August 2018

# VITA - WARREN M. WASHINGTON

**DATE & PLACE OF BIRTH:** 28 August 1936, Portland, Oregon

**EDUCATION:** B.S. 1958 Oregon State University (Physics)

M.S. 1960 Oregon State University (Meteorology) Ph.D. 1964 Pennsylvania State University (Meteorology)

# RESEARCH POSITIONS:

May 1995-present Senior Scientist; Climate Change

Research Section, Climate & Global Dynamics Division, National Center for Atmospheric Research, Boulder, Colorado

June 1987-May 1995 Director, Climate & Global Dynamics Division;

Senior Scientist; Leader, Climate Sensitivity and CO2 Research Group, National Center for Atmospheric Research, Boulder, Colorado.

October 1974-June 1987 Senior Scientist; Head, Climate Section; Leader,

Global Climate Modeling Group; Member, Community Climate Model Steering Committee, National Center for Atmospheric Research, Boulder, Colorado.

July 1973-October 1974 Project Leader, Large-Scale Modeling

and Analysis Group, National Center for Atmospheric Research, Boulder, Colorado.

June 1972-July 1973 Program Scientist, Dynamical Aspects of

Atmospheric Circulation, National Center for Atmospheric Research, Boulder, Colorado.

1963-present Senior Scientist, National Center for Atmospheric Research,

Boulder, Colorado. Numerical weather prediction and computer simulation of the Earth’s climate

1968-1971 Adjunct Associate Professor of Meteorology and Oceanography, College of Engineering, University of Michigan, Ann Arbor, Michigan.

1960-1963 Research Associate, Pennsylvania State University, University Park, Pennsylvania. Objective analysis and numerical weather prediction.

1959 (Summer) Mathematician, Stanford Research Institute, Menlo Park,

California. Objective analysis of meteorological fields.

# PROFESSIONAL SOCIETIES:

American Meteorological Society:

Member, Ad Hoc Committee on Increasing Number of Black Scientists in AMS Member, Board on Women and Minorities (1976)

Chairman, Committee on Nominations (1982)

Member, Committee on the History of the Atmospheric Sciences (1985-1987 and 1988-1989)

Member, Council (1986-1988)

Member, Board on Women and Minorities (1988-1990) Member, Awards Committee (1991-1994)

Chair, Ad Hoc Committee on development of a career booklet entitled “The Challenge of Meteorology'” (1991-1992)

President-Elect (1993)

President (1994)

Past President (1995, 1996)

History of the Atmospheric Sciences Committee (1999-2005) AMS Award Committee (2000)

American Association for the Advancement of Science: Chairman, Youth Council (1971)

Committee on Meetings (1970-1971)

Member, Committee on Minorities in Science (1971-1972) Member, Committee on Opportunities in Science (1973-1978) Chairperson, Committee on Opportunities in Science (1975-1978) Chairperson, Panel on Black Scientists (1973-1978)

Member, Committee on Nominations (1980-1982) Member, Electorate Nominating Committee (1981-1984)

Chairperson, Electorate Nominating Committee, Section W (Atmospheric and Hydrospheric Sciences) (1984-1985)

Member, Committee on Climate (1985-1988)

Chair-Elect, Section on Atmospheric and Hydrospheric Sciences (1990-1991) Board of Directors (1991-1995)

Board Representative to the Committee on Science, Engineering and Public Policy (1991)

Board Representative to the Committee on Opportunities in Science (1992-1995)

Member of the National Taskforce for the NSF-Funded Museum Equity Project (Project MOSAIC) (1992-1994)

Member, the National Committee, American Association for the Advancement of Science Center for Science and Engineering (1994-2006)

National Academy of Engineering (2002) American Philosophical Society (2003),

Vice President (2018-2023)

Academy of Arts and Sciences (2009)

National Associate of the National Academy of Sciences (2011) Lifetime Appointment American Geophysical Union - AGU Fellow (2013)

# AWARDS AND HONORS:

Presidential Appointment to the National Advisory Committee on Oceans and Atmosphere (1978-1984)

Fellow, American Meteorological Society (1980)

Fellow, American Association for the Advancement of Science (1981)

Fellow, The Alumni Fellow Program, The Pennsylvania State University (1989)

One of 16 scientists featured in the Chicago Museum of Science and Industry's "Black Achievers in Science" Exhibit. The exhibit is touring major science centers and museums in the United States from 1988-1995

Fellow, The Alumni Fellow Program, Oregon State University (1990) Distinguished Alumni Award, Pennsylvania State University (1991) Fellow, African Scientific Institute (1993)

Presidential Appointment to National Science Board (1994-2006) Le Verrier Medal of the Societe Meteorologique de France (1995)

E. B. Lemon Distinguished Alumni Award, Oregon State University (1996)

Inducted into the National Academy of Sciences Portrait Collection Of African Americans in Science, Engineering, and Medicine (1997)

Department of Energy Biological and Environmental Research Program Exceptional Service Award for Atmospheric Sciences (1997)

Sigma Xi Distinguished Lecturer (1998-1999)

University Corporation for Atmospheric Research Walter Orr Roberts Distinguished Lecturer (1998)

Dr. Charles Anderson Award, American Meteorological Society, (2000) National Weather Service Modernization Award (1999)

Celebrating 20th Century Pioneers in Atmospheric Sciences Award (2000) Colorado’s Bonfils-Stanton Foundation Science Award (2000)

Franklin Institute Black History Month Exhibit on African Americans in Science (2002)

Elected to the National Academy of Engineering (2002)

Elected to American Philosophical Society, (2003)

Recipient of Reed College Vollum Award for Distinguished Accomplishment in Science and Technology (2004)

Elected Honorary Member of the American Meteorological Society – Highest award given by the AMS (2006)

Commencement Speaker and recipient of Honorary Doctorate of Science, Oregon State University (2006)

Science Spectrum Trailblazer, Science Spectrum Magazine (2006)

Robert D. Cess Distinguished Topics in Atmospheric an Oceanic Sciences Seminar Speaker, State University of New York at Stonybrook, (2006)

Charles Franklin Brooks Award for Outstanding Services to the Society, American Meteorological Society (January 2007)

Experience Works, Primetime Award for Outstanding Older Worker for Colorado (2007)

U. S. Department of Energy Lifetime Achievement Award from Raymond L. Orbach (2007)

Warren Washington Symposium on Climate Modeling, Prediction and Science Policy, NCAR (2007)

Commencement Speaker and recipient of Honorary Doctorate at Bates College, Lewiston, Maine (2008)

Jule G. Charney Award for Outstanding Collaborative Contributions to Modeling Climate and its Response to Anthropogenic and Natural Forcings, received with Dr. Gerald A. Meehl, American Meteorological Society (2009)

Elected Fellow of the American Academy of Arts & Sciences (2009)

Warren Washington Special Symposium at the American Meteorological Society 2010 Annual Meeting (2010)

2010 Tzvi Gal-Chen Memorial Lecturer, University of Oklahoma (2010)

2010 Recipient of the Charles L. Hosler Alumni Scholar Medal, College of Earth and Mineral Sciences, The Pennsylvania State University (2010)

Texas State Senate Proclamation 94 for significant contributions to the study of climate change (2010)

Recipient of 2010 James E. Stewart Award, American Association of Blacks in Energy (2010)

Recipient of the 2009 National Medal of Science awarded by President Barack Obama on November 17, 2010 (Citation: *for his fundamental contributions to the understanding of Earth's coupled climate system through numerical simulation, leadership in U.S. science policy, and inspiring mentorship of young people of all backgrounds and origins.)*

In 2012, *A Night with Warren Washington* was presented at the National Academy of Sciences by the Historymakers. This was a PBS interview of Washington by Ralph Cicerone, The President of the Academy.

Urban Education Institute Award, North Carolina A&T State University (2013) (Citation: *In Recognition of your numerous and inspirational contributions to raising the achievement and performance levels of People of Color in the STEM fields)*

Selected Speaker for The Bert Bolin Lecture on Climate Research, University of Stockholm, Sweden (2013)

National Organization of Black Chemists and Chemical Engineers (NOBCChE) Percy L. Julian Award (2013)

Honorary Doctorate, University of Massachusetts, Amherst, October 18, 2013, Doctor of Science, (*Honoris causa)*

Supercomputing13, November 2013, Keynote Speaker American Geophysical Union, Fellow, December 2013

Martin Luther King, Jr. Keynote speech at Northwestern University, January 20, 2014 Association of American Geographers’ Honorary Geographer Award, April 2014 Distinguished Alumni Achievement Award, Oregon State University, November 2014 Alpha Phi Alpha, Public Award of Merit, 2015

NCAR Distinguished Scholar Award (2015-2019)

Honorary Doctorate, Colby College, Maine, May 2017

Warren Washington Legacy Symposium: A Scientific Journey in Climate Modeling, Research, and Science Policy, September 6, 2018, Penn State University. The President of the University announced that they would name a building in his honor, 2019

The International Tyler Prize for Environmental Research with Michael Mann May 2019

Naming of a Penn State University Innvocation Park Building on May 17, 2019. “Warren M. Washington”

2019 Jearld Lecture in Woods Hole Diversity Initiative

2010 Lifetime Distinguished Award, Oregon State University College of Science

2020

“The American Meteorological Society (AMS) has created a new national award in honor of Warren Washington, a senior scientist at the National Center for Atmospheric Research (NCAR) and a pioneer in the development of computer models of Earth's climate.

The Warren Washington Research and Leadership Medal will be presented to individuals who are recognized for the combination of highly significant research and distinguished scientific leadership in the atmospheric and related sciences.”

# COMMITTEES AND PANELS:

Member, Advisory Panel for Atmospheric Sciences of the National Science Foundation (1972-1974)

Member, Panel on Climatic Variation of National Academy of Sciences/National Research Council (1972-1975)

Member, Panel on the Monsoon Experiment of National Academy of Sciences--U.S. GARP Committee (1974)

Member, Panel on Energy and Climate of Geophysics Research Board of National Academy of Sciences/National Research Council (1974-1976)

Member, Panel on National Science Foundation Energy-Related Postdoctoral Fellowship Program (1975-1977)

Member, Governor's Science and Technology Advisory Council, State of Colorado (1975-1978)

Member, President's National Advisory Committee on Oceans and Atmosphere (1978- 1984): Panels dealing with ocean waste management, hydrology, satellites, government reorganization, atmospheric research facilities, ocean weather services, and weather modification. Chair of the Weather Services Panel that issued the 1982 report on "The Future of the Nation's Weather Services.''

Member, U.S. National Committee for the International Union of Geodesy and Geophysics (1978-1982)

Chair, Subcommittee for International Association of Meteorology and Atmospheric Physics (IAMAP) (1979-1982)

Member, Evaluation Panels, Research Associateship Program, National Research Council (1983, 1987)

External Examiner, Department of Meteorology, University of Nairobi, Kenya (1983)

Affiliate Faculty Member, Department of Atmospheric Science, Colorado State University, Fort Collins (1983-1985)

Member, Polar Oceans Climate Studies Panel, Board on Ocean Science and Policy, National Research Council (1984-1987)

Member, Advisory Panel for the Summer Radiation and Climate Modeling Course, National Oceanic and Atmospheric Administration (1986)

Member, Board on Atmospheric Sciences and Climate, National Research Council; Chairman, NOAA Review Panel (1985-1988)

Chair, Advisory Panel for Planet Earth film, *Climate Puzzle*, National

Research Council (1986)

Chairperson, Earth Sciences Research Associateship Program, National Research Council (1986)

Member, Editorial Board, *Climate Dynamics* (1986-1989)

Member, San Diego Supercomputer Center Computer Allocation Committee (1986)

Member, Advisory Committee to David Skaggs (Member of the U.S. House of Representatives Committee on Science, Space and Technology) (1987-1989)

Member, National Oceanic and Atmospheric Administration Panel on Climate and Global Change (1987-1991)

Cooperating Investigator, SPECMAP (1988-1992)

Member, University Corporation for Atmospheric Research President Search Committee (1988)

Member, University Corporation for Atmospheric Research Visiting Scientist Programs Steering Committee (1988-1992) and Chair (1989-1992)

Member, National Aeronautics and Space Administration's Greenhouse Detection Project Science Working Group (1989-1991)

Member, International Working Group on Global Change, National Science Foundation Representative (1989-1990)

Member, Investigator Working Group of the National Aeronautics and Space Administration's Earth Observing System (1990)

Member, Secretary of Energy Advisory Board (1990-1993) President, Black Environmental Science Trust (1990-1995)

Member, Earth Observing System (EOS) External Engineering Review, appointed by the National Aeronautics and Space Administration and the White House National Space Council (1991)

Member, National Advisory Committee for First National Minority Environmental Leadership Summit, sponsored by the United Church of Christ Commission for Racial Justice (1991)

Member, National Council of the Environmental Defense Fund (1992-2007)

Member, External Advisory Panel of the National Science Foundation's Science and Technology Center for the Study of Clouds, Chemistry and Climate (1992-1994)

Member, Commission on Geosciences, Environment, and Resources, National Research Council (1992-1994)

Member, Advisory Committee of the Minority Media Information Center at the Scientists' Institute for Public Information (1993-1994)

Member, Modernization Transition Committee of the National Weather Service, U.S. Department of Commerce (1993-1998)

Member, the National Committee, American Association for the Advancement of Science Center for Science and Engineering (1994-2007)

Member, Board on Sustainable Development, National Research Council (1995-1998)

Member, National Centers for Environmental Prediction (NCEP) Advisory Panel, (1995-1997)

Member, the UCAR Education Committee, (1995-1996)

Member, NASA Earth Systems Science and Applications Advisory Committee (ESSAAC), (1998-2001)

Member, Board of Trustees of the Bermuda Biological Station for Research, (1998- 2002)

Member, NOAA Science Advisory Board, (1998-2002)

American Meteorological Society, History of the Atmospheric Sciences Committee, (2002-2005)

Member of Corporation for Woods Hole Oceanographic Institution, (1999-2002)

Member, Secretary of Energy Biological and Environmental Research Advisory Committee (1990-2014)

Co-Chair of NCAR Community Climate System Model (CCSM) Climate Change and Assessment Working Group, (1999-present)

Member of National Energy Research Scientific Computing Center (NERSC) Policy Board of the Lawrence Berkeley National Laboratory, (1999-2000)

AMS Awards Committee, (2000-2002)

Member of DOE Advanced Scientific Computing Advisory Committee, (2000-2002) National Science Foundation Vannevar Bush Award Committee, (2001)

Member of U.S. Commission on Ocean Policy Science Advisory Panel, (2002-2007) Elected to the National Academy of Engineering (2002)

Elected to the American Philosophical Society (2003)

Member National Academies of Science Coordinating Committee on Global Change, (2003-2005)

NOAA Research Review Panel (2003)

Member of Survey Steering Committee for Earth Sciences and Applications from Space: A Community Assessment and Strategy for the Future. National Research Council, (2004-2006)

Member of Advisory Committee of the International Risk Governance Council (2004- 2006)

Member of Advisory Committee of the AAAS Center for Advancing Science & Engineering Capacity, (2005-2006)

Chair of AMS Development Committee (2005-2007)

Member, American Philosophical Society Class 1 Committee on Memberships (2005- 2008 and Chair 2009-2012)

Member, National Center for Computational Sciences Advisory Committee, Oak Ridge National Laboratory’s (ORNL) National Center for Computational Sciences (2006-2009)

Chair, American Philosophical Society 2006 Annual Fund Committee (2006) Member, National Science Board (1995-2006)

Member, National Science Board Programs and Plans Committees: CPP Task Force on the Environment; CPP Task Force on Polar Issues; and Chair of the Merit Review Criteria Task Force, 1996-2002

Elected to Executive Committee of National Science Board, 1998-2000

Member of National Science Board Committee on Strategy and Budget, 2001-2002 Vice-Chair of National Science Board Committee on Programs and Plans, 2001-2002 Elected Chair of National Science Board, May 2002-May 2004

Re-elected Chair of National Science Board May 2004-May 2006

Member, National Academies of Science Space Studies Board (2006-2012)

National Academies of Science Policy and Global Affairs Division (PGA) Committee (2006-2008)

National Academies of Science PGA Committee on Women in Science, Engineering and Medicine (CWSEM) (2007-2009)

13th Annual Heinz Award Juror (2007)

Howard University NOAA Center for Atmospheric Sciences (NCAS) Advisory Committee (2006-2008)

National Science Board Public Service Awards (2008)

Member, Board of Directors, National Council for Science and the Environment (2007- 2010)

Member, Board of Trustees, the H. John Heinz III Center for Science, Economics and the Environment (2007-2013)

Commission to Engage African Americans on Climate Change (CEAC) (2008-2013)

National Academies of Science, BASC, Panel on Advancing the Science of Climate Change (2008-2010)

Member, Board of Directors, Health Effects Institute (2009-2016)

Member of the National Research Council’s Report Review Committee (RRC) (2010- 2016)

Member of the HistoryMakers Advisory Committee and its ScienceMakers Advisory Board (2010-2015)

Chair of Section 12 of the National Academy of Engineering (2011-2012) Member, National Academy of Engineering Committee on Meetings (2011-2014)

Member of IRESM DOE/Pacific Northwest Laboratory Advisory Committee (2009-2013)

National Research Council Committee on NASA’s Strategic Direction and the Need for a National Consensus (2012-2013)

Chair, NRC Committee to Advise the U.S. Global change Research Program (USGCRP) (2011-2017)

Member of the Scientific Advisory Committee for the ORNL Energy and Environmental Sciences Directorate (2012-2014)

Chair of National Research Committee Panel to Review the National Climate Assessment (2012-2013)

Member of the American Meteorological Society Awards Committee (2014) Member of the American Geophysical Union Centennial Task Force (2015) Member, American Geophysical Union (AGU) College of Fellows Task Force (2016)

# PRINCIPAL PUBLICATIONS:

Washington, W.M., 1964: A note on the adjustment towards geostrophic equilibrium in a simple fluid system. *Tellus*, 16, 530--534. *Also in Selected Meteorological Papers*, No. 15, Dynamic Meteorology (Part I), compiled by the Meteorological Society of Japan, March 1973, 85-89.

Houghton, D., A. Kasahara, and W. Washington, 1966: Long-term integration of the barotropic equations by the Lax-Wendroff method. *Monthly Weather Review*, 94, 141-150.

Kasahara, A. and W.M. Washington, 1966: A report on the general circulation experiments at NCAR. *Proceedings of Symposium on the Arctic Heat Budget and Atmospheric Circulation*, 31 January-4 February 1966, Lake Arrowhead, CA, Memo RM-5233-NSF, 401-410.

Kasahara, A. and W.M. Washington, 1967: NCAR global general circulation model of the atmosphere. *Monthly Weather Review*, 95, 389-402.

Washington, W.M. and A. Kasahara, 1967: Recent progress on general circulation experiments at NCAR. *Proceedings of Technical Exchange Conference*,} 4-7 April 1967, Monterey, CA, AWS Tech. Rept. 196, 162-171.

Washington, W.M., 1968: Computer simulation of the earth's atmosphere. *Science Journal*, 4, 36-41.

Washington, W.M., B.T. O'Lear, J. Takamine, and D. Robertson, 1968: The application of CRT contour analysis to general circulation experiments. *Bulletin of the American Meteorological Society*, 49, 882-888.

Blumen, W. and W.M. Washington, 1969: The effect of horizontal shear flow on \break geostrophic adjustment in a barotropic fluid. *Tellus*, 21, 167-176.

Houghton, D. and W.M. Washington, 1969: On global initialization of the primitive equations: Part I. *Journal of Applied Meteorology*, 8, 726-737.

Kasahara, A. and W.M. Washington, 1969: Thermal and dynamical effects of orography on the general circulation of the atmosphere. *Proceedings of the WMO/IUGG Symposium on Numerical Weather Prediction*, 26 November-4 December 1968, Tokyo, Japan, IV-47-56.

Julian, P.R., W.M. Washington, L. Hembree, and C. Ridley, 1969: On the spectral distribution of large-scale atmospheric kinetic energy. *Journal of the Atmospheric Sciences*, 27, 376-387.

Washington, W.M., 1970: On the simulation of the Indian monsoon and tropical easterly jet stream with the NCAR general circulation model. *Proceedings of the Symposium on Tropical Meteorology*, 2-11 June 1970, University of Hawaii, Honolulu, HI, sponsored by the American Meteorological Society, WMO JVI-1-6.

Washington, W.M. and A. Kasahara, 1970: A January simulation experiment with the two-layer version of the NCAR global circulation model*. Monthly Weather Review*, 95, 559-580.

Washington, W.M. and L.G. Thiel, 1970: *Digitized Global Monthly Mean Ocean Surface Temperatures.* Technical Note, NCAR/TN-54, National Center for Atmospheric Research, Boulder, CO, 30pp.

Oliger, J.E., R.E. Wellck, A. Kasahara, and W.M. Washington, 1970: *Description of NCAR Global Circulation Model*. Technical Note, NCAR/TN-56+STR, National Center for Atmospheric Research, Boulder, CO, 94 pp.

Washington, W.M., 1971: A model for global weather forecasting and climate study. *Proceedings of Annual Meeting and Equipment Exposition of the Institute of Environmental Sciences*, April 1971, Los Angeles, CA.

Washington, W.M., 1971: On the possible uses of global atmospheric models for the study of air and thermal pollution. *Man's Impact on the Climate*, W.H. Matthews,

W.W. Kellogg and G.D. Robinson, editors, MIT Press, Cambridge, MA, Part V, 18, 265-276.

Washington, W.M., 1971: On the role of radiation in dynamical climate simulation and numerical weather prediction. *Proceedings of the Remote Sensing Workshop*, 29-31 March 1971, Miami, FL.

Kasahara, A. and W.M. Washington, 1971: General circulation experiments with a six- layer NCAR model including orography, cloudiness, and surface temperature calculations*. Journal of the Atmospheric Sciences*, *28*, 657-701.

Houghton, D., D. Baumhefner, and W.M. Washington, 1971: On global initialization of the primitive equations: Part II, The divergent component of the horizontal wind. *Journal of Applied Meteorology*, 10, 626-634.

Wellck, R.E., A. Kasahara, W.M. Washington, and G. DeSanto, 1971: The effect of horizontal resolution in a finite-difference model of the general circulation.

*Monthly Weather Review*, 99, 673-683.

Washington, W.M., 1972: On the possible uses of global atmospheric models for the study of air pollution*. Air and Water Pollution*, W. Brittin, R. West, and R. Williams, editors, Colorado Associated University Press, Boulder, CO, pp. 599- 613.

Washington, W.M., 1972: Development of a three-dimensional stratospheric global circulation model at the National Center for Atmospheric Research (NCAR). *Proceedings of the Second Conference on the Climatic Impact Assessment Program* sponsored by the Department of Transportation, 14-17 November 1972, Cambridge, MA, DOT-TSC-OST-73-4, 358-362.

Washington, W.M., 1972: Numerical climatic-change experiments: The effect of man's production of thermal energy. *Journal of Applied Meteorology*, 11, 768-772.

Washington, W.M., 1972: Parameterization of surface temperature calculation, soil moisture, snow cover and pack ice. Proceedings of the Study Group Conference on the Parameterization of Subgrid Scale Processes, 20-27 March 1972, Leningrad, USSR.

Washington, W.M., 1973: University use of the NCAR general circulation models.

*Atmospheric Technology*, National Center for Atmospheric Research, Boulder, CO, 3, 17-20.

Blumen W. and W.M. Washington, 1973: Atmospheric dynamics and numerical weather prediction in the People's Republic of China 1949-1966. *Bulletin of the American Meteorological Society,* 54, 502-518.

Williamson, D.L. and W.M. Washington, 1973: On the importance of precision for short- range forecasting and climate simulation. *Journal of Applied Meteorology*, 12, 1254-1258.

Kasahara, A., T. Sasamori, and W.M. Washington, 1973: Simulation experiments with a 12-layer stratospheric global circulation model. I. Dynamic effect of the earth's orography and thermal influence of continentality. Journal of the Atmospheric Sciences, 30, 1229-1251.

Washington, W.M., 1974: Brief description of NCAR global circulation model. *Modeling for the First GARP Global Experimen*t, Report No. 14, GARP Publications Series, 61-78.

Washington, W.M. and D.P. Baumhefner, 1974: Use of numerical models for tropical climate simulation and forecasting*. Preprint Volume (Part I) International Tropical Meteorology Meeting*, 31 January-7 February 1974, Nairobi, Kenya, East Africa.

Williamson, D.L. and W.M. Washington, 1974: Reply to Comments on the importance of precision for short-range forecasting and climate simulation. *Journal of Applied Meteorology*, 13, 602-603.

Williams, J., R.G. Barry, and W.M. Washington, 1974: Simulation of the atmospheric circulation using the NCAR global circulation model with ice age boundary conditions. *Journal of Applied Meteorology*, 13, 305-317.

Washington, W.M. and D.P. Baumhefner, 1975: A method of removing Lamb waves from initial data for primitive equation models. *Journal of Applied Meteorology*, 14, 114-119.

GCM Steering Committee, 1975: *Development and Use of the NCAR GCM, A Report of the GCM Steering Committee*. Technical Note, NCAR/TN-101+STR, National Center for Atmospheric Research, Boulder, CO, 177 pp.

Schneider, S.H. and W.M. Washington, 1975: Letter: Energy production and climate.

*Science*, 187, p. 13.

Washington, W.M., and S.M. Daggupaty, 1975: Numerical simulation with the NCAR global circulation model of the mean conditions during the Asian-African summer monsoon. *Monthly Weather Review*, 103, 105-114.

Washington, W.M., 1976: Numerical simulation of the Asian-African winter monsoon.

*Monthly Weather Review*, 104, 1023-1028.

Washington, W.M., 1976: The use of global circulation models for climate simulation and transport of pollution. *Proceedings of the International Conference on Environmental Sensing and Assessment*, 14-19 September 1975, Las Vegas, NV, 2, 26-32.

Washington, W.M. and D.P. Baumhefner, 1976: The influence of the Gulf of Mexico on baroclinic systems in a GCM. *Proceedings of the Conference on Meteorology over the Gulf of Mexico*, 14-16 January 1976, Texas A\&M University, College Station, TX.

Chervin, R.M., W.M. Washington, and S.H. Schneider, 1976: Testing the statistical significance of the response of the NCAR general circulation model to North Pacific Ocean surface temperature anomalies. *Journal of the Atmospheric Sciences*, 33, 413-423.

Kao, S.K., C.N. Chi, and W.M. Washington, 1976: Statistical characteristics of three- dimensional particle movement in NCAR general circulation model*. Journal of the Atmospheric Sciences*, 33,1042-1049.

Washington, W.M., A.J. Semtner, Jr., C. Parkinson, and L. Morrison, 1976: On the development of a seasonal change sea ice model. Journal of Physical Oceanography, 6, 679-685.

Llewellyn, R.A. and W.M. Washington, 1977: Energy and climate: Regional and global aspects. Energy and Climate, Studies in Geophysics, National Academy of Sciences, National Research Council, Washington, DC, 106-118.

Washington, W.M. and D.L. Williamson, 1977: A description of the NCAR global circulation models. In *Methods in Computational Physics, General Circulation Models of the Atmosphere*, Volume 17, J. Chang, editor, Academic Press, New York, NY, 111-172.

Washington, W.M., R.M. Chervin, and G.V. Rao, 1977: Effects of a variety of Indian Ocean surface temperature anomaly patterns on the summer monsoon circulation: Experiments with the NCAR general circulation model*. Pure and Applied Geophysics*, 115, 1335-1356. Also appearing in Contributions to Current Research in Geophysics (CCRG), *Monsoon Dynamics*, Vol. 4, T.N. Krishnamurti, editor, Birkhauser Verlag, Basel and Stuttgart, 1978.

Washington, W.M., B. Otto-Bliesner, and G. Williamson, 1977: *January and July Simulation Experiments with the 2.5o Latitude-Longitude Version of the NCAR General Circulation Model*. Technical Note, NCAR/TN-123+STR, National Center for Atmospheric Research, Boulder, CO, Vol. 1, Text, 39 pp.; Vol. 2, Figs., 61 pp.

Schneider, S.H., W.M. Washington, and R.M. Chervin, 1978: Cloudiness as a climatic feedback mechanism: Effects on cloud amounts of prescribed global and regional surface temperature changes in the NCAR GCM*. Journal of the Atmospheric Sciences*, 35, 2207-2221.

Parkinson, C. and W. Washington, 1979: A large-scale numerical model of sea ice.

*Journal of Geophysical Research*, 84, 311-337.

Washington, W.M. and R.M. Chervin, 1979: Regional climatic effects of large-scale thermal energy consumption: Simulation studies with the NCAR general circulation model. *Journal of Applied Meteorology*, 18, 3-16.

Washington, W.M., R.E. Dickinson, V. Ramanathan, T. Mayer, D. Williamson,

G. Williamson, and R. Wolski, 1979: Preliminary atmospheric simulation with the third-generation NCAR general circulation model: January and July*. Report of the JOC Study Conference on Climate Models: Performance, Intercomparison and Sensitivity Studies*, 3-7 April 1978, Washington, DC, GARP Publication Series No. 22, WMO, Geneva, Vol. I, 95-138.

Forderhase, K., W.M. Washington, R.M. Chervin, V. Ramanathan, D.L. Williamson, and

D.J. Knight, 1980: *Lower Boundary Conditions for the NCAR Global Circulation Model: Ocean Surface Temperatures, Sea Ice, Snow Cover, Continental Surface Albedos and Surface Emissivity, Subsurface Continental Temperatures and Mountain Heights*, Technical Note, NCAR/TN-157+STR, National Center for Atmospheric Research, Boulder, Colorado, 58 pp.

Washington, W.M., 1980: A review of general circulation model experiments on the Indian Monsoon. Chapter 7 in *Monsoon Dynamics*, J. Lighthill and R.P. Pearce, editors, Cambridge University Press, Cambridge, England, 111-130.

Parkinson, C.L. and W.M. Washington, 1980: Summary of a large-scale sea-ice model.

*Sea Ice Processes and Models, Proceedings of Arctic Ice Dynamics Joint Experiment/International Commission on Snow and Ice Symposium*, R.S. Pritchard, editor, University of Washington Press, Seattle, WA, 224-233.

Washington, W.M. and R.M. Chervin, 1980: Response time of an atmospheric general circulation model to changes in ocean surface temperature: Implications for interactive large-scale atmosphere and ocean models. *Tellus*, 32, 119-123.

Washington, W.M. and V. Ramanathan, 1980: Climatic response due to increased CO2: Status of model experiments and the possible role of the oceans.

*Proceedings of the Carbon Dioxide and Climate Research Program Conference*, 24-25 April 1980, Washington, D.C., Carbon Dioxide Effects Research and Assessment Program, L.E. Schmitt, editor, Prepared by the Institute for Energy Analysis/Oak Ridge Associated Universities. Work supported by U.S.

Department of Energy, Office of Environment, Contract No. DE-AC05- 76OROOO33, December 1980, CONF-8004110, 107-131.

Washington, W.M., A.J. Semtner, G.A. Meehl, D.J. Knight, and T.A. Mayer, 1980: A general circulation experiment with a coupled atmosphere, ocean and sea ice model. *Journal of Physical Oceanography*, 10, 1887-1908.

Baker, D.J., Jr., et al., 1980: Polar atmosphere-ice-ocean processes: A review of polar problems in climate research. *Reviews of Geophysics and Space Physics*, 18, 525-543.

Polar Group (R. Dickinson, W. Holland, W. Kellogg, H. van Loon, W. Washington), 1980: Polar atmosphere-ice-ocean processes: A review of polar problems in climate research. *Reviews of Geophysics and Space Physics*, 18, 525-543.

Dickinson, R.E., J. Jager, W.M. Washington, and R. Wolski, 1981: *Boundary Subroutine for the NCAR Global Climate Model*. Technical Note, NCAR/TN- 173+IA, National Center for Atmospheric Research, Boulder, CO, 75 pp.

Barron, E.J. and W.M. Washington, 1982: The Cretaceous atmospheric circulation: Comparisons of model simulations with the geologic record. *Palaeo Geography Climatology Ecology*, 40, 103-134.

Barron, E.J. and W.M. Washington, 1982: The atmospheric circulation during warm, geologic periods: Is the equator-to-pole surface temperature gradient the controlling factor? *Geolog*y, 10, 633-636.

Washington, W.M., Ed., 1982*: Documentation for the Community Climate Model (CCM), Version 0.* NTIS PB82-194192, Climate Section, NCAR, Boulder, CO, 222 pp.

Washington, W.M. and G.A. Meehl, 1982: Coupled and uncoupled atmosphere-ocean general circulation model experiments on summer and winter monsoon.

*Proceedings of the International Conference on Early Results of FGGE and Large-Scale Aspects of the Monsoon Experiments Condensed Papers and Meeting Report,* Tallahassee, FL, 12--17 January 1981, World Meteorological Organization, Geneva, 4-20 to 4-29.

Meehl, G.A., W.M. Washington, and A.J. Semtner, 1982: Experiments with a global ocean model driven by observed atmospheric forcing. *Journal of Physical Oceanography*, 12, 301-312.

Barron, E.J. and W.M. Washington, 1983: Geographic variables and paleoclimates. *Second Conference on Climate Variations*, American Meteorological Society, 10-14 January, New Orleans, LA.

Barron, E.J. and W.M. Washington, 1983: Numerical climate modeling: An exploration frontier in petroleum source rock prediction. *American Association of Petroleum Geology Bulletin*, 67, 419.

Washington, W.M. and G.A. Meehl, 1983: General circulation model experiments on the climatic effects due to a doubling and quadrupling of carbon dioxide concentrations. *Journal of Geophysical Research*, 88, 6600-6610.

Washington, W.M. and G.A. Meehl, 1983: A summary of recent NCAR general circulation experiments on climatic effects of doubled and quadrupled amounts of CO2*. Proceedings of the U.S. Department of Energy CO2 Research, Conference on Carbon Dioxide, Science, and Consensus,* Coolfont Conference Center, Berkeley Springs, WV, 19-23 September 1982, U.S. Dept. of Energy Conf.- 820970, Dist. Category UC-11, Washington, DC, pp. III.177-II.192.

Barron, E.J. and W.M. Washington, 1984: The role of geographic variables in explaining paleoclimates: Results from Cretaceous climate model sensitivity studies. *Journal of Geophysical Research*, 89, 1267-1279.

Wang, W.-C., W.M. Washington, D.J. Wuebbles, R.G. Isaacs, and G. Molnar, 1984: Model projections of the potential climatic effects of perturbations other than CO2. Chapter 6 in *SOA Volume*, 86 pp.

Washington, W.M. and G.A. Meehl, 1984: Using climate models to investigate global habitability issues. *Proceedings of American Institute of Aeronautics and Astronautics Aerospace Sciences Meeting*, 9-12 January 1984, Reno, NV.

Washington, W.M. and G.A. Meehl, 1984: Seasonal cycle experiment on the climate sensitivity due to a doubling of CO2 with an atmospheric general circulation model coupled to a simple mixed layer ocean model. *Journal of Geophysical Research*, 89, 9475-9503.

Meehl, G.A. and W.M. Washington, 1985: Sea surface temperatures computed by a simple ocean mixed layer coupled to an atmospheric GCM. *Journal of Physical Oceanography*, 15, 92-104.

Meehl, G.A. and W.M. Washington, 1985: Tropical response to a doubling of CO2 with an atmospheric GCM coupled to a simple mixed layer ocean model.

*Proceedings of the Third Conference on Climate Variations: Symposium on Contemporary Climate 1850-2100,* Los Angeles, CA, 8-11 January 1985, American Meteorological Society, Boston, MA, 130-131.

Barron, E.J. and W.M. Washington, 1985: Warm Cretaceous climates: High atmospheric CO2 as a plausible mechanism*.* The Carbon Cycle and Atmospheric CO2: Natural Variations Archean to Present, Geophysical Monograph 32, American Geophysical Union, pp. 546-553.

Wang, W.-C., D.J. Wuebbles, W.M. Washington, R.G. Isaacs, and G. Molnar, 1986: Trace gases and other potential perturbations to global climate. *Reviews of Geophysics*, 24, 110-140.

Meehl, G.A. and W.M. Washington, 1986: Tropical response to increased CO2 in a GCM with a simple mixed layer ocean: Similarities to an observed Pacific Warm Event. *Monthly Weather Review*, 114, 667-674.

Washington, W.M. and G.A. Meehl, 1986: General circulation model CO2 sensitivity experiments: Snow-sea ice albedo parameterizations and globally averaged surface air temperature. *Climatic Change*, 8, 231-241.

Washington, W.M. and C.L. Parkinson, 1986: *An Introduction to Three-Dimensional Climate Modeling*, University Science Books, Mill Valley, CA, and Oxford University Press, New York, NY, 422 pp.

Washington, W.M. and L. VerPlank, 1986: *A Description of Coupled General Circulation Models of the Atmosphere and Oceans Used for CO2 Studies.* Technical Note, NCAR/TN-271+EDU, National Center for Atmospheric Research, Boulder, CO, 29 pp.

Washington, W.M., G.A. Meehl, W.L. Gates, and G.L. Potter, 1987: The role of the ocean in climate change resulting from increased CO2. Research Project of the Month, October 1987, Carbon Dioxide Research Division, Office of Basic Energy Sciences, U.S. Department of Energy, Washington, DC.

Dickinson, R.E., G.A. Meehl, and W.M. Washington, 1987: Ice-albedo feedback in a CO2 doubling simulation. *Climatic Change*, 10, 241-248.

Meehl, G.A. and W.M. Washington, 1988: A comparison of soil-moisture sensitivity in two global climate models. *Journal of the Atmospheric Sciences*, 45, 1476-1492.

Washington, W.M. and G.A. Meehl, 1989: Climate sensitivity due to increased CO2: Experiments with a coupled atmosphere and ocean general circulation model. *Climate Dynamics*, 4, 1-38.

Cess, R.D., G.L. Potter, J.P. Blanchet, G.J. Boer, S.J. Ghan, J.T. Kiehl, H. LeTreut, Z.-

X. Li, X.-Z. Liang, J.F.B. Mitchell, J.-J. Morcrette, D.A. Randall, M.R. Riches, E. Roeckner, U. Schlese, A. Slingo, K.E. Taylor, W.M. Washington, R.T. Wetherald, and I. Yagai, 1989: Interpretation of cloud-climate feedback as produced by 14 atmospheric general circulation models. *Science*, August, 513-516.

Cess, R.D., G.L. Potter, J.P. Blanchet, G.J. Boer, A.D. Del Genio, M. D\'equ\'e, V. Dymnikov, V. Galin, W.L. Gates, S.J. Ghan, J.T. Kiehl, A.A. Lacis, H. LeTreut, Z.- X Li, X.-Z. Liang, B.J. McAvaney, V.P. Meleshko, J.F.B. Mitchell, J.-J. Morcrette,

D.A. Randall, L. Rikus, E. Roeckner, J.F. Royer, U. Schlese, D.A. Sheinin, A. Slingo, A.P. Sokolov, K.E. Taylor, W.M. Washington, R.T. Wetherald, I. Yagai, and M.-H. Zhang, 1990: Intercomparison and interpretation of climate feedback processes in 19 atmospheric general circulation models. *Journal of Geophysical Research,* 95, 16,601-16,615.

Washington, W.M., T.W. Bettge, G.A. Meehl, and J.B. Yost, 1990: Computer simulation of the global climatic effects of increased greenhouse gases. *The International Journal of Supercomputer Applications*, 4, 5-19.

Meehl, G.A. and W.M. Washington, 1990: CO2 climate sensitivity and snow-sea-ice albedo parameterization in an atmospheric GCM coupled to a mixed-layer ocean model. *Climatic Change*, 16, 283-306.

Washington, W.M., 1990: Where's the heat? *Natural History*, March, 66-72.

Kutzbach, J.E., P.J. Guetter, and W.M. Washington, 1990: Simulated circulation of an idealized ocean for Pangaean time. *Paleoceanography*, 5, 299-317.

Washington, W.M. and T.W. Bettge, 1990: Computer simulation of the greenhouse effect*. Computers in Physics*, 4, 240-246.

MacCracken, M. (Chairman), U. Cubasch, W.L. Gates, L.D. Harvey, B. Hunt, R. Katz, E. Lorenz, S. Manabe, B. McAvaney, N. McFarlane, G. Meehl, V. Meleshko, A. Robock, G. Stenchikov, R. Stouffer, W.-C. Wang, W. Washington, R. Watts, and

S. Zebiak, 1991: Working Group 2: A critical appraisal of model simulations. In *Greenhouse-Gas-Induced Climatic Change: A Critical Appraisal of Simulations and Observations*, M.E. Schlesinger, editor, Elsevier Science Publishers B.V., Amsterdam, 583-591.

Cess, R.D., G.L. Potter, M.-H. Zhang, J.-P. Blanchet, G.J. Boer, S. Chalita, D.A. Dazlich, A.D. Del Genio, V. Dymnikov, V. Galin, D. Jerrett, E. Keup, A.A. Lacis,

H. LeTreut, X.-Z. Liang, J.-F. Mahfouf, B.J. McAvaney, V.P. Meleshko, J.F.B. Mitchell, J.-J. Morcrette, P.M. Norris, D.A. Randall, L. Rikus, E. Roeckner, J.-F. Royer, U. Schlese, D.A. Shenin, J.M. Slingo, A.P. Sokolov, K.E. Taylor, W.M. Washington, R.T. Wetherald, and I. Yagai, 1991: Interpretation of snow-climate feedback as produced by 17 general circulation models. *Science*, 253, 888-892.

Randall, D.A., R.D. Cess, J.P. Blanchet, G.J. Boer, D.A. Dazlich, A.D. Del Genio, M. Deque, V. Dymnikov, V. Galin, S.J. Ghan, A.A. Lacis, H. LeTreut, Z.-X. Li, X.-Z. Liang, B.J. McAvaney, V.P. Meleshko, J.F.B. Mitchell, J.-J. Morcrette, G.L. Potter, L. Rikus, E. Roeckner, J.F. Royer, U. Schlese, D.A. Sheinin, J. Slingo,

A.P. Sokolov, K.E. Taylor, W.M. Washington, R.T. Wetherald, I. Yagai, and M.-H. Zhang, 1992: Intercomparison and interpretation of surface energy fluxes in atmospheric general circulation models. *Journal of Geophysical Research*, 97, 3711-3724.

Washington, W.M. and G.A. Meehl, 1991: Characteristics of coupled atmosphere- ocean CO2 sensitivity experiments with different ocean formulations. In *Greenhouse-Gas-Induced Climatic Change: A Critical Appraisal of Simulations and Observations*, M.E. Schlesinger, editor, Elsevier Scientific Publishers, Amsterdam, 79-110.

Washington, W.M., 1992: Reliability of the models: Their match with observations. In *Climate Change and Energy Policy*. Proceedings of the International Conference on Global Climate Change: Its Mitigation Through Improved Production and Use of Energy, Los Alamos National Laboratory, 21-24 October 1991, Los Alamos, NM, L. Rosen and R. Glasser, editors, American Institute of Physics, New York, NY, 63-74.

Washington, W.M., 1992: Greenhouse-gas increases. In *Climate System Modeling*, K. Trenberth, Editor, Cambridge University Press, England, 643-668.

Meehl, G.A., W.M. Washington, and T.R. Karl, 1992: Low-frequency variability and CO2 transient climate change. Part 1. Time-averaged differences*. Climate Dynamics*, 8, 117-133.

Washington, W.M. and G.A. Meehl, 1993: Greenhouse sensitivity experiments with penetrative cumulus convection and tropical cirrus albedo effects*. Climate Dynamics*, 8, 211-223.

Meehl, G.A., G.W. Branstator, and W.M. Washington, 1993: Tropical Pacific interannual variability and CO2 climate change. *Journal of Climate*, 6, 42-63.

Meehl, G.A. and W.M. Washington, 1993: South Asian summer monsoon variability in a model with doubled atmospheric carbon dioxide concentration. *Science,* 260, 1101-1104.

Washington, W.M., G.A. Meehl, L. VerPlank, and T.W. Bettge, 1994: A world ocean model for greenhouse sensitivity studies: resolution intercomparison and the role of diagnostic forcing. *Climate Dynamics*, 9, 321-344.

Meehl, G.A., M. Wheeler, and W.M. Washington, 1994: Low-frequency variability and CO2 transient climate change. Part 3. Intermonthly and interannual variability. *Climate Dynamics*, *10*, 277-303.

Liu, Y., F. Giorgi, and W.M. Washington, 1994: Simulation of summer monsoon climate over east Asia with an NCAR Regional Climate Model. *Monthly Weather Review*, 122, 2331-2348.

Campbell, G.G., T.G.F. Kittel, G.A. Meehl, and W.M. Washington, 1995: Low-frequency variability and CO2 transient climate change. Part 2: EOF analysis of CO2 and model-configuration sensitivity. *Global and Planetary Change*, 10, 201-216.

Meehl, G.A., and W.M. Washington, 1995: Cloud albedo feedback and the super greenhouse effect in a global coupled GCM. *Climate Dynamics*, 11, 399-411.

Washington, W.M., G.A. Meehl, and T.W. Bettge, 1995: Global simulations with 1o sea- ice and ocean model components: Present and future prospects. In *Proceedings of Fourth Conference on Polar Meteorology and Oceanography,* 15-20 January 1995, Dallas, Texas, American Meteorological Society, Boston, Massachusetts, (J9)10-(J9)13.

Meehl, G.A., and W.M. Washington, 1995: Cloud-albedo feedback and the super greenhouse effect in a global coupled GCM. In *Proceedings of Symposium on the Regulation of Sea-Surface Temperatures and Warming of the Tropical Ocean--Atmosphere System,* 15-20 January 1995, Dallas, Texas, American Meteorological Society, Boston, Massachusetts, 96-100.

Meehl, G.A., and W.M. Washington, 1996: El Niño-like climate change in a model with increased atmospheric CO2 concentrations*. Nature*, 382, 56-60.

Washington, W.M., 1996: Foreword in *Historical Essays on Meteorology*, 1919- 1995(James R. Fleming, Ed.), (The diamond anniversary history volume of the American Meteorological Society), Braun-Brumfield, Inc., USA, pp. v-viii.

Washington, W.M., and G.A. Meehl, 1996: High--latitude climate change in a global coupled ocean-atmosphere-sea ice model with increased atmospheric CO2. *Journal of Geophysical Research*, 101, 12,795-12,801.

Washington, W.M., T.W. Bettge, G.A. Meehl, R.M. Chervin, D. Pollard, W.G. Strand, and L. VerPlank, 1995: *Description of New Global, Coupled, General Circulation Models of the Atmosphere, Ocean, and Sea Ice to be Used in Multidecadal Time- Scale Greenhouse-Effect Studies*. Technical Note, National Center for Atmospheric Research, Boulder, Colorado.

Washington, W.M., 1996: An Overview of Climate Modeling. *An Institute on the Economics of the Climate Resource, Final Report*, 5--7 June 1995, National Center for Atmospheric Research, Boulder, Colorado, 117-140.

Meehl, G.A., and W.M. Washington, 1997: Pacific region climate change in a global coupled climate model. Second UNAM-Cray Supercomuting Conference Volume.

Meehl, G.A., W.M. Washington, D.J. Erickson III, B.P. Briegleb, and P.J. Jaumann, 1996: Climate change from increased CO2 and the direct and indirect effects of sulfate aerosols. *Geophys. Res. Lett*., 23, 3755-3758.

Meehl, G.A., and W.M. Washington, 1996: El Niño-like climate change in a model with increased atmospheric CO2 concentrations. *Nature*, 382, 56-60.

Meehl, G. A. and W. M. Washington, 1997: Pacific region climate change in a global coupled climate model. *Numerical Simulations in the Environmental and Earth Sciences*. F. Garcia-Garcia, G. Cisneros, A. Fernandez-Eguiarte, and R. Alvarez, Eds., Cambridge University Press, New York, 58-63.

Washington, W.M., 1997: Description of a new coupled modeling effort for the DOE Climate Change Prediction Program: Emphasis in Polar Processes. Workshop on Polar Processes in Global Climate, 13-15 November 1996, Cancun Mexico, American Meteorological Society, pp. 15-18.

Washington, W. M. and G. A. Meehl, 1997: Climate model simulations of global warming. Chapter 7 in *Assessing Climate Change: Results from the Model Evaluation Consortium for Climate Assessment*. W. Howe and A. Henderson- Sellers, Eds. Gordon and Breach Science Publishers, North Ryde, Australia, 125-140.

Washington, W.M. 1997: Book review of *Global Warming: The Truth Behind the Myth*

by Michael Parsons. Bulletin of the American Meteorological Society, 78:9, 2019-

-2020.

Washington, W.M. and J.W. Weatherly, 1997: Simulations with a climate model with high resolution ocean and sea ice. Polar Processes and Global Climate, Draft

Summary Report from the Conference on Polar Processes and Global Climate, WMO/ICSU/IOC World Climate Research Programme (WCRP). Prepared by International ACYSYS Project Office, Oslo Norway, pp. 250-252.

Weatherly, J.W. and W.M. Washington, 1997: Sea ice and ocean circulation in a high resolution global climate model. Polar Processes and Global Climate, Draft Summary Report from the Conference on Polar Processes and Global Climate, WMO/ICSU/IOC World Climate Research Programme (WCRP). Prepared by International ACYSYS Project Office, Oslo Norway, pp. 253-254.

Washington, W.M., 1998: Diversity in the science workforce: Trends and programs. In *Proceedings of Seventh Symposium on Education*, 11-16 January 1998, Phoenix, Arizona. American Meteorological Society, page 35.

Washington, W.M., J.W. Weatherly, and R.M. Chervin, 1998: A new DOE coupled parallel climate model with high-resolution ocean and sea ice. *In Proceedings of Ninth Symposium on Global Change Studies*, 11-16 January, 1998, Phoenix, Arizona. American Meteorological Society, pp. 65-68.

Washington, W.M., 1998: Book Review of *Hot Talk Cold Science: Global Warming's Unfinished Debate* by S. Fred Singer. Bulletin of the American Meteorological Society, 79:9, 1936-1937.

Washington, W.M., 1999: Projections of Climate Change for the 21st Century, AAAS Annual Meeting, 21-26 January, Anaheim, California.

Washington, W.M., et al., 1999: Climate simulations with the DOE parallel climate model (PCM)), Tenth Symposium on Global Change Studies, 79th AMS Annual Meeting, 10-15 January, Dallas, Texas.

Weatherly, J.W. and W.M. Washington, 1999: Arctic and Antarctic influences on thermohaline circulation in a global climate model, Fifth Conference on Polar Meteorology and Oceanography, 79th AMS Annual Meeting, 10-15 January, Dallas, Texas.

Washington, W.M., 1999: Three Dimensional Numerical Simulation of Climate: The Fundamentals. Chapter Two in *Anthropogenic Climate Change*, GKSS School of Environmental Research, H. Von Storch and G. Floser, Eds., Springer-Verlag, Heidelberg, Germany, 37-59.

Washington, W.M., 1999: Research and Decision Tools. Workshop Report in *Final Report from the Conference on Basic Research Needs to Achieve Sustainability: The Carbon Problem*. P.M. Eisenberger and M. Knotek, Eds., Biosphere 2 Center, Columbia University, 21-23.

Washington, W.M., 1999: United States Climate Modeling Research and Prediction in the 21st Century. In *Greenhouse Effect and Climate Change*, Proceedings of Advances of the Joint Research Project on CO2 Induced Climate change, Department of Energy and the Chinese Academy of Sciences, PRC, T. Shiyan,

C. Panqin, M.R. Riches, and W.C. Wang, Eds., China Ocean Press, Beijing, 83- 86.

Meehl, G.A., W.M. Washington, J.M. Arblaster, T.W. Bettge, and W.G. Strand Jr., 2000: Anthropogenic forcing and decadal climate variability in sensitivity experiments of 20th and 21st century climate. *Journal of Climate*, 13, 3728-3744.

Washington, W.M. et al., 2000: Parallel Climate Model (PCM): Control and transient simulations. *Climate Dynamics*, 16/10-1, 755-774.

Dai, A., G.A. Meehl, W.M. Washington, T.M.L. Wigley, 2001: Ensemble simulation of the 20th and 21st century climates by a coupled GCM. In: *Proceedings of the AMS 12th Symposium on Global Change and Climate Variations*, 14-18 January 2001, Albuquerque, New Mexico.

Washington, W.M., A. Dai, J.M. Arblaster, G.A. Meehl, J.W. Weatherly, and A.J. Semtner, 2001: Ensemble historical and climate change simulations. In: *Proceedings of the AMS 12th Symposium on Global Change and Climate Variations*, 14-18 January 2001, Albuquerque, New Mexico.

Washington, W.M., 2001: A new environmental initiative for NSF and advances in climate modeling of the Arctic. Arctic Forum 2000. The Arctic Research Consortium of the U.S. (ARCUS), Fairbanks, AK, 97pp.

Liu, P., W.M. Washington, G.A. Meehl, G. Wu, and G.L. Potter, 2001: Historical and future trends of the Sahara Desert. *Geophysical. Research Letters*, 28, 2683- 2686.

Latif, M., K. Sperber, J. Arblaster, P. Braconnot, D. Chen, A. Colman, U. Cubasch, C. Cooper, P. Delecluse, D. DeWitt, L. Fairhead, G. Flato, T. Hogan, M. Ji, M. Kimoto, A. Kitoh, T. Knutson, H. LeTreut, T. Li, S. Manabe, O. Marti, C. Mechoso, G. Meehl, S. Power, E. Roeckner, J. Sirven, L. Terray, A. Vintzileos, R. Vob, B. Wang, W. Washington, I. Yoshikawa, J. Yu, S. Zebiak, 2001: ENSIP: The El Niño simulation intercomparison project. *Climate Dynamics*, 18, 255-276.

Blackmon, M., B. Boville, F. Bryan, R. Dickinson, P. Gent, J. Kiehl, R. Moritz, D. Randall, J. Shukla, S. Solomon, G. Bonan, S. Doney, I. Fung, J. Hack, E. Hunke, J. Hurrell, J. Kutzbach, G. Meehl, B. Otto-Bliesner, R. Saravanan, E. Schneider, L. Sloan, M. Spall, K. Taylor, J. Tribbia, and W. Washington, 2001: The Community Climate System Model. *Bulletin of the American Meteorological Soc*iety, 82, 2357-2376.

Dai, A., G. A. Meehl, W. M. Washington, and T. M. L Wigley, 2001: Climate changes in the 21st century over the Asia-Pacific region simulated by the NCAR CSM and PCM*. Advances in Atmospheric Science,* 18, 639-658.

Dai, A., G. A. Meehl, W. M. Washington, T. M. L Wigley, and J. M. Arblaster, 2001: Ensemble simulation of 21st century climate changes: business as usual vs. CO2 stabilization. *Bulletin of the American Meteorological Society*, 82, 2377-2388.

Dai, A., T. M. L. Wigley, G. A. Meehl, and W. M. Washington, 2001: Effects of stabilizing atmospheric CO2 on global climate in the next two centuries. *Geophysical Research Letters*, 28, 4511-4514.

Washington, W.M., 2001: The status of climate models and climate change simulations. In *The Science and Culture Series, Nuclear Strategy and Peace Technology*, Proceedings of the International Seminar on Nuclear War and Planetary Emergencies, 25th Session, Erice, Italy, 19-24 August 2000, 362-365.

Dai, A., G.A. Meehl, W.M. Washington, and W.G. Strand, 2002: North Atlantic Ocean Response to a future anthropogenic forcing in a coupled GCM. In: *Proceedings of the AMS 13th Symposium on Global Change and Climate Variations*, 14-17 Jan. 2002, Orlando, FL, pp. 188-190.

Goody, R. J. Anderson, T. Karl, R. Balstad Miller, G. North, J. Simpson, G. Stephens and W. Washington, 2002: Why monitor the climate? *Bulletin of the American Meteorological Society*, 83:6, 873-878.

Meehl, G. A., W. M. Washington, T. M. L. Wigley, J. M. Arblaster, and A. Dai, 2003: Solar and greenhouse gas forcing and climate response in the 20th century. *Journal of Climate*, 16, 426-444.

Santer, B.D., T.M.L. Wigley, G.A. Meehl, M.F. Wehner, C. Mears, M. Schabel, F.J. Wentz, C.M. 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.

Ammann, C., G.A. Meehl, W.M. Washington, and C.S. Zender, 2003: A monthly and latitudinally varying volcanic forcing dataset in simulations of 20th century climate. *Geophysical Research Letters*, 30:12, 1657, 10.1029/2003GL016875.

Santer, B.D., T.M.L. Wigley, G.A. Meehl, M.F. Wehner, C. Mears, M. Schabel, F.J.Wentz, C. Ammann, J.M. Arblaster, T.W. Bettge, W.M. Washington, K.E. Taylor, J.S. Boyle, W. Bruggemann, C. Doutriaux: 2003: Response to Reliability of Satellite Data Sets by J.R. Christy and R.W. Spencer. *Science*, 301, 1046- 1049.

Leung, L.R., Yun Qian, Xindi Bian, Warren M. Washington, Jongil Han, John O. Roads, 2004: Mid-Century Ensemble Regional Climate Change Scenarios for the Western United States. *Climatic Change*, 62, 75-113.

Barnett, T., R. Malone, W. Pennell, D. Stammer, A. Semtner, and W. Washington, 2004: The effects of climate change on water resources in the west: Introduction and Overview. *Climatic Change*, 62, 1-11.

Dai, A., W.M. Washington, G.A. Meehl, T.W. Bettge,and W.G. Strand, 2004: The ACPI climate change simulations. *Climatic Change*, 62, 29-43.

Washington, W.M., 2004: Overseas scientists still welcome in the United States.

Correspondence in *Nature,* 427, p. 777.

Santer, B.D., M.F. Wehner, T.M.L. Wigley, R. Sausen, G.A. Meehl, K.E. Taylor, C. Amman, J.M. Arblaster, W.M. Washington, J.S. Boyle, W. Bruggeman, 2004:

Response to comment on Contributions of anthropogenic and natural forcing to recent tropopause height changes. *Science*, 303, 1771c.

Meehl, G.A., W.M. Washington, C. Ammann, J.M. Arblaster, T. M.L. Wigley and C. Tebaldi, 2004: Combinations of natural and anthropogenic forcings and 20th century climate. *Journal of Climate*, 17, 3721-3727

Meehl, G.A., W.M. Washington, J.M. Arblaster, and A. Hu, 2004: Factors affecting climate sensitivity in global coupled models. *Journal of Climate*, 17, 1584-1596.

Hu, A., G.A. Meehl, W. M. Washington, and A. Dai, 2004: Response of the Atlantic thermohaline circulation to increased atmospheric CO2 in a coupled model. *Journal of Climate,* 17, 4267-4279.

Meehl, G. A., W. M. Washington, T. M. L. Wigley, J. M. Arblaster, and A. Dai, 2004: Mechanisms of an intensified Hadley circulation in response to solar forcing in the 20th century. Chapter 17 In: *The Hadley Circulation: Past, Present, and Future*, H. Diaz and R. Bradley, Eds., Springer, pp. 489-511.

Washington, W.M. and C.L. Parkinson, 2005: An Introduction to Three-Dimensional Climate Modeling, 2nd Edition. University Science Books, ISBN: 1-891389-35- 1, 353 pp.

Santer, B.D., T.M.L. Wigley, Adrian J. Simmons, P.W. Kallberg, G.A. Kelly, S.M. Uppala, C. Ammann, J.S. Boyle, W. Bruggemann, C. Doutriaux, M. Fiorino, C. Mears, G.A. Meehl, R. Sausen, K.E. Taylor, W.M. Washington, M.F. Wehner, F.

J. Wentz, 2004: Identification of anthropogenic climate change using a second- generation reanalysis. *Journal of Geophysical Research*, 109, D21104, doi:10.1029/2004 JD005075.

Lamarque, J.-F., P. Hess, L. Emmons, L. Buja, W.M. Washington and C. Granier, 2005: Tropospheric ozone evolution between 1890 and 1990, *Journal of Geophysical Research,* 110, D08304, doi: 10.1029/2004JD005537.

Meehl G.A., W.M. Washington, W.D. Collins, J.M. Arblaster, A. Hu, L.E. Buja, W.G. Strand and H. Teng, 2005: How much more global warming and sea level rise? *Science*, 307, 1769-1772.

Ramanathan, V., C. Chung, D. Kim, T. Bettge, L. Buja, J.T. Kiehl, W.M. Washington, Q.Fu, D.R. Sikka and M. Wild, 2005: Atmospheric brown clouds: Impacts on S. Asian climate and hydrological cycle. Proceedings of the National Academy of Sciences (PNAS), 102, 5325-5333, doi: 10.1073/pnas.0500656102.

Dai, A., A. Hu, G.A. Meehl, W.M. Washington and W.G. Strand, 2005: Atlantic thermohaline circulation in a coupled general circulation Model: Unforced variations vs. forced changes. *J. Climate,* 18, 2990-3013.

Barnett, T.P., D. Pierce, K. AchutaRao, P. Gleckler, B. Santer, J. Gregory and W. Washington, 2005: Penetration of a warming signal into the world’s oceans: Human Impacts, Science, 309, 284-287.

Feddema, J., K. Oleson, G. Bonan, L. Mearns, W.M. Washington, G. Meehl, 2005: A comparison of a GCM response to historical anthropogenic land cover change and model sensitivity to uncertainty in present day land cover representations. Climate Dynamics, 26:6, 581-609. DOI: 10.1007/s00382-005-0038-z.

Feddema, J.J. K. Oleson, G. Bonan, L.O. Mearns, L. E. Buja, G.A. Meehl, W.M. Washington, 2005: The importance of land-cover change in simulating future climates. Science, 310, 1674-1678.

Washington, W.M., A. Dai, and G.A. Meehl, 2006: Climate Change Modeling: A Brief History of the Theory and Recent 21st Century Ensemble Simulations. In: Frontiers in the Science of Climate Modeling, J.T. Kiehl and V. Ramanathan (eds.), Cambridge University Press, pp. 26-51.

Washington, W.M., 2006: Computer Modeling the Twentieth- and Twenty-First-Century Century Climate, American Philosophical Society, 150:3, 414-427.

Teng, H., W.M. Washington, G.A. Meehl, L.E. Buja and W.G. Strand, 2006: 21st Century Arctic Climate Change in the CCSM3 IPCC Scenario Simulations. Climate Dynamics, DOI: 10.1007/s00382-005-0099-z.

Santer, B. D., T. M. L. Wigley, P. J. Gleckler, C. Bonfils, M. F. Wehner, K. AchutaRao,

T. P. Barnett, J. S. Boyle, W. Bruggemann, M. Fiorino, N. Gillett, P. D. Jones, S.

A. Klein, G. A. Meehl, S. C. B. Raper, K. E. Taylor, R. W. Reynolds, and W. M. Washington, 2006: Causes of ocean surface temperature changes in Atlantic and Pacific hurricane formation regions. In: Proceedings of the National Academy of Sciences, 103, 13905-13910, 10.1073/pnas.0602861103.

Washington, W.M., 2006: Modeling future climate change. In Proceedings of Bridging the Gap Between Science and Society: The Relationship between Policy and Research in National Laboratories, Universities, Government and Industry.

November 1-2, 2003, James A. Baker, III Institute for Public Policy and Rice University, pp 60-64.

Pierce, D.W., T.P. Barnett, K. AchutaRao, P. Gleckler, B. Santer, J. Gregory and W.M Washington, 2006: Anthropogenic Warming of the Oceans: Observations and Model Results, J. Climate, 19:1873-1900.

Teng, H., W.M. Washington and G. A. Meehl, 2007: Interannual Variations and Future Change of Wintertime Extratropical Cyclone Activity over North America in CCSM3. Climate Dynamics, doi: 10.1007/s00382-007-0314-1.

Santer, B.D., C. Mears, F.J. Wentz, K.E. Taylor, P.J. Gleckler, T.M.L. Wigley, T.P. Barnett, J.S. Boyle, W. Bruggemann, N.P. Gillett, S.A. Klein, G.A. Meehl, T. Nozawa, D.W. Pierce, P.A. Stott, W.M. Washington, and M.F. Wehner, 2007: Identification of human-induced changes in atmospheric moisture content. Proc. Nat. Acad. Sci., 104, 15248-15253.

Washington, W.M., L. Buja and A. Craig, 2009: The computational future for climate and earth system models: On the path to petaflop and beyond. Philosophical

Transactions of the Royal Society A, The environmental eScience revolution, Royal society Publishing, London, UK (367) 833-846.

Washington, W.M., J. Drake, L. Buja, D. Anderson, D. Bader, R. Dickinson, D. Erickson,

P. Gent, S. Ghan, P. Jones and R. Jacob: 2008: Journal of Physics Conference Series 125 012023, SciDac 2008, the use of the Climate-science Computational end Station (CCES) development and grand challenge team for the next IPCC assessment: an operational plan.

Washington, WM., Knutti, R., Meehl, GA.,Teng,H., Tebaldi, C.,Buja, DL., Strand, WG.

2009, 36, L08703, DOI: 10.1029/2008GRL037074.

Ammann, C., W.M. Washington, G.A. Meehl, L. Buja, and H. Teng, 2010: Climate engineering through artificial enhancement of natural forcings: Magnitudes and implied consequences, Journal of Geophysical Research-Atmospheres, 115, D22109, doi:10.1029/2009JD012878.

Banner, J.L., C.S. Jackson, Z-L, Yiang, K. Hayhoe, C. Woodhouse, L. Gulden, K. Jacobs, G. North, R. Leung, W.M. Washington, X. Jiang and R. Casteel, 2010: Climate change Impacts on Texas Water: A White Paper Assessment of the Past, Present and Future and Recommendations for Action. Texas Water Journal, Texas Water Resources Institute, Volume 1, No. 1, 1-19.

Washington, W.M. and A. Kasahara, 2011: The evolution and future research goals for general circulation models, in The Development of Atmospheric General Circulation Models, edited by L. Donner, W. Schubert, and R. Somerville, Cambridge University Press, New York, 18-50.

Hu, A.**,** Meehl, G.A., Han, W., Timmermann, A., Otto-Bliesner, B., Liu, Z., Washington, W.M., Large, W.G., Abe-Ouchi, A., Kimoto, M., Lambeck, K., Wu, B., 2012: Role of the Bering Strait on the hysteresis of the ocean conveyor belt circulation and glacial climate stability. *Proceedings of the National Academy of Sciences (PNAS)*, 109, 6417-6422, 10.1073/pnas.1116014109.

Meehl, G.A., Washington, W.M., Arblaster, J., Hu, A., Teng, H., Tebaldi, C., Sanderson, B.M., Lamarque, J.-F., Conley, A.J., Strand, W.G., White, J.B., 2012: Climate system response to external forcings and climate change projections in CCSM4. *Journal of Climate*, 25, 3661-3683, 10.1175/JCLI-D-11-00240.1.

Meehl, G.A., Hu, A., Tebaldi, C., Arblaster, J., Washington, W.M., Teng, H., Sanderson, B.M., Ault, T., Strand, W.G., White, J., 2012: Relative outcomes of climate change mitigation related to global temperature versus sea-level rise. *Nature Climate Change*, 2, 576–580, 10.1038/nclimate1529.

Teng, H., Washington, W.M., Branstator, G.W., Meehl, G.A., Lamarque, J.-F., 2012: Potential impacts of Asian carbon aerosols on future US warming. *Geophysical Research Letters*, 39, L11703, 10.1029/2012GL051723.

Meehl, G.A., W.M. Washington, J.M. Arblaster, A. Hu, H. Teng, C. Tebaldi, B. Sanderson, J.F. Lamarque, A. Conley, W.G. Strand, and J.B. White III, 2012:

Climate system response to external forcings and climate change projections in CCSM4. *J. Climate*, 25,36613683, doi: <http://dx.doi.org/10.1175/JCLI-D-11-> 00240.1.

Sanderson, B.M., B. O’Neill, J.T. Kiehl, G.A. Meehl, R. Knutti, and W.M. Washington, 2011: The response of the climate system to very high greenhouse gas emission scenarios. *Env. Res. Lett*., 6 034005, doi:10.1088/1748-9326/6/3/034005.

Meehl, G.A., A. Hu, C. Tebaldi, J.M. Arblaster, W.M. Washington, H. Teng, B. Sanderson, T. Ault, W.G. Strand, and J.B. White III, 2012: Relative outcomes of climate change mitigation related to temperature versus sea level rise. *Nature Climate Change,* 2,8,576-580, DOI:10.1038/NCLIMATE1529.

Hu, A., G.A. Meehl, W. Han, A. Timmermann, B. Otto-Bliesner, Z. Liu, W.M. Washington, W. Large, A. Abe-Ouchi, M. Kimoto, K. Lambeck, B. Wu, 2012: The Bering Strait and glacial climate stability. *Proc. Nat. Acad. Sci.*, 109, 17, 6417- 6422,DOI: 10.1073/pnas.1116014109

Meehl, G.A., W.M. Washington, J.M. Arblaster, A. Hu, H. Teng, J.E. Kay, A. Gettelman,

D.M. Lawrence, B.M. Sanderson, and W.G. Strand, 2013: Climate change projections in CESM1(CAM5) compared to CCSM4. Journal of Climate, 26, 6287-6308, doi: 10.1175/JCLI-D-12-00572.1.

Moss, R. H., G. A. Meehl, M. C. Lemos, J. B. Smith, J. R. Arnold, J. C. Arnott, D. Behar,

G. P. Brasseur, S. B. Broomell, A. J. Busalacchi, S. Dessai, K. L. Ebi, J. A. Edmonds, J. Furlow, L. Goddard, H. C. Hartmann, J. W. Hurrell, J. W. Katzenberger, D. M. Liverman, P. W. Mote, S. C. Moser, A. Kumar, R. S. Pulwarty, E. A. Seyller, B. L. Turner, W. M. Washington, T. J. Wilbanks. Hell and High Water: Practice-Relevant Adaptation Science. *Science*, 2013; 342 (6159): 696 DOI:10.1126/science.1239569.

Taylor, P.C., M. Cai, A. Hu, G.A. Meehl, W.M. Washington, and G.J. Zhang, 2013: A decomposition of feedback contributions to polar warming amplification. Journal of Climate, 26, 7023-7043, doi: [http://dx.doi.org/10.1175/JCLI-D-12-00696.1.](http://dx.doi.org/10.1175/JCLI-D-12-00696.1)

Hu, A., Y. Xu, C. Tebaldi, W.M. Washington, V. Ramanathan, 2013. Mitigation of short- lived climate pollutants slows sea-level rise. Nature Climate Change, doi:10.1038/nclimate1869.

Xu, Y, V. Ramanathan, W. M. Washington, 2016: Observed High-Altitude Warming and Snow cover Retreat over Tibet and the Himalayas Enhanced by Black Carbon Aerosols, submitted to Atmospheric Chemistry and Physics, 16, 1303-1315

Hu A, S. Levis, G. A. Meehl, W. Han, W.M. Washington, K. Oleson, B. J. Ruijven, M. He, and W. G. Strand, 2016: Impact of Solar Panels on Global Change,Nature Climate Change, 6, 290-294, doi:10.1038/NCLIMATE2843.

Washington, W. M. and Busalacchi, 2019, Reviewers of the National Academies report final draft of Negative Emissions Technologies and Reliable Sequestration: A Research Agenda, pp 495.

Co-editors: Warren Washington, retired as a senior scientist at the National Center for Atmospheric Research (NCAR), Antonio Busalacchi, is President of the University Corporation for Atmospheric Research (UCAR), and Cameron Fletcher is managing editor of *The Bridge* a publication of the National Academy of Engineering.