Tentative Schedule of the Seventh International Seminar on Climate System and Climate Change

19-30 July 2010, Beijing, China

Date	19(M)	20(T)	21(W)	22(T)	23(F)
Morning	Opening ceremony 09:30-09:50	Claude Boutron	Ned Helme	Ned Helme	Klaus Fraedrich
	09:50-10:10 Photo-taking	09:00-10:20 Lecture 3: Natural changes in the occurrence of heavy metals in Antarctic ice during the past 670 kyr	09:00-10:20 Lecture 1: emissions trading experience in Europe and the US	09:00-10:20 Lecture4: global prospects for climate policy in the various global markets	09:00-10:20 Lecture 3: Continuum climate variability: long term memory, extremes, predictability
				Francis Zwiers:	
	10:30-12:00Claude Boutron Lecture 1: Drilling snow and ice cores in Antarctica , Greenland and high altitude temperate areas	10:40-11:40 Questions/Discussions	10:40-12:00 Lecutre 2: competitiveness effects of climate policy on both China and developed countries' energy intensive/trade exposed industries	10:40-11:40 Teaching assistance in Chinese	10:40-11:40 Questions/Discussions
Afternoon	Claude Boutron 14:00-15:20 Lecture 2: Analysing snow and ice cores for heavy metals at extremely low concentration levels	Claude Boutron 14:00-15:20 Lecture 4: Man induced changes in heavy metals since the Antiquity documented in snow and ice cores	Ned Helme 14:00-15:20 Lecture 3: CDM, sectoral crediting and offsets policies	Klaus Fraedrich 14:00-15:20 Lecture 1: Climate, Chaos, and Catastrophes Lecture 2: Three bridges: the Europe - Asia connection	Klaus Fraedrich 14:00-15:20 Lecture 4: A suite of global circulation models
	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions
	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese
Evening					Reception for students

24(S)	25(S)	26(M)	27(T)	28(W)	29(T)	30(F)
Technical Tour	Steven John Ghan 09:00-10:20 Lecture 1: Aerosol effects on clouds	John A. Ogren 09:00-10:20 Lecture 1: Atmospheric Cycle of Elemental Carbon	John A. Ogren 09:00-10:20 Lecture 3: Climate Sensitivity and Aerosol Forcing	Nakajima Teruyuki 09:00-10:20 Lecture 1: Role of radiation in the climate system	Nakajima Teruyuki 09:00-10:20 Lecture 4: Global warming and various feedback system in the climate system	09:00-12:00 Group Discussion and Exchange （3-4 groups） Oral presentation and paper submission
			Lecture 4: Biogeochemical cycles of greenhouse gases		Lecture 1:	
	10:40-11:40 Questions/Discussions	10:40-12:00 Steven John Ghan Lecture 3: Effects of black carbon on climate	10:40-12:00 Steven John Ghan Lecture 4: Impacts of climate change on mountain snow	10:40-12:00 Lecture 2: Signature of climate change from space	10:40-11:40 Teaching assistance in Chinese	
	Steven John Ghan 14:00-15:20 Lecture 2: Toward a minimal representation of aerosol effects on climate	John A. Ogren 14:00-15:20 Lecture 2: Measurement Techniques for Aerosol Climate-forcing Properties	John A. Ogren 14:00-15:20 Lecture 4: Haze and Clouds: Interactions of Aerosols and Water	Nakajima Teruyuki 14:00-15:20 Lecture 3: Aerosols and clouds in the climate system	14:00-20:00 Preparation of oral presentation (Computer room: Room 706, CMA Training Center)	14:00-15:50 Oral presentation and paper submission
	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions	15:40-16:10 Questions/Discussions		16:00-16:30 Closing ceremony
	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese	16:10-17:10 Teaching assistance in Chinese		

Evening: 17:15-20:00 (Mon.-Fri.), Computer room: Room 706, CMA Training Center

Curriculum vitae of
Prof. Dr. Claude Boutron

Laboratory of Glaciology and Geophysics of the Environment,
University Joseph Fourier of Grenoble/CNRS, 54, rue Molière, 38400
Saint Martin d'Hères (France)
Phone : 33 4 76 82 42 00 ; E-mail : boutron@lgge.obs.ujf-grenoble.fr
Born 26 June 1947, Gap (France), Married, 3 children

University studies

Physics/Geophysics, University Joseph Fourier of Grenoble, France; Master (1969);
Doctorat de 3e cycle (1971); Doctorat d'Etat (1978)

Research positions

- 1969-1970: Research Assistant, Atomic Energy Commission, Fontenay aux Roses, France
- 1970-1988: Assistant, Maitre-Assistant and Maitre de Conferences, University Joseph Fourier of Grenoble, France,
- 1981 and 1984/1985: Visiting Research Associate, California Institute of Technology, Pasadena, California, USA (Division of Geological and Planetary Sciences)
- 1988-present: *Professor, University Joseph Fourier of Grenoble, France. At present "Professeur classe exceptionnelle 2e échelon"*
- 1992, 1994, 1995 and 1997: Contract Professor, University Ca' Foscari of Venice, Italy
- 1993 and 1994: Visiting Professor, Curtin University of Technology, Perth, Australia
- 1999, 2002, 2004 and 2005: Contract Professor, University of Ancona, Italy
- 1995-2005: *Senior member of the Institut Universitaire de France, Paris*

Field experience

- Scientific leader in Antarctica of two traverses of the International Antarctic Glaciological Programme (total: 6 months).

Main present and past collaborations

- California Institute of Technology, Division of Geological and Planetary Sciences, Pasadena, USA (Prof. Clair C. Patterson) (total: 18 months in Pasadena as Visiting Research Associate),
- Institute of Spectroscopy, Russia Academy of Sciences, Troitzk, Russia (Profs.Vsevolod Koloshnikov and Michael Bolshov) (total: 2 months in Troitzk),
- University of Connecticut, Department of Marine Sciences, Groton, Connecticut, USA (Prof. William Fitzgerald),
- University of Antwerpen, Department of Chemistry, Micro and Trace Analysis Center (Prof. Freddy Adams),
- Curtin University of Technology, Department of Applied Physics, Perth, Australia (Prof. Kevin Rosman) (total: 4 months in Perth as Visiting Professor),
- University Ca Foscari of Venice, Department of Environmental Sciences, Italy (Profs. Carlo Barbante and Paolo Cescon)
- Korea Polar Research Institute and Inha University, Incheon, South Korea (Prof. Sungmin Hong)
- Ohio State University, Byrd Polar Research Center, Colombus, USA (Prof. Lonnie Thompson and Dr. Paolo Gabrielli)

- University of Leeds, School of Chemistry, Leeds, United Kingdom (Prof. John Plane)
- GKSS Research Center, Departement for Environmental Chemistry, Geesthacht/Hamburg, Germany (Prof. Ralf Ebinghaus)
- Paul Scherrer Institute, Laboratory of Radio Chemistry and Environmental Chemistry, Villigen, Switzerland (Prof. Heinz Gäggeler and Dr. Margit Schwikowski)

Awards and Honours

- 1995-2005: Senior Member of the Institut Universitaire de France.
- Since 2005: Honorary Member of Institut Universitaire de France
- 2002: Theurlot, Durand-Claye, Alexandre Darracq and Coron-Thevenet Prize of the french Academy of Sciences
- 2003 : Gold Medal of the University Joseph Fourier
- 2006 : International Prize “Felice Ippolito” of the Accademia Nazionale dei Lincei, Rome
- 2007 : Alfred Wegener Medal of the European Geosciences Union (Union Medal)
- Since 2007: Honorary Member of the European Geosciences Union
- 2007: Co-laureate of the Descartes Prize of the European Union (European Project for Ice Coring in Antarctica)
- 2010: Honoris Causa Doctorate of the University of Luneburg, Germany

EDWARD ALFRED HELME

Proposed role in the project: Key Expert 1: Team Leader

Family name: Helme

First names: Edward (Ned)

Date of birth: 23 August 1947

Nationality: United States

Civil status: U.S. Citizen

Education:

Institution (Date from - Date to)	Degree(s) or Diploma(s) obtained:
Haverford College 9/65-6/69	Masters of Public Policy in Economics and Energy
University of California, Berkley 9/75-5/77	B.A. in Political Science and Psychology

1. Membership of professional bodies:

Mr. Helme is a member of the following bodies: the U.S. Transportation Research Board, British Petroleum (BP) Alternate Energy Advisory Board, past adjunct lecturer at Johns Hopkins Krieger School of Arts and Sciences, Board of Directors of CCAP Action Fund, CCAP-Europe.

2. Other skills: Competent in Microsoft Office Suite of applications, skilled in international diplomacy, with over 25 years of negotiating with U.S. and international policymakers on clean air and climate change policy.

3. Present position: President, Center for Clean Air Policy

4. Years within the firm: 25

5. Key qualifications: (Relevant to the project)

- Ned Helme is the founder and president of the Center for Clean Air Policy (CCAP). As a leading expert on climate and air policy, he advises Members of the U.S. Congress, state and international governments, the European Commission and developing countries on these issues. He is the author of more than 50 key studies on climate change, air quality, electricity regulation, and transportation policy. With more than twenty-

five years experience in climate and air policy, Mr. Helme has a broad and deep understanding of cap-and-trade programs and other market and nonmarket approaches to addressing climate change.

- **Global Sectoral Study (2008-Present):** Directs a project, undertaken by a consortium led by CCAP-Europe and financed primarily by the European Commission's DG-Enterprise, to provide a proof-of-concept of sectoral approaches to GHG emissions mitigation in developing countries. This study involves mitigation and cost analysis, barrier identification, assessment of capacity-building needs, policy design, and modelling of competitiveness impacts related to the development of sector-wide mitigation programs for energy-intensive sectors in China, Mexico and Brazil.
- **Assisting Developing Country Climate Negotiators Through Analysis and Dialogue (2005-Present):** Directs a project, financed by the UK DFID and Tinker Foundation, to work with leading researchers in Brazil, China, India, and Mexico to analyze the costs and implications of policies to reduce greenhouse gas (GHG) emissions in these countries.
- **Dialogue on Future International Actions to Address Global Climate Change (2003-Present):** Directs a dialogue, financed by more than 15 countries, that combines analysis, policy development, and dialogue to identify, discuss, and consider options for future international actions to address climate change. The process brings together climate change negotiators from more than 30 developed and developing countries for semi-annual, informal, off-the-record dialogue sessions.
- **Technology Transfer and Investment Risk in International Emissions Trading (2005-2007):** Worked with the Center for European Economic Research (ZEW) of Germany, Ecoplan of Switzerland, the Energy Research Center of the Netherlands (ECN), and Natsource-Tullet Europe (NTE) of the United Kingdom to explore the economic and industrial impacts, as well as the prospects for achieving technology transfer, associated with the implementation of the Kyoto Protocol's flexible mechanisms.
- **Innovations in Sustainable Energy in LAC and Potential Linkages to the Carbon Market (2006):** Assisted Inter-American Development Bank in designing a plan to facilitate the mainstreaming of clean energy considerations into its lending practices and increase its investment portfolio of clean energy projects in Latin America and the Caribbean.
- **Assessment of the Effectiveness of European Air Quality Policies and Measures** (**2003-2004):** Contributed to a project conducted to analyze the effectiveness of European air quality policies and measures as a part of the Commission's Clean Air For Europe (CAFE) program. As a part of this effort, led the CCAP team that analyzed the effectiveness of air quality policies in the U.S., Canada, and Japan.
- **Monitoring, Reporting, and Verification Protocols for the EU Trading System (2001-2003):** In collaboration with experts from TNO in the Netherlands and the Foundation for International Environmental Laws and Development (FIELD) in the UK, worked to define the monitoring, reporting and verification (MRV) systems necessary to support the groundbreaking GHG cap-and-trade program for the European member states.

- **Design of an Emissions Trading System in the European Community (1998-2000):** Oversaw and played a leading role on the international, multi-disciplinary team that worked to design a greenhouse gas emissions trading system for the Environment Directorate General (DGXI) of the European Commission (EC) for their consideration as an option for addressing Kyoto commitments. As part of this initiative, the Center developed three papers presenting options for points of regulation (e.g., upstream, downstream, hybrid), methods of allocating allowances, and a gradual phase-in of a trading system.
- **Greenhouse Gas Emissions Trading Braintrust (1996-2003):** Oversaw and directed, multi-year project to analyze and develop a greenhouse gas emissions trading system for the U.S. Facilitated the process and contributed to a number of reports and presentations, including the Airlie Carbon Trading papers.
- **Development of the First Joint Implementation Project under the UNFCCC in Decin, Czech Republic (1993-1995):** Together with three U.S. utilities, brokered the conversion of a district heating plant from coal to natural gas cogeneration resulting in major local air quality benefits. It won approval as the first project in the world to generate carbon credits to the investors and was the model used for the 1997 Kyoto Protocol's JI and CDM provisions.
- **Developing the Acid Rain Trading Program (1986-1990):** Pioneered, through a stakeholder dialogue process, an innovative, phased cap-and-trade approach to acid rain control legislation and created a powerful political coalition of U.S. Governors, corporate leaders, and environmentalists that successfully lobbied Congress and the Bush Administration to enact legislation in 1990 based on a trading approach.
- Other relevant CCAP projects include:
    - **European Dialogue on the Energy and Climate Challenge** (2007-Present)
    - **California Climate Change Policy Development** (2004-Present)
    - **Building the Capacity of Chile's Transportation Sector to Participate in the CDM** (2002-2005)
    - **Preparing Accession Countries for Participation in the EU Trading System** (2002-2003)
    - **Clean Development Mechanism Dialogue** (2000-2003)
    - **Identifying Opportunities for Industrial Energy Efficiency and CDM Project Development in Brazil** (2000-2001)
    - **Regional Capacity Building & Policy Development in the Caribbean** (1999-2001)
    - **Climate-Change Capacity Building and Policy Development in Mexico** (1998-2000)

6. Specific experience in the region:

Country	Date from - Date to
Mexico	1998-2000, 2006-present
China	February 2005 – present
India	February 2005 – present
Brazil	2000-2001, February 2005 – present
Indonesia	August 2009 - present

7. Professional experience

Date from - Date to	Location	Company& reference person[1] (name & contact details)	Position	Description
1985-Present	Washington, DC	Center for Clean Air Policy (reference: Tony Earl, Chairman of the Board of Directors, 608-283-2471)	President	Director of the Center for Clean Air Policy's International, Domestic and Transportation Programs and their projects.
1977-1985	Washington, DC	National Governor's Association (reference: Human Resources, 202-624-5300)	Director, Natural Resources Program	Built grassroots coalitions on energy conservation programs in the Midwest and on coal strip mining legislation, along with numerous legislative coalitions. Developed a number of strong policy recommendations for the Alliance for Acid Rain Control and Energy Policy on Clean Air, energy and global warming bills.
1972-1976	Washington, DC	US Representative Ken Hechler (D-WV) (reference: Ken Hechler, 304-395-4323)	Legislative Director	Drafted major alternative coal strip mining control legislation and directed grass roots environmental coalition which won adoption of legislation after 4 year battle

[1] The Contracting Authority reserves the right to contact the reference persons. If you can not provide a reference, please provide a justification.

Klaus Fraedrich

Resumé:

Klaus Fraedrich is a truly multi-faceted and insightful scientist. His contributions include, but are not restricted to the following:

Regional climates (1970s): Identification of the River Nile's source (nocturnal circulation over Lake Victoria) and the Andes/Altiplano outflow anticyclone (detection and impact) are subjects that more recently found the attention of researchers.
Parametrisation of convection (1970-80s): The cloud life cycle, vorticity source and the first stochastic cloud model were introduced into the literature.
Dynamical concepts for climate change (1970-80s) have now become part of the present day teaching on catastrophes, resilience and thresholds in simple climate system models.
Non-linear systems analysis (1980-90s) is applied to weather data, pioneering phase space analysis of weather dynamics and its predictability.
Dynamics and stochastics (90s): The cooperation between two storm tracks and the resonance effects in ocean and atmosphere provide insight into the low-frequency dynamics of atmosphere (North Atlantic Oscillation) and ocean (spatial resonance); coherence resonance is a new subject in the possible impact of stochastics on dynamic feedbacks.

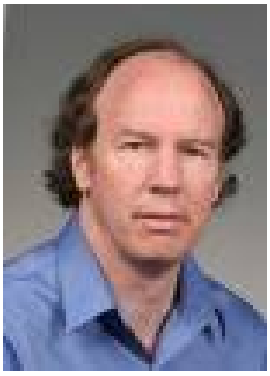
Maximum entropy production (MEP): First application of the MEP principle in a constrained dynamical environment and its possible use in climate dynamics.
Tropical dynamics: Madden-Julian Oscillation (new theory), tropical cyclones (new track forecast system applied by Australian Weather Service), the theory of the 26-degree sea surface temperature threshold are all new approaches to old subjects.
Dynamical concepts for low-frequency climate variability (last ten years): Long-term memory, 1/f-noise (diffusion and adjustment) has been introduced to climate analysis and model inter-comparison.

Modelling (last ten years): Building a user-friendly and freely available GCM hierarchy that includes, in turn, SAM, the Shallow Atmosphere Model; PUMA, the Portable University Model of

the Atmosphere, with adjoint diagnostics; and PlaSim, the Planet Simulator (towards a user-friendly Planet-System Model).

His seminal ideas have had a most significant impact on the cognoscenti, i.e., he is a scientist's scientist. Outside Europe, Fraedrich has a truly important presence in China, including Tibet and Xinjiang, and in Australia. His many and talented students include people with rapidly budding careers in the US (Philip Sura) and the UK (Christian Franzke). Fraedrich's distinctions so far include Distinguished Overseas Scientist (Melbourne, Australia, 1982-1983), the Max-Planck/Humboldt Prize (1994), the Gay-Lussac Prize (France, 2004), a Max-Planck Fellowship (2007) and Fellow, Hamburg Academy of Sciences (2008). He was President of the Nonlinear Dynamics Section (European Geophysical Society, 1994–1996) and was on the Editorial Board of Nonlinear Processes in Geophysics (1994–1998).

Steven J. Ghan



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http://www.pnl.gov/atmospheric/staff.asp

General Research Interests:

Cloud-Aerosol Interactions. One of the largest sources of uncertainty in simulations of climate change is in the radiative forcing due to the effects of aerosols on clouds. Cloud droplet number concentration is strongly influenced by the aerosols upon which droplets form, but the influence depends on competition for water in cloud updrafts. Dr. Ghan and colleagues showed that this influence can be expressed analytically, thus laying the foundation for physically-based treatments of the influence in global climate models. More recently, Dr. Ghan's interests have expanded to the much more complex problem of aerosol effects on ice clouds. He is now working with PNNL colleagues to address this challenge with a combination of laboratory studies, field experiments, and modeling.

Aerosol Modeling. Simulating the global distribution of aerosols and aerosol properties requires a balance between the need for realism and the requirement to complete simulations in a reasonable time. Both the composition and the size distribution of the aerosol must be represented, which requires multiple species of a variety of sizes. Century simulations must be completed within months. Dr. Ghan and his PNNL colleagues have achieved such a balance in a model the treats all aerosol processes that are important for climate change. Dr. Ghan is now working to apply the model to studies of the impacts of aerosols on climate change.

Climate in Complex Terrain. The horizontal grid size of global climate models is typically 100 km, which is far coarser than the size of all individual mountains and most mountain ranges. Climate models therefore only poorly resolve the influence of complex terrain on the spatial distribution of climate. The weakness greatly limits the application of global climate models to impacts of climate change on water resources in regions with complex terrain. To address this weakness, Dr. Ghan and

his PNNL colleague Ruby Leung developed a treatment of the subgrid influence of surface elevation on climate. The treatment works amazingly well. Dr. Ghan has already used the scheme to investigate the impact of global warming on global water resources for a full century. His future ambitions are to support this scheme as it is adopted as a permanent feature of the NCAR Community Climate System Model and then use it to simulate the demise of the Greenland Ice Sheet.

Career Highlights:

- B.S. in Atmospheric Science (*cum laude*), University of Washington, 1979
- M.S. in Meteorology, Massachusetts Institute of Technology, 1981
- Ph.D. in Meteorology, Massachusetts Institute of Technology, 1988
- 90 peer-reviewed publications (32 as first author)
- Citations: 3118
- Mean citations per publication: 35
- Hirsch index h (# papers with at least h citations): 32
- Atmospheric Scientist, Lawrence Livermore National Laboratory, 1984 – 1990
- Visiting professor, University of Louvain-la-Neuve, Belgium, April 1989
- Atmospheric Scientist, Pacific Northwest National Laboratory, 1990 – present
- Affiliate Associate Professor, University of Washington, 1994-2005
- Lecturer, Advanced Studies Summer Colloquium on Clouds and Climate, NCAR, July 1993
- Principal Investigator:
    - DOE Atmospheric Radiation Measurement program, 1991 – 2009
    - NASA Aerosol Interdisciplinary Science Program, 1993 – 1997
    - NASA EOS Interdisciplinary Science program, 1997 – 2003, 2007–present
    - DOE Climate Change Prediction Program, 1999 – 2001
    - DOE Atmospheric Science Program, 2004 – 2009
    - All of PNNL Research for DOE ARM and ASP programs, 2007– 2009.
    - All of PNNL Research for DOE Atmospheric Systems Research program, 2009 -
    - Co-Investigator, DOE Scientific Discovery through Advanced Computing: Climate Change Prediction Program, 2001 – present
- Developed an instability theory for aerosol radiative-dynamical interactions (Ghan, 1989a,b)
- Coupled atmosphere, ocean, aerosol models to estimate climate impact of nuclear war (Ghan, 1991)
- Showed that cloud microphysics parameterizations developed for cloud-resolving models can be easily adapted for stratiform clouds in GCMs (Ghan and Easter, 1992).
- Developed an aerosol activation parameterization based on Kohler theory and log-normal aerosol size distribution (Ghan et al., 1993)
- Introduced droplet number as a prognostic variable in a global model (Ghan et al., 1997).
- Co-developed a parameterization of the subgrid influence of orography on clouds, precipitation, and land surface processes (Leung and Ghan, 1995).
- Used the orography parameterization in a regional model to estimate a 30-70% reduction in Cascade snowpack in response to doubled CO_2 (Leung and Ghan, 1999)

- Applied the orography parameterization to a global circulation model (Ghan et al., 2002)
- Used the orography parameterization in the global circulation model to estimate global snow reduction in mountain snowpack for IPCC A1B scenario (Ghan and Shippert, 2006).
- Developed DOE strategy for improving the treatment of aerosols in climate models (Ghan and Schwartz, 2007)
- Editor, *Journal of Geophysical Research-Atmospheres*, 2007-present.
- Editorial board member, *Climatic Change*, 1992 - 1998.
- Editorial board member, *Northwest Science*, 1996 - 2006.
- Contributing author, *Climate Change 1995*, Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change.
- Contributing author, Chapters 5 and 6, *Climate Change 2001: The Scientific Basis*, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change.
- Steering committee, DOE Atmospheric Radiation Measurement Cloud Parameterization and Modeling working group, 1999 – 2004.
- Advisory panel, NSF Climate Process Team, 2003 – 2006.
- Science Steering Committee, DOE Atmospheric Science Program, 2005 – 2009.
- Scientific Steering Committee, NCAR Community Climate System Model, 2006 – present.
- Convener, session on cloud effects on aerosol, AGU Fall 2007 and 2008 Meetings.
- Leader, PNNL Aerosol Climate Initiative, 2007 – present.
- Key contributions to DOE Climate Change Research Division Strategic Plan, 2007.
- Key contributions to Science Plan for DOE Atmospheric Systems Research Program, 2009
- Principal Investigator, Indirect Semi-Direct Aerosol Campaign, Barrow, Alaska, April 2008.
- Co-leader of the Cloud-Aerosol-Precipitation Interactions working group and member of Science and Infrastructure Steering Committee for the DOE Atmospheric Systems Research program, 2009 – present
- Member of ARM Climate Research Facility Science Board, 2010 - present

Prof. Dr. John A. Ogren

BORN: 30 September 1952, Troy, New York, USA
CITIZENSHIP: USA

Email：jogren@cmdl.noaa.gov

EDUCATIONAL HISTORY:

1975 BS Harvey Mudd College Engineering
1975 ME Harvey Mudd College Engineering
(Thesis: The contribution of the stratosphere to ozone levels in the Los Angeles basin)
1983 PhD University of Washington Civil Engineering
(Dissertation: Elemental carbon in the atmosphere)

AWARDS AND HONORS:

1974-1975 Henry T. Mudd Fellowship
1975 Graduation with distinction and departmental honors
1977-1980 National Science Foundation Graduate Fellowship
1981 Valle Scandinavian Exchange Program Scholarship

RELATED WORK EXPERIENCE:

1975-1977 Research Engineer, Meteorology Research, Inc., Altadena, California
1978-1982 Research Assistant, Civil Engineering, University of Washington, Seattle, Washington
1983-1985 Research Associate, Department of Meteorology, University of Stockholm, Sweden
1985-1989 Research Assistant Professor (oavl? docent), Department of Meteorology, University of Stockholm, Sweden
1989-1991 Associate Professor (h?olelektor), Department of Meteorology, University of Stockholm, Sweden
1991- Physical Scientist, National Oceanic and Atmospheric Administration, Climate Monitoring and Diagnostics Laboratory, Boulder, Colorado
1994- Affiliate Faculty, Department of Atmospheric Sciences, Colorado State University, Ft. Collins, Colorado

MEMBERSHIPS:

American Geophysical Union.
American Association for Aerosol Research.

Teruyuki Nakajima, Prof.

Director, Center for Earth System Dynamics
Atmosphere and Ocean Research Institute, The University of Tokyo
5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8568, Japan
Tel: +81-(0)4-7136-4398, 6325; Fax: +81-(0)4-7136-4375
E-MAIL ADDRESS: teruyuki.nakajima@aori.u-tokyo.ac.jp

EDUCATIONAL RECORD:

1973	B.S.	Tohoku University, Sendai, Japan; in Physics
1975	M.S.	Tohoku University, Sendai, Japan; in Geophysics
1981	Sci.D.	Tohoku University, Sendai, Japan; in Geophysics

PROFESSIONAL RECORD (INCLUDING POSITIONS HELD):

1977-1980	Teaching assistant, Geophysical Institute, Tohoku University
1981-1990	Assis. prof., Upper Atmosphere and Space Research Laboratory, Tohoku U.
1987-1990	Senior visiting associate, NRC and USRA at NASA/Goddard Space Flight Center
1990-1991	Assoc. prof., Center for Atmospheric and Oceanic Variation, Tohoku U.
1991-1994	Assoc. prof., Center for Climate System Research, U. Tokyo
1994-2010	Professor, Center for Climate System Research
2004-2010	Director, Center for Climate System Research
2010-	Professor, Director, Center for Earth System Dynamics, Atmosphere and Ocean Research Institute

MEMBERSHIP OF SCIENTIFIC COMMITTEES AND SOCIETIES:

Japan Meteorological Society, executive member
Japan Remote Sensing Society, member
American Meteorological Society, member
American Geophysical Union, member
Science Council of Japan, member (2008-)
Journal of Korean Meteorological Society, Editor (2007-)
Atmospheric and Oceanic Science Letters, China, Editor (2008-)
WCRP Radiation Panel, member (1991-1999)
IGAC DARF focus, convener (1995-1998)
IAMAS International Radiation Commission (IRC), member (1993-); president (2000-2008)
Science Council of Japan, Associate member (2006-2008); member (2008-)

IPCC lead authors for TAR (2001), Special Report for Aviation and the global atmosphere (1999) and AR5 (2010); Review editor for AR4 (2007)

WCRP JSC member (2009-)

AWARDS:

1987-1989: Senior Scientist of National Research Council at NASA/Goddard Space Flight Center

1995 : Japan Meteorological Society Award

2000 : Nissan Science Award

2009 : A milestone paper in the 50 year history of J. Quantitative Radiat. Spectrosc., Elsevier Press

EXPERTISE/SCIENTIFIC FIELD:

Atmospheric radiative transfer theory of the earth-atmosphere system: Development of the world's first matrix method for the coupled atmosphere-ocean system [Tanaka and Nakajima 1977; Nakajima and Tanaka, 1983], a new truncation method for accelerating the radiance calculation [Nakajima and Tanaka 1988]. This fast algorithm is also used in the NASA/DISORT package and also in the AERONET operational system. A general purpose radiative transfer code *Rstar* is used by many users in the world.

Remote sensing of aerosols and clouds from satellite and ground-based instruments: Development of the world's first two channel algorithm for global retrieval of the aerosol optical thickness and Ångström exponent from AVHRR (Nakajima and Higurashi 1998), and also aerosol indirect radiative forcing evaluation from AVHRR-retrieved aerosol and cloud parameters (Nakajima and King, 1990; Nakajima et al. 2001). Development of sun-sky photometry for retrieving aerosol microphysical parameters; One of NASA/AERONET founders (Nakajima et al., 1996; Holben et al., 1998), ADEOS-II/GLI satellite sensor team PI, an active contributor to IGAC/ACE-Asia, JST/APEX, and UNEP/ABC regional experiments (Nakajima et al., 2007).

Climate modeling of aerosol and cloud microphysical processes in GCMs and meso-scale models: MSTRN radiation code and SPRITNARS aerosol model have been built by his group and used intensively in several models. The results for the radiative forcing evaluation of aerosol direct and indirect effects are referred by IPCC-TAR and AR4 (Nakajima and Higurashi 1997; Takemura et al. 2005).

第七届气候系统与气候变化国际讲习班（ISCS）

学员名单

No	姓 名	职称/职务	单 位	E-mail
1	李 琰	硕士研究生	北京大学城市与环境学院	sh-zhao@urban.pku.edu.cn
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