

Review of the Second State of the Carbon Cycle Special Report (SOCCR-2)

Committee

Inez Y. Fung

Chair

DR. INEZ Y. FUNG (NAS) is a professor of atmospheric sciences at the University of California, Berkeley. She studies the interactions between climate change and biogeochemical cycles, particularly the processes that maintain and alter the composition of the atmosphere. Her research emphasis is on the global carbon cycle and how CO₂ sources and sinks are changing. Dr. Fung is a recipient of the American Geophysical Union's Roger Revelle Medal, and appears in a NAS biography series for middle-school readers, *Women's Adventures in Science*. She is a fellow of the American Meteorological Society and the American Geophysical Union, as well as a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the American Philosophical Society, and Academia Sinica (Taiwan). She received her SB in applied mathematics and her ScD in meteorology from Massachusetts Institute of Technology. Dr. Fung has served on over a dozen National Academies committees, and is the co-lead author of the 2014 NAS-Royal Society publication "Climate Change, Evidence and Causes".

Peter G. Brewer

Member

DR. PETER G. BREWER is an ocean chemist, and senior scientist, at the Monterey Bay Aquarium Research Institute (MBARI). Prior to joining MBARI in 1991 he spent 24 years as a researcher at the Woods Hole Oceanographic Institution, rising to the rank of senior scientist. He served as program manager for Ocean Chemistry at the National Science Foundation (1981-1983), receiving the NSF Sustained Superior Performance Award. He has taken part in more than 40 deep-sea cruises and also has served as chief scientist on well over 100 ROV dives as well as major expeditions worldwide. He is a fellow, and the 2016 Maurice Ewing Medal awardee, of the American Geophysical Union, and of the American Association for the Advancement of Science. Internationally he has served as a lead author for the 2005 IPCC Special Report on CO₂ Capture and Storage, as a member of SCOR, and as vice-chair of JGOFS. He has served as a member of the Vice-President Gore's Environmental Task Force, and was a member of MEDEA. He served as president of the Ocean Sciences Section of AGU from 1994-1996. Dr. Brewer holds a "By Courtesy" appointment in the Stanford University Dept. of Geological and Environmental Science. In 2010 he received the Zheng Zhong Distinguished Visiting Fellowship from Xiamen University, and a UK Royal Academy of Engineering Distinguished Visiting Fellowship. He is appointed as an independent scientist to the BP Gulf of Mexico Research Institute (GoMRI) Board overseeing the research devoted to the impacts of the Deepwater Horizon oil release. In 2012 he received an Einstein Visiting Professorship from the Chinese Academy of Sciences, and was made an Honorary Professor at Northwestern Polytechnical University, Xi'an. He serves also on the Major Projects Review Board of the Hong Kong University Grants Committee. Dr. Brewer's research interests are broad, and include the ocean geochemistry of the greenhouse gases. He has devised novel techniques both for measurement and for extracting the oceanic signatures of global change. At MBARI his current interests include the geochemistry of gas hydrates, the biogeochemical impacts of the growing oceanic fossil fuel CO₂ signal and the multiple impacts of ocean acidification, and the development of in situ laser Raman spectrometry techniques for real-time measurement in the deep-sea. He served as co-Chair of the NSF Decadal Report Ocean Sciences at the New Millennium, on the US National Methane Hydrates Advisory Committee, and on the IPCC WG II Fifth Assessment Report. He is author, or co-author, of over 170 scientific papers, and the editor of several books. Dr. Brewer has served on several National Academies committees in the past.

Evan H. DeLucia

Member

DR. EVAN H. DeLUCIA is the G. William Arends Professor of Biology and Baum Family Director at the University of Illinois at Urbana-Champaign. Dr. DeLucia served as the founding director of the Program in Ecology and Evolutionary Biology, the head of the Department of Plant Biology, and the director of the School of Integrative Biology. He was named director for the new Institute for Sustainability, Energy and Environment in 2013. After completing his BA at Bennington College and working as a teaching fellow at Phillips Andover Academy, DeLucia completed a MFS (1982) in forest ecology at Yale University and a PhD (1986) in plant ecology and physiology at Duke University. He joined the faculty at Illinois in 1986, where he was recognized as a University Scholar in 1997. In 1994, DeLucia was a Bullard Fellow at Harvard University and in 2002 he was a Fulbright Fellow at Landcare Research in New Zealand. DeLucia became a fellow of the American Association for the Advancement of Science in 2005 and of the Ecological Society of America in 2015. He is a member of the American Association of Plant Physiologists, the International Union of Forest Research Organizations, the Ecological Society of America, the American Geophysical Union and the American Association for the Advancement of Science. He was elected Chair of the Physiological Ecology Section of the Ecological Society (1996-98). He currently provides editorial services for several prominent journals, including Ecology, Oecologia, Tree Physiology, and Global Change Biology. How the use and management of land affects the climate system, and the responses of forest and agro-ecosystems to elevated carbon dioxide and other elements of global change are at the center of DeLucia's research interests. Using ecological, physiological and genomic approaches, DeLucia seeks to understand how global change affects the carbon cycle and the trophic dynamics between plants and insects. DeLucia previously served as a committee member for the review of the 2013 National Climate Assessment Report with the National Academies.

David L. Greene

Member

DR. DAVID L. GREENE is a senior fellow of the Howard H. Baker, Jr. Center for Public Policy and a research professor of Civil and Environmental Engineering at The University of Tennessee. In 2013 he retired from Oak Ridge National Laboratory as a corporate fellow after 36 years researching transportation and energy policy issues. Much of his research is concerned with the effectiveness and impacts of fuel economy and greenhouse gas emissions standards. He served on four National Research Council (NRC) committees evaluating the Corporate Average Fuel Economy Standards between 1990 and 2015. Other areas of research interest include alternative fuels, the costs of oil dependence and the transition to low carbon energy in transportation. From 2011 to 2012 he served on the NRC's Committee on Transitions to Alternative Vehicles and Fuels. In all, he has served on more than a dozen NRC and Transportation Research Board (TRB) special committees and is a member emeritus of the TRB's standing committees on Energy and Alternative Fuels. He has testified to the U.S. Congress concerning transportation and energy issues on a dozen occasions. Author of over 100 peer-reviewed journal articles and over 275 professional publications, he is a Lifetime National Associate of the National Academies and recipient of the Transportation Research Board's Roy W. Crum Award. He was recognized by the Intergovernmental Panel on Climate Change for contributing to the award of the 2007 Noble Peace Prize to the IPCC. He holds a PhD in geography and environmental engineering from The Johns Hopkins University as well as degrees in geography from the University of Oregon (MA) and Columbia University (BA).

Tessa M. Hill

Member

DR. TESSA M. HILL is an associate professor and Chancellor's fellow at the University of California, Davis, in the Department of Earth & Planetary Sciences. She is resident at UC Davis Bodega Marine Laboratory, a research station on the northern California coast. Dr. Hill graduated with a BS in Marine Science from Eckerd College (1999) and a PhD in Marine Science from UC Santa Barbara (2004). She was then a UC President's postdoctoral fellow at UC Davis, prior to starting a faculty position. Her research interests include climate change, both past and present, and understanding the response of marine species to environmental perturbation. She is part of the Bodega Ocean Acidification Research (BOAR) group at Bodega Marine Laboratory, which aims to understand the impact of ocean acidification on marine species. Dr. Hill leads an NSF-supported program with future (pre-service) K-12 science teachers to infuse their classrooms with climate change science, and an industry-academic partnership to understand the consequences of ocean acidification on shellfish farmers. Her work has been featured in a variety of mass media outlets (e.g., NPR, The New York Times, Al Jazeera America, Science Friday). She has served as an associate director of the UC Davis Coastal & Marine Sciences Institute since 2013. She is a fellow of the California Academy of Sciences, a AAAS Leshner Public Engagement Fellow, and a recipient of the Presidential Early Career Award for Scientists & Engineers (PECASE). Dr. Hill has yet to serve on a National Academies committee.

Henry D. Jacoby

Member

DR. HENRY D. JACOBY is the William F. Pounds Professor of Management (emeritus) in the Sloan School of Management and former co-director of the Joint Program on the Science and Policy of Global Change, both at the Massachusetts Institute of Technology (MIT). His work has focused on the integration of the natural and social sciences and policy analysis in application to the threat of global climate change. Previously, he served on the faculties of the Department of Economics and the Kennedy School of Government, both at Harvard University. He has also served as director of the Harvard Environmental Systems Program, director of the MIT Center for Energy and Environmental Policy Research, associate director of the MIT Energy Laboratory, and chair of the MIT faculty. He has an undergraduate degree in mechanical engineering from the University of Texas at Austin and a PhD in economics from Harvard University. Dr. Jacoby currently serves as a member of the National Academies' Committee to Advise the USGCRP and has served on several other committees in the past.

Gary S. Morishima

Member

DR. GARY S. MORISHIMA is the natural resources technical advisor to the president of the Quinault Nation, an affiliate professor at the University of Washington, and CEO of MORI-ko, LLC, a natural resources consulting firm. With expertise in modeling, statistical analysis, natural resource management, and policy analysis, he has been called upon to participate in domestic and international legislative, administrative, judicial, and educational processes. He recently served on the Department of the Interior's Advisory Committee on Climate Change and Natural Resource Science. Dr. Morishima has authored numerous publications relating to natural resource management and holds a PhD in quantitative science and environmental management from the University of Washington. Among the honors he received are a Pride in Excellence Award from the Boeing Company and Outstanding National Forester from the Intertribal Timber Council. Dr. Morishima has yet to serve on a National Academies committee.

J. William Munger

Member

DR. J. WILLIAM MUNGER is a senior research fellow in atmospheric science at the Harvard University School of Engineering and Applied Sciences. His work focuses broadly on the carbon cycle and air pollution. Current projects include managing a long-term observatory for forest-carbon exchange at the Harvard Forest Long-term Ecological Research site, and collaborating with partners in China to observe CO₂ emission and exchange with vegetation at a rural Chinese site. Additionally he is part of the Arctic-Boreal Vulnerability Experiment with a project to quantify how CO₂ and CH₄ exchange in the arctic is responding to climate change. Dr. Munger received his MS from University of Minnesota in 1981 studying environmental controls of acid precipitation. He received his PhD from California Institute of Technology in 1989 studying the chemical composition of fog and clouds. Dr. Munger has yet to serve on a National Academies committee.

David S. Schimel

Member

DR. DAVID S. SCHIMEL is currently a senior research scientist at the Jet Propulsion Laboratory, leading research focused on carbon-cycle climate interactions, combining models and observations. For the previous five years, Schimel led the National Ecological Observatory Network project where he was responsible for the top-level science design, site selection, and observing system simulations. From 2001-2007, Schimel was at the National Center for Atmospheric Research as a senior scientist, with research focused on assimilation of carbon cycle data in land and atmospheric models. From 1998-2001, Schimel served as founding co-director and managing director of the Max Planck Institute for Biogeochemistry in Jena, Germany. Schimel served as convening lead author for the first IPCC assessment of the carbon cycle. He has served as an IPCC CLA four times, and as a lead author twice. From 1988-1989, Schimel was an NRC Fellow at NASA Ames. He received his PhD from Colorado State University in 1982 and has served on a number of NRC committees since 1992.

Kathleen C. Weathers

Member

DR. KATHLEEN C. WEATHERS is the G.Evelyn Hutchinson Chair of Ecology at the Cary Institute of Ecosystem Studies. She received her master's degree from Yale University and Ph.D. from Rutgers University. Weathers carries out biogeochemical research in ecosystems around the world focusing on carbon, nitrogen, sulfur, and other elemental cycling in the context of how biology affects geochemistry and biogeochemical cycling across heterogeneous landscapes, and within and among multiple systems (air-land-water). Specific topics have included quantifying cross-boundary nutrient fluxes and their impact on ecosystem processes (e.g., nutrient and pollutant delivery and biogeochemistry from ocean to forest); how landscape and plant structure affect fog inputs and how fog affects the biotic and abiotic maintenance of ecosystems; the importance of tree species, and their pests and pathogens, in controlling landscape biogeochemistry; and the effect of cyanobacteria on oligotrophic lake resilience. Dr. Weathers is an elected a Fellow of the American Association for the Advancement of Science (AAAS) and the Ecological Society of America (ESA). She is co-chair of the grassroots Global Lakes Ecological Observatory Network (GLEON; www.gleon.org).

Jingfeng Xiao

Member

DR. JINGFENG XIAO is currently a research associate professor at the Earth Systems Research Center, University of New Hampshire. Dr. Xiao's research interests include terrestrial carbon cycle, remote sensing, ecological modeling, vegetation dynamics, land cover/land use change, disturbances, and human-environment interactions. He is particularly interested in understanding the impacts of climate variability and change, land cover/land use change, and disturbances on terrestrial carbon cycling as well as their feedbacks to the climate over various spatial and temporal scales. He combines remote sensing, ecological modeling, field measurements (e.g., eddy covariance measurements), model-data fusion, and statistical analysis to answer important carbon cycle and climate change related questions. Dr. Xiao earned his PhD in global ecology from the Department of Geography at the University of North Carolina at Chapel Hill in 2006, MS in remote sensing from the Institute of Remote Sensing & GIS at Peking University in 2000, and BS in physical geography at the Department of Geography, Lanzhou University. He was a post-doc at Purdue University from 2006 to 2008 and a research associate at the Pennsylvania State University from 2008 to 2009. Dr. Xiao has not yet served on a National Academies committee.

Zicheng Yu

Member

DR. ZICHENG YU is a professor in the Department of Earth and Environmental Sciences at Lehigh University. He is a paleoecologist and paleoclimatologist, with research interests in understanding past climate change, peatland carbon dynamics, and carbon cycle-climate connections, in particular in high latitude and high altitude regions. He has led field research in Alaska, the Tibetan Plateau, Kamchatka, western Canada, Patagonia and the Antarctic Peninsula, studying carbon accumulation and climate sensitivity of peat-forming ecosystems. He has served on proposal review panels in the National Science Foundation. Over the last decade, he has worked on global peatland carbon data synthesis, and he now serves as a leader of PAGES (Past Global Changes) C-PEAT (Carbon in Peat on Earth Through Time) Working Group. Dr. Yu received his PhD in Botany from University of Toronto (Canada) in 1997 and BS from Peking University (China). Dr. Yu has not yet served on a National Academies committee.