

Topical Group on the Physics of Climate

March 2013 Newsletter

Contents:

1. Welcome from the Chair: History, Objectives and Events
2. APS Climate Physics / GPC Timeline & Context
3. Some Climate-Related Links of Interest
4. GPC Executive Committee: *Officers, Biographies, Statements*
5. Other Appointed GPC Committees: *Nominating Committee, Program Committee, Communications Committee, Ad Hoc Science Liaisons Committee*
6. 2013 APS March Meeting Sessions
 - A. GPC Invited Session: *Climate as a Complex Dynamical System*
 - B. GPC Focus Session: *The Physics of Climate*
 - C. Focus Session (shared with DFD): *Climate Physics / Instabilities and Turbulence*
 - D. Kavli Foundation Special Session: *Forefront Physics for Real World Problems: Energy, Climate, and the Environment*

Message from the Editor: This is the very first GPC Newsletter, and given that the Communications Committee is rather new at this, its formatting is not as professional as that of other APS entities. Rest assured that this will improve over time.

1. Welcome from the Chair: History, Objectives and Events

Welcome to the Topical Group on the Physics of Climate (GPC)!

This is the first Newsletter of the new GPC, to inform the GPC membership and encourage participation in GPC activities now, and into the future. We hope that this newsletter and the inaugural GPC events at the upcoming APS March Meeting of the APS in Baltimore March 18-22 will both create interest within the GPC membership and encourage new members to help evolve the topical group into the future. Please refer to the GPC website for details such as bylaws, governance, etc: <http://www.aps.org/units/gpc/index.cfm>.

A topical group is a mini APS division; it organizes sessions at the APS March and/or April meetings and puts out a newsletter for its members. It has a governance structure similar to that of a typical APS unit and its officers are elected by the topical group membership. The GPC was formed, in part, in response to a long period of debate that took place within the APS membership about a year after the APS adopted a "Statement on Climate Change" in late 2007 and a "Commentary" in April 2010 (http://www.aps.org/policy/statements/07_1.cfm). The formation of the GPC in 2012 occurred after a lengthy process that began with formal signed petitions to the APS in 2011 to form a topical group that focuses strictly on the physics, prediction and measurement of the dynamical processes that contribute to climate, independent of economic, political or societal issues surrounding the public debate.

The formation process began with the establishment of an Organization Committee in September 2010 which, after several meetings and months of work, generated the GPC philosophy, aims, and committee structure subsequently summarized in the GPC Bylaws (see website). It was a year before the Bylaws were in place, the initial GPC membership was established, and the Organization Committee transformed itself into the first GPC Nominating Committee in September 2011. After another long series of meetings and extended discussions, the first slate of candidates was presented to the new GPC membership in March 2012, and after a runoff election, the inaugural Executive Committee of the GPC was completed in June of 2012, consisting of the chair, chair-elect, vice chair, secretary/treasurer, newsletter editor and 6 members-at-large.

To quote from the bylaws: "The GPC is governed by its Executive Committee, which shall have general charge of the affairs of the Topical Group, including changes to the areas of scientific inquiry of the GPC. The voting members of the Executive Committee shall consist of the Officers of the GPC: Chair (1 year term), Chair-Elect (1 year term), Vice-Chair (1 year term), Secretary Treasurer (3 year term), the most recent Past Chair, the most recent past Secretary-Treasurer for one year, six Members-at-Large elected to three-year staggered terms (two positions expiring in each year). The Newsletter Editor (3 year term), who also serves as the Chair of the Communications Committee, shall be a nonvoting member of the Executive Committee."

With the exception of two members-at-large, the inaugural Executive Committee leads the GPC through 2013. The APS was kind enough to invite all new Executive Committee members to an inaugural meeting at the American Center for Physics, College Park, MD. This meeting took place on August 13, 2012. Formation of the other GPC committees was completed on September 7, 2012. As specified in the Bylaws, these are the Program Committee, the Communications Committee, and the Nominations Committee. (The Fellowship Committee is delayed to 2014.) Please see below for a listing and photos of all members of the GPC Committees.

Once formed, two committees immediately initiated action. The Nominating Committee, led by Brad Marston, developed nominations and carried out elections to replace two members-at-large for 2013. Judy Curry and Dan Rothman were elected to replace Pierre Meystre and Bob Austin. The Program Committee began its work when the Committee on the Status of Women in Physics (CSWP) kindly donated their Invited Session at the 2013 March Meeting to the Topical Group on the Physics of Climate and the GPC leadership made the decision to develop an Invited Session and a Focus Session at the meeting as its inaugural events. A great deal of discussion within the Program and Executive Committees led to the development of two excellent sessions as described below. In addition, the chair of GPC was invited to join the organization committee for the Kavli Plenary session, and two speakers were invited to speak on the physics of climate.

It should also be mentioned that the process of choosing invited speakers for the GPC March meeting sessions was not without argument. The aim by both the Nominating Committee, charged with driving the effort, and the Executive Committee, who worked with the Program Committee in both developing and discussing potential speakers, was to strive for excellence in scientific research, a theme continuously emphasized. Unfortunately, disagreements arose that led Roger Cohen to resign. Roger was one of our members-at-large and a major contributor to the organizational process from the beginning. It was with great regret that he left the GPC Executive Committee and it is our hope that evolution of the GPC will realize the goals that we all had in its creation: a strong emphasis on quality scientific research outside the public debate. We feel that we have made a good start in that direction with these inaugural events. Bob Austin kindly agreed to remain a member-at-large for an additional year to fill the vacancy left by Roger's departure.

The exciting GPC-sponsored March Meeting events may be summarized as follows: an **Invited Session** on Wednesday morning (11:15 am, N4), a **Focus Session** on Thursday morning (11:15 am, U15), and a **Shared Session** early Thursday morning (8:00, T16). The GPC has also contributed to the Kavli Plenary Session on Wednesday Afternoon (2:30 pm, R0). In addition, the **GPC Business Meeting** will be held Tuesday 5:45 – 6:45 pm in room 301 of the Convention Center. At this meeting the Executive Committee will review GPC history and committee activities, and will solicit ideas and interest from the membership. The first period of the GPC Focus Session on Thursday will also begin with a review of GPC history followed by interactive discussion. *All members are encouraged to attend the GPC sessions and business meeting and participate in the discussions.* Only through scholarly interaction with its membership will the GPC evolve into an active scientific organization that contributes at the highest levels of scientific quality and integrity to our understanding of the complex highly nonlinear highly multiscale system we call "climate".

I end my welcome discussion with another quote from the GPC bylaws that summarize what the Topical Group on the Physics of Climate is about: "The objective of the GPC shall be to promote the advancement and diffusion of knowledge concerning the physics, measurement, and modeling of climate processes, within the domain of natural science and outside the domains of societal impact and policy, legislation and broader societal issues. The objective includes the integration of scientific knowledge and analysis methods across disciplines to address the dynamical complexities and uncertainties of climate physics. Broad areas of initial scientific inquiry are described [below]. These are expected to evolve with scientific progress, while remaining entirely within the domain of natural science. The GPC Executive Committee, Program Committee, and Communications Committee shall assist in maintaining the scientific

focus of the Topical Group by conducting an ongoing and open dialog with Topical Group members concerning the scope and boundaries of scientific interest.”

We look forward to seeing you all at the Inaugural Events of the Topical Group on the Physics of Climate at the 2013 APS March Meeting. Please also join the GPC leadership at the GPC Business Meeting on Tuesday 5:45 – 6:45 pm in room 301 of the Convention Center.

Initial Areas of Scientific Inquiry: The five initial broad areas of scientific inquiry listed below from the bylaws were the basis for the inaugural events organized by the GPC Program Committee for the APS March Meeting. These are based on the current perceived needs of climate science and are likely to change as that science progresses.

1. Climate as a complex dynamical system, leading to a better understanding of the natural modes of the climate system, their coupling to each other and to exogenous forces.
2. The physics of climate influences, leading to a better understanding of the mechanisms, magnitudes, and timescales by which anthropogenic and non-anthropogenic processes affect climate, including for example, greenhouse gases, solar variability and unforced influences such as internal modes of variability.
3. Insight into the nature, magnitude and timescales of climate sensitivity, arising from feedbacks including clouds, water vapor and the hydrological and carbon cycles, at the surface, in the atmosphere, and in the oceans.
4. The physics of proxies used to infer the properties of past climates for which instrumental records are not available, leading to a better understanding of past climates and their relation to the present climate.
5. The computational physics and statistical analysis of climate model and measurement systems, leading to a better understanding of the methods, capabilities, and limitations of climate models and climate simulation predictions.

Specific science areas underlying these issues include fluid dynamics, modeling of nonlinear systems, the physics of complex systems, gas phase physics and chemistry, radiation/heat transfer, phase transitions, measurement science, computational physics, statistics, and biological physics.

2. APS Climate Physics/GPC Timeline & Context

1. IPCC Third Assessment Report (2001) http://www.grida.no/publications/other/ipcc_tar/
[First report (1990), second report (1995)]
2. AGU position statement on human impacts on climate (December 2003, reaffirmed December 2007) http://www.agu.org/sci_pol/positions/climate_change2008.shtml
3. Adoption of APS Statement on Climate change (following AAAS request for APS to sign on to a statement with other organizations): Council Meeting, Adams Mark Hotel, Denver, Colorado, November 18, 2007 http://www.aps.org/policy/statements/07_1.cfm
4. IPCC and Al Gore Jr. win the Nobel peace prize (Fall 2007)
http://www.nobelprize.org/nobel_prizes/peace/laureates/2007/
5. IPCC Fourth Assessment Report (2007)
http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html
6. A motion is introduced by Councilor Robert Austin to replace the 2007 climate change statement (APS council meeting, May 1, 2009).
7. Open letter urging revision of the 2007 APS statement (Nature, July 23, 2009)
<http://www.nature.com/nature/journal/v460/n7254/full/460457b.html>;
http://www.tech-know-group.com/archives/APS_Open%20Letter_07_29_09.pdf
8. “Climategate”: E-mail server at Climatic Research Unit (CRU) at the University of East Anglia is hacked (November 2009)
http://en.wikipedia.org/wiki/Climatic_Research_Unit_email_controversy
9. Addendum to APS statement (APS Council, April 18, 2010), following recommendations of *ad hoc* committee formed by APS President Dr. Cherry Murray (Robert K. Adair, David M. Ceperley, Alexander L. Fetter, Daniel Kleppner (chair), Helen R. Quinn, Ellen D. Williams). <http://www.aps.org/publications/apsnews/200910/climate.cfm>;
<http://www.aps.org/publications/apsnews/201005/council.cfm>
10. Petition, organized by Robert Levine, Roger Cohen, and others, submitted to APS for establishment of a climate physics Topical Group (August 4, 2010).
11. Parallel request for such a Topic Group by APS President Curtis Callan, differing in some details on mission (August, 2010).
<http://www.aps.org/publications/apsnews/201010/climatechange.cfm>
12. Appointment of GPC Organization committee by APS President Curtis Callan: The committee, formed September 2010, consisted of J. Bradley Marston, Jerry Friedman (Chair), James Brasseur, Judith Lean, Pierre Mystre, Robert Austin, Roger Cohen, and Warren Warren.
13. Response of APS to resignation of Harold Lewis (of *Technological Risk* fame) from APS, and to his accompanying letter to APS President Callan (October 2010).
<http://www.aps.org/about/pressreleases/haroldlewis.cfm>
14. Formation of GPC Nomination Committee (September 2011), consisting of Bradley Marston, Roger Cohen, Warren Warren, James Brasseur, Judith Lean, Pierre Meystre, Robert Austin.
15. Completion of nomination process/candidate lists (June 2012).
16. GPC Elections (July 2012).
17. Committees for GPC fully formed September 7, 2012. <http://www.aps.org/units/gpc/>
18. First meeting of executive committee (APS HQ, College Park, MD, Aug. 13, 2012).

19. First GPC-sponsored and cosponsored events: four 2013 March meeting sessions. (a) invited session, (b) focus session ('physics of climate'), (c) regular session ('climate physics', shared with DFD 'instabilities & turbulence'), (d) two talks at Kavli plenary session.
20. IPCC Fifth Assessment Report (2013).

3. Some climate-related links of interest

Princeton Symposium Video Series: *How Climate Works*

<http://www.princeton.edu/pei/news/archive/?id=8982>

Upcoming KITP Program, March 24--June 20, 2014: *Wave-Flow Interaction in Geophysics, Climate, Astrophysics, and Plasmas*

<http://www.kitp.ucsb.edu/activities/dbdetails?acro=waveflows14>

Community Earth System Model (CESM)

<http://www.cesm.ucar.edu>

CESM Annual Workshop, June 17 – 20, 2013 in Breckenridge, CO

<http://www.cesm.ucar.edu/events/ws.2013/>

American Meteorological Society (AMS)

<http://www.ametsoc.org/>

AMS Conference on Atmospheric and Oceanic Fluid Dynamics, June 17–21, 2013, Newport, Rhode Island

<http://www.ametsoc.org/MEET/fainst/201319fluid.html>

Climate Dialogue

<http://www.climatedialogue.org>

RealClimate

<http://www.realclimate.org/>

Geophysical Fluid Dynamics Laboratory: *Isaac Held's blog*

<https://www.gfdl.noaa.gov/blog/isaac-held/>

International Space Sciences Institute: *Zonal Jets and Eddies: Planetary Science and Satellite Oceanography at the Crossroads*

<http://www.issibern.ch/teams/zonaljets/index.html>

Judith Curry's blog site: *Climate, etc.*

<http://judithcurry.com/>

The 5th IPCC Assessment Report will be finalized in 2013-2014. The Working Group 1 Report, "The Physical Science Basis" (WG1 AR5) recently completed a second order draft review and the final version is due to be released in September 2013. This assessment will provide the most up-to-date summary of the present understanding of climate physics and climate change.

<https://www.ipcc-wg1.unibe.ch/AR5/AR5.html>

A new assessment of the role of black carbon aerosols in radiative forcing was recently completed, which showed that the impacts of black carbon are likely to be much greater than previously thought. With a total estimated forcing of 1.1 W/m^2 , this would put black carbon

second only to carbon dioxide in terms of human-induced radiative forcing. The link to the Journal of Geophysical Research paper:

<http://onlinelibrary.wiley.com/doi/10.1002/jgrd.50171/abstract>

NY Times article discussing the above publication:




<http://www.nytimes.com/2013/01/16/science/earth/burning-fuel-particles-do-more-damage-to-climate-than-thought-study-says.html>

The draft report of the third U.S. National Climate Assessment is now available online and public comments are invited until April 12. This effort is organized by the U.S. Global Change Research Program and supported by NOAA. The National Climate Assessment collects, integrates, and assesses observations and research specific to climate issues for the U.S.

<http://ncadac.globalchange.gov>

4. Executive Committee (summer 2012 elections)

Executive Committee Officers:

	<p>Chair (through 2013): James G. Brasseur (Jim) Department of Mechanical Engineering Pennsylvania State University 205 Reber Bldg University Park, PA 16802 (814) 865-3159 brasseur@psu.edu</p>		<p>Chair-Elect (through 2013): Robert P. Behringer (Bob) Physics Department Box 90305 Duke University Durham, NC 27708 (919) 660-2550 bob@phy.duke.edu</p>
	<p>Vice Chair (through 2013): John S. Wettlaufer Applied Mathematics, Geology, Geophysics and Physics Yale University 210 Whitney Avenue PO Box 208109 New Haven, CT 06520-8109 (203) 432-0892 john.wettlaufer@yale.edu</p>		<p>Secretary/Treasurer (through 2015): Kenneth R. Minschwaner (Ken) Department of Physics New Mexico Tech 801 Leroy Pl Socorro, NM 87801 (575) 835-5226 krm@kestrel.nmt.edu</p>

Officer biographical sketch and vision statements for GPC:

James Brasseur is Professor of Mechanical Engineering, Bioengineering and Mathematics at the Pennsylvania State University. He did his graduate research at Stanford University in Aeronautical and Astronautical Sciences with a minor in Physics, followed by postdoctoral research at NASA-Ames Research Center (computational fluid dynamics), the University of Southampton England (aerodynamics) and The Johns Hopkins University (turbulence physics). He has developed two research tracts, both integrating high-performance computing (HPC) with experimental data analysis and theory. His first tract surrounds turbulence and turbulent flow. He has used direct and large eddy simulation and theory to study turbulence physics, and turbulence dynamics in the lower troposphere. Jim leads a team developing a “Cyber Wind Facility” for HPC “experiments” on wind turbines in the atmospheric boundary layer and is currently ASP Faculty Fellow at NCAR in the Atmospheric Chemistry Division studying the role of atmospheric turbulence in lower tropospheric chemistry and ozone production. His second research area integrates mechanics and physiology to study gastrointestinal (dys)function and drug delivery, with focus on mechanical responses to neurological controls of muscle motion at disparate scales. Jim was a member of the organization committee for the GPC and was instrumental in the development of its bylaws.

GPC Vision Statement: Much of the public debate that has surrounded the question of potential human influence on climate has unfortunately derived from political, economic or societal concerns rather than on scientific analysis of objectively collected data using the laws of physics. Objective debate among scientists about methodology, data, analysis, results, and validity, precision and strength of scientific conclusions has often been usurped by attempts to sway public opinion by filtering the scientific literature to support pre-determined points of view. The aim of the GPC is to focus attention on objective *scientific* analysis. At the same time, there is a gulf between objective science and subjective human interpretations of science, even within scientific debate where points of view can cloud objective analysis. However, through a system of anonymous peer review and open critical discussion, science moves towards consensus on some points while allowing other conclusions to fade from lack of consistent support. Maintaining this scientific approach within a charged debate that draws from emotion and demands simple answers from a complex dynamical system will be the challenge. As GPC Chair I will, as much as humanly possible, uphold the philosophical focus of the GPC towards quality scientific debate and away from opinionated argument. In this inaugural year, it will be important to place the GPC on sound footing to maintain its science-based focus well into the future.

Robert Behringer received B.S. and Ph.D. degrees in Physics from Duke University, in 1970 and 1975. He continued his education as a post-doc at Bell Laboratories, working with Guenter Ahlers on some of the earliest studies of chaos in dynamical systems, such as Rayleigh-Bénard convection. He began his academic career at Wesleyan University in Middletown Connecticut, and returned to Duke University as a faculty member in 1982. He has served as chair the Physics Department there, and is currently James B. Duke Professor of Physics. He is Director of Duke University's Center for Nonlinear and Complex Systems. His research has spanned a broad range of condensed matter and statistical physics topics, including critical phenomena, quantum fluids, nonlinear dynamics and chaos, classical fluids, including convection and other pattern-forming systems. Starting in the late 1980's he helped pioneer granular physics, which has now become a significant part of the soft condensed matter physics community.

GPC Vision Statement: The APS Topical Group on the Physics of Climate is a special opportunity for the physics community, as well as others, to better understand the nature of climate and the role played by humans. Earth's climate is a highly complex dynamical system, involving chemistry, radiation, the flow of fluids, and other processes, all coupled in a highly nonlinear fashion. These topics are of interest to members of the physics community, where there is already an established history of work on fluids, chemical physics, and nonlinear, statistical and complex systems. This community specializes in constructing and testing models that can be analyzed to yield new predictive insights. GPC can foster better understanding of the basic physics involved through symposia, meetings, and outreach. The APS should strive for unbiased presentation of the best physics of climate to its own members, but also try to play a role in educating both the physics community at large, and the general public. GPC should become a forum for open discussion of climate related issues, and should also seek ways to provide learning opportunities for students and the public in the basic physics needed to understand climate issues.

John Wettlaufer obtained degrees in Physics and Mathematics from the University of Puget Sound and his PhD from the University of Washington in Seattle. He was jointly appointed at the University of Washington's Applied Physics Laboratory and the Physics Department where he remains an Affiliate Professor. In 2002 he joined Yale University and is presently the A.M. Bateman Professor of Applied Mathematics, Geophysics and Physics. Often motivated by astrophysical, biophysical, geophysical and mathematical problems, his research draws together and develops new approaches in condensed matter physics and applied mathematics. His interests span length scales from atoms to kilometers, with implications on much larger scales. Some recent foci include the microscopic kinetics in crystal growth and melting, pattern formation and the stability of phase boundaries; static, dynamic and size effects in melting and wetting; density functional theory; supersolidity; ice biophysical interactions; freezing and drying of saturated granular materials; geometric and topological evolution equations for multiphase materials; thin film hydrodynamics; sea ice thermodynamics, and climate dynamics. Since having had the opportunity to spend half a year on Arctic sea ice, he has been interested in the physics of the natural environment.

GPC Vision Statement: Although the APS membership has branched actively into rich, complex fields such as the biological sciences, we have yet to fully embrace the challenging treasure trove of physical climatology. While the origin of biology is distinct from physics, such is not the case in physical climatology, launched by the likes of Fourier, Tyndall and Arrhenius and underlain by the Stefan-Boltzmann and Wien Displacement Laws. Nonetheless, over time, the desire to test ideas and principles in the natural record has led to an approach rooted in observations. Whilst our community is certainly intimate with the interplay between observation and theory in astronomy and astrophysics a similar interplay in climate, between geology and geophysics, is ripe for our renewed efforts. No scientist today would deny that the Earth's climate system is a complex nonlinear dynamical system, riddled with feedbacks. Despite understanding many of the physical principles of its internal components and external forcings we lack predictive acuity. The difficulty originates in the confluence of the nature of the system itself, our ability to mathematically and computationally describe it, and the construction of tests and data sets to vet predictions over the myriad of relevant time and length scales. Developing an active and engaged community of physicists studying climate is both a compelling goal and a natural endeavor; our membership has the foundation for collaboration and success. We are ideally poised to build bridges with experts in the areas of theoretical and observational geophysics and applied and computational mathematics to bring new approaches, methods and conceptual modalities to bear on planetary climate dynamics. These are complex scientific problems of broad interest and the APS membership needs a modern and serious basis for its scientific stances. The GPC, like all such groups, could be well guided by Richard Feynman's definition "Science is a way of trying not to fool yourself. The first principle is that you must not fool yourself, and you are the easiest person to fool."

Kenneth Minschwaner is professor of physics at the New Mexico Institute of Mining and Technology. He received his B.S. and M.S. degrees in Physics from Florida Atlantic University and his Ph.D. in Earth and Planetary Physics from Harvard University. He completed his postdoctoral work as a Fellow in the Advanced Study Program at the National Center for

Atmospheric Research and has been a faculty member at New Mexico Tech since 1994. At Tech, he has taught undergraduate and graduate courses on the physics of weather and climate, atmospheric remote sensing, chemical spectroscopy, and the physics of the upper atmosphere. His research interests involve observational work, modeling, and data analysis on the physics and chemistry of the atmosphere. His publication record includes papers on the infrared radiative forcing of greenhouse gases, the water feedback and climate, ground and balloon-borne measurements of reactive gases and solar radiation, photo dissociation of atmospheric molecules, the chemistry of stratospheric ozone, and analysis of satellite observations of the mesosphere/thermosphere region. He has contributed to climate-related initiatives such as the Intergovernmental Panel on Climate Change (IPCC), the World Meteorological Society (WMO) Ozone Assessment, and the Stratospheric Processes And their Role in Climate (SPARC) project.

GPC Vision Statement: The APS membership is well positioned to make important contributions to improve our understanding of climate, and to share this knowledge with the broader scientific community. Earth's climate is determined by complex interactions between solar and terrestrial radiation, fluid circulations in the atmosphere and ocean, chemical processes that govern atmospheric composition, and thermodynamic processes involving water in all phases. Along with this complexity, climate studies must consider the coupling of processes on local to global scales, and on timescales of minutes to centuries. The most effective progress towards addressing the complexities and uncertainties of climate physics requires fostering interdisciplinary studies, where communication and collaborative efforts will be critical. For example, emerging research has established links between the state of the upper atmosphere, including space weather, and the climate state of the lower atmosphere. GPC must therefore promote ties to the many other organizations and efforts focused on the physics and chemistry of the atmosphere, oceans, and terrestrial biosphere.

Executive Committee Members-at-Large and Newsletter Editor: Robert Austin, Judith Curry, Judith Lean, Bradley Marston, Warren Warren, Dan Rothman, Peter Weichman (Newsletter Editor).



5. Other GPC Committees (Appointed)

Nominating Committee: Bradley Marston (Chair), Margaret Murnane, Raymond Pierrehumbert, Raymond Shaw, Robert de Zafra.



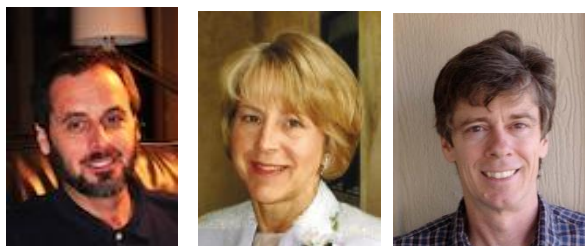
The role of the Nominating Committee is to prepare a slate of candidates for the open elected positions each year. The Nominating Committee shall also respond with appropriate names to the Society's call for nomination for senior Society positions.

Program Committee: Robert Behringer (Chair), Robert Ecke, Andrew Kaldor, Daniel Rothman



The role of the Program Committee is to work with the Executive Officers in scheduling contributed papers within areas of interest to the GPC and in arranging symposia and sessions of invited papers sponsored by the GPC at Society meetings. From time to time the Program Committee may also organize special GPC meetings and workshops, some with and some without the participation of other organizations.

Communications Committee: Peter Weichman (Chair), Barbara Levi, Michael Ritzwoller



The role of the Communications Committee is to have oversight of the Newsletter and any other publications that may be established by the GPC. The Communications Committee shall also be responsible for keeping the physics community and other interested communities informed about climate physics issues, activities, and accomplishments through the Newsletter, GPC website and email messages.

Ad-hoc Science Liaisons Committee (SLC): Warren Warren (Chair), Judith Lean, Bradley Marston



The role of the SLC is to advise the various other GPC Committees with regard to potential useful relationships between the GPC and scientific organizations outside the APS. Specific objectives of the SLC include:

- (a) Initiate contact and serve as liaison between the GPC and external scientific organization with related interests to enhance the objectives of the GPC.*
- (b) Identify high-quality research on climate physics traditionally presented in other societies and provide this information to the GPC Program Committee.*
- (c) Develop concepts that enhance the objectives of the GPC through activities with external scientific organizations for consideration by the GPC Executive Committee.*

7. 2013 APS March Meeting Sessions

A. GPC Invited Session

Climate as a Complex Dynamical System

(Session N4, 11:15 am – 2:15 pm, Wednesday, March 20)

This invited session marks the inauguration of the Topical Group on the Physics of Climate (GPC) at the APS March Meeting. The GPC promotes fundamental scientific studies of climate physics outside societal debate. Our inaugural invited session treats climate as a complex dynamical system, emphasizing the physical processes associated with the Earth's climate as being inherently nonlinear, complex, and stochastic in space and time. As a complex coupled system, Earth's climate involves nonlinear processes in fluid dynamics, radiation/thermodynamics/heat transfer, chemistry, phase transitions, and biological and human dynamics. These processes require interdisciplinary approaches to analysis that integrate measurement science, computational physics, statistics, biophysics, chemical physics and geophysics, among other fields. The inaugural GPC invited session highlights interdisciplinary and international interactions surrounding these complex topics. The goals of this session are to provide the latest scientific information and to inform the broader APS community about important issues, knowledge, and uncertainties in the science surrounding climate.

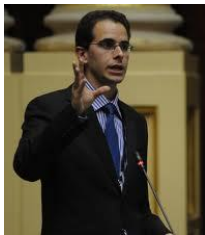
Speakers:



DR. CLAIRE L. PARKINSON

Aqua Project Scientist, Goddard Space Flight Center
National Aeronautics and Space Administration

Presentation title: [“Changes in Polar Sea Ice and How They Illustrate the Complex Picture of Global Climate Change”](#)



NIR J. SHAVIV

Professor, Racah Institute of Physics
The Hebrew University of Jerusalem

Presentation title: [“The Solar Climate Link: How Large? How Come? How Important?”](#)



SASHA MADRONICH

Senior Scientist, Atmospheric Chemistry Division
National Center for Atmospheric Research

Presentation title: [“The Atmospheric Chemistry of Climate”](#)



PETER HUYBERS

Department of Earth and Planetary Sciences, Harvard University

Presentation title: [“Testing climate models using instrumental and geologic observations”](#)



WILLIAM (BILL) COLLINS
Senior Scientist and Department Head Professor in Residence
Professor, University of California, Berkeley
Presentation title: [“Climate modeling from first principles: Feasibility and prospects”](#)

B. GPC Focus Session
[The Physics of Climate](#)

(Session U15, 11:15 am – 2:15 pm, Thursday, March 21)

Invited Speaker:



GEOFFREY (GEOFF) VALLIS
Professor, Atmospheric and Oceanic Sciences, Princeton University
Presentation title: [“The Ocean's Role in Global Warming”](#)

Contributed talks:

James Brasseur, Robert Behringer	The New APS Topical Group on the Physics of Climate: History, Objectives and Panel Discussion
Brad Marston	Direct Statistical Simulation of Climate
Kenneth Minschwaner, Lars Hoffmann, Alex Brown, Martin Riese, Rolf Müller, Peter Bernath	Atmospheric Lifetimes and Radiative Forcing of CFC-11 and CFC-12
Brian Tinsley	A cloud microphysical mechanism linking solar activity, atmospheric electricity, and climate
John Wettlaufer, Woosok Moon, Sahil Agarwal	Theory of Arctic Sea Ice Loss: Trends, Noise and Bifurcations
D.A. Kurtze, D. S. Comeau, K. Gimre, J.M. Restrepo	Coupling of ocean circulation and sea ice
Constantin Andronache	Sea surface temperature and short term climate predictability
Joseph Trout	Comparing the Standard Deviation from the Average Seasonal Surface Temperature Signal for Fourteen Years of Hourly Surface Temperature Data as Recorded at Twenty-Five

	Stations across the United States of America
Jasper Kok	Dust shatters like glass: Implications for the climate forcing of mineral dust aerosols
Susan Nossal, Edwin Mierkiewicz, Fred Roesler, L. Qian, S. Solomon, Alan Burns	Investigation of Solar Cyclic and Climatic Trends in Upper Atmospheric Hydrogen Distributions
Sharon Sessions, Stipo Sentic, David Raymond	Using multiple equilibria in precipitation to understand self-aggregation of deep tropical convection in a warming climate

C. Regular Session (shared with DFD)
Climate Physics / Instabilities and Turbulence
(Session T16, 8:00 – 11:00 am, Thursday, March 21)

Contributed talks:

Sean Martin, Kevin Aptowicz, Yong-Le Pan, Richard Chang, Ronald Pinnick	Simultaneous measurement of sphericity and scattering phase functions from single atmospheric aerosol particles in Las Cruces, NM
Getachew Tedela , Sujeeta Singh, Marc Fiddler, Solomon Bililign	Measurement of aerosol optical properties by integrating cavity ring-down spectroscopy and nephelometry
Matthieu A. Andre, Philippe M. Bardet,	Non-Condensable Gas Absorption by Capillary Waves
Golan Bel, Yosef Ashkenazy	The relation between the statistics of open ocean currents and the temporal correlations of the wind-stress
Laure Zanna , Luca Mana	Stochastic Parameterization of Ocean Mesoscale Eddies
Hussein Aluie, Matthew Hecht, Geoffrey Vallis, Kirk Bryan, Mathew Maltrud, Robert Ecke, Beth Wingate	Nonlinear Scale Interactions and Energy Pathways in the Ocean
Matthew Scase, Richard Hill, Kyle Baldwin	Suppressing Rayleigh-Taylor Instability with rotation
Luca Biferale, Stefano Musacchio, Federico Toschi	Inverse Energy cascade in 3D Navier-Stokes eqs
Shima Parsa, Greg Voth	Rotation rate of tracer and long rods in turbulence
Quoc Nguyen, Chiranth Srinivasan , Dimitrios Papavassiliou	Flow induced particle separation in turbulent channel flow
Walter Goldburg, Rory Cerbus	Intermittency in 2D Turbulence
Ujjayan Paul, Roddam Narasimha	From a Desingularized Vortex Sheet Model to a Turbulent Mixing Layer
Cheryl Klipp	Return to isotropy in high Reynolds number

	turbulent shear flow
Rory Cerbus, Walter Goldberg	Information Content of Turbulence
Simon Berkovich	A hypothesis on nanodust as a source of energy for extreme weather events and climate changes

D. Kavli Foundation Special Session
Forefront Physics for Real World Problems: Energy, Climate, and the Environment

(Session R0, 2:30 – 5:30 pm, Wednesday, March 20)



LONNIE G. THOMPSON
Distinguished University Professor in the School of Earth Sciences, Ohio State University
Presentation title: [“Earth's Climate History from Glaciers and Ice Cores”](#)



GRAEME L. STEPHENS
University Distinguished Professor, Department of Atmospheric Science, Colorado State University.
Presentation title: [“Physical Controls of the Earth's Climate and Climate change”](#)

Forum on International Physics (FIP) Symposium on the Science of Climate

We call attention as well to the Forum on International Physics (FIP) [Symposium on the Science of Climate](#) (Session B9, 11:15 am – 2:15 pm, Monday, March 18) with invited speakers Richard Lindzen (“Climate Concerns: Asking the Right Questions”), Joanna Haigh (“Solar Variability and Climate Change”), Bhupendra Nath Goswami (“On Winning the Race for Predicting the Indian Summer Monsoon”), L.M. Polvani (“Stratospheric ozone: a major (long neglected) anthropogenic forcing of the climate system”), and Francois Forget (“Climate of Mars and Other Planets”).