, Claremont, CA: "Volcanic contribution to the recent warming hiatus"
336	March	Invited presentation, evening on "Climate Change and Water in California", Robert Mondavi Institute for Wine and Food Science, University of California at Davis, Davis, CA: "The scientific evidence for a discernible human influence on climate"
337	March	Invited presentation, Pacific Northwest Association for College Physics, Spokane Falls Community College, Spokane, WA: "Detection and attribution evidence, and the recent "stasis": Input to the American Physical Society climate change workshop"
338	April	Invited presentation, US National Academy of Sciences, session on "Climate Change Science and Climate Impacts", Washington DC: "Discussion of NAS/Royal Society report on Climate Change: Evidence and Causes"
339	May	Invited presentation, Giannini Foundation of Agricultural Economics, meeting on "Climate Change: Challenges to California's Agriculture and Natural Resources", The California Museum, Sacramento, CA: "The science of climate change: Implications for California"
340	May	Invited presentation, 2014 Institute for Complex Adaptive Matter Annual Conference, University of California at Davis, Davis, CA: "Frontiers in understanding human and natural impacts on the climate"
341	May	Invited presentation, Northern California Science + Skepticism Conference ("SkeptCal-14"), Oakland, CA: "A discernible human influence on global climate"
342	June	Invited lecture, Earth, Atmospheric, and Planetary Sciences Department Lecture Series, Massachusetts Institute of Technology, Cambridge, MA: "Fingerprinting with the vertical structure of atmospheric temperature change, and the volcanic contribution to the warming hiatus"
343	July	Invited lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "The evidence for a discernible human influence on global climate"
344	July	Invited lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "The genesis of the 'balance of evidence' statement in the 1995 IPCC Second Assessment Report"
345	July	Invited lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "The volcanic contribution to the warming hiatus"
346	July	Invited lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "How do we evaluate global climate models?"
347	July	Invited lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "Fingerprints in the sky: Identifying human influences on the vertical structure of atmospheric temperature"
348	August	Invited lecture, Understanding Global Change Summer Institute, University of California at Berkeley, Berkeley, CA: "A discernible human influence on global climate"
349	August	Invited lecture, DHS briefing, Lawrence Livermore National Laboratory, Livermore, CA: "A discernible human influence on global climate"
350	September	Invited lecture, Surface Hydrology class (CE203), University of California at Berkeley, Berkeley, CA: "Fingerprints in the sky: Identifying human influences on the vertical structure of atmospheric temperature"
351	September	Invited lecture, Climates of the World class (GEOG171), University of California at Berkeley, Berkeley, CA: "The evidence for a discernible human influence on global climate"

- 352 **September** Invited presentation to the University of California Regents, Committee on Oversight of the Dept. of Energy Laboratories, University of California at San Francisco, San Francisco, CA: "Using climate change detection and attribution methods to study the causes of drought"
- 353 **September** Invited presentation to the Belizean Grove/TARA, Lawrence Livermore National Laboratory, Livermore, CA: "Identifying human effects on global climate"
- 354 **September** Lecture, Dept. of Soil, Water, and Climate, University of Minnesota, St. Paul Campus, MN: "An update on the contribution of early 21st century volcanic activity to the warming hiatus"
- 355 **October** Invited lecture, Distinguished Speakers Series, Dept. of Earth and Climate Sciences, San Francisco State University, San Francisco, CA: "The evidence for a discernible human influence on global climate"
- 356 **October** Invited lecture, Yale Physics Club, Yale University Dept. of Physics, New Haven, CT: "Human Effects on Global Climate: Scientific Evidence Provided to the American Physical Society"
- 357 **October** Presentation to Far West Section of the American Physical Society, University of Nevada, Reno, NV. Atmospheric Science panel: "Climate science careers for physicists"
- 358 **November** Invited lecture, Class on "Climate Change: An Earth Systems Perspective", Stanford University, Stanford, CA: "Fingerprints in the sky: Identifying human influences on the vertical structure of atmospheric temperature"
- 359 **December** Presentation to Hugo van Meijenfeldt, Consul General, Kingdom of the Netherlands (at Lawrence Livermore National Laboratory, Livermore, CA): "Identifying human influences on global climate"
- 360 **December** Presentation to David Hochschild, Commissioner, California Energy Commission (at Lawrence Livermore National Laboratory, Livermore, CA): "Identifying human influences on global climate"
- 361 **December** Invited presentation, American Geophysical Union Fall Meeting, San Francisco, CA. Session U52A ("Understanding why people reject sound scientific information and how scientists can respond"): "After the storm: Lessons learned from the IPCC's discernible human influence finding"
- 2015**
- 362 **January** Invited participant, UC Davis-Mars Symposium, Panel on "Solving agriculture's greatest challenges", University of California at Davis, CA
- 363 **January** Presentation to meeting of International Detection and Attribution Group (IDAG), National Center for Atmospheric Research, Boulder, CO: "Observed multi-variable signals of late 20th and early 21st century volcanic activity"
- 364 **February** Presentation to CMIP6 Workshop, College Park, MD: "The benefit of model intercomparison projects: The perspective of a D&A practitioner"
- 365 **April** Invited presentation, SPARC Temperature Trends Group, Victoria, Canada: "Observed multi-variable signals of late 20th and early 21st century volcanic activity"
- 366 **May** Invited lecture, Earth, Atmospheric, and Planetary Sciences Department Lecture Series, Massachusetts Institute of Technology, Cambridge, MA: "Observed multi-variable signals of late 20th and early 21st century volcanic activity"
- 367 **June** Invited lecture, Physics Colloquium, Dept. of Physics, University of California at Davis, Davis, CA: "Observed multi-variable signals of late 20th and early 21st century volcanic activity"
- 368 **June** Invited lecture, American Meteorological Society Short Course on "Weather and Climate in Times of Change", Raleigh, NC: "The 'warming hiatus': A teachable moment"
- 369 **June** Keynote lecture, "Confronting Climate Change: Science, Education, and Solutions", Science Museum of Minnesota, Minneapolis, MN: "Climate change science: Looking back 20 years, and looking into the future"
- 370 **June** Remote lecture, Georgetown University Emergency and Disaster Management Graduate Class: "The evidence for a discernible human influence on global climate"
- 371 **June** Invited lecture, International Union of Geodesy and Geophysics, session on Weather and Climate Effects of Volcanic Eruptions, Prague, Czech Republic: "Observed multi-variable signals of late 20th and early 21st century volcanic activity"
- 372 **August** Lecture, LLNL Triennial Climate Scientific Focus Area Review, Rockville, MD: "Detection and attribution research"
- 373 **September** Invited lecture, Climates of the World class (GEOG171), University of California at Berkeley, Berkeley, CA: "The evidence for a discernible human influence on global climate"

374	October	Invited lecture, Fall 2015 Seminar Series, Department of Earth Sciences, University of Minnesota, Minneapolis, MN: "Human effects on global climate: Scientific evidence provided to the American Physical Society"
375	October	Invited lecture, Department of Earth Sciences, University of Minnesota, Minneapolis, MN: "Climatic effects of early 21 st century volcanic eruptions"
376	October	Presentation to US DOE Team Lead Meeting, Bethesda, MD: "Detection and attribution research at PCMDI: Accomplishments and plans"
377	October	Invited lecture, Stanford University, Graduate class on "Climate Science: An Earth Systems Perspective", Palo Alto, CA: "Vertical fingerprinting, and the volcanic contribution to the recent 'pause' in warming"
378	October	Invited lecture, Livermore First Presbyterian Church, Livermore, CA: "Issues of our dawning future: Global climate change"
379	November	Invited presentation, GFDL's 60 th Anniversary Symposium, Princeton, NJ: "GFDL's discernible influence on climate change detection and attribution research"
380	November	Invited presentation, St. Mark's Episcopal Church, Minneapolis, MN: "Climate change science: Looking back 20 years, and looking into the future"
2016		
381	January	Plenary lecture, American Association of Physics Teachers winter meeting, New Orleans, LA: "Evidence for human effects on global climate"
382	January	Invited talk, session on Climate Change, American Association of Physics Teachers winter meeting, New Orleans, LA: "Volcanic effects on climate in the late 20 th and early 21 st centuries"
383	February	Lecture, University of Arizona, Tucson, AZ: "Volcanic effects on climate in the late 20 th and early 21 st centuries"
384	March	Invited lecture, Changemaker Speaker Series, Principia College, Elmhurst, IL: "Climate change science: Looking back 20 years, and looking into the future"
385	March	Invited lecture, Introduction to Sustainability Class, Principia College, Elmhurst, IL: "Evidence for a discernible human influence on global climate"
386	March	Invited lecture, Environmental Economics Class, Principia College, Elmhurst, IL: "Genesis of the balance of evidence statement in the 1995 IPCC Second Assessment Report"
387	March	Keynote lecture, Society of Physics Students, Zone 18 Meeting, California State University Fresno, CA: "The scientific evidence for a discernible human influence on global climate"
388	March	Lecture, Class on The Science and Politics of Global Warming, University of Minnesota, Minneapolis, MN: "The scientific evidence for a discernible human influence on global climate"
389	March	Lecture, Class on Climate Change: Myths, Mysteries, and Uncertainties, University of Minnesota, Minneapolis, MN: "Climate change science: Looking back 20 years, and looking into the future"
390	April	Invited lecture, Deutsches Zentrum für Luft- und Raumfahrt and United Nations Office for Outer Space Affairs, Conference on Challenges for Atmospheric Research, Cologne, Germany: "Use of satellite measurements of atmospheric temperature and water vapor in climate change detection and attribution studies"
391	April	Lecture, GEOS 443, Texas A&M University, College Station, TX: "The genesis of the balance of evidence statement in the 1995 IPCC Second Assessment Report"
392	April	Invited lecture, Atmospheric Sciences Department, Texas A&M University, College Station, TX: "Climate change: Data or Dogma?"
393	May	Invited lecture, Dept. of Atmospheric and Oceanic Sciences, UCLA, Los Angeles, CA: "A scientific response to the 'Data or Dogma?' hearing"
394	May	Third Annual Yanai lecture, UCLA, Los Angeles, CA: "Fingerprinting the climate system"
395	May	Invited lecture, Sustainable Aviation Symposium, Redwood City, CA: "Climate change: Data or Dogma?"
396	May	Remote lecture, Georgetown University Emergency and Disaster Management Graduate Class: "The evidence for a discernible human influence on global climate"
397	May	Remarks made at annual meeting of Chevron shareholders (as legal proxy for UBS Financial Services, Inc.), San Ramon, CA
398	June	Invited lecture, Ron Stouffer Symposium, Geophysical Fluid Dynamics Laboratory, Princeton, NJ: "Climate change detection and attribution"
399	June	Invited lecture, 44 th AMS Conference on Broadcast Meteorology, Austin, TX: "Fingerprinting the climate system"

400	June	Keynote speech, Summer Institute for Climate Change Education, Macalester College, Minneapolis, MN: "Fingerprinting the climate system"
401	June	Invited lecture, 66 th Lindau Nobel Laureate Meeting, Lindau, Germany: "Using big data to study climate change"
402	July	Invited lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "Climate change science: A personal perspective on lessons learned"
403	July	Lecture, Juneau Icefield Research Program, Camp 10, Juneau Icefield, AK: "How do we evaluate global climate models?"
404	August	Invited lecture, CMIP-6 tutorial, National Center for Atmospheric Research, Boulder, CO: "Making sense of differences between simulated and observed historical climate change"
405	August	Invited lecture, Sons in Retirement Branch 121, Livermore, CA: "Climate change science: A personal perspective on lessons learned"
406	August	Invited lecture, IBM Research Almaden, San Jose, CA: "Fingerprinting the climate system"
407	September	Keynote speech, Workshop on Occultations for Probing Atmosphere and Climate, Leibnitz, Austria: "Comparing atmospheric temperature trends and variability in climate models and satellite observations"
408	October	Lecture, Fundraiser for Juneau Icefield Research Program, Milwaukee, WI: "Climate change science: A personal perspective on lessons learned".
2017		
409	January	Principal lecturer, Winter Seminar Series, Faculty Resource Network, American College of Greece, Athens, Greece: "Global Climate Change: Science, Economics, Migration" (a total of 8 lectures).
410	January	Invited lecture, ALLETE Board of Directors meeting, Minneapolis, MN: "The evidence for a discernible human influence on global climate"
411	February	Invited lecture, Rosenstiel School of Marine and Atmospheric Sciences, Miami, FL: "Lessons learned after the 1995 'discernible human influence' finding of the Intergovernmental Panel on Climate Change"
412	February	Invited lecture, Rosenstiel School of Marine and Atmospheric Sciences, Miami, FL: "Fingerprinting the climate system"

Non-Scientific Publications

Santer, B.D., 1990: In the Crevasse, in *One Step in the Clouds*, edited by A. Salkeld and R. Smith, Hodder and Stoughton, London, UK, 109-118

Santer, B.D., 1995: Plastering Holes, in *Reflections of Light*, edited by C. Sullivan and J.L. Esterby, The National Library of Poetry, Watermark Press, Owings Mills, MD, page 416

Interests

Rock-climbing, mountaineering, poetry, marathon running, playing the guitar

Selection of Alpine climbs

Cascades, United States

Mt. Rainier; Mt. St. Helens; Mt. Adams; Sloan Peak; Mt. Shuksan (via Hourglass Route); Chair Peak; The Tooth; Three-Fingered Jack

Enchantments, United States

West Ridge of Prussik Peak; Dragontail; Little Annapurna

Yosemite and Tuolumne Meadows, United States

Leaning Tower (via Leaning Tower Traverse); Cathedral Peak (via South-East Buttress)

Alaska, United States

Taku B (Juneau Icefield)

Switzerland

Mönch (Bernese Oberland); Piz Badile (via North Ridge; Bregaglia); Piz Bernina (via the Bianco Ridge; Bregaglia); Gletschhorn (via South Ridge; Urner Alps); Freiheit (via South Face; Appenzeller Alps); Altmann (Appenzeller Alps)

France

Aiguille du Midi-Aiguille du Plan Traverse (French Alps); Aiguille d'Argentiere (via the Milieu Glacier; French Alps); Aiguille de l'M (via North-North East Ridge; French Alps)

Italy

Cima Presanella (Dolomites)

Austria

Roggalspitze via Roggalkante (Lechtaler Alps)

Nepal

Participation in 1986 Lampertheimer Himalayan expedition to Ama Dablam and Kangtega

Rock-climbing routes

Yosemite (California, USA); Tuolumne Meadows (California, USA); The Pinnacles (California, USA); Smith Rocks (Oregon, USA); Peshastin Pinnacles (Washington, USA); Cottonwood Canyon (Utah, USA); Lake District (UK); Peak District (UK); Snowdonia (UK); Gower Peninsula (UK); Danube Valley (Germany); Kreuzberge (Appenzeller Alps, Switzerland)

Marathons

Frankfurt, Munich, New York, Portland, Vancouver. Also completed the Engadin ski-marathon