NOAA GMD Research

2018 GMD SCIENCE REVIEW
Chair and Reviewers

Chair: Anne Thompson

Primary Reviewer	Suggested Research Area Coverage
Ken Davis	Tracking Greenhouse Gases and Understanding Carbon Cycle Feedbacks • Calibrations and Standards
Steve Wofsy	Tracking Greenhouse Gases and Understanding Carbon Cycle Feedbacks • Calibrations and Standards • Atmospheric Baseline Observatories
David Crisp	Tracking Greenhouse Gases and Understanding Carbon Cycle Feedbacks; Monitoring and Understanding Changes in Surface Radiation, Clouds, and Aerosol Distributions • Calibrations and Standards
Paul Stackhouse	Monitoring and Understanding Changes in Surface Radiation, Clouds, and Aerosol Distributions • Calibrations and Standards • Atmospheric Baseline Observatories
Anne Thompson (Chair)	Guiding Recovery of Stratospheric Ozone • Atmospheric Baseline Observatories
Eric Saltzman	Guiding Recovery of Stratospheric Ozone • Calibrations and Standards
Ray Weiss	Guiding Recovery of Stratospheric Ozone • Calibrations and Standards • Atmospheric Baseline Observatories

TRACKING GREENHOUSE GASES AND UNDERSTANDING CARBON CYCLE FEEDBACKS

Dr. Ken Davis
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Biography

Dr. Davis's research interests include boundary layer meteorology, terrestrial carbon and hydrologic cycles, remote sensing using lidar, flux measurement methods, interactions between terrestrial processes and boundary layer development, climate change ethics.
He is interested in how terrestrial systems and the atmosphere are linked via the atmospheric boundary layer, the lowest layer of the atmosphere characterized by turbulent flows and rapid response to changes in the earth's surface. Surface-atmosphere interactions are important to climate and weather. Dr. Davis studies these interactions via observations of the atmospheric boundary layer, including turbulent flux measurements, trace gas mixing ratio measurements and lidar remote sensing. His group also employs atmospheric models and models of ecosystem biogeochemistry and hydrology to synthesize and interpret complex observations. His current research focuses on study of the terrestrial carbon and water cycles. He has played a leading role in a number of innovative field studies including the Chequamegon Ecosystem-Atmosphere Study (ChEAS), the NACP Midcontinent Intensive regional study (MCI), and the Indianapolis Flux experiment (INFLUX).

Education:
A.B., Physics with honors, Princeton University, 1987
Ph.D., Astrophysical, Planetary and Atmospheric Sciences, University of Colorado, 1992

GMD Research Theme: Tracking Greenhouse Gases and Understanding Carbon Cycle Feedbacks
Direct Funding Connections: None
Research Collaborations with GMD: Collaborated with GMD scientists on the North American Carbon Program Science Steering Group, Carbon Cycle Science Steering Group, the *A new U.S. Carbon Cycle Science Plan*, and the *First State of the Carbon Cycle Report (SOCCR)*.

Dr. Steven C. Wofsy
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Biography

Professor Steven Wofsy is the Abbott Lawrence Rotch Professor of Atmospheric and Environmental Science in the Harvard University's School of Engineering and Applied Sciences. He received a B.S. degree in Chemistry in 1966 from the University of Chicago, an M.A. degree in Chemistry in 1967 from Harvard University, and a Ph.D. in Chemistry in 1971 from Harvard University. His research interests are atmospheric and climate modeling; oceans and geophysics; and observations and field testing. Professor Wofsy and associates study the two-way exchange of gases between natural ecosystems and the atmosphere, the emissions, transformations and deposition of atmospheric pollutants, the processes that transport pollutants in the atmosphere, and depletion of stratospheric ozone. The focus is on long-term measurements to help understand processes affecting atmospheric composition on time scales relevant to climate change, and airborne observations to define rates of pollutant transport and sources or sinks of key gases (CO_2, CO, nitrogen oxides) on continental and global scales. Professor Wofsy is a Fellow of the American Geophysical Union, Fellow of the American Association for the Advancement of Science, and a Member of National Academy of Sciences. He has received many honors, including the James B. Macelwane Award of the American Geophysical Union (1982), the Ledlie Prize for experimental and theoretical investigation of ozone depletion in the stratosphere from Harvard University, and the Distinguished Public Service Medal of NASA (2001).

Education:
B.S., Chemistry, University of Chicago, 1966
M.A., Chemistry, Harvard University, 1967
Ph.D., Chemistry, Harvard University, 1971

GMD Research Theme: Tracking Greenhouse Gases and Understanding Carbon Cycle Feedbacks
Direct Funding Connections: None
Research Collaborations: Collaboration on HIPPO and Atmospheric Tomography Mission (ATom)

MONITORING AND UNDERSTANDING CHANGES IN SURFACE RADIATION, CLOUDS, AND AEROSOL DISTRIBUTIONS

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Biography

Dr. David Crisp is an atmospheric physicist at the Jet Propulsion Laboratory (JPL), California Institute of Technology. Since receiving his Ph.D., his research has focused primarily on the development of instruments and numerical models for analyzing light reflected, emitted, and scattered by atmospheres and surfaces of the Earth and other planets. He has served on the science teams of several missions including the Soviet/French/US VEGA Balloon mission, NASA's Hubble Space Telescope Wide Field/Planetary Camera-2, and Mars Pathfinder missions, and the European Space Agency (ESA) Venus Express mission. He contributed to NASA's technology programs as the Chief Scientist of the New Millennium Program, NASA's space flight technology demonstration program, from 1997 to 2001. He has continued to participate in NASA's Planetary programs as a member of the Executive Council of the Venus Exploration Analysis Group (VEXAG, 2013-2014) and as the JPL lead for the NASA Astrobiology Institute Virtual Planetary Laboratory (NAI VPL) task.

Dr. Crisp was the Principal Investigator of the Earth System Science Pathfinder (ESSP) Orbiting Carbon Observatory (OCO) mission. This was the first NASA mission designed to measure atmospheric carbon dioxide (CO_2) with the sensitivity, accuracy, resolution, and coverage needed to detect and quantify the sources emitting CO_2 into the atmosphere and the natural sinks absorbing it at the surface. He is currently serving as the Science Team Leader for NASA's Orbiting Carbon Observatory-2 (OCO-2) mission and as a member of the Science Team and JPL task lead for the Earth Ventures Geostationary Carbon Cycle Observatory (GeoCarb). In addition to these responsibilities, Dr. Crisp is serving as the Science Definition Team co-lead for the NASA Active Sensing of CO_2 Emissions over Days, Nights, and Seasons (ASCENDS) mission concept, and as a member of CO_2 Task Force convened by ESA and the European Commission to study a future operational CO_2 mission. He is also serving as the Greenhouse Gas Lead for the Committee on Earth Observation Satellites (CEOS) Atmospheric Composition Virtual Constellation (AC-VC).

Education:

- B.S., Education, Magna Cum Laude, Texas A&M University, 1977
- M.A., Geophysical Fluid Dynamics, Princeton University, 1981
- Ph.D., Geophysical Fluid Dynamics, Princeton University, 1984

GMD Research Theme: Tracking GHG and Understanding Carbon Cycle Feedbacks; Monitoring & Understanding Changes in Surface Radiation, Clouds, & Aerosol Distributions
Direct Funding Connections: None

Research Collaborations: OCO-2, GOSAT

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Biography

Dr. Stackhouse is a Senior Research Scientist at the NASA Langley Research Center in Hampton, Virginia where he is responsible for numerous projects estimating global radiative energy quantities such as surface solar energy from satellite measurements. He is lead scientist of the NASA/Global Energy and Water Cycle Experiment (GEWEX) Surface Radiation Budget (SRB) Project, a project responsible to use satellite and other analysis to estimate the long-term surface radiation budget and components. He is also co-lead of the Clouds and Earth Radiant Energy System (CERES) FLASHFlux (Fast Longwave and Shortwave radiative Fluxes) working group that produces near-real estimates of top-of-atmosphere and surface radiation data products from CERES. Using the long-term and near-real time data products from the science projects above, Dr. Stackhouse leads several NASA-funded Applied Science projects that customize these data products, along with meteorological input, for the renewable energy-related and agricultural industries (http://power.larc.nasa.gov). These applied science projects have led to the development of data sets and web interface tools for distributing solar energy and other quantities for the last 15 years including the new SSE-GIS web portal providing web mapping and data services for users of renewable energy information.

Education:
M.S., Atmospheric Sciences, Colorado State University, 1989
Ph.D., Atmospheric Sciences, Colorado State University, 1995

GMD Research Theme: Monitoring and Understanding Changes in Surface Radiation, Clouds, and Aerosol Distributions
Direct Funding Connections: None
Research Collaborations: None

GUIDING RECOVERY OF STRATOSPHERIC OZONE

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Biography

Dr. Thompson's research interests include investigations of tropospheric chemical and dynamical processes, from air-sea gas exchange to interactions with the lower stratosphere. Her work in the 1980s and early 1990s was among the first to link chemical changes, climate forcings and the earth's oxidizing capacity. Trends of atmospheric ozone and the interaction of natural variability and human influence (biomass fires, urban pollution) are on-going themes of research that employs satellite data from a variety of atmospheric and land-surface sensors. A veteran of a dozens of NASA aircraft missions, ground-based campaigns and oceanographic cruises, Thompson was Co-Mission Scientist for SONEX (1997) and is PI for the SHADOZ (Southern Hemisphere Additional Ozonesondes) tropical validation network. Thompson's recent actitivies include being PI on NASA's Air Quality Applied Sciences (AQAST) Team, SEAC4RS, DISCOVER-AQ, KORUS-AQ and Co-I on the NSF DANCE project to measure reactive nitrogen off coastal DelMarVa. A member of Goddard's Laboratory for Atmosphere for 20 years, Dr. Thompson was a Professor of Meteorology at Penn State for 8 years before re-joining GSFC in 2013. Community contributions have included membership on AMS and AGU Councils and past President of the International Commission on Atmospheric Chemistry and the AGU Atmospheric Sciences Section. Thompson's honors include the AMS Verner Suomi Award, the AGU Reger Revelle Medal and Corresponding Member of the Academy of Athens.

Dr. Thompson is a fellow of the American Association for the Advancement of Science (AAAS), fellow of the American Meteorological Society (AMS), and a fellow of the American Geophysical Union (AGU). Dr. Thompson has over 150 refereed scientific publications and is an ISI highly-cited author (Geosciences).

Education:
PhD, Physical Chemistry, Bryn Mawr College

GMD Research Area: Guiding Recovery of Stratospheric Ozone
Direct Funding Connections: Funds GMD for SHADOZ project
Research Collaborations: SHADOZ

Dr. Eric Saltzman
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Biography

Dr. Saltzman holds joint appointments as Professor in the Departments of Earth System Science and Chemistry at UC Irvine. He is a widely recognized leader in the field of atmospheric science. He has published over 130 articles on various aspects of atmospheric chemistry, including marine aerosols, air/sea gas exchange, photochemical cycling, and developing atmospheric histories of climate-active trace gases. Dr. Saltzman studies how biosphere-atmosphere-human interactions affect tropospheric oxidation capacity and deploys gas phase atmospheric constituents monitoring instrumentation to the field to constrain tropospheric oxidation capacity. He works to understand air pollution from secondary photochemical products such as ozone and secondary organic aerosols; radiative forcers such as methane, secondary aerosols and ozone; and how photochemical interactions between anthropogenic air pollutants and natural origin reactive constituents affect local and regional oxidation capacity. He is an expert in the production, emissions and atmospheric chemistry of oceanic trace gases, trace gas detectors, computer modeling and simulation, ice cores and air trapped in polar snow in Greenland and Antarctica.

Dr. Saltzman was a Professor at the Rosenstiel School of Marine and Atmospheric Science at the University of Miami and served as Chair of the Division of Marine and Atmospheric Chemistry. He previously served at NSF under an IPA appointment as a Program Manager for Atmospheric Chemistry. He has also served as Chair of the Department of Earth System Science at the University of California, Irvine. Saltzman is active in international scientific coordination, serving as Chair of the international Surface Ocean-Lower Atmosphere Project (SOLAS), and is a Fellow of the American Geophysical Union. He has also served as the Chair of the NSF Office of Polar Programs Advisory Committee.

Education:
B.S., Geology, University of Rochester
M.S., Ph.D., Oceanography, University of Miami

GMD Research Area: Guiding Recovery of Stratospheric Ozone
Direct Funding Connections: None
Research Collaborations: Collaboration at South Pole and Summit when working at NSF

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Biography

Dr. Ray Weiss is Distinguished Professor Emeritus, Distinguished Research Professor and Associate Dean of Academic Affairs Emeritus at the Scripps Institution of Oceanography, University of California, San Diego. Professor Weiss's career has been devoted to the application of chemical and isotopic measurements to the study of natural processes in the atmosphere, oceans, and deep lakes. He has authored or co-authored more than 160 research papers appearing in the international peer-reviewed scientific literature.

Professor Weiss is an elected Fellow of the American Association for the Advancement of Science, and of the American Geophysical Union. He has served on numerous national and international scientific planning and steering committees, and on the editorial boards of a number of prominent journals in the atmospheric and oceanic sciences. He has also been active in the international scientific assessment processes of the Intergovernmental Panel on Climate Change (IPCC) and the Scientific Assessment of Ozone Depletion reports of the United Nations Environment Programme and the World Meteorological Organization. Professor Weiss is the lead principal investigator responsible for the measurement component of the Advanced Global Atmospheric Gases Experiment (AGAGE), an international effort to measure and model the global distributions, emissions and atmospheric lifetimes of a wide range of anthropogenic and natural greenhouse gases and ozone depleting substances.

Education:
B.S., California Institute of Technology, 1964
M.S., UCSD, Scripps Institution of Oceanography
Ph.D., UCSD, Scripps Institution of Oceanography, 1970

GMD Research Area: Guiding Recovery of Stratospheric Ozone
Direct Funding Connections: None
Research Collaborations: AGAGE