



Michael E. Schlesinger, Professor of Atmospheric Sciences, University of Illinois at Urbana-Champaign (UIUC), received his B.S. and M.S. degrees in Engineering, and his Ph.D. degree in Meteorology, all from the University of California, Los Angeles. Professor Schlesinger directs the UIUC Climate Research Group (CRG) within the Department of Atmospheric Sciences. He is an expert in the modeling, simulation and analysis of climate and climate change, with interests in simulating and

understanding past, present and possible future climates, climate impacts and climate policy. He carried out the first detailed comparison of climate and climate changes simulated by different atmospheric general circulation models (GCMs). The CRG has tropospheric, tropospheric/lower-stratospheric, tropospheric/stratospheric and tropospheric/stratospheric/mesospheric GCMs – which can be run with and without the CRG's atmospheric photochemistry/species-transport model, either with sea surface temperature and sea ice thickness prescribed or simulated by either the CRG mixed-layer ocean model or the CRG oceanic GCM. The CRG has a coupled atmosphere/ocean general circulation model that has been used to simulate the slowdown and shutdown of the thermohaline circulation in the Atlantic Ocean. The CRG also has a coupled atmospheric general circulation/mixed-layer ocean—ice-sheet/asthenosphere model and a variety of simple climate models, including the model that Prof. Schlesinger developed in 1984 and later used to make projections of global temperature change to the year 2100 for the 1990 Intergovernmental Panel on Climate Change (IPCC) report. Results from increased carbon-dioxide and other simulations by the tropospheric and tropospheric/lower-stratospheric GCMs have been used in many climate-impact assessments, beginning with that for the United States published by the EPA in 1989. In 1991 Prof. Schlesinger investigated the urgency of climate-change mitigation and found that "the penalty for a 10-year delay in initiating the transition to a reduced-greenhouse-gas scenario is small." In 1994 he discovered a 65-70 year temperature oscillation in observed surface temperatures for the North Atlantic Ocean and its bordering continental regions, a finding that was reported in *Discover Magazine* as one of "The Top 75 Science Stories" of 1994. In 1996 he published the first simulation of the onset of the last ice age using a coupled atmospheric general circulation/mixed-layer ocean—ice-sheet/asthenosphere model. In 1997 he developed the Country-Specific Model for Intertemporal Climate which has been used by 123 scientists in 47 countries. Since 1991 he has published several papers on climate-change impacts and policy, including those developing the robust adaptive decision strategy. Recently he has published papers on the influence of the Pinatubo eruption on climate and chemistry, on the causes of the observed temperature changes since 1856, and on an objective estimation of the probability distribution for climate sensitivity based on observed temperature changes. His research currently focuses on: (1) simulating and understanding the effects on climate of a human-induced melting of the Greenland ice sheet; (2) simulating and understanding the influence of the sun on climate in terms of its changes in total solar irradiance, ultraviolet radiation and precipitating energetic electrons; (3) understanding and reducing the uncertainty in the estimated climate sensitivity; (4) determining the effects on past and future climate of the sun, sulfate aerosols – both of volcanic and anthropogenic origin – and natural variability; (5) performing integrative assessment of climate change, including the impacts of climate change and adaptation and

mitigation responses; (6) further developing the robust adaptive decision strategy; and (7) simulating and understanding the coupled climate-chemistry system, including the influences of the sun – both irradiance and energetic electron precipitation – and volcanoes. He has directed NATO and other conferences in Italy, England and the United States; has edited four books, most recently *Human-Induced Climate Change: An Interdisciplinary Assessment* (http://www.amazon.com/Human-Induced-Climate-Change-Interdisciplinary-Assessment/dp/0521866030/sr=8-1/qid=1168621254/ref=sr_1_1/104-6563218-1755132?ie=UTF8&s=books); and has contributed to many assessments of climate change, including those of the IPCC and the Energy Modeling Forum. A complete list of Professor Schlesinger's publications follows. Additional information is located on the CRG Homepage at: <http://crga.atmos.uiuc.edu/>

1. **Vital Statistics**

Born: 23 February 1943, Los Angeles, California

Present Position:

Professor

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2. **Education**

B.S. (1965) - Engineering, University of California, Los Angeles

M.S. (1970) - Engineering (Fluid Mechanics), University of California, Los Angeles

Ph.D. (1976) - Meteorology, University of California, Los Angeles.

3. **Professional Employment**

1964: Engineer, U.S. Naval Ordnance Test Station, China Lake, CA.

1965: Engineer, Ralph M. Parsons Company, Los Angeles, CA.

1965: Engineer, N.V. Philips, Eindhoven, Netherlands.

1965-6: Engineer, Ralph M. Parsons Company, Los Angeles, CA.

1966: Research Assistant, UCLA Institute of Transportation and Traffic Engineering.

1967: Research Assistant, UCLA School of Engineering and Applied Sciences.

1969: Research Assistant, UCLA School of Engineering and Applied Sciences.

1971: Consultant, Lytton Ships, through contract with UCLA.

1971-4: Research Assistant, UCLA Department of Meteorology.

1973-6: Resident Consultant, Climate Dynamics Program, Rand, Santa Monica, CA.

1977: Consultant, Department of Atmospheric Sciences, UCLA.

1979-81: Expert, National Aeronautics and Space Administration, Washington, D.C.

1976-82: Assistant Professor, Dept. of Atmospheric Sciences, Oregon State University.

1982-89: Associate Professor, Dept. of Atmospheric Sciences, Oregon State University.

1989-: Professor, Dept. of Atmos. Sciences, University of Illinois at Urbana-Champaign.

4. Professional Affiliations, Honors and Awards

Tau Beta Pi - Engineering Honorary Society

B.S. with highest honors

NSF traineeships (1967-1971)

Engineering Faculty-Friends prize for design of power generating equipment for North American Water and Power Alliance (1965)

Engineering Faculty-Friends prize for design, construction and successful test firing of a restartable solid propellant rocket engine

Certificate of Appreciation, Institute for Atmospheric Optics and Remote Sensing (1980)

Awarded Special Creativity awards by the National Science Foundations in 1993 and 1998

Discovery of a North Atlantic Oscillation (Schlesinger and Ramankutty, 1994) was reported in Discover magazine as one of "The Top 75 Science Stories" of 1994 [Zimmer, 1995].

Member of the Board of Consulting Editors for the *McGraw-Hill Encyclopedia of Science & Technology* and its related publication, the *Yearbook of Science & Technology*, 2002 to 2003.

Foreign member of Academia Europaea

Listed in Who's Who in Science and Engineering

Listed in The International Directory of Distinguished Leadership

Listed in 1000 World Leaders of Scientific Influence

Listed in 500 Leaders of Science

5. Publications in Reviewed Literature

1972

The structure of blunt base wakes in swirling flow, *Astronomica Acta*, 17, 375-386, 1972 (A.F. Charwat and M.E. Schlesinger).

1977

Numerical simulation of the January and July global climate with a two-level atmospheric model, *J. Atmos. Sci.*, 34, 36-76, 1977 (W.L. Gates and M.E. Schlesinger).

1979

Numerical simulation of ozone production, transport and distribution with a global atmospheric general circulation model, *J. Atmos. Sci.*, 36, 1325-1361, 1979 (M.E. Schlesinger and Y. Mintz).

Discussion of a global ocean-atmosphere climate model with seasonal variation: possible application to a study of climate sensitivity, *Dyn. Atmos. and Oceans*, 3, 427-432, 1979.

1980

The January and July performance of the OSU two-level atmospheric general circulation model, *J. Atmos. Sci.*, 37, 1914-1943, 1980 (M.E. Schlesinger and W.L. Gates).

1981

Preliminary analysis of experiments on the climatic effects of increased CO₂ with an atmospheric general circulation model and a climatological ocean. *J. Geophys. Res.*, 86, 6385-6393, 1981 (W.L. Gates, K.H. Cook, and M.E. Schlesinger).

1982

Sensitivity analysis of a radiative-convective model by the adjoint method. *J. Atmos. Sci.*, 39, 2038-2050, 1982 (M. C. G. Hall, D. G. Cacuci, and M. E. Schlesinger).

1983

A review of climate models and their simulation of CO₂-induced warming. *The International Journal of Environmental Studies*, 20, 103-114, 1983.

1984

Climate model simulations of CO₂-induced climatic change. In *Advances in Geophysics*, Vol. 26, ed. B. Saltzman, Academic Press, New York, 141-235, 1984.

1985

Analytical solution for the effect of increasing CO₂ on global mean temperature. *Nature*, 315, 649-652, 1985. (T.M.L. Wigley and M.E. Schlesinger).

The global climate simulated by a coupled atmosphere-ocean general circulation model: Preliminary results. In *Coupled Ocean-Atmosphere Models*, J. C. J. Nihoul (ed.), Elsevier, Amsterdam, 131-151, 1985 (W. L. Gates, Y.-J. Han, and M. E. Schlesinger).

An analysis of the air-sea-ice interaction simulated by the OSU-coupled atmosphere-ocean GCM. In *Coupled Ocean-Atmosphere Models*, J. C. J. Nihoul (ed.), Elsevier, Amsterdam, 167-182, 1985 (Y.-J. Han, M. E. Schlesinger, and W. L. Gates).

The role of the ocean in CO₂-induced climatic warming: Preliminary results from the OSU coupled atmosphere-ocean GCM. In *Coupled Ocean-Atmosphere Models*, J. C. J. Nihoul (ed.), Elsevier, Amsterdam, 447-478, 1985 (M. E. Schlesinger, W. L. Gates, Y.-J. Han).

Model projections of the equilibrium climatic response to increased CO₂. In *The Potential Climatic Effects of Increasing Carbon Dioxide*, M. C. MacCracken and F. M. Luther, Eds., U.S. Department of Energy, DOE/ER-0237, 81-147, 1985 (M. E. Schlesinger and J. F. B. Mitchell).

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1986

Equilibrium and transient warming induced by increased atmospheric CO₂. *Climate Dynamics*, 1, 35-51, 1986.

Meeting Report on the NATO Advanced Study Institute on Physically-Based Modelling and Simulation of Climate and Climatic Change. *Eos Trans. AGU*, 67, 1377-1378, 1986.

Letter to the Editor on "Reduction in Summer Soil Wetness Induced by an Increase in Atmospheric Carbon Dioxide" by S. Manabe and R.T. Wetherald. *Science*, 234, 659-660, 1986. (M.C. MacCracken, M.E. Schlesinger, M.R. Riches).

1987

Climate model projections of the equilibrium climatic response to increased CO₂. *Reviews of Geophysics*, 25, 760-798, 1987 (M.E. Schlesinger and J.F.B. Mitchell).

Climate-chemical interactions and effects of changing atmospheric trace gases. *Reviews of Geophysics*, 25, 1441-1482, 1987 (V. Ramanathan, L. Callis, R. Cess, J. Hansen, I. Isaksen, W. Kuhn, A. Lacis, F. Luther, J. Mahlman, R. Reck, and M. Schlesinger).

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1988

The Transport of CO₂-induced Warming into the Ocean: An Analysis of Simulations by the OSU Coupled Atmosphere-Ocean General Circulation Model, *Climate Dynamics*, 3, 1-17, 1988 (M.E. Schlesinger and X. Jiang).

Quantitative analysis of feedbacks in climate model simulations of CO₂-induced warming. In *Physically-Based Modelling and Simulation of Climate and Climatic Change*, M. E. Schlesinger, Ed., NATO Advanced Study Institute Series, Kluwer, Dordrecht, 653-736, 1988.

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1989

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1990

A Method of Relating General Circulation Model Simulated Climate to the Observed Local Climate. Part I: Seasonal Statistics. *J. Climate*, 3, 1053-1079, 1990. (T. R. Karl, W. C. Wang, M. E. Schlesinger, R. W. Knight and D. Portman).

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1991

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1993

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The Impact of Potential Abrupt Climate Changes on Near-Term Policy Choices. *Climatic Change*, 26, 351-376, 1994 (R. J. Lempert, M. E. Schlesinger and J. K. Hammitt).

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- An Oscillation in the Global Climate System of Period 65-70 Years. *Nature*, 367, 723-726, 1994 (M. E. Schlesinger and N. Ramankutty).
- Analysis of Global Cloudiness: 2. Comparison of Ground-Based and Satellite-Based Cloud Climatologies. *J. Geophys. Res.*, 99, 17,045-17,065 (I. I. Mokhov and M.E. Schlesinger).
- Letter to Editor, *Atmósfera*, 7, 249, 1994. (D. G. Cacuci and M. E. Schlesinger).
- Low-frequency oscillation. Reply. *Nature*, 372, 508-509, 1994 (M. E. Schlesinger and N. Ramankutty).

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- Is the Recently Reported 65-70 Year Surface-Temperature Oscillation the Result of Climatic Noise? *J. Geophys. Res.*, 100, 13,767-13,774 (M. E. Schlesinger and N. Ramankutty).
- Comparison of observed seasonal temperature maxima, minima, and diurnal range in North America with simulations from three global climate models. *Atmos. Res.*, 37, 267-275, 1995 (G. Kukla, J. Gavin, M. Schlesinger and T. Karl).

1996

- Simulation of Glacial Onset with a Coupled Atmospheric General Circulation/Mixed-Layer Ocean—Ice-Sheet/Asthenosphere Model. *Paleoclimates—Data and Modelling*, 2, 179-201 (M.E. Schlesinger and M. Ya. Verbitsky).
- When We Don't Know the Costs or the Benefits: Adaptive Strategies for Abating Climate Change. *Climatic Change*, 33, 235-274, 1996 (R. J. Lempert, M. E. Schlesinger, S. C. Bankes).
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- Comparison of Paleotemperature Reconstructions as Evidence for the Paleo-Analog Hypothesis, *Climatic Change*, 35, 123-131 (H. S. Kheshgi, M. E. Schlesinger and A. G. Lapenis).
- Comparison of the seasonal change in cloud-radiative forcing from atmospheric general circulation models and satellite observations. *J. Geophys. Res.*, 102, 16,593-16,603 (Cess, R. D., M. H. Zhang, G. L. Potter, V. Alekseev, H. W. Barker, S. Bony, R. A. Colman, D. A. Dazlich, A. D. Del Genio, M. Déqué, M. R. Dix, V. Dymnikov, M. Esch, L. D. Fowler, J. R. Fraser, V. Galin, W. L. Gates, J. J. Hack, W. J. Ingram, J. T. Kiehl, Y. Kim, H. Le Treut, X.-Z. Liang, B. J. McAvaney, V. P. Meleshko, J.-J. Morcrette, D. A. Randall, E. Roeckner, M. E. Schlesinger, P. V. Sporyshev, K. E. Taylor, B. Timbal, E. M. Volodin, W. Wang, W. C. Wang, and R. T. Wetherald).
- COSMIC – Country Specific Model for Intertemporal Climate, Computer Software, Electric Power Research Institute, Palo Alto (Schlesinger, M. E., and L. J. Williams).

1998

- Sea Level Change: The Expected Economic Cost of Protection or Abandonment in the United States, *Climatic Change*, 38, 447-472 (G. W. Yohe and M. E. Schlesinger).

Intercomparison of models representing direct shortwave radiative forcing by sulfate aerosols, *J. Geophys. Res.*, 103, 16,979-16,998 (O. Boucher, S. E. Schwartz, T. P. Ackerman, T. L. Anderson, B. Bergstrom, B. Bonnel, P. Chylek, A. Dahlback, Y. Fouquart, Q. Fu, N. Halthore, J. M. Haywood, T. Iversen, S. Kato, S. Kinne, A. Kirkevåg, K. R. Knapp, A. Lacis, I. Laszlo, M. I. Mishchenko, S. Nemesure, V. Ramaswamy, D. L. Roberts, P. Russell, M. E. Schlesinger, G. L. Stephens, R. Wagener, M. Wang, J. Wong, and F. Yang).

Geographical Scenarios of Greenhouse-Gas and Anthropogenic-Sulfate-Aerosol Induced Climate Changes, *J. Aerosol Sci.*, 29 (suppl. 1), S121-S122 (M.E. Schlesinger, N. G. Andronova, A. Ghanem, S. Malyshev, E. Rozanov, W. Wang and F. Yang)

Energy Implications of future stabilization of atmospheric CO₂ content, *Nature*, 395, 881-884 (M. I. Hoffert, K. Caldeira, A. K. Jain, E. F. Haites, L. D. D. Harvey, S. D. Potter, M. E. Schlesinger, S. H. Schneider, R. G. Watts, T. M. L. Wigley and D. J. Wuebbles).

1999

Monsoon changes for 6000 years ago: Results of 18 simulations from the Paleoclimate Modeling Intercomparison Project (PMIP): *Geophys. Res. Lettr.*, 26, 859-862 (Joussaume, S., K. E. Taylor, P. Braconnot, J. F. B. Mitchell, J. E. Kutzbach, S. P. Harrison, I. C. Prentice, A. J. Broccoli, A. Abe-Ouchi, P. J. Bartlein, C. Bonfils, B. Dong, J. Guiot, K. Heterich, C. D. Hewitt, D. Jolly, J. W. Kim, A. Kislov, A. Kitoh, M. F. Loutre, V. Masson, B. McAvaney, N. McFarlane, N. de Noblet, W. R. Peltier, J. Y. Peterschmitt, D. Pollard, D. Rind, J. F. Royer, M. E. Schlesinger, J. Syktus, S. Thompson, P. Valdes, G. Vettoretti, R. S. Webb and U. Wyputta).

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2000

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- The Impacts of Climate Variability on Near-Term Policy Choices and the Value of Information, In *Societal Adaptation to Climate Variability and Change*, S. M. Kane and G. W. Yohe (Editors), Kluwer, Dordrecht, 129-161, 2000 (R. J. Lempert, M. E. Schlesinger, S. C. Bankes and N. G. Andronova).
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- Geographical Distributions of Temperature Change for Scenarios of Greenhouse Gas and Sulfur Dioxide Emissions, *Technological Forecasting and Social Change*, 65, 167-193, 2000 (M. E. Schlesinger, S. Malyshev, E. V. Rozanov, F. Yang, N. G. Andronova, B. de Vries, A. Grübler, K. Jiang, T. Masui, T. Morita, J. Penner, W. Pepper, A. Sankovski and Y. Zhang).
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Climate Change in the 21st Century - Interim Characterizations based on the New IPCC Emissions Scenarios. The Finnish Environment 433, Finnish Environment Institute, Helsinki, 148 pp. (Carter, T.R., M. Hulme, J.F. Crossley, S. Malyshev, M.G. New, M.E. Schlesinger, and H. Tuomenvirta).

Study of the effects of the Pinatubo volcanic eruption using the UIUC stratosphere/troposphere GCM with interactive photochemistry. Proceedings of the SPARC General Assembly 2000 (E. Rozanov, M. Schlesinger, F. Yang, S. Malyshev, N. Andronova, V. Zubov, and T. Egorova). Available at:

http://www.aero.jussieu.fr/~sparc/SPARC2000_new/PosterSess3/Session3_3/Rozanov/P_3_3_13/Pinatubo.html#Anchor-Study-49575

Sensitivity of the UIUC stratosphere/troposphere GCM with interactive photochemistry to the observed increase of solar UV radiation. Proceedings of the SPARC General Assembly 2000 (Rozanov, E., M. E. Schlesinger, F. Yang, S. Malyshev, N. Andronova, V. Zubov, and T. Egorova). Available at:

http://www.aero.jussieu.fr/~sparc/SPARC2000_new/PosterSess3/Session3_3/Rozanov/P_3_3_12/SOLAR_UIFolder/SOLAR.html#Anchor-Sensitivity-11481

Simulation of the effects of the Montreal Protocol using the UIUC stratosphere/troposphere ACTM driven by the UKMO-assimilated winds. Proceedings of the SPARC General

Assembly 2000 (T. A. Egorova, E. V. Rozanov, M. E. Schlesinger, S. L. Malyshev, N.G. Andronova, V. A. Zubov and I. L. Karol. Available at:
http://www.aero.jussieu.fr/~sparc/SPARC2000_new/PosterSess3/Session3_4/Egorova/egorova.html#Anchor-Simulation-11481

Study of the relationship between interannual climate variability and the interannual variability of ozone and methane. Proceedings of the SPARC General Assembly 2000 (N. Andronova, M. Schlesinger, E. Rozanov and T. Egorova). Available at:
http://www.aero.jussieu.fr/~sparc/SPARC2000_new/PosterSess2/SessionP2_5/andronova/SPARC_EOF_Ozone.htm

2002

Use adaptive strategy to act on global warming. News-Gazette, 9 June 2002, page B-3 (Michael Schlesinger and Natalia Andronova).

Importance of Context in Defining Malaria Risk: Summary and Discussion. In *The Contextual Determinants of Malaria*, E. A. Casman and H. Dowlatabadi (Editors). Resources for the Future Press, Washington, D. C., 349-357 (Casman, E. A., R. E. Basher, A. E. Beljaev, M. Birley, R. Bos, J. St. H. Cox, R. S. Desowitz, H. Dowlatabadi, B. Fischhoff, D. A. Focks, D. J. Gubler, R. d'A. Gusmão, C. Kidson, A. Kondrachine, R. S. Kovats, L. B. Lave, S. Litsios, J. Longstreth, W. Lutz, A. J. McMichael, M. G. Morgan, J. Mouchet, P. Reiter, D. R. Roberts, G. Sabatinelli, A. Schapira, M. E. Schlesinger, V. P. Sharma, K. M. Strzepek, Tang L.-h., M. L. Wilson).

2003

IPCC SRES Revisited: a Response, Energy & Environment, Vol. 14, Nos. 2 & 3, 187-214, 2003 (Nebojsa Nakicenovic, Arnulf Gröbler, Stuart Gaffin, Tae Tong Jung, Tom Kram, Tsuneyuki Morita, Hugh Pitcher, Keywan Riahi, Michael Schlesinger, P. R. Shukla, Detlef van Vuuren, Ged Davis, Laurie Michaelis, Rob Swart and Nadja Victor).

2006

World Calamity Doesn't Make Cut, Hartford Courant Newspaper, 30 June 2006 (Gary Yohe and Michael Schlesinger).

Few scientists doubt global warming. News-Gazette, 3 August 2006, page B-5 (Michael Schlesinger).

7. Books Edited

Physically-Based Modelling and Simulation of Climate and Climatic Change, Parts 1 and 2, NATO Advanced Study Institute Series, Kluwer, Dordrecht, 1084 pp., 1988.

Climate-Ocean Interaction, NATO Advanced Study Institute Series, Kluwer, Dordrecht, 385 pp., 1990.

Greenhouse-Gas-Induced Climatic Change: A Critical Appraisal of Simulations and Observations, Elsevier, Amsterdam, 615 pp., 1991.

Human-Induced Climate Change: An Interdisciplinary Assessment, Cambridge University Press (in press).

8. Other Professional Activity

University Courses Taught

Atmospheric Dynamics (course versions for 1 and 2 terms)

Atmospheric Modeling (course versions for 1 and 2 terms)
 Atmospheric Physics (course versions for 1 and 2 terms)
 Atmospheric Radiation (course version for 1 term)
 Atmospheric Thermodynamics (course version for 1 term)
 Atmospheric Weather Processes (course for non-majors, version for 1 term)
 Climate Dynamics (course version for 1 term)
 Numerical Weather Prediction (course version for 1 term)
 Physics of Clouds and Precipitation (course version for 1 term)
 The Upper Atmosphere (course version for 1 term)

Invited Lectures

1980

Invited Lecturer, Institute for Atmospheric Optics and Remote Sensing Short Course on Climate Change and Climate Modeling, Alexandria, VA, 3-7 November.

1981

Invited speaker and panel participant on the issue "Carbon dioxide proliferation: Will the polar icecaps melt?" at the Special Session of the IEEE Power Engineering Society 1981 Summer Meeting, Portland, OR, 28 July.

Presented invited seminar titled "The global annual-mean climate change simulated for doubled CO₂ concentration by the OSU Atmospheric General Circulation-Swamp Ocean Model" at the Lawrence Livermore Laboratory, Livermore, CA, 7 August.

1982

Invited speaker in the session on "The CO₂ problem" at the Joint Oceanographic Assembly in Halifax, Nova Scotia, 2-13 August.

Presented invited seminar titled "Simulating CO₂-Induced Climatic Change with Mathematical Climate Models: Capabilities, Limitations and Prospects" at the Computer Center of the USSR Academy of Sciences, Moscow, 17 September.

Invited to present issue paper "Simulating CO₂-Induced Climatic Change with Mathematical Climate Models: Capabilities, Limitations and Prospects" at the DOE Sponsored Research Conference Carbon Dioxide, Science and Consensus, Berkeley Springs, WV, 19-23 September.

Invited speaker and participant, Fourth Ewing Symposium on "Climate Processes: Sensitivity to Solar Irradiance and CO₂," Lamont-Doherty Geological Observatory, Columbia University, 25-27 October.

Invited seminar speaker on "Comparison of 3-D Simulations of CO₂-Induced Climate Changes," General Motors Research Laboratories, Warren, Michigan, 29 November.

1983

Invited speaker and participant, Conference on Climate/Energy Interactions, American Meteorological Society, New Orleans, LA, 10-13 January. Presented Talk "Review of Global Climate Models, Strengths and Limitations."

Invited speaker, Department of Atmospheric Sciences, University of Washington, Seattle, 24 January. Presented paper "Sensitivity Analysis of a Radiative-Convective Model by the Adjoint Method."

Invited speaker in the seminar series Modelling Quaternary Environments, Quaternary Research Center, University of Washington, Seattle, 25 January. Presented talk "Modelling the Effect of Increasing Atmospheric CO₂ on Global Climate."

Presented invited seminar "Climate Model Simulations of CO₂-Induced Climate Change" at the Institute of Atmospheric Physics, The University of Arizona, Tucson, 1 August.

1984

Presented invited seminar "A Review of Simulations of Equilibrium and Non-Equilibrium Climatic Changes Induced by Increased CO₂," Laboratoire de Meteorologie Dynamique, Paris, France, 26 June.

Presented invited seminar "The Role of the Ocean in CO₂-Induced Climate Change: Preliminary Results from the OSU Coupled Atmosphere-Ocean General Circulation Model," Goddard Institute for Space Studies, New York, NY, 29 November.

Invited speaker in the "Study Session on CO₂ Sensitivity Experiments Using GCMs" of the National Research Council, Climate Research Committee, Washington, D.C., 30 November.

1985

Invited speaker in the seminar series Our Climatic Future: Analogs, models, and predictions, Quaternary Research Center, University of Washington, 16 April. Presented seminar "Modeling the Climatic Effects of Increasing Atmospheric CO₂."

Invited speaker in the University of Maryland/NASA Goddard Space Flight Center-Laboratory for Atmospheres Climate and Radiation Seminar, 1 May. Presented seminar "Equilibrium and Transient Climatic Effects of Increasing Atmospheric CO₂."

Invited speaker at the Department of Meteorology, Texas A&M University, 19 November. Presented paper "The Role of the Ocean in CO₂-Induced Climatic Change."

1986

Invited speaker at the Scripps Workshop on Atmosphere-Ocean General Circulation Models, Scripps Institution of Oceanography, 30 January. Presented seminar "The OSU Coupled GCM."

Invited speaker at the Climate Change Impacts Workshop for the Canadian Arctic, Geneva Park, Canada, 3-5 March. Presented paper "General Circulation Model Simulations of CO₂-Induced Equilibrium Climate Change."

Presented invited seminar "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the Atmospheric Environment Service, Ontario, Canada, 6 March.

Presented invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the Canadian Meteorological and Oceanographic Society 20th Annual Meeting, University of Regina, Regina, Canada, 4 June.

Presented invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the Lawrence Livermore National Laboratory, 12 September.

1987

Presented invited lecture on "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the Department of Meteorology, McGill University, 18 March.

Presented invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the Association of American Geographers Conference in Portland, 23 April.

Presented invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at New York University, 11 June.

1988

- Presented an invited seminar titled "Model Projections of the Equilibrium and Transient Climatic Changes Induced by Increased Atmospheric CO₂" at the NASA Goddard Space Flight Center, 28 January.
- Presented invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at Geofysisk Institutt, University of Bergen, Bergen, Norway, 20 May.
- Invited participant in the Symposium on Climate and Geosciences: A Challenge for Society in the 21st Century held in Louvain-la-Neuve, Belgium, 22-27 May. Presented invited lecture on "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂."
- Invited participant in the FIRE Science Team Workshop on Scientific Results held in Vail, CO, 11-15 July. Presented invited lecture on "A 'First-Look' Analysis of ISCCP Cloud Observations." Participated as a Member in a meeting of the National Academy of Sciences Panel on ISCCP/FIRE.
- Invited participant in the Workshop on The Global Water Cycle: Past, Present and Future, Pennsylvania State University, 29 July. Presented invited lecture on "Model Projections of CO₂-Induced Changes in the Global Water Cycle."
- Invited presentation to CH2M Hill on "Model Projections of the Climatic Changes Induced by Increased Atmospheric CO₂", Corvallis, OR, 19 August.
- Visit to Moscow and Leningrad under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment., 29 August-4 September. Presented lectures on "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" and "The Quantitative Evaluation of Cloud Feedbacks in Climate Model Simulations" at the Computer Center, USSR Academy of Science in Moscow on 30 August and 31 August, respectively. Presented lecture on "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the State Hydrological Institute in Leningrad on 1 September.
- Invited presentation to the NOAA Climate Program on "Model Projections of the Climatic Changes Induced by Increased Atmospheric CO₂", Rockville, Md., 9 September.
- Invited presentation on "Mathematical Modelling of Climate and Climatic Change" as the First Climate Lecture of the Academy of Sciences of the Netherlands, Amsterdam, 22 September.
- Invited participation in the NATO Advanced Research Workshop on "The Global Transport Mechanisms Program," Cascais, Portugal, 6-8 October.
- Presented invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at Department of Atmospheric Sciences, University of Illinois, 26 October.
- Invited presentation on "The Greenhouse Effect: Theory or Fact?" to the Salem City Club, 11 November.
- Invited presentation on "The Greenhouse Effect: Theory or Fact?" to the Society of American Foresters meeting, Eugene, 15 November.
- Invited speaker at the Technical Briefing on the Greenhouse Effect sponsored by The Association of Northwest Gas Utilities, Portland, 17 November.
- Invited participant in the meeting of Working Group VIII of the US-USSR Bilateral On Environmental Protection, Leningrad, 27 November - 6 December.
- Invited participant in the Greenhouse Panel, 52nd Annual Meeting of the Washington State Public Utilities Districts' Association. Presented an invited lecture on the Greenhouse Effect, 8 December.

Invited presentation on "Model Projections of the Equilibrium and Transient Climatic Changes Induced by Increased Atmospheric CO₂" to the meeting of The Royal Society on "The Dynamics of the Coupled Atmosphere and Ocean," London, 13-14 December.

Invited presentations on "Model Projections of the Equilibrium and Transient Climatic Changes Induced by Increased Atmospheric CO₂" and "Design and Critical Appraisal of an Accelerated Integration Procedure for Atmospheric GCM/Mixed-Layer Ocean Models" to the Max-Planck-Institute for Meteorology, Hamburg, 15-16 December.

1989

Invited speaker in the seminar series Global Change: A Quaternary Perspective, Quaternary Research Center, University of Washington, 3 January. Presented seminar "Insights on Future Climate Changes from Model Simulations."

Invited participant and speaker in a briefing for Oregon Congressional Staff. Presented seminar "The Greenhouse Effect: Theory for Fact?" Oregon State University, 10 January.

Invited participant in the Northwest Power Planning Council's Global Warming Seminar, 9 February, Olympia, Washington. Presented seminar titled "The Greenhouse Effect: Theory for Fact?"

Invited presentation on "The Greenhouse Effect: Theory for Fact?" at Western Oregon State College, 15 February.

Invited participant in the Meeting on Development of Regional Climate Scenarios for Impact Assessment, International Institute for Applied Systems Analysis, Laxenburg, Austria, 20-22 February.

Visit to Leningrad under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment., 22-26 February. Presented lecture on "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂" at the Main Geophysical Observatory on 24 February.

Invited participant in the authors' meeting for the report "Scientific Assessment of Climate Change" for the World Meteorological Organization/United Nations Environmental Programme Intergovernmental Panel on Climate Change. Meeting held at the Geophysical Fluid Dynamics Laboratory, Princeton University, 7-9 March.

Invited presentation on "Global Warming: A Matter of Degrees" to the Northwest Public Power Association Workshop "Public Utility Issues of the 90's", 30 March, Vancouver, Washington.

Invited presentation on "Global Warming: Magnitude and Timing" to the Portland Metropolitan Area Conference on Environmental Sciences and Resources, Portland State University, 13 April, Portland, Oregon.

Invited presentation on "Global Warming: Fact or Fiction?" to the City Club of Portland, 20 April, Portland, Oregon.

Invited presentation on the Greenhouse Effect to the Oregon State Board of Forestry, Salem, 7 June.

Invited participant at the Mars GCM meeting. NASA Ames Research Center, 12 June.

Visit to Leningrad and Moscow under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment., 25 June to 2 July. Presented lecture on "Development and

- Evaluation of a Cloud-Radiation Parameterization for an Atmospheric GCM" at the Institute for Atmospheric Physics, Moscow on 29 June.
- Invited participant in the Symposium on The Late Cenozoic Ice Age, The Royal Society of Edinburgh, 3 - 5 July. Presented invited lecture on "Model Projections of Greenhouse Gas-Induced Climate Change".
- Invited Featured Speaker at the Professional Development Program "Integrating STS (Science, Technology and Society) into the Science Curriculum: The Greenhouse Effect," sponsored by the Oregon Department of Education, Northwest Natural Gas Company and the Association of Northwest Gas Utilities. Presented lecture on "The Greenhouse Effect: Fact or Fiction?" Portland, OR, 4 August.
- Invited lecture on "The Timescale of Climate Change Induced by Increased Carbon Dioxide" at the International Conference on "Modelling of Global Climate Change and Variability," University of Hamburg, 11-15 September.
- Invited meeting at the Foundation for Research of Natural Resources in Finland and the Finnish Meteorological Institute to advise on the future Symposium on "Climate and Forests," Helsinki, 14 September.
- Visit to Leningrad under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment., 14-20 September. Presented lecture on "The Timescale of Climate Change Induced by Increased Carbon Dioxide" at the Main Geophysical Observatory on 19 September.
- Invited participant in the meeting of Working Group VIII of the US-USSR Bilateral On Environmental Protection, Orlando, Florida, 10-22 October.
- Invited participant in the workshop on "Future Climate Change and Radioactive Waste Disposal," Norwich, United Kingdom. Presented invited lecture on "The Application of GCM Output to the Estimation of Regional Patterns of Change." 1-3 November.
- Invited lecture on "The Greenhouse Effect: Fact or Fiction?" for the League of Oregon Cities 64th Annual Conference, Eugene, Oregon, 14 November.
- Invited lectures on "The Greenhouse Effect: Fact or Fiction?" and "A Method to Estimate Regional Greenhouse-Gas-Induced Climate Change from GCM Simulations" presented at the Australian Bureau of Meteorology Research Centre, Melbourne, 19 and 20 December.
- 1990**
- Invited participant in the meetings on "Climate Change in the Western Hemisphere: 40N to 40S" and "Climate Change Models and Policies" held at the 1990 Annual Meeting of the American Association for the Advancement of Science, New Orleans. Presented invited lectures respectively on "Climate Change: Projections and Impacts" and "Strengths and Weaknesses of the Revised OSU (fi UI) Model." 17-19 February.
- Invited lecture on "A Climatologist's View of the Greenhouse Effect" for the American Gas Association Demand Modeling & Forecasting Seminar, Houston, Texas, 23 February.
- Invited lecture on "Global Warming: Fact or Fiction?" at the Gordon Research Conference on Modeling in Solar Terrestrial Physics, 2 August, Plymouth State College, Plymouth, NH.
- Invited lecture on "Simple Model Representation of Atmosphere-Ocean GCMs, Estimation of the Response Time of the Climate System, and the IPCC Projections of Global Warming" at the Aspen Institute On Global Change Meeting, 17 August, Aspen, CO.

Invited lecture on "Climate Model Simulations of Greenhouse-Gas-Induced Equilibrium Climate Change," at the Canada/United States Symposium on the Impacts of Climatic Change and Variability on the Great Plains, 11 September, Calgary, Alberta, Canada.

Invited lecture on "Global Warming: Fact or Fiction?" at the Symposium Climate Change, 28 September, Seattle Center, Seattle.

1991

Invited lecture on "Current Views on Greenhouse Warming" at Yonsei University, Seoul, Korea, 25 April.

Invited speech on "Global Warming: Fact or Fiction?" at the Korean Meteorological Society annual meeting, Seoul, Korea, 26 April.

Invited lecture on "Projections of Greenhouse Warming Using Numerical Models: Methods, Results and Uncertainties" at the University of Minnesota Institute of Technology Science and Technology Day, Minneapolis, 9 May.

Invited lecture on "Toward an Improved Estimate of Climate Sensitivity," Rockefeller Foundation Study and Conference Center, Bellagio, Italy, 5 June.

Invited lectures to JASON on "CO₂-induced Ocean Climatic Change and Tracer Experiments with an Atmosphere-Ocean GCM," and "Simulation of Glacial Onset with a Global Atmospheric General Circulation/Mixed Layer Ocean-Ice Sheet/Asthenosphere Model," La Jolla, CA, 3 July.

Invited lecture on "Current Views on Greenhouse Warming," Rand Corporation, Santa Monica, CA, 17 December.

1992

Invited lectures at American Association for the Advancement of Science annual meeting on "Ice-Age and Future Ice-Sheet Growth Simulated by an Atmosphere-Ocean-Ice Sheet-Asthenosphere Model" and "Implication of Anthropogenic Atmospheric Sulphate for the Sensitivity of the Climate System," Chicago, 9 February.

Invited lecture on "Greenhouse Economics and Policy," EPA, Corvallis, OR, 9 June.

Invited lecture at Livermore/University of Illinois Greenhouse Effect and Global Climate Change Curriculum Workshop for high school teachers, Urbana, IL, 28 July.

Invited lecture, "A Sequential-Decision Strategy for Abating Climate Change," at Global Warming: Understanding the Forecast Symposium, American Museum of Natural History, New York, 14 October.

Invited lecture, "Greenhouse Economics and Policy," at the Global Climate Change: Focus on Illinois workshop, Bloomington, IL, 29 October.

1993

Invited lecture, "Empirical-Theoretical Analysis of Climatic Change Without Feedback," at the AMIP/FANGIO meeting, Bologna, Italy, 10-14 May.

1994

Lecture on "65-70 Year Oscillation in the Global Climate System," EPA, Corvallis, OR, 23 June.

1995

Lecture on "To Abate or Not To Abate – That is the Greenhouse Question," University of New Orleans, 9 February.

Lecture on "What Caused the Last Ice Age?," Tulane University, New Orleans, 10 February.

Invited lecture, "To Abate or Not To Abate? – That Is the Greenhouse Question," Sherwood Fusion Theory Conference, Incline Village, Nevada, 3 April.

- Invited lecture, "Uncertainties in Climate Modeling," Stanford Energy Modeling Forum (EMF)–14 on Integrated Assessment of Global Climate Change, Study Group on Decisions Under Uncertainty, Palo Alto, CA, 19-20 January.
- Invited lecture, "In Search of the 'Holy Grail' of Climate Change – The Elusive Climate Sensitivity, ΔT_{2x} ," Stanford Energy Modeling Forum (EMF)–14 on Integrated Assessment of Global Climate Change, Study Group on Decisions Under Uncertainty, Palo Alto, CA, 24-26 May.
- Invited lecture, "Has the Sun Changed Climate?," IUGG XXI General Assembly, Boulder, CO, 2-14 July.
- Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 16-23 August.
- Invited participant in the PMIP (Paleoclimate Model Intercomparison Project) Workshop, Collonges-la-Rouge, France, 1-6 October.
- Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Washington, DC, 29 November.
- Invited participant in the World Bank/Federation of American Scientists Climate Change Colloquium Hearings, Warrenton, VA, 9-10 December.

1996

- Invited participant in the National Academy of Sciences Climate Research Committee Meeting, Washington, D.C., 10-12 June.
- Invited lecturer at the International School of Physics "Enrico Fermi", Varenna, Italy, 25 June - 5 July. Presented lectures titled "Modelling and Simulation of Climate and Climate Change."
- Invited participant in the Stanford Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 25 July-1 August.
- Invited lectures on "Empirical Estimation of Climate Sensitivity and Anthropogenic Sulfate Forcing" and "When We Don't Know the Costs or the Benefits: Adaptive Strategies for Abating Climate Change " at the Aspen Global Change Institute Meeting, Aspen, CO, 31 July-8 August.
- Invited participant in the IPCC Workshop on Regional Climate Change Projections for Impact Assessment, London, 24-26 September.

1997

- Presented Keynote Address, When We Don't Know the Costs or the Benefits: Adaptive Strategies for Abating Climate Change, 1997 Society for Computer Simulation Western MultiConference, 12-15 January, Phoenix, Arizona.
- Invited participant in the Workshop on Climate Change: Thresholds and Response Functions, Potsdam Institute for Climate Impact Research (PIK), 23-24 January. Presented lecture titled When We Don't Know the Costs or the Benefits: Adaptive Strategies for Abating Climate Change.
- Invited participant in the IPCC Asia-Pacific Workshop on Integrated Assessment Models, 10-12 March 1997, United Nations University, Tokyo. Presented lecture titled Country-Specific Market Impacts of Climate Change.
- Invited participant in the Tokyo Modeling Forum, 13-14 March 1997, United Nations University, Tokyo. Presented lecture titled Development of Geographical Climate Scenarios for the Impact Analyses of Energy Modeling Forum 14.

Presented invited lecture, When We Don't Know the Costs or the Benefits: Adaptive Strategies for Abating Climate Change, at the Center for Integrated Study of the Human Dimensions of Global Change, Department of Engineering and Public Policy, Carnegie Mellon University, 24 March.

Presented invited lecture, When We Don't Know the Costs or the Benefits: Adaptive Strategies for Abating Climate Change, at the Symposium on Global Climate Change: Uncertainties and Research Needs at the Annual Meeting of the American Chemical Society, San Francisco, 13 April.

Presented invited lecture, Transient climate models: A hybrid strategy at the Forest Service-NCAR Workshop, 3-4 June 1997, NCAR.

Presented invited lectures, Development of Geographical Climate Scenarios for the Impact Analyses of Energy Modeling Forum 14 and Empirical Estimation of Climate Sensitivity and Anthropogenic Sulfate Forcing, International Energy Workshop and the Energy Modeling Forum, 23-25 June 1997, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Presented invited lecture, Empirical Estimation of Climate Sensitivity and Anthropogenic Sulfate Forcing, at the Second Meeting of The Center for Integrated Study of the Human Dimensions of Global Change, Carnegie Mellon University, Pittsburgh, Pennsylvania, 29 June–2 July.

Presented invited lecture, Geographical Scenarios of Greenhouse-Gas and Anthropogenic-Sulfate-Aerosol Induced Climate Changes, at the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 4-15 August.

1998

Presented invited lecture, COSMIC: Country-Specific Model for Intertemporal Climate, Executive Board of ACACIA (A Consortium for Application of Climate Impact Assessments), 16 January, Phoenix, Arizona.

Presented invited lecture, Modeling and Analysis of Global Biosphere-Atmosphere Interactions, at the Third Meeting of The Center for Integrated Study of the Human Dimensions of Global Change, Carnegie Mellon University, Pittsburgh, Pennsylvania, 18-20 May.

Presented invited lecture, Geographical Scenarios of Greenhouse-Gas and Anthropogenic-Sulfate-Aerosol Induced Climate Change, at the Conference "Do We Understand Global Climate Change?", Norwegian Academy of Technological Sciences, Oslo, Norway, 11-12 June.

Presented invited lectures, Geographical Scenarios of Greenhouse-Gas and Anthropogenic-Sulfate-Aerosol Induced Climate Change and COSMIC: Country-Specific Model for Intertemporal Climate at the Community Meeting on Integrated Assessment, 9-10 July, Washington, D.C.

Presented invited lecture on "The Impacts of Climate Variability on Near-Term Policy Choices and the Value of Information" at the Aspen Global Change Institute Meeting on Innovative Energy Systems & CO₂ Stabilization, Aspen, CO, 14-24 July.

Presented invited lecture, Geographical Distribution of Temperature Change for the New IPCC Scenarios: A First Look, at the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 3-11 August.

Presented invited lecture, Geographical distributions of temperature change for the new IPCC Scenarios: A First Look, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, 8 September.

- Presented invited lecture, Geographical scenarios of greenhouse-gas and anthropogenic-sulfate-aerosol induced climate changes, Workshop on Climate Impact Response Functions, Potsdam Institute for Climate Impact Research (PIK), Potsdam, Germany, 2 September
- Presented invited lecture, The Impacts of Climate Variability on Near-Term Policy Choices and the Value of Information, at the Rijksinstituut Voor Volksgezondheid En Milieu (RIVM), Bilthoven, Netherlands, 9 September.
- Presented invited lecture, The Impacts of Climate Variability on Near-Term Policy Choices and the Value of Information, at Koninklijk Nederlands Meteorologisch Instituut (KNMI), de Bilt, Netherlands, 9 September.
- Presented invited lecture, First-Look Estimates of Time-Dependent Geographical Scenarios of Temperature Change for the New IPCC SO₂ Emission Scenarios, IPCC Working Group III Special Report on Emissions Scenarios Lead Authors Meeting, Beijing, China, 7-9 October.
- Presented invited lecture, First-Look Estimates of Time-Dependent Geographical Scenarios of Temperature Change for the New IPCC SO₂ Emission Scenarios, Peking University, Beijing, China, 5 October.
- Presented invited lecture, The Dependence on Convection Parameterization of the Tropical Intraseasonal Oscillation Simulated by the UIUC 11-Layer Atmospheric GCM, GCSS-WGNE Workshop on Cloud Processes and Cloud Feedbacks in Large-Scale Models, European Centre for Medium Range Weather Forecasts, Shinfield Park, UK, 9-13 November 1998.
- Presented invited lectures on "The Impacts of Climate Variability on Near-Term Policy Choices and the Value of Information" and "First-Look Estimates of Time-Dependent Geographical Scenarios of Temperature Change for the New IPCC SO₂ Emission Scenarios" at the Center for International Climate and Environmental Research – Oslo (CICERO), Oslo, Norway, 16 November 1998.
- Invited participant at the IPCC Third Assessment Report (TAR) meeting, Paris, 20 November – 1 December 1998.

1999

- Invited participant at the International Workshop on Next Generation Climate Models for Advanced High Performance Computing Facilities, Honolulu, 1-3 March 1999.
- Invited participant at the Arctic Climate Change Workshop, Fairbanks, 13-15 May. Presented lecture on Anthropogenically Induced Climate Change in the Arctic.
- Invited participant at the Fourth Meeting of The Center for Integrated Study of the Human Dimensions of Global Change, Carnegie Mellon University, Pittsburgh, Pennsylvania, 23-25 May.
- Presented invited lecture on "Geographical Distributions of Temperature Change for the SRES Scenarios of Greenhouse Gas and Sulfur Dioxide Emissions" at the June session of the United Nations Framework Convention on Climate Change, Bonn, Germany, 4 June.
- Presented invited lecture on "Climate Sensitivity, Sulfate Aerosol Induced Regional Temperature Changes, Climate Impacts and Adaptive Decision Strategies" and was a member of the 3-member panel at the Forum on The State of Climate Science Since IPCC 1995, Resources for the Future, Washington, DC, 7 June.
- Invited participant in the Special Report on Emissions Scenarios Lead Authors Meeting, International Institute for Applied Systems Analysis, Laxenburg, Austria, 27-30 June 1999.

Invited participant in the Stanford Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 26 July – 3 August. Presented lecture "The market impacts of the SRES non-intervention scenarios of greenhouse gas and sulfur dioxide emissions."

Presented lectures on "Geographical distributions of temperature change for the SRES scenarios of greenhouse gas and sulfur dioxide emissions" and "The Impacts of Climate Variability on Near-Term Policy " at the Aspen Global Change Institute Meeting on Ecological and Agricultural Consequences of Climatic Extremes and Variability, Aspen, CO, 13-22 August.

Invited participant in the United States - Canada Symposium on North American Climate Change and Weather Extremes, Atlanta, GA, 6-8 October. Presented lecture "Understanding Extreme Weather in the Context of Climate Change."

Invited participant in the Annapolis Center Workshop on Climate Change, Annapolis, MD, 4-5 November. Presented lecture "A Method to Evaluate and Compare the Performance of General Circulation Models."

Invited speaker at the AES Corporation Environmental and Social Responsibility Conference, Rio de Janeiro, Brazil, 8 November. Presented lecture "Climate Science, Projections of Climate Changes and Their Impacts, and Robust Adaptive Decision Strategies."

Invited participant in the Thermohaline Circulation Workshop, Boulder, CO, 1-3 December.

2000

Invited participant in the Third Lead Authors Meeting of IPCC Working Group III On Mitigation, Eisenach, Germany, 7-11 February. Presented lecture "Climate Changes for the Post-SRES Scenarios."

Invited participant in the NASA Workshop on Solar Influences on Climate, Tucson, AR, 6-8 March. Presented lecture "Climate Modeling and the Use of Climate Models to Study the Influence of the Sun on Climate."

Invited participant in the Contextual Determinants of Malaria Workshop, Lausanne, Switzerland, 15-18 May. Presented lecture "Economical Construction of Geographical Scenarios of Climate Change."

Invited lecture "Anthropogenically Induced Climate Change" at the Program in Arms Control, Disarmament and International Security, University of Illinois at Urbana-Champaign, 20 September.

Invited participant at the Fifth Meeting of The Center for Integrated Study of the Human Dimensions of Global Change, Carnegie Mellon University, Pittsburgh, Pennsylvania, 19-21 July.

Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 24 July - 4 August. Presented lecture "Some Thoughts On Climate Extremes."

2001

Invited participant in the Living With a Star Architecture Team Workshop, Greenbelt, Md. 31 January. Presented lecture "Has the Sun Changed Climate?."

Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 30 July–10 August. Presented lecture "Climate Change Policy Needs to be Robust."

Invited participant in the 1st Meeting on the Combined Effects of Stratospheric Ozone Depletion and Climate Change on Human Health, Orvieto, Italy, 5-6 October. Presented lecture The

Use of the UIUC Global Climate–Chemistry Model to Simulate the Interactive Effects of Global Warming and Ozone Change.

Invited participant in the Worldwide Universities Network Oceanography and Climate Exemplar Meeting, 9 December, San Francisco. Presented lecture Coupled Atmosphere/Ocean General Circulation Model Research of the UIUC Climate Research Group.

2002

Invited participant in the American Astronomical Society meeting session on Some Impacts of Solar Irradiance Variation on Terrestrial Climate, Hilton Washington and Towers, 7 January 2002. Presented lecture "Has the Sun Changed Climate?"

Presented invited lecture, "Has the Sun Changed Climate?", to the Yale Department of Geology and Geophysics, 18 February 2002.

Invited participant in the Seminar for Federal Judges, Understanding the Ecology, Economics, and Ethics of Climate Change held 9-14 July 2002 at the Gallatin Gateway Inn, Gallatin Gateway, Montana. Presented two lectures: "Anthropogenic Climate Change: An Introduction and Overview," and "Anthropogenic Climate Change: Designing Robust Adaptive Response Strategies."

Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 29 July–7 August. Presented lecture "The Use of the UIUC Global Climate–Chemistry Model to Simulate the Interactive Effects of Global Warming and Ozone Change."

Invited participant in the COSPAR meeting session on Solar Variability and Climate Change, George Bush Convention Center, Houston, 10-12 October 2002. Presented lecture "Has the Sun Changed Climate?"

Invited participant in the Climate Change Science Program Planning Workshop for Scientists and Stakeholders, Marriott Wardman Park, Washington DC Hotel, 3-5 December 2002. Presented lecture "Reducing the Uncertainty in Climate Sensitivity."

2003

Invited participant in the National Academy of Science Workshop on Estimating Climate Sensitivity, The National Academies, 30-31 January 2003. Presented lecture "Climate Sensitivity: Uncertainties & Learning."

Presented the Cornelia and Arthur Jung Lecture, Learning About Climate Change and Designing Robust Adaptive Response Strategies, Tulane University, 21 February 2003.

Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 28 July–7 August. Presented lecture "Dangerous Anthropogenic Interference With the Climate System: Construction of Geographical Scenarios of Climate Change Due to Reductions in the Thermohaline Circulation."

Presented lecture "Human Induced Climate Change: An Introduction and Overview" at the University of Illinois at Urbana-Champaign Department of Physics Saturday Physics Honors Program, 20 September 2003.

Invited participant in the World Climate Change Conference, Moscow, 29 September to 3 October, 2003. Presented invited plenary lecture, "Climate Sensitivity: Uncertainties and Learning."

Presented invited tele-lecture "Climate Sensitivity: Uncertainties and Learning" to the Worldwide Universities Network, 12 November 2003.

Presented invited lecture “Causes of Global Temperature Changes During the 19th and 20th Centuries and More ” at the Cato Institute conference Global “Warming: The State of the Debate,” Washington, D.C., 12 December 2003.

2004

Invited participant in the Workshop on GHG Stabilization Scenarios, National Institute of Environmental Studies, Tsukuba, Japan, on 22-23 January 2004. Presented lecture "Climate Sensitivity: Uncertainties & Learning."

Invited participant in the Workshop on Climate Scenarios and Projections: the Known, the Unknown, and the Unknowable Applied to California Aspen Global Change Institute 12-14 March 2004. Presented lectures on “Climate Sensitivity: Uncertainties & Learning” and “Is a Shutdown of the Thermohaline Circulation Irreversible?”

Invited participant in the US Planning Workshop for the 2007 International Heliophysical Year, National Solar Observatory, Sunspot, NM, April 20-22, 2004.

Invited participant in the Workshop on Solar Variability on Decadal to Millennial Timescales: Influence on Earth Climate Change and Prediction, Patuxent Wildlife Center, Laurel, MD, 26-27 April. Presented invited lecture “Effects of the Sun on Climate.”

Invited participant in the IPCC Workshop on Describing Scientific Uncertainties in Climate Change to Support Analysis of Risk and of Options, Maynooth, Ireland, 11-13 May. Presented lecture “Climate Sensitivity: Uncertainty and Learning.”

Invited participant in the XVIth Rencontres de Blois on “Challenges in the Climate Sciences,” Blois, France, 23-28 May. Presented invited lecture :”Is a Shutdown of the Thermohaline Circulation Irreversible?”

Invited participant in the Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, 27 July–5 August. Presented invited lecture “Is a Shutdown of the Thermohaline Circulation Irreversible?”

Invited participant in the Workshop on Weather Variability in a Changing Climate: The Known, the Unknown and the Unknowable, Montreal, Canada, 8-10 September. Presented invited lecture “Climate Sensitivity: Uncertainty and Learning.”

Invited participant in the Expert Workshop on Greenhouse Gas Emissions and Abrupt Climate Change: Positive Options and Robust Policy, Paris, France, 30 September – 1 October. Presented invited lecture “Is a Shutdown of the Thermohaline Circulation Irreversible?”

Invited speaker at NASA Goddard Space Flight Center, 22 October 2004. Presented lecture “Human-Induced Climate Change: To Hedge Or Not To Hedge Against An Uncertain Climate Future.

Invited participant at the Climate Research Committee Forum on Characterizing and Communicating Climate Change Uncertainties, National Academy of Science, 26 October 2004.

Invited participant at the EMF22 Meeting in Brussels on Climate Policy Scenarios for Stabilization and in Transition. Presented lecture “Climate Sensitivity: Uncertainty and Learning, 10–12 November 2004, Brussels, Belgium.

Presented lecture Climate Sensitivity, To Hedge or Not Against an Uncertain Climate Future?, and Implications of a Shutdown of the Atlantic Thermohaline Circulation: (1) Tyndall Climate Change Centre, University of East Anglia, 18 November 2004; (2) Southampton Oceanography Centre, 23 November 2004; (3) U.K. Meteorological Office, 24 November

2004; (4) University of Bristol, 25 November 2005; (5) University of Sheffield, 26 November 2004.

2005

Invited participant at the IPCC Expert Meeting on Emission Scenarios, Marriott Hotel, 12-14 January 2005.

Invited participant at the Avoiding Dangerous Climate Change: A Scientific Symposium on Stabilisation of Greenhouse Gases, U. K. Met Office, Exeter, UK, 1–3 February 2005.

Presented invited Keynote Lecture “Reducing the Risk of a Collapse of the Atlantic Thermohaline Circulation.

Presented lecture at the National Science Foundation titled “The Day After Tomorrow? Assessing the Risk of a Collapse of the Atlantic Thermohaline Circulation, 3 March 2005.

Presented lecture “Paleo-Hosing to Simulate the Climate Changes of the Younger Dryas & 8.2 ka Event” at the Paleoclimate Modeling Intercomparison Project II meeting, 3–8 April 2005, Giens, France.

Invited lecture on “Proposal for PMIP2/1ACE Palaeo-hosing Model Intercomparison Project (PhMIP)” at the Worldwide Universities Network Arctic Climates and Environments initiative Kickoff meeting, Bristol, UK, 16-18 May 2005.

Invited lecture on “Projections of Human-Induced Climate Change and Their Influence on the New Orleans” at the Teach-in on Katrina and Other Human Disasters, University of Illinois at Urbana-Champaign, 21 September.

Presented poster Reducing the Risk of a Collapse of the Atlantic Thermohaline Circulation at the U.S. Climate Change Science Program Workshop: Climate Science in Support of Decisionmaking, 14-16 November 2005, Crystal Gateway Marriott, Arlington, VA.

Presented the invited lecture Assessing the Risk of a Collapse of the Atlantic Thermohaline Circulation at the UK Department for Environment, Food and Rural Affairs side event to Launch the Avoiding Dangerous Climate Change book, UN Conference of the Parties – 11 on 8 December 2005 in Montreal.

Presented invited lecture Assessing the Risk of a Collapse of the Atlantic Thermohaline Circulation on 15 December 2005 at the Netherlands Environmental Assessment Agency (MNP-RIVM), Bilthoven The Netherlands. Was a member of the Ph.D. committee for Michiel Schaeffer, University of Utrecht, Netherlands on 16 December 2005.

2006

Presented invited lecture “The Influence of Non-Sulfate Aerosol Radiative Forcing on the Estimation of Climate Sensitivity” on 1 February 2006 at the Energy Modeling Forum 22 Working Group Meeting: Climate Change Control Scenarios – Black Carbon and Land Modeling Subgroups. Hotel Washington, Washington, D.C.

Presented invited lecture “How Dangerous is Climate Change? Assessing the Likelihood of a Collapse of the Atlantic Thermohaline Circulation,” Program in Arms Control, Disarmament, and International Security, University of Illinois at Urbana-Champaign, 8 March 2006.

Invited participant at the EMF-22 EMF22: Climate Transition Policy Scenarios, Instituto de Prospectiva Tecnológica (IPTS), Sevilla, Spain, March 23-24, 2006.

Presented invited lecture “The Dependence of Climate Sensitivity on Non-Sulfate Aerosol Radiative Forcing” on 10 April 2006 at the Conference on Learning and Climate Change, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, 10-11 April 2006.

- Presented invited lecture “Human-induced Climate Change: From Quantum Mechanics to Politics” on 22 April 2006 at the Third Chicago Climate Change Forum held at the "Human Footprints: Exploring the intersections of Society and the Natural World", Northwestern University – Chicago Campus, Hughes Auditorium, 303 E. Superior (Downtown Chicago).
- Participated in a news conference and gave a briefing at J. P. Morgan/Chase in New York City on 9 May, and gave a briefing at the Russell Senate Office Building, Washington, D.C. on 10 May for the U.S. debut of the book “Avoiding Dangerous Climate Change”.
- Participated in the Workshop on Uncertainty, Probability, Modelling and Climate at the Royal Holloway University, Egham, UK, 26-30 June 2006 and presented lectures “Assessing the Risk of a Collapse of the Atlantic Thermohaline Circulation: The Effect of Different Subjective Probability Distributions” and “Has the Circulation of the North Atlantic Ocean Really Slowed?”, 28 June 2006.
- Presented invited lecture “Human-induced Climate Change: From Quantum Mechanics to Climate Policy” on 24 August 2006 at “Getting Serious about Tackling Global Warming: A Forum for Illinois Policymakers’ in Chicago, Illinois.
- Presented invited lecture “Human-induced Climate Change: From Quantum Mechanics to Climate Policy” on 6 October 2006 at William A. Staerckel Planetarium, Parkland College, Champaign, IL.
- Presented invited lecture “Human-induced Climate Change: From Quantum Mechanics to Climate Policy” on 10 October 2006 at Ameren in St. Louis, MO.
- Presented invited lecture “Human-induced Climate Change: From Quantum Mechanics to Climate Policy” on 23 October 2006 at the U.K. National Oceanography Centre, Southampton, and the School of Geographical Sciences, University of Bristol.
- Presented invited lecture “Human-induced Climate Change: From Quantum Mechanics to Climate Policy” on 7 November 2006 at the 2006 ASME International Mechanical Engineering Congress at the Chicago Hilton Hotel.
- Presented invited Keynote Lecture “Human-induced Climate Change: From Quantum Mechanics to Climate Policy” at the Second Environmental Modelling and Simulation Conference of the International Association of Science and Technology for Development, Wyndham Sugar Bay Resort and Spa, St. Thomas, U.S. Virgin Islands, 30 November 2006.

Invited Work

Commission of European Communities Joint Research Centre Ispra Establishment, August 1991.

Invited Testimony

To U.S. House of Representatives, Committee on Science, Space and Technology, Subcommittee on Science, Research and Technology on The National High-Performance Computing Technology Act, H.R. 3131, Washington, D.C., 14 March. 1990.

Meetings Directed

1982

Session chairman, Fourth Conference on Ocean-Atmosphere Interaction, San Diego, CA, 8-11 June. Presented paper "An atmospheric general circulation model experiment on the role of the ocean in climate."

1986

Invited session chairman and speaker at the 1986 Eastern Simulation Conferences, Norfolk, Virginia, 12 March. Presented talk "The Role of the Ocean in CO₂-Induced Climate Change."

Director of the NATO Advanced Study Institute on Physically-Based Modelling and Simulation of Climate and Climatic Change, Erice, Sicily, 11-23 May. Presented lecture titled "Quantitative Analysis of Feedbacks in Climate Model Simulations of CO₂-Induced Warming."

Member of the Advisory Panel for the course on Atmospheric Radiation As It Relates To Climate held at the University of Colorado, Boulder, 13-19 July.

1988

Convener of the Session on Coupled Atmosphere-Ocean Models held at the American Geophysical Union meeting in Baltimore, MD during 16-20 May.

Director of the NATO Workshop on Climate-Ocean Interaction held in Oxford, England during 26-30 September.

1989

Director of the Workshop on "Greenhouse-Gas-Induced Climatic Change: A Critical Appraisal Of Simulations And Observations" to be held in Amherst, MA during 8-12 May.

1996

Co-convener with Judit Pap the special session of the AGU 1996 Fall meeting, Has the Sun Changed Climate?, 26-27 December 1996.

1999

Co-convener, with Allen Solomon the Aspen Global Change Institute Meeting on Ecological and Agricultural Consequences of Climatic Extremes and Variability, Aspen, CO, 13-22 August.

2003

Co-convener with Natasha Andronova session on Observational and Model Estimates of Climate Sensitivity at the IUGG2003 Sapporo General Assembly, 30 June.

Panels and Committees

Appointed member of the National Research Council's Advisory Panel for the International Satellite Cloud Climatology Project (ISCCP) for a three-year term from 1987 to 30 June 1990.

Appointed member of the American Geophysical Union's Committee on Paleoclimatology for a term from 1988 to 30 June 1990.

Invited to be affiliated with the University of Illinois Russian and East European Center as "Other Interested" staff, 1989.

Electric Power Research Institute Global Climate Advisory Committee, 1991-1993.

Invited to be a member of the Science Team of the International Global Aerosol Program (IGAP), 1993-.

Organizing Committee for the 1994 Global Change Institute

Organizing Committee for the Stanford Energy Modeling Forum 14, Integrated Assessment of Global Climate Change

Member of the National Technical Advisory Committee (NTAC) of the National Institute for Global Environmental Change (NIGEC), 1995.

Member of the Project Steering Committee for A Consortium for the Application of Climate Impact Assessments (ACACIA) Sulfate Aerosol Research Project, 1996-
 Member of the Scientific Steering Committee for the IPCC Workshop on Regional Climate Change Information, to be held in the UK during 24-26 September 1996.
 Member of the Science, Health, and Economic Advisory Council of the Annapolis Center, 2001-
 Member of the Illinois Climate Change Advisory Group at the invitation of Governor Rod Blagojevich, 2007.

Interviews (Sample only)

Television

Canadian Broadcasting Corporation The Nature of Things
 KATU, Portland (11 September 1988; 17 November 1988)
 KGW, Portland (October 1986)
 KPDX, Portland (15 September 1988)

Radio

BBC World Service (29 November 1995)
 Extension 720, WGN Radio, Chicago (22 August 1989; 24 March 1998)
 KIRO, Seattle (8 December 1988)
 KLCC, Eugene (May 1988; 23 January 1989)
 KWIP, Salem (24 June 1988; 19 January 1989)
 National Public Radio
 University of Washington Radio, Seattle (3 January 1989)
 Voice of America (16 November 1989; 23 February 1994)
 WNTR, Washington, D.C. (25 August 1989)

Newspapers

Akron Beacon Journal Le Monde (Paris) Statesman Journal (Eugene)
 Associated Press Los Angeles Times TASS (Moscow)
 Christian Science Monitor Morning News Tribune (Seattle) United Press International
 Dong-A Il Bo (South Korea) New York Times USA Today
 The Edmonton Journal Oregonian Willamette Week
 Financial Times (London) Seattle Times

Magazines

Farm Journal Magazine Oregon Scientist Science Magazine
 Newsweek Readers' Digest Time
 Science News Discover

Meetings Attended By Invitation

1975

Invited participant, NASA Meeting on Science Applications for Satellite Radiation Budget Measurements, Boulder, CO, 12-14 May.
 Invited participant, National Center for Atmospheric Research. Workshop on the Role of Cloudiness in Climate Change, Boulder, CO, 14-18 July.

1977

Invited Participant, ERDA sponsored Workshop on the Environmental Effects of CO₂, Miami Beach, Florida, March.

Invited participant and discussant, Joint JOC/SCOR Study Conference on General Circulation Models of the Ocean and their Relation to Climate, Helsinki, Finland, May.

Invited participant, Workshop on Regional Climate and Stratospheric Change, sponsored by the U.S. Environmental Protection Agency at the National Center for Atmospheric Research, Boulder, CO, June.

Invited guest of the Soviet government in a 10-day symposium on the Structure of the Present Climate and its Variability, held in Leningrad, USSR under the auspices of the USA-USSR Bilateral Agreement on the Environment, June.

1978

Invited participant in the World Meteorological Organization (WMO) Working Group on the Research and Monitoring Project on Atmospheric CO₂ and the Joint IIASA/WMO Workshop on Carbon Dioxide, Climate and Society, Laxenburg, Austria, February.

Invited participant, JOC Study Conference on Climate Models: Performance, Intercomparison and Sensitivity Studies, Washington, D.C., April.

Invited participant, Symposium/Workshop on Solar-Terrestrial Influences on Weather and Climate, Columbus, OH, July.

Invited participant, JOC Study Conference on the Parameterization of Extended Clouds and Radiation for Climate Models, Oxford, England, September-October.

1979

Invited participant, U.S. National Climate Program 5-Year Research Planning Workshop, NOAA Geophysical Fluid Dynamics Laboratory, Princeton, NJ, 30 January - 2 February.

Invited participant, NASA Upper Atmospheric Research Satellite proposal evaluation panel, Goddard Space Flight Center, Greenbelt, MD, 23-29 April.

Invited participant, NASA Earth Radiation Budget Satellite proposal evaluation panel, Langley Research Center, Langley, VA, 18-22 June.

Invited participant, NASA Special Study Workshop on Hydrologic Processes, Goddard Space Flight Center, Greenbelt, MD, 24-25 September.

Invited participant, NASA review of the Integrated Soil Moisture Research Plan, Washington, D.C., 21 December.

1980

Invited participant, AAAS Workshop on the Description of Grazingland Research Issues in Connection with CO₂-Induced Climate Change, National Center for Atmospheric Research, Boulder, CO, 17 January.

Invited participant, NASA review of the Integrated Soil Moisture Research Plan. Phoenix, AZ, 28-29 January.

Invited participant, DOE Progress and Planning Meeting on the Carbon Dioxide and Climate Research Program, Washington, D.C., 24-25 April.

Invited participant, NSF Snow Watch Workshop, Washington, D.C., 2-3 October.

Invited participant, NASA Goddard Institute for Space Studies Cloud/Climate Workshop, New York, NY, 29-31 October.

1981

Invited participant, World Meteorological Organization-International Council of Scientific Unions Study Conference on Land Surface Processes in Atmospheric General Circulation Models, NASA Goddard Space Flight Center, Greenbelt, MD, 5-10 January.

Invited participant, DOE Workshop on First Detection of Carbon Dioxide Effects, Harpers Ferry, WV, 8-10 June.

1982

Invited participant, World Meteorological Organization-International Council of Scientific Unions Study Conference on Physical Basis for Climate Prediction on Season, Annual and Decadal Time Scales, Leningrad, USSR, 13-17 September.

Invited participant Milankovitch and Climate Symposium and NATO Workshop Lamont-Doherty Geological Observatory, Columbia University, 30 November - 4 December.

1983

Invited participant, Workshop on the First International Satellite Cloud Climatology Project Regional Experiment, National Center for Atmospheric Research, Boulder, CO, 4-6 May.

Invited participant, National Academy of Sciences, Polar Research Board, Glaciology Committee Workshop on Potential CO₂-Induced Changes in the Environment of West Antarctica, University of Wisconsin at Madison, 5-7 July.

1984

Invited participant, Meeting of authors of the Department of Energy State of the Art Report on the Climatic Effects of Increasing CO₂, Arlington, VA, 30 April-2 May.

Invited Professor, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, May. Presented lecture "Mathematical Modelling and Simulation of Climate and Climatic Change" and a course on "General Circulation Models of the Atmosphere and Ocean."

Invited participant, Workshop on the Intercomparison of Radiation Codes used in Climate Models, Frascati, Italy, 15-18 August.

Invited participant, Workshop on Land Ice/Ocean Interactions, Battelle Research Center, Seattle, Washington, 13-15 September.

1985

Invited participant of the International Satellite Cloud Climatology Project (ISCCP) Advisory Panel, Colorado State University, 25-26 November.

Invited participant in the U.S. Congressional Office of Technology Assessment work session on computer-based modeling and decision support, Washington, D.C., 21 June.

Invited participant of the Mars GCM meeting. NASA Ames Research Center, 9-10 September.

Invited participant in the Snowwatch 1985 Workshop on CO₂/Snow Interaction, University of Maryland, 28-30 October. Presented paper "CO₂-Induced Changes in Seasonal Snow Cover Simulated by the OSU Coupled Atmosphere-Ocean General Circulation Model."

Invited participant in the International Satellite Land-Surface Climatology Project (ISLSCP) meeting, Academia, Rome, 2-6 December. Presented paper "CO₂-Induced Changes in Seasonal Hydrology Simulated by General Circulation Models."

1986

Invited participant in the US/USSR Meeting of Experts on the Causes of Recent Climate Change held in Leningrad during 21-27 July under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment. Presented lectures on "Equilibrium and Transient Climatic

Warming Induced by Increased Atmospheric CO₂" and "Quantitative Analysis of Feedbacks in Climate Model Simulations of CO₂-Induced Warming."

Invited participant in the Workshop on the Intercomparison of Radiation Codes in Climate Models, University of Maryland, 10-12 March.

Invited participant in the Department of Energy (DOE) Meeting on Clouds and Climate Modelling held at the DOE in Germantown, Maryland during 29-30 July.

Invited participant at the International Satellite Cloud Climatology Project (ISCCP) Advisory Panel Meeting and Workshop, Goddard Institute for Space Studies, New York, 8-10 October.

Invited participant in the Department of Energy (DOE) CO₂-Ocean Research Workshop held at the DOE in Germantown, Maryland during 14-15 October.

1987

Invited participant in the Environmental Protection Agency Planning Workshop on Model Simulated Variability held at the National Center for Atmospheric Research, Boulder, CO, 25-26 February.

Invited participant at the Mars GCM meeting. NASA Ames Research Center, 19-20 March.

Invited participant in the Department of Energy Workshop on Determining a Strategy for Model Intercomparison held in Stony Brook, New York, 9-10 June. Presented lecture "Recommendations for a Model Intercomparison Program."

Invited participant in the Department of Energy Workshop on Ocean General Circulation Models, Battelle Marine Research Laboratory, Sequim, WA, 30-31 July. Presented lectures "CO₂-Induced Transient Climate Change" and "Available and Needed Data for the Verification and Intercomparison of OGCMs."

Invited participant in Cooperative Institute for Research on the Atmosphere (CIRA) Workshop on Monitoring Climate for the Effects of Increasing Greenhouse Gas Concentrations, Pingree Campus of Colorado State University, 27-28 August. Presented an invited lecture "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂."

Invited participant in the United Nations Environment Programme Workshop on Climatic Change, Sea Level, Severe Tropical Storms, and Associated Impacts, University of East Anglia, Norwich, United Kingdom, 1-4 September. Presented invited lectures "The Sea-Level Rise Induced By Increased Greenhouse Gases: An Analysis Based On The OSU Coupled Atmosphere-Ocean General Circulation Model," "State Of The Art In Simulating CO₂-Induced Equilibrium Climate Change," and Greenhouse-Gas-Induced Changes In Tropical Cyclones."

Invited participant in the Alberta Research Council Symposium/Workshop on The Impact of Climate Variability and Change on the Canadian Prairies, Alberta Research Council, Edmonton, Alberta, 9-11 September. Presented Keynote Address "Equilibrium and Transient Climatic Effects of Increased Atmospheric CO₂."

Invited participant in the Environmental Protection Agency Workshop on the EPA Global Climate Research Plan, Raleigh, North Carolina, 21-24 September.

Invited participant in the NASA Workshop on the Detection of the Greenhouse Effect on Climate from Space Observations, Columbia, Maryland, 29 September-1 October. Presented a lecture on "Detecting Changes in Global Climate Induced by Greenhouse Gases."

Invited participant in the meeting of Working Group VIII of the US-USSR Bilateral On Environmental Protection, Geophysical Fluid Dynamics Laboratory, Princeton University,

19-23 October. Presented lectures on "The Sign of Cloud Optical Depth Feedback" and "Detecting Changes in Global Climate Induced by Greenhouse Gases."

Invited participant in "Clouds In Climate II: A World Climate Research Programme Workshop on Modeling and Observations," Columbia Maryland, 19-23 October. Presented an invited lecture on "The Quantitative Evaluation of Cloud Feedbacks in Climate Models."

Invited participant in FIRE Science Experiment Team Meeting, Linthicum, Maryland, 8-12 November.

1988

Invited participant in the "Workshop on NOAA Experimental Aerosol Product," World Weather Building, Camp Springs, MD, 25-26 April. Presented invited lecture on "Uses of Aerosol Observations for Climate Simulation, Prediction and Monitoring."

Invited participant in the DOE Model Intercomparison Workshop II held in Cambridge, MA, 7-8 July.

Invited participation in the International Rice Research Strategy Meeting, Manila, 5 September.

Invited participation in the Climate Trends Workshop, U.S. Academy of Science, Washington, D.C., 7-9 September.

1989

Invited participant in the FIRE Science Team Workshop on Scientific Results held in Monterey, CA, 10-14 July. Participated as a Member in a meeting of the National Academy of Sciences Panel on ISCCP/FIRE.

Invited participant in the Third Climate Model Intercomparison Workshop held in Stony Brook, New York, 9-10 November.

Invited participant in the IPCC Working Group 1 Meeting on Paleo-Analog Forecasting, Bath, United Kingdom, 20–21 November.

Visit to the Main Geophysical Observatory, Leningrad under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment., 22–26 November.

Invited participant in the IPCC Working Group 1 Meeting for authors of Sections 4, 5 and 6, Brisbane, Australia, 11-15 December.

1990

Invited participant in the IPCC Working Group 1 Meeting for authors of Section 8, Washington, D.C., 9 January.

Visit to the Main Geophysical Observatory, Leningrad under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment., 12 January.

Invited participant in the Global Forum on Environment and Development, Moscow, USSR, 15-19 January. Presented lecture on the current status of climate model simulations of greenhouse-gas-induced climate change.

Invited participant in the Greenhouse Glasnost Meeting, Moscow, USSR, 18 January. Presented lecture on the current status of climate model simulations of greenhouse-gas-induced climate change.

Invited participant in the IPCC Working Group 1 Lead Authors' Meeting, Edinburgh, Scotland, 26 February - 2 March.

Visit to the Main Geophysical Observatory, Leningrad (5-6 March), the USSR Academy of Sciences Computing Center, Moscow (7 March), and the Institute of Atmospheric Physics (7

March) under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment.

Climate System Modeling Project Workshop, NCAR, 11-13 April.

The White House Conference on Science and Economics Research Related to Global Change, Washington, D.C., 17-18 April.

Visit to the Main Geophysical Observatory, Leningrad, the USSR Academy of Sciences Computing Center, Moscow, the Institute of Atmospheric Physics, Moscow and the Hydrometeorological Centre under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment, 13-20 May. Presented invited seminar "Accurate Prediction of Greenhouse-Gas-Induced Climate Change: A Challenge for the 1990s" at the Hydrometeorological Centre (16 May) and at the Main Geophysical Observatory (18 May).

Invited participant in the "Workshop on Supercomputers in Climatology-Meteorology and Fluid Dynamics," Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 21-23 May. Presented invited lecture on "Accurate Prediction of Greenhouse-Gas-Induced Climate Change: A Challenge for Supercomputers (and Modellers) in the 1990s."

Invited participant in the International Conference on "The Dilemmas of Global Warming," Deauville, France, 12-16 November. Presented lecture on "Reconstruction and Projection of Global Warming From 1765 to 2100."

Visit to the Main Geophysical Observatory, Leningrad and the Institute of Atmospheric Physics, Moscow under the auspices of Working Group VIII on the Influence of Environmental Changes on Climate under the US-USSR Agreement in the Field of Protection of the Environment, 19-23 November.

1991

Participant in the Atmospheric Modeling Intercomparison Project inaugural meeting, Berkeley, CA, 4-5 April. Presented a talk on the University of Illinois multilayer atmospheric general circulation model.

Participant in the US/USSR Working Group VIII meeting at New York University, 6 May.

Participant in the NATO Advanced Research Workshop 91 on Paleoclimate Modeling, Saclay, France, 27-31 May. Presented a lecture titled, "Simulation of Glacial Onset with a Global Atmospheric General Circulation/Mixed Layer Ocean-Ice Sheet/Asthenosphere Model."

Participant in the US/USSR Working Group VIII meeting on "Toward an Improved Estimate of Climate Sensitivity: A US-USSR Paleoclimate Reconstruction and Modeling Project," Bellagio, Italy, 3-7 June. Presented a lecture titled, "Simulation of Glacial Onset with a Global Atmospheric General Circulation/Mixed Layer Ocean-Ice Sheet/Asthenosphere Model."

Participant in the Conference on Global Climate Change: Its Mitigation through Improved Production and Use of Energy, Los Alamos, New Mexico, 21-24 October. Presented lectures titled, "Revised Projection of Future Greenhouse Warming," and Implication of Anthropogenic Atmospheric Sulphate for the Sensitivity of the Climate System."

Participant in the First DEMETRA Meeting on Climate Variability and Global Change, Chianciano Terme, Italy, 28 October-1 November. Presented lecture titled, "Model Simulation-Observation Intercomparison Strategies for Estimating the Sensitivity of the Climate System to Increases in Greenhouse Gases."

Meeting on Global Change research recommended by me to be performed by the Commission of European Communities Joint Research Centre, Ispra, Italy, 18-19 November.
Invited participant in the IPCC Working Group 1 Meeting, Bristol, United Kingdom, 20-22 November.

1992

Meeting of Electric Power Research Institute Global Climate Advisory Committee. Presented invited lecture, "Research on Greenhouse Warming," Palo Alto, 11-12 February.
EPRI/Scripps Workshop on Climate Mitigation. Presented invited lecture, "Implications for Global Warming of Intercycle Solar-Irradiance Variations," Scripps Institution of Oceanography, 10-11 September.
NOAA Global Change/Economics Proposal Review Panel, Silver Springs, MD, 17 September.

1993

Working visit to the Institute of Atmospheric Physics, Moscow, and Main Geophysical Observatory, St. Petersburg, Russia, 15-29 May.
International Global Aerosol Project (IGAP) Science Team Meeting, Geneva, Switzerland, 29 June – 1 July.
Third EPRI-Scripps Workshop on Global Climate Change, La Jolla, CA, 27-28 September. Presented paper, "A 65-79 Year Oscillation in Observed Global-Mean Surface Temperatures."
MiniMax Workshop, College Park, MD, 27-30 September. Presented paper, "A 65-79 Year Oscillation in Observed Global-Mean Surface Temperatures."
International Workshop on Integrative Assessment of Mitigation, Impacts and Adaptation of Climate Change, International Institute for Applied Systems Analysis, Laxenburg, Austria, 13–15 October. Presented paper, "The Impact of Potential Abrupt Climate Changes on Near-Term Policy Choices."
NATO Advanced Research Workshop on The Solar Engine and Its Influence on Terrestrial Atmosphere and Climate, Paris, 25-29 October. Presented paper, "A 65-79 Year Oscillation in Observed Global-Mean Surface Temperatures."

1994

Organizing Committee meeting for 1994 Global Change Institute meeting on Integrated Assessment Modeling, Arlington, Virginia, 19 January.
Organizing Committee meeting for the Stanford Energy Modeling Forum (EMF)–14 on Integrated Assessment of Global Climate Change, Chantilly, VA, 25 January.
Workshop on Uncertainty and Global Climate Change Research, Oak Ridge National Laboratory, Knoxville, TN, 22-23 March. Presented paper, "The Impact of Potential Abrupt Climate Changes on Near-Term Policy Choices."
Global Climate Change: Science, Policy, and Mitigation Strategies, Phoenix, AR, 5-8 April. Presented paper, "An oscillation in the global climate system of period 65-79 years."
Organizing Committee meeting for the Stanford Energy Modeling Forum (EMF)–14 on Integrated Assessment of Global Climate Change, Chantilly, VA, 2-3 June.
NATO Advanced Research Workshop on Climate Sensitivity to Radiative Perturbations: Physical Mechanisms and Validation, Paris, 11-15 July. Presented invited lecture, "Analyzing the Instrumental Temperature Record for Multi-decadal Variability."
Global Change Institute on Integrated Assessment of Climate Change, Snowmass, CO, 20-29 July.

- Joint U.S.-Russian Workshop on Paleocalibration of Climatic Sensitivity, Silver Spring, MD, 15-17 August. Presented invited lecture "Some Lessons from GCM Paleoclimate Simulations."
- NATO Advanced Research Workshop on The effects of the Mt. Pinatubo Eruption on the Atmosphere and Climate, Rome, 26-30 September. Presented invited lecture, "Surface Temperature Changes Simulated by a Simple Climate/Ocean Model in Response to Volcanic Eruptions."
- NATO Advanced Research Workshop on Climatic Variations and Forcing Mechanisms of the Last 2,000 Years, Il Ciocco, Luca, Italy, 3-7 October. Presented invited lecture, "Has the Sun Changed Climate?"
- Third Japan–U.S. Workshop on Global Change, 25-27 October, East-West Center, Honolulu, Hawaii.
- Stanford Energy Modeling Forum (EMF)–14 on Integrated Assessment of Global Climate Change, Vienna, Austria, 1-2 December.

1995

- Documenting and Detecting Long-Term Climate Change: Monitoring Requirements for GCOS, Asheville, North Carolina, 9-11 January. Presented invited lecture, "Has the Sun Changed Climate?"
- Organizing Committee Meeting for Workshops on Representing Climate Impacts in Integrated Assessment Models, Department of Agriculture, Washington, D.C., 1 March.
- Meeting of National Technical Advisory Committee of the National Institute for Global Environmental Change, University of California, Davis, 4-5 April.
- First International AMIP Scientific Conference, Monterey, California, 15-19 May.
- Workshop on Regional Assessment of Climate Change Impacts in the Southeast: Integrated Assessment Options and Research Needs, Holiday Inn, World's Fair, in Knoxville, Tennessee, 17-20 July 1995.

1996

- ACACIA Sulfate Aerosol Research Project Planning Meeting, NCAR, Boulder, CO, 27-28 February 1996. Presented invited lecture, "The Dependence of Climate Sensitivity on Sulfate Aerosol Forcing."
- International Workshop on Climate Change: Integrating Science, Economics, and Policy, IIASA, Laxenburg, Austria, 19-20 March. Presented invited lecture, The Standard Error of Observationally Based Estimates of Climate Sensitivity.
- EMF 14 Working Group Meeting on Integrated Assessment of Global Climate Change, IIASA, Laxenburg, Austria, 21-22 March. Presented invited lecture, "Development of the Geographical Climate Scenarios for the Impact Analyses of Energy Modeling Forum 14 – Integrated Assessment of Climate Change."
- IPCC meeting on IPCC Workplan for 1996. Washington, D.C., 22 April.

1997

- Paleoclimate Model Intercomparison Project (PMIP) Workshop, Danville, CA, 4-7 November.

1998

- Sixth Japan–U.S. Workshop on Global Change, 24-26 February, East-West Center, Honolulu, Hawaii.
- GCSS-WGNE Workshop on Cloud Processes and Cloud Feedbacks in Large-Scale Models, 9-13 November 1998, held at the European Centre for Medium range Weather Forecasting, Shinfield Park, Reading, UK. Presented lecture, "The Dependence on Convection

Parameterization of the Tropical Intraseasonal Oscillation Simulated by the UIUC 11-Layer Atmospheric GCM.

1999

International Workshop on Next-Generation Climate Models, 1-3 March, in Honolulu.

1999 GRIPS (GCM-Reality Intercomparison Project) workshop, 22-25 March, University of Reading, UK. Presented talk on The Use of the Methane Distribution Simulated by an ACTM to Evaluate the Middle Atmosphere Performance of GCMs.

IPCC Working Group III Emissions Scenarios Special Report Lead Authors Meeting, 23-25 March, in London.

Workshop on Global Climate Science, "Research Pathways for the Next Decade", A Discussion, National Environmental Policy Institute, 31 March, Georgetown University Conference Center, Washington, D. C. Presented invited talk on Reducing the Uncertainty in the Estimated Value of Climate Sensitivity.

IPCC Expert Meeting on Mitigation and Stabilisation Scenarios for IPCC's Third Assessment Report, Copenhagen, 2-4 June.

IMAGE-2 Advisory Board Meeting, 15-17 November, Bilthoven, Netherlands.

2002

Invited participant in the UN Framework Convention on Climate Change Expert Meeting on Assessment of Contributions to Climate Change, UK Met Office, Bracknell, UK, 25-27 September 2002.

2003

Invited participant in the Northern Eurasia Earth Science Partnership Initiative (NEESPI) workshop held during 22-25 April 2003 in Suzdal, Russia.

Invited participant in the NASA Living With a Star Sun-Climate Task Force meeting held 28-30 May 2003 in Tucson, Arizona.

2006

Invited participant in the RAPID Climate Change meeting, Holiday Inn City Centre Hotel, Birmingham, U.K., 24-27 October 2006. Presented a poster titled "Assessing the Risk of a Collapse of the Atlantic Thermohaline Circulation: The Effect of Different Subjective Probability Distributions."

Invited participant in the Stanford Energy Modeling Forum 22 meeting on Climate Policy Scenarios for Stabilization and in Transition, Tsukuba International Congress Center, Tsukuba, Japan, 12-14 December 2006.

Other Meetings Attended

1971

Participant, International Colloquium on Gasdynamics of Explosions, Marseilles, France, 12-17 September.

1973

Participant, ARPA/Rand Climate Dynamics Conference, Santa Monica, CA, 13-15 March.

1974

Participant, National Center for Atmospheric Research Climate Project Summer Radiation Workshop, Boulder, CO, 16-18 September.

Participant, American Meteorological Society Conference on the Upper Atmosphere, Atlanta, GA, 30 September - 4 October.

Participant, American Geophysical Union Fall Annual Meeting, San Francisco, CA, 12-17 December.

1975

Participant, World Meteorological Organization Symposium on Long-Term Climatic Fluctuations and the Future of our Climate, Norwich, England, 17-23 August.

1976

Participant, U.S. Naval Postgraduate School Ocean Forecasting Workshop, Monterey, CA, 8-10 June.

Participant, Deutsche Meteorologische Gesellschaft and American Meteorological Society Conference on Simulation of Large-Scale Atmospheric Processes, Hamburg, FRG, 30 August - 4 September.

1979

Participant, Fourth Annual Climate Diagnostics Workshop, University of Wisconsin, Madison, 16-18 October.

1981

Participant, American Meteorological Society First Conference on Climate Variations, San Diego, CA, 19-23 January.

1982

Participant, NASA Goddard Space Flight Center Climate Science Review, 15-16 June.

1983

Participant, Second Conference on Climate Variations, American Meteorological Society, New Orleans, LA, 10-14 January. Presented paper "The Climatic Response to Doubled CO₂ Simulated by the OSU Atmospheric GCM with a Coupled Swamp Ocean."

1984

Participant, Sixteenth International Liege Colloquium On Ocean Hydrodynamics, Symposium on Coupled Atmosphere-Ocean Models, Liege, Belgium, 7-11 May. Presented paper "The Role of the Ocean in CO₂-Induced Climatic Change: A Study with the OSU Coupled Atmosphere-Ocean GCM."

Participated as an Invited Expert at the World Ocean Circulation Experiment - Numerical Experiment Group (12 May) and the Committee on Climatic Changes and the Ocean Modelling Panel (14-16 May), Liege, Belgium.

Participant, Ninth Climate Diagnostic Workshop, Corvallis, Oregon, 22-26 October. Presented paper "Atmospheric General Circulation Model Simulations of the Modern Antarctic Climate."

Attended meeting of authors of the chapter on climate in the NASA assessment report on atmospheric ozone, Geophysical Fluid Dynamics Laboratory, Princeton University, 3 December.

1985

Participant, Third Conference on Climate Variations and Symposium on Contemporary Climate: 1850-2100, Los Angeles, 8-11 January. Presented papers "The Role of the Ocean in CO₂-Induced Climate Change: A Study with the OSU Coupled Atmospheric-Ocean General Circulation Model" and "Transient Response and the Detection of CO₂-Induced Climatic Change."

Attended meeting of authors of the chapter on climate in the NASA assessment report on atmospheric ozone, National Center for Atmospheric Research, Boulder, CO, 29-30 April.

Participant, IAMAP/IAPSO Joint Assembly, Honolulu, Hawaii, 5-16 August. Presented paper "A Numerical Simulation of CO₂-Induced Transient Climate Change with a Coupled Atmosphere-Ocean General Circulation Model."

1986

Participant in the Second International Conference On Southern Hemisphere Meteorology held in Wellington, New Zealand, 1-5 December. Presented paper "Atmospheric General Circulation Model Simulations of the Modern Antarctic Climate."

Participant in the Conference on Mechanisms of Interannual and Longer Term Climatic Variations held in Melbourne, Australia, 8-12 December. Presented paper "The Role of Oceanic Heat Transport Mechanisms in CO₂-Induced Warming As Simulated by the OSU Atmospheric/Oceanic GCM."

1987

Participant in the American Meteorology Society Fourth Conference on Climate Variations: Climate Dynamics Update, Baltimore, MD, 10-13 March. Presented invited lecture on "Prospects for Coupled Ocean-Atmosphere Numerical Modeling."

Participant in the International Union of Geodesy and Geophysics XIX General Assembly, Vancouver, Canada, 9-22 August. Presented lecture "The Transport of CO₂-induced warming into the Ocean," and an invited lecture "Quantitative Analysis of Feedbacks in Climate Model Simulations of CO₂-induced Warming."

1988

WGNE Workshop on Systematic Errors, Toronto, Canada, 19-23 September.

1989

Participant in the American Meteorology Society annual Meeting, Anaheim, CA, 30-31 January. Presented invited lecture on "Prospects for Coupled Ocean-Atmosphere Numerical Modeling."

1996

Participant in the SPARC (Stratospheric Processes and Their Role in Climate) 1st General Assembly, Melbourne, Australia, 2-6 December 1996. Presented poster on "Hybrid Scheme for 3-Dimensional Transport of Chemical Species".

1998

Participant in the Aspen Global Change Institute Meeting on Climate Extremes: Changes, Impacts, and Projections, Aspen, CO, 7-14 August.

1999

Participant in the 1999 Open Meeting of the Human dimensions of Global Environmental Change Research Community, Shonan Village, Japan, 24-26 June 1999. Presented lecture titled "The Impacts of Climate Variability on Near-Term Policy Choices and the Value of Information."

2002

Participant in the Chapman Conference on Volcanism and the Earth's atmosphere, Thera, Greece, 17-21 June 2002. Presented poster on "Study of the Effects of the Pinatubo Volcanic Eruption Using the UIUC Stratosphere/Troposphere GCM with Interactive Photochemistry."

2003

Participant in the IUGG2003 Sapporo General Assembly, 30 June – 4 July. Presented papers on Climate Sensitivity: Uncertainties and Learning, Dependence of Climate Sensitivity on Volcanic Radiative Forcing, and On the Use of Regression to Estimate Climate Sensitivity.

2004

Participant in the Gravity Wave Processes and Parameterization, Presented paper on Sensitivity of Middle Atmospheric Temperature and Circulation in the UIUC Mesosphere-Stratosphere-Troposphere GCM to the Treatment of Subgrid-Scale Gravity-Wave Breaking.

Community Service

2005–6

Coached the Science Olympiad team at Urbana Middle School.