Understanding and Monitoring Abrupt Climate Change and its Impacts

Committee

James W. White

Chair

Dr. James White is a professor of Geological Sciences and of Environmental Studies at the University of Colorado at Boulder, where he is also a Fellow at the Institute of Arctic and Alpine Research (INSTAAR) and past director of the Environmental Studies Program. His research interests at the Light Stable Isotope Laboratory include global scale climate and environmental dynamics, carbon dioxide concentrations and climate from stable hydrogen isotopes, peats, and other organics, climate from deuterium excess and hydrogen isotopes in ice cores, isotopes in general circulation models, and modern carbon cycle dynamics via isotopes of carbon dioxide and methane. Dr. White has served on the Global Change Subcommittee, Planning Group 2, of SCAR from 1993 to 1996 and as a member of the U.S. Ice Core Working Group from 1989 to 1992, after which he was the Chair from 1992 to 1996. He has served on the Polar Research Board of the National Research Council since May 2005. He was a member of the US Global Change Research Program's Synthesis and Assessment Product 1.2, Past Climate Variability and Change in the Arctic and at High Latitudes, from 2008-2009. Dr. White received his doctorate in Geological Sciences in 1983 from Columbia University. He is nominated to the committee for his knowledge of ice-sheet geochemistry and in particular of the materials that may enter subglacial environments from the overlying ice.

Richard B. Alley

Member

Dr. Richard Alley (NAS) is the Evan Pugh Professor of the Department of Geosciences and EMS Environment Institute at Pennsylvania State University. Dr. Alley studies past climate change by analyzing ice cores from Greenland and Antarctica. He has helped demonstrate that exceptionally large climate changes have occurred in as little as a single year. His work on deformation of subglacial tills has helped lead to new insights to ice-sheet stability and the interpretation of glacial deposits, and his ongoing work on ice-flow modeling may help lead to predictions of future sea-level change. Related interests include metamorphic textures of ice, transformation of snow to ice, microwave remote sensing of ice, origins of ice stratification, controls on snowfall, monitoring of past storm tracks. Along with his many teaching accomplishments, Dr. Alley has authored many publications, chaired the National Academy of Sciences' 2002 panel on abrupt climate change, has been involved with advisory groups to improve national and international research, and has been active with media outreach translate research findings to a broad audience with appearances on television, radio and print outlets. Dr. Alley received his Ph.D. in Geology at the University of Wisconsin-Madison.

David Archer

Member

Dr. David Archer is a professor in the Department of Geophysical Sciences at the University of Chicago. He earned his Ph.D. in oceanography from the University of Washington in 1990. He has worked on a wide range of topics pertaining to the global carbon cycle and its relation to global climate, with special focus on ocean sedimentary processes such as $CaCO_3$ dissolution and methane hydrate formation, and their impact on the evolution of atmospheric CO_2. He previously served on the NRC Committee on “Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean.”

Anthony D. Barnosky

Member

Dr. Anthony D. Barnosky is a Professor in the Department of Integrative Biology at The University of California, Berkeley. His research interests include understanding how global change influences biodiversity, evolution, and extinction, particularly for mammals. He received his Ph.D. in Geological Sciences from the University of Washington in 1983.

Jonathan Foley

Member

Dr. Jonathan Foley is the director of the Institute on the Environment (IonE) at the University of Minnesota, where he is a professor and McKnight Presidential Chair in the Department of Ecology, Evolution and Behavior. Dr. Foley’s work focuses on the sustainability of our civilization and the global environment. He and his students have contributed to our understanding of global food security, global patterns of land use, the behavior of the planet’s climate, ecosystems and water cycle, and the sustainability of the biosphere. This work has led him to be a regular advisor to large corporations, NGOs and governments around the world.

Rong Fu

Member

Dr. Rong Fu is a professor in the Department of Geological Sciences of the Jackson School of Geosciences at The University of Texas at Austin. Dr. Fu's research aims at understanding the dynamic and physical processes of the atmosphere's hydrological and energy cycles and their links to the terrestrial ecosystem and ocean surface conditions in the tropics using a variety of observations, especially those from satellite remote sensing. She has served on national and international panels such as the review panels for NASA Carbon Cycle Science Program, Cloud and Aerosol Program, NOAA Cooperative Institute for Climate Science at Princeton University, NSF Drought in Coupled Models Project, and panels for the U.S. and International Climate Variability and Predictability projects. She has also served on NRC Committee on Challenges and Opportunities in Earth Surface Processes. She received her B.S. degree in geophysics from Peking University in 1984, and her Ph.D. in atmospheric sciences from Columbia University in 1991. She then worked as a post-doctoral research associate at the Department of Atmospheric Sciences in the University of California at Los Angeles, and as a visiting scientist fellow at the Geophysical Fluid Dynamic Laboratory at Princeton University. She was previously a faculty member in the School of Earth and Atmospheric Sciences at Georgia Institute of Technology and in the Department of Atmospheric Sciences at the University of Arizona.

Marika Holland

Member

Dr. Marika Holland is a an Ice Specialist in the Oceanography section of the Climate and Global Dynamics division at the National Center for Atmospheric Research (NCAR). She received her Ph.D. in 1997 from the Program in Atmosphere and Ocean Sciences at the University of Colorado in the area of sea ice modeling for climate applications. Her training continued with a postdoctoral fellowship at the University of Victoria in British Columbia studying the influence of sea ice variability and change on the global ocean circulation and climate. In 1999, Dr. Holland moved to the NCAR in Boulder, Colorado, as a Postdoctoral Fellow and joined the scientific staff in 2000. Her research interests include polar climate variability and future change, including the role of ice-ocean-atmosphere interactions and feedbacks. She has extensive experience using coupled climate models to study these issues and has been active in the development of improved sea ice models for climate simulations. She is currently serving as Chief Scientist for the Community Earth System Modeling Project.

Susan Lozier

Member

Dr. Susan Lozier is a physical oceanographer with interests in large-scale ocean circulation. Upon completion of her PhD at the University of Washington, she was a postdoctoral scholar at Woods Hole Oceanographic Institution. She has been a member of the Duke faculty since 1992, where she was named a distinguished professor in 2012. Professor Lozier was the recipient of an NSF Early Career Award in 1996, was awarded a Bass Chair for Excellence in Research and Teaching in 2000, received a Duke University Award for Excellence in Mentoring in 2007 and was named an AMS Fellow in 2008.

Johanna Schmitt

Member

Dr. Johanna Schmitt (NAS) is a professor in the Ecology and Evolutionary Biology Department at Brown University. Dr. Schmitt’s research focus is adaptive evolution of developmental, physiological, and life history traits in natural plant populations. Her lab uses quantitative genetics, QTL mapping, and association studies of candidate loci to examine the genetic basis of natural variation in ecologically important traits. By experimentally manipulating environments, phenotypes, and genotypes in the field, they measure natural selection on these traits and the loci underlying them. Another major research objective is to elucidate the genetic and ecological mechanisms of adaptation to seasonal and geographic variation in climate. Dr. Schmitt received her Ph.D. in Biological Sciences from Stanford University in 1981.

Laurence C. Smith

Member

Dr. Laurence C. Smith is Professor and Vice-Chair of Geography and Professor of Earth & Space Sciences at the University of California, Los Angeles. His research interests include topics of northern hydrology, climate change, carbon cycles and satellite remote sensing. In 2007 his work appeared prominently in the Fourth Assessment Report of the United Nations' Intergovernmental Panel on Climate Change (IPCC). In 2006-2007 he was named a Guggenheim Fellow by the John S. Guggenheim Foundation. Dr. Smith received his Ph.D. in Earth and Atmospheric Sciences in 1996 from Cornell University.

George Sugihara

Member

George Sugihara is a professor and department chair at SIO at the University of California, San Diego. He earned his Ph.D. in Mathematical Biology from Princeton. His diverse research interests include complexity theory, nonlinear dynamics, food web structure, species abundance patterns, conservation biology, biological control, empirical climate modeling, fisheries forecasting, and the design and implementation of derivative markets for fisheries. One of his most interdisciplinary contributions involves the work he developed with Robert May concerning methods for forecasting nonlinear and chaotic systems. This took him into the arena of investment banking, where he took a five-year leave from SIO to become Managing Director for Deutsche Bank. There he made a successful application of these theoretical methods to forecast erratic market behavior. Most of Dr. Sugihara's early work was motivated exclusively by pure science and the later work more by pragmatic utility and environmental concerns. Nearly all of it is based on extracting information from observational data (turning data into information). His initial work on fisheries as complex, chaotic systems led to work on financial networks and prediction of chaotic systems. Dr. Sugihara serves on the Board on Mathematical Sciences and their Applications here at the NRC and also served on the Planning Committee for a Workshop on Technical Capabilities Required for Regulation of Systemic Risk.

David Thompson

Member

Dr. David Thompson is a Professor in the Department of Atmospheric Science at Colorado State University. Dr. Thompson's research focuses on improving our understanding of global climate variability using observational data. His interests include large-scale atmospheric dynamics, the interpretation of observed climate change, stratosphere/troposphere coupling, ocean/atmosphere interaction, decadal climate variability, and the climate impacts of large-scale atmospheric phenomena. Dr. Thompson received his Ph.D. in Atmospheric Science in 2000 from the University of Washington.

Andrew J. Weaver

Member

Dr. Andrew Weaver is a Lansdowne Professor and Canada Research Chair at the University of Victoria, British Columbia. Dr. Weaver's research focuses upon understanding processes and feedbacks operating within the climate system on a range of timescales. In particular, he is interested in exploring the role of the oceans in past, present and future climate change using his locally developed Earth Model of Intermediate Complexity (the UVic ESCM). Dr. Weaver received his Ph.D. in 1987 from the University of British Columbia.

Steven C. Wofsy

Member

Dr. Steven C. Wofsy (NAS) was born in New York City in 1946 and is currently Abbott Lawrence Rotch Professor of Atmospheric and Environmental Chemistry at Harvard University, Division of Engineering and Applied Science and Department of Earth and Planetary Sciences. He studied chemical physics at University of Chicago (BS, 1966) and Harvard (PhD 1971), shifting to atmospheric chemistry in 1971. His work has focused on changes in the composition of the stratosphere and troposphere, at first in theory and modeling and later in field and laboratory studies. His current research emphasizes the effects of terrestrial ecosystems on the global carbon cycle, aircraft measurements of greenhouse gases in the atmosphere, the impacts of climate change and land use on ecosystems and atmospheric composition. Several projects focus on quantitative measurements of ecosystem carbon fluxes, for time scales spanning instantaneous to decadal and spatial scales from meters to thousands of kilometers, combining physical, chemical and biological methods. He is a member of the National Academy of Sciences. His awards include AGU's McIlwane prize and NASA's Distinguished Public Service Medal.