

Richard B. Rood

June 30, 2020

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OpenClimate.org: <https://openclimate.org>

Google Scholar: <http://scholar.google.com/citations?user=viGxwOwAAAAJ&hl=en&oi=ao>

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CURRENT POSITION

2015 - : Professor, Department of Climate and Space Sciences and Engineering, University of Michigan, Ann Arbor, MI; Professor, School of the Environment and Sustainability, University of Michigan, Ann Arbor, MI

2014 - : Dow Sustainability Distinguished Faculty Fellow, Graham Sustainability Institute, University of Michigan

2010 - 2015: Professor, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan, Ann Arbor, MI; Professor, School of Natural Resources and the Environment, University of Michigan, Ann Arbor, MI

2005 - 2010: Professor, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan, Ann Arbor, MI

Consulting and Writing

2018 – : Community Lead, Unified Forecast System - Steering Committee, National Oceanic and Atmospheric Administration

2015 – 2018: Independent Expert, European Center for Medium-range Weather Forecasts, Copernicus Climate Services

2015 – 2016: External Expert, Dynamical-Core Test Group, National Weather Service

2013, 2016: American Association for Advancement of Science

2009, 2012: Consultant, World Bank

2007 – 2017: Expert Content Provider, Wunderground.com, <http://www.wunderground.com/>

Affiliations at University of Michigan

Graham Sustainability Institute

Energy Institute, Beyond Carbon Neutral

Michigan Institute for Computational Discovery and Engineering

Professional Summary: Richard B. (Ricky) Rood

Richard B. (Ricky) Rood is a Professor at the University of Michigan, Ann Arbor, in the Department of Climate and Space Sciences and Engineering (formerly, Atmospheric, Oceanic and Space Sciences). He has a courtesy appointment in the School of the Environment and Sustainability and is a Dow Sustainability Distinguished Faculty Fellow.

Rood's research is multi-disciplinary. His natural science research includes investigations of the interaction of atmospheric dynamics and chemistry, computational fluid dynamics, climate and chemical data assimilation, and process-based analysis of models and observations. Rood's present focus is on climate change. This research is focused on improving the usability of climate knowledge in planning and practice. He works at the interfaces with many fields. In addition to publications in physical and computational science, he has published in political science, forestry, environmental epidemiology, and communication.

Professor Rood's current research and teaching activities are highly integrated. In 2006, he initiated a cross-discipline graduate course on climate change, which addresses critical analysis and complex problem solving. This course has attracted students from many colleges and departments at the University. In 2014, with Paul Edwards, he started a course on climate informatics. Rood advises the undergraduate Climate Impacts Engineering Program and the Master of Engineering in Applied Climate.

A major part of Rood's recent role includes public engagement. He wrote, until 2017, expert blogs on climate change for the Weather Underground and ClimatePolicy.org. His articles in The Conversation have had more than one million readers. He writes the column, Climate Blue, for Michigan Today. He does frequent radio and newspaper interviews.

The National Oceanic and Atmospheric Administration (NOAA) has, since 2015, engaged Professor Rood in strategic leadership positions for their emerging Unified Forecast System.

As a member of the Senior Executive Service at the National Aeronautics and Space Administration (NASA), Rood received recognition for his ability to lead both scientific and high-performance computing activities. He is a Fellow of the American Meteorological Society (AMS) and a winner of the World Meteorological Organization's Norbert Gerbier Award. Richard B. Rood is a U.S. Citizen

PREVIOUS POSITIONS

2011 - 2013: National Climate Predictions and Projections Platform, Lead
(Intergovernmental Personnel Act Mobility Program, Climate Program Office, National
Oceanic and Atmospheric Administration)

2005 - 2005: Chief, Computational and Information Sciences and Technology Office,
NASA/Goddard Space Flight Center, Greenbelt, MD

2004 - 2005: Visiting Scientist (Intergovernmental Personnel Act Mobility Program),
Lawrence Livermore National Laboratory, Livermore, CA

2001 - 2005: Chief, Earth and Space Data Computing Division, NASA/Goddard Space
Flight Center, Greenbelt, MD

2001 - 2002: Founding Director, NOAA/NASA Joint Center for Satellite Data
Assimilation

1998 - 2001: Senior Scientist, Data Assimilation Office, NASA/Goddard Space Flight
Center, Greenbelt, MD

1992 - 1998: Head, Data Assimilation Office, NASA/Goddard Space Flight Center,
Greenbelt, MD

1986 - 1992: AST, Atmospheric Chemistry and Dynamics, NASA/Goddard Space Flight
Center, Greenbelt, MD

1984 - 1986: Assistant Scientist, Applied Research Corporation, Landover, MD (at
NASA/Goddard Space Flight Center, Greenbelt, MD)

1982 - 1984: NAS/NRC Research Associate, NASA/Goddard Space Flight Center,
Greenbelt, MD

1979 - 1982: Research Assistant, Plasma Physics Division, Science Applications Inc.,
McLean, VA (at Naval Research Laboratory, Washington, DC)

EDUCATION

1982: Ph.D., *Meteorology*, Florida State University, Tallahassee, FL

1979: M.S., *Meteorology*, Florida State University, Tallahassee, FL

1976: B.S., *Physics*, University of North Carolina, Chapel Hill, NC

PROFESSIONAL SOCIETY

American Meteorological Society (*Fellow*)

American Geophysical Union

Selected Awards

2014: Dow Sustainability Distinguished Faculty Fellow

2004: American Meteorological Society, Elected Fellow

2003: World Meteorological Organization Norbert Gerbier Award

2000: NASA Outstanding Leadership Medal

1995: NASA Exceptional Achievement Medal

1982: National Research Council Postdoctoral Fellowship

RESEARCH HIGHLIGHTS

Richard B. Rood has notable contributions in several fields. His work has been interdisciplinary from the beginning, with his thesis focused on the interaction of ozone chemistry and atmospheric dynamics. As an individual researcher, group leader, and science manager, he has focused on the synthesis of science-based knowledge to build modeling and analysis systems, to design and deploy computational systems, and to apply climate science to a portfolio of societal problems. Highlights are:

- Investigation, description, and overcoming the barriers that aggravate the gap between data and knowledge producers and users – the usability gap (e.g., Barsugli et al., 2013; Lemos et al., 2014; Briley et al., 2015; Guentchev et al., 2016)
- Investigation of sub-scale mixing, effective resolution, consistency, and the interface between atmosphere physics parameterizations and dynamical cores (e.g., Whitehead et al., 2011, 2014; Kent et al., 2014; Yorgun and Rood, 2014).
- Advancing the use of weather and climate models and observations in public health applications related to excess heat (e.g., Zhang et al., 2011; Oswald and Rood, 2014).
- Description of the *Uncertainty Fallacy*, the idea that reduction of scientific uncertainty is a primary barrier of the application of climate projections to policy and planning (Lemos and Rood, 2010).
- Development and validation of ozone data assimilation systems and description of value of observing system monitoring (e.g., Stajner et al., 2001; Stajner et al., 2004).
- Design, development, implementation, and analysis of the first reanalysis of atmospheric observations with an unvarying data assimilation system (e.g. Schubert et al., 1993; Douglass et al., 2003; Rood and Bosilovich, 2010).
- Pioneering the application of meteorological data assimilation to chemistry and transport in the atmosphere (e.g., Rood et al.; 1989; Allen et al.; 1996, Chin et al., 2000).
- Introduction, from plasma physics and aeronautics, of shape-preserving, finite-volume numerical methods to atmospheric chemistry and transport models, climate models, and weather models (e.g., Rood, 1987; Allen et al., 1991; Lin and Rood, 1996).
- Untangling the dynamical and photochemical contributions to the relation of temperature and ozone (e.g. Rood and Douglass, 1985; Douglass and Rood, 1986).

Research Proposals (Current and Ongoing)

- Interactions between Tropospheric Water Vapor and Potential Vorticity in Tropical Disturbances, National Science Foundation (role PI, February 1, 2019 – January 31, 2022)
- Environmental Modeling: Integrating Community and Operations, National Oceanic and Atmospheric Administration, National Weather Service (role PI, July, 2018 – August, 2022)
- Supporting Lake Ontario Water Resources Designing Making with Research and Engagement, National Oceanic and Atmospheric Administration (role Co-I, Syracuse University, lead, September 1, 2019 – August 31, 2021)
- Expanding Green Infrastructure as a Response to Environmental Injustice and Climate Change, School of Environment and Sustainability McIntire-Stennis Research Program, U.S. Department of Agriculture, National Institute for Food and Agriculture (role Co-PI, 2019 – 2020)
- Great Lakes Regional Integrated Sciences and Assessments Center, National Oceanic and Atmospheric Administration, Climate Program Office (role Co-PI, July, 2010 – August, 2021)
- Dynamical Core Selection for the Next Generation Global Prediction System (NGGPS), National Oceanic and Atmospheric Administration, National Weather Service (role PI, April, 2015 – August, 2017)

Prior Funding Summary

Richard B. Rood has competed and won research proposals as an individual investigator, co-investigator, and as a team lead. At NASA, he was the principal investigator of an Earth Observing System (EOS), Interdisciplinary Science proposal, *The Development and Use of a Four-Dimensional Atmospheric-Ocean-Land Data Assimilation System for EOS*. This, with related proposals, was awarded at, approximately, \$18M per year (in 1994). Rood managed organizations with budgets up to, approximately, \$35M per year (in 2002).

Rood has been Principal and Co-Principal Investigator in programs with:

- **National Aeronautics and Space Administration (NASA)**: Earth Observing System Program; High Performance Computing and Communications Program; Atmospheric Chemistry Modeling and Analysis Program; Atmospheric Effects of Aviation Program; Modeling, Analysis and Prediction Program
- **Department of Energy**: Biological and Environmental Research Program
- **National Science Foundation**: Division of Advanced Cyberinfrastructure
- **National Oceanic and Atmospheric Administration (NOAA)**: Climate Program Office, National Weather Service
- **Department of Interior**: National Park Service
- **National Institutes of Health**: National Institute of Environmental Health Sciences

- **Centers for Disease Control:** National Center for Environmental Health
- **Graham Environmental Sustainability Institute** (University of Michigan)
- **University of Michigan Water Center**
- **Kresge Foundation**

EDUCATION: Teaching and Students

ADVISOR:

- Climate Impacts Engineering (Undergraduate)
- Master of Engineering in Applied Climate

COURSES:

- *CLIMATE 480 / Natural Resources and Environment 480*: Climate Change: The Move to Action. This is a course-focused on complex problem solving at the intersection of climate science, business, policy, public health, ethics, etc. Started in 2006, the course has attracted graduate students from many departments and schools at the University. Ongoing, Winter Term.
- *CLIMATE 605 / NRE 501*: Conference of the Parties. University Student Delegates work with each other over the months preceding the conference to craft the delegation's priorities and activities around the conference. Fall 2015 – ongoing, Fall Term. (With Avik Basu, School of Natural Resources and the Environment; Paul Edwards, School of Information)
- *CLIMATE 530*: Climate Change in Planning and Design. This seminar-reading-discussion course focuses on special topics on the use of climate-change data and knowledge in planning, design, engineering and management. Topics include uncertainty in the context of decision making, non-stationarity in design and engineering, and vulnerability and risk assessment. Fall 2014 – ongoing, Fall Term
- *CLIMATE 591*: Applied Climate Practicum I. Students work on projects for clients to incorporate climate knowledge and data into clients' problem solving. Fall 2013 – ongoing.
- *CLIMATE 592*: Applied Climate Practicum II. Students work on projects for clients to incorporate climate knowledge and data into clients' problem solving. Winter 2014 – ongoing.
- *CLIMATE 605 / School of Information 614*: Climate Informatics. This course focuses on translating climate change data and information into usable knowledge for specific purposes. Students work on projects for clients, designing tools for searching, presenting, and visualizing climate data for water managers, city planners, and public health officials. Winter 2014, 2015 (With Paul Edwards, School of Information)
- *Atmospheric, Oceanic, and Space Science 749*: Departmental Seminar. Fall 2013 and Winter 2014.
- *Atmospheric, Oceanic, and Space Science 401*: Geophysical Fluids Dynamics. This is a course in atmospheric dynamics for majors, regularly, Fall 2006 – Fall 2013.
- *Atmospheric, Oceanic, and Space Science 605*: Quikclimate: Water in the Atmosphere. Winter 2008.
- *Atmospheric, Oceanic, and Space Science 605*: Quikclimate: General Circulation and Wave-mean flow interaction. Fall 2008.

GRADUATE STUDENTS:

- Haochang (HC) Luo (ongoing), Southeast US and Caribbean Summer Drought
- M. Soner Yorgun (2014), *An Object-Based Approach for Quantification of GCM Biases in the Simulation of Orographic Precipitation* (**Position:** Research Fellow, Monash University)
- Evan Oswald (2013), *Heat as a Hazard to Human Health: A Multiple Dataset Assessment of Extreme Heat Indices Relevant to Human Health* (**Position:** PACE (Postdocs Applying Climate Expertise), now at Climate Prediction Center, College Park, MD)
- Erika Roesler (2012), *Representing the Fate of Springtime Arctic Clouds*, (Joint with D. Posselt, **Position:** Sandia National Laboratory)
- Laura Briley (2012), *Uncertainty Description for CMIP3 Precipitation Projections in the Great Lakes Region*, (University of Northern Illinois, Master of Science, **Position:** Great Lakes Integrated Sciences and Assessment Center, Ann Arbor, MI)
- Jared Whitehead (Applied Mathematics, 2012), *Topics in Geophysical Fluid Dynamics* (**Position:** Post-doctoral Fellow Los Alamos National Laboratory, now Assistant Professor Brigham Young University)
- Gabriel Thoumi (2009), *Avoided Deforestation: Carbon trading, Climate, Conservation, and Sustainability* (Master of Business Administration, **Position:** Director Capital Markets at Climate Advisers (2016, <http://www.climateadvisers.com/>))
- Cedric Drui (2007), Environmental Risk Assessment (Master of Science, **Position:** Senior Portfolio Manager, Neuberger Berman (<https://www.nb.com/en/global/biographies/cedric-drui> 2020))
- William Putman (2007), *Development of the Finite-Volume Dynamical Core on the Cubed Sphere*, (Florida State University, Ph. D., **Position:** NASA Goddard Space Flight Center)
- Rebecca Orris (1997), *Ozone and Temperature: A Test of the Consistency of Models and Observations in the Middle Atmosphere*, (Princeton, Ph. D., **Position:** National Institutes of Health, National Center for Biotechnology Information (2016))
- Dale J. Allen (1996), *The Effects of Transport and Convection on the Global Atmospheric Distribution of Trace Species as Determined by a Chemistry and Transport Model*, (University of Maryland, Ph. D., **Position:** University of Maryland)
- Glen Schuster (1988), *Total Southern Hemisphere Ozone, 1978-1987: The Quasi-Biennial Oscillation*, (Florida State University, Master of Science, **Position:** Founder and President STEM Education at U.S. Satellite Laboratory)

UNDERGRADUATE HONORS THESIS:

- Timothy D. Arvan (Philosophy, Politics, and Economics, 2019) *NGO Influence and Countervailing Lobbying in British and German Climate Change Mitigation Policy* (Joint with Robert Mickey, Political Science)

THESIS COMMITTEES:

- Natalie Packard (Earth and Environmental Sciences, ongoing), Triple Oxygen Isotopes to Better Understand Evaporative Signatures at Bear Lake
- Ray Watkins (Material Sciences and Engineering, ongoing), Radar-derived Ice-shelf Data to Investigate Ice Base
- Alex Thompson (Earth and Environmental Sciences, ongoing), West African Monsoon during the African Humid Period
- Alexander Gvakharia (2019), *The Atmospheric Impact of Energy and Food Production*
- James Arnott (Sustainability and Environment, 2019), *Accelerating Actionable Sustainability Science Science Funding, Co-Production, and the Evolving Social Contract for Science*
- Jared Ferguson (Applied Physics, 2018), *Bridging Scales in 2- and 3-Dimensional Atmospheric Modeling with Adaptive Mesh Refinement*
- Elizabeth Ultee (Climate and Space Sciences and Engineering, 2018), *Constraints on the Dynamic Contribution to 21st-Century Sea Level Rise from Greenland Outlet Glaciers*
- Xiaojian Liu (Atmospheric, Oceanic, and Space Sciences, 2017) *Surface Energy and Mass Balance Model for Greenland Ice Sheet and Future Projections*
- Fang Pan (Atmospheric, Oceanic, and Space Sciences, 2017), *Climate change analysis from the TOA spectrally resolved IR radiation* (2017)
- Fei He (Climate and Space Sciences and Engineering, 2016), *Quantitative Assessment of Tropical Cyclone Simulation Sensitivity in the Community Atmosphere Model*
- Greg Teirney (Atmospheric, Oceanic, and Space Sciences, 2017), *An Examination of Extratropical Cyclone Sensitivity to Environmental Variability*
- Austin Boles (Earth and Environmental Sciences, 2017), *Clay Neomineralization and the Timing, Thermal Conditions and Geofluid History of Upper Crustal Deformation Zones*
- Anna Savage (Earth and Environmental Sciences, 2017), *Sea Surface Height Signatures of Internal Gravity Waves*
- Scott Kalafatis (Natural Resources and Environment, 2016), *Colleagues, Competitors, Creators: City Governance Among Peers and Its Implications for Addressing Climate Change*
- Michele Reicher Newstadt (School of Education, 2015), *The Complexities, Persistence, and Relationships among Middle School Students' Climate Change Stances and Knowledge*

- Weiye Yao (Atmospheric Oceanic and Space Sciences, 2015), *An Assessment of the Quasi-Biennial Oscillation (QBO) and Sudden Stratospheric Warmings (SSWs) with Idealized General Circulation Models*
- Abhishek Chatterjee (Civil and Environmental Engineering, 2012), *Data Assimilation for Atmospheric CO₂: Towards Improved Estimates of CO₂ Concentrations and Fluxes*
- Paul Ullrich (Atmospheric, Oceanic, and Space Sciences, 2011), *Atmospheric Modeling with High-Order Finite-Volume Methods*
- Andrew Winkelman (Natural Resources and Environment, 2011), *The Clean Development Mechanism and Least Developed Countries: Key Determinants for Enhancing Climate Change Mitigative Capacity through Case Study Analysis in Niger*
- Shanna Shaked (Applied Physics, 2011), *Multi-Continental Multimedia Model of Pollutant Intake and Application to Impacts of Global Emissions and Globally Traded Goods*
- Christine Kirchhoff (Natural Resources and Environment, 2010), *Integrating Science and Policy: Climate Change Assessments and Water Resources Management*
- Jasper Kok (Applied Physics, 2009), *Understanding Wind-Blown Sand and the Electrification of Granular Systems*
- Sharon Gourджи (Civil and Environmental Engineering, 2011), *Improved Estimates of Regional-scale Land-Atmosphere CO₂ Exchange Using Geostatistical Atmospheric Inverse Models*
- Su-Ting Cheng (Natural Resources and Environment, 2010), *A Reduced Parameter Stream Temperature Model (RPSTM) for Fluvial Ecosystem Forecasting*
- Cheng Zhou (Atmospheric, Oceanic, and Space Sciences, 2010), *Linear and nonlinear Kelvin waves/tropical instability waves in the shallow-water system (2010)*
- Minghuai Wang (Atmospheric, Oceanic, and Space Sciences, 2009), *Aerosol Indirect Effects in a Coupled Global Aerosol and Atmospheric Circulation Model*
- Alanood Alkhaled (Civil and Environmental Engineering, 2009), *Remote Sensing of CO₂: Geostatistical Tools for Assessing Spatial Variability, Quantifying Representation Errors, and Gap Filling (2007 – 2009)*
- Huan Guo (Atmospheric, Oceanic, and Space Sciences, 2007), *Examining Aerosol Direct and Indirect Effects Using a Radiative Transfer Model and a Cloud Resolving Model*

SHORT COURSES:

- Lecturer, *The 2012 Dynamical Core Model Intercomparison Project*, Boulder, Colorado, USA (2012)
- Lecturer, *Numerical Techniques for Global Atmospheric Models*, Boulder, Colorado, USA (2008)
- Lecturer, Third ENVISAT Summer School, *Earth System Monitoring and Modeling*,

Frascati, Italy (2006)

- Lecturer, Summer Colloquia 2006 (Advanced Study Program and the Climate and Global Dynamics Division of NCAR), *The Art of Climate Modeling*, Boulder, Colorado, USA (2006)
- Lecturer, Modeling of Global Chemistry for Climate Project Summer School, *Use of Models for the Interpretation of Atmospheric Measurements*, Banff, Canada (2005)
- Lecturer, International Summer School of Atmospheric and Oceanic Sciences, *The Need for Observing Systems of Atmospheric Composition*, L'Aquila, Italy (2004)
- Lecturer and Keynote Speaker, NATO Advanced Study Institute Summer School, *Data Assimilation for the Earth System*, Acquafredda, Italy (2002)
- Lecturer, World Climate Research Program, *Tutorial Symposium on Global Tracer Transport Modeling*, Bermuda (1991)

SERVICE and SPECIAL EXPERIENCE:

ONGOING AND RECENT:

- Community Model Committee, National Oceanic and Atmospheric Administration (2018 -)
- University Corporation for Atmospheric Research Community Advisory Committee for NCEP (UCACN) Model Advisory Panel (UMAC) (2015 – 2017, Co-Chair)
- Independent Expert, European Center for Medium-range Weather Forecasts, Copernicus Climate Services (2015 – 2019)
- NASA Earth Science Advisory Committee (2014 – 2020)
- American Meteorological Society Committee on Open Environmental Information (2013 – present, Chair 2016 – 2018)
- External Expert, Dynamical-Core Test Group, National Weather Service (2015 – 2016)
- Team Member Great Lakes Adaptation Assessment for Cities (GLAA-C)

Review Panels:

- Department of Defense, Strategic Environmental Research and Development Program
- National Science Foundation, Cyber-enabled Discovery and Innovation
- Department of Energy INCITE
- Swiss National Supercomputing Center
- American Association for the Advancement of Science (AAAS) Research Competitiveness Program for the King Abdulaziz City for Science and Technology
- Natural Sciences and Engineering Research Council of Canada (NSERC)

SPECIAL EXPERIENCE:

- External Expert, Dynamical-Core Test Group, National Weather Service (2015 – 2016)
- Independent Expert, European Center for Medium-range Weather Forecasts, Copernicus Climate Services (2015 - 2019)
- Expert's Meeting: Making regional plans and decisions that incorporate global change information, Board on Environmental Change and Society, National Academy of Science, March 2013
- Sackler Forum, National Academy of Sciences and The Royal Society, September 2012.
- Weather Coalition (2012 – 2013)
- National Research Council Study Committee, A National Strategy for Advancing Climate Modeling (2011 – 2012)
- University of Michigan Representative to University Corporation of Atmospheric Research (2006 – present)
- Delegate U.S. - Japan Joint Climate Research Initiatives (Dept. of State, President's Office of Science and Technology Policy, 2002)
- Delegate U.S. - Italy Joint Climate Research Initiatives (Dept. of State, President's Office of Science and Technology Policy, 2002)
- Software Engineering Working Group (National Center for Atmospheric Research, External Co-Chair, 2000 – 2002)
- White House Office of Science and Technology Policy (Lead Author on Plan for National Climate Modeling and Associated Supercomputing, 2000 – 2001)

- National Research Council Board on Competitiveness of U.S. Climate Modeling (National Academy of Science, 2000)
- Detailed to NASA Headquarters (NASA Strategy on Modeling and Supercomputing, 2000)
- *Ad hoc* Task Group on Climate Modeling and Computing Requirements (D. Evans, Chair, report to J. Baker, NOAA and, 1999 – 2000)
- *Ad hoc* committee on Interagency Climate Modeling (L. Gates, Chair, report to US Global Change Research Program, 1998 – 2000)
- Participant in United Nations Environment Program and U.S. assessment activities on the state of atmospheric ozone and the environmental impact of aircraft. Lead author and co-author in assessment reports (1989-1995)

PROFESSIONAL SOCIETIES:

- American Meteorological Society Committee on Open Environmental Information (2013 – present, Chair 2016 – 2018)
- Editor, *Journal of the Atmospheric Sciences* (1993 – 1996; UARS Special Issue, 1994)
- Associate Editor, *Geophysical Research Letters* (1989 – 1993)
- AMS Committee on Middle Atmosphere (1988 – 1994, Chairman 1992 – 1994)
- Regular Reviewer of Papers and Proposals

UNIVERSITY OF MICHIGAN COMMITTEES

Departmental:

- Alumni and Friends (2014 – ongoing)
- Curriculum Committee
- Qualifying Exam Committee
- Strategic Planning Committee (2016 – 2018)
- Graduate Student Committee (2013 – 2017)
- Mentoring Committee (2009 – 2011)
- Applied Climate Curriculum Development (2009-2010)
- Undergraduate Curriculum Committee (2008 – 2009)
- Strategic Planning Committee (2007 – 2008, Chair)
- Faculty Search Committee (2007 – 2008, 2009 – 2010, 2010 – 2011)
- Faculty Search Committee (2005 – 2006, Chair)
- Information Technology Committee (Chair), 2005 – ongoing)

College of Engineering:

- Research Computing for Engineering Committee (2007)
- Awards Committee (2007)

University:

- University of Michigan Delegation to Conference of Parties, Copenhagen (2009, Delegation Lead)
- Research Cyber-infrastructure Committee (2006 – 2007)

EXTERNAL REVIEWS AND ADVISORY PANELS:

- University Corporation for Atmospheric Research Community Advisory Committee for NCEP (UCACN) Model Advisory Panel (UMAC) (2015 – 2018, Co-Chair)
- NASA Earth Science Subcommittee (2014 – 2020)
- Red Team / Blue Team Review DOE Accelerated Climate Model for Energy (2013)
- Advisory Panel, Climate Change Education Program, National Academy of Engineering, Climate, Engineered Systems and Society (2010-2012)
- External Review NOAA Climate Research and Modeling Program (2008)
- Board of Directors, Canadian-Stratospheric Processes and their Role in Climate (2006-2010)
- Naval Research Laboratory Atmospheric Sciences External Review (2006)
- Community Climate System Model Advisory Board (National Center for Atmospheric Research, 2005-2011)
- Climate, Ocean, and Sea Ice Modeling Project External Review Panel (Los Alamos National Laboratory, 2002)
- Center for Computational Sciences Review Committee (Oak Ridge National Laboratory, 2000)
- Computing Sciences Review Committee (Lawrence Berkeley National Laboratory, 1999)
- ERA-40 External Advisory Panel (European Center for Medium-range Weather Forecasts, 1997-2001)
- Earth Observing System Data Information System (EOSDIS) Advisory Panel (1994 – 1998)
- Computer Environment and Research Requirements Committee (1994)
- Earth Sciences Directorate/National Meteorological Center (NMC) Technical Implementation Agreement on Data Exchange (Principal Author, with Wayman Baker, NMC, 1993)
- Office of Space Science and Applications Supercomputer Requirements at NASA/GSFC (with Michele Rienecker, 1992)
- Goddard Space Flight Center (GSFC) Strategic Planning Task Group on *GSFC's Role as a Science Data and Information Center* (1991)
- Merit Review Board for NASA Historically Black College and University Program (1991)
- Review Board for NASA Graduate Student Research Program (1990, 1991)
- NASA OSO/OSSA Committee on Supercomputing (1989)
- International Review Committee for the Networks of Centers of Excellence (Natural Sciences and Engineering Research Council of Canada, 1989)

PROFESSIONAL TALKS

(Since joining University of Michigan, September 2005):

Richard B. (Ricky) Rood has been a contributing and invited speaker at national and international conferences since 1979. He has given seminars at universities and national laboratories in the United States and Europe. He was Keynote Speaker at the *Earth Systems Processes Conference* (Geological Society of London), Edinburgh, Scotland (2001) and the Dinner Speaker for *Climate Change Science Program* (Dept. of Energy), Seattle, WA (2004). He speaks at community (e.g., Sierra Club) and university (e.g. Students for Clean Energy) events.

INVITED TALKS:

- Evaluation of Climate Projections for Use in Planning and Adaptation Applications, Richard B. Rood, American Geophysical Union, December 2013.
- Narrative Descriptions to Improve the Salience of Climate Projections to Policy and Planning, Richard B. Rood, American Meteorological Society, January 2013.
- Reducing Barriers to the Use of Climate Data in Adaptation Planning, Richard B. Rood, American Meteorological Society, January 2013.
- Extreme Heat and Human Health, Richard B. Rood, Marie S. O'Neill, American Geophysical Union, December 2010.
- Community Climate Models: Is a new paradigm of model development possible? Richard B. Rood, Supercomputing 2010, November 2010.
- Heat and Human Health: An Integrated Approach, Richard B. Rood, Marie S. O'Neill, et al., American Meteorological Society, January 2010.
- Our Changing Climate: What Next? Richard B. Rood. Michigan Seminars, Palm Beach Florida, February 2009.
- Assimilation of Scientific Information into Complex Problem Solving, Richard B. Rood, National Center for Atmospheric Research, July 2008.
- Dynamical Cores: Design and the Designer, Richard B. Rood, National Center for Atmospheric Research, June 2008.
- Bridging Weather and Climate, Richard B. Rood, Presidential Symposium, American Meteorological Society, January 2007.
- Weather and Climate Research and Operations Infrastructure, Richard B. Rood, History and Theory of Infrastructure Workshop, October 2006.
- Assimilation of Satellite Observations: Why and Why Not, Richard B. Rood, European Geophysical Society, April 2006.

SEMINARS:

- Framing Approaches to Climate Change Problem Solving, Richard B. Rood, University of Michigan Biological Station (Endowed Lecture), May 14, 2020 (<https://openclimate.org/lecture-problem-solving-framing-approaches-to-climate-change-problem-solving/>)
- The Usability of Climate Science in Planning and Management (Lake Levels Use Case), Richard B. Rood, Colorado State University, September 26, 2019. (<https://openclimate.org/lecture-the-usability-of-climate-science-in-planning-and-management/>)
- Climate Informatics: Human Experts and the End-to-End System, Richard R. Rood and Paul N. Edwards, National Center for Atmospheric Research, Expeditions Meeting, July 2014.
- The Usability of Climate Data in Climate-Change Planning and Management, Richard B. Rood, Jet Propulsion Laboratory, June 2014
- The National Climate Predictions and Projections (NCCP) Platform: Development of Capacity to Support Planning and Management, Richard B. Rood, NOAA, Climate Program Office, Webinar Series, November 2013.
- Thinking about the Arctic Oscillation, Richard B. Rood, National Park Service, Climate Change in America's National Parks - Post-Sandy: Storms, Barrier Islands, and Implications for the Atlantic Coastline, Webinar Series, August 2013.
- The Validation of Climate Models: The Development of Essential Practice, Richard B. Rood, NCAR, August 2012.
- The Validation of Climate Models: The Development of Essential Practice, Richard B. Rood, NOAA, Earth System Research Laboratory, February 2012.
- Global Warming: Simple Physics in a Complex System, Richard B. Rood, Department of Physics, November 2010.
- Climate Change: In the Moment, Richard B. Rood, Sierra Club Southeast Michigan, November 2010.
- Climate Management 101: Complex Problems with No Known Solutions, Richard B. Rood, Grosse Pointe Audubon, Grosse Pointe, Michigan, November 2007.
- The Impact of the Lin-Rood Dynamical Core on (Modeled) Precipitation, Richard B. Rood and Cedric Drui, Interdepartmental Environmental Geophysical Fluid Dynamics Seminar Series, University of Michigan, April 2006.
- A Walk Through the Science and Observations of Climate Change, Richard B. Rood, SAS Alliance-University Living, Ann Arbor, Michigan, February 2006.
- Regional Analysis of Climate Change, Richard B. Rood, Third Faculty Forum on Climate Change, University of Michigan, December 2005.

PUBLIC ENGAGEMENT

Professor Rood spends significant effort on public engagement. He does frequent radio and newspaper interviews. He speaks at community (e.g., Sierra Club) and university (e.g. Students for Clean Energy) events.

Richard B. (Ricky) Rood wrote, until 2017, an expert blog on climate change for the Weather Underground and the American Meteorological Society's ClimatePolicy.org. These blogs are presently being archived and curated in the ACI Scholarly Blog Index and catalogued using ORCID. His contributions to The Conversation have more than one million readers. He writes the column, Climate Blue, for Michigan Today.

Rood writes short stories, essays, and poems and has been published in *Night Music*, *Bay Weekly*, *Faultline*, *Foreign Service Journal* (*Summer Fiction Winner, 2004*), *Current Magazine* (*Fiction and Poetry Contest, 2006, Honorable Mention*) and *Arnazella*.

Rood was President of Cape Anne Citizens Association (~1988-1992) in Anne Arundel County, Maryland.

PUBLIC ENGAGEMENT: COMMENTARY, ANALYSIS, BLOGS:

Climate Blue: Column in Michigan Today -

<https://michigantoday.umich.edu/category/columns/climate-blue/>

Dr. Ricky Rood's Climate Change Blog –

<https://www.wunderground.com/blog/RickyRood/archive.html>

Climate Policy Blog: An American Meteorological Society Project –

<http://blog.climatepolicy.org/>

- Actually, Climate Scientists Don't Blame Anything They Want on Climate Change, July 12, 2019, *PRAVMIR* (<http://www.pravmir.com/actually-climate-scientists-don-t-blame-anything-they-want-on-climate-change/>)
- Climate change is driving rapid shifts between high and low water levels on the Great Lakes, June 4, 2019, *The Conversation* (<https://theconversation.com/climate-change-is-driving-rapid-shifts-between-high-and-low-water-levels-on-the-great-lakes-118095>)
- Opinion: Wave of flooding a wake-up call, May 9, 2019, *The Detroit News* (<https://www.detroitnews.com/story/opinion/2019/05/09/opinion-wave-flooding-wake-up-call/1132929001/>)
- Making sense of the polar vortex and record cold on a feverish planet, February 8, 2019, *The Washington Post* (<https://www.washingtonpost.com/weather/2019/02/08/making-sense-polar-vortex-record-cold-feverish-planet/>)
- Red team-blue team? Debating climate science should not be a cage match, August 13, 2017, *The Conversation* (<https://theconversation.com/red-team-blue-team-debating-climate-science-should-not-be-a-cage-match-80663>)
- If we stopped emitting greenhouse gases right now, would we stop climate change? Richard B. Rood, July 4, 2017, *The Conversation* (<https://theconversation.com/if-we-stopped-emitting-greenhouse-gases-right-now-would-we-stop-climate-change-78882>)
- Take the Long View on Environmental Issues in the Age of Trump, Richard B. Rood, *Eos*, 97, <https://doi.org/10.1029/2016EO063609>. Published on 01 December 2016. (<https://eos.org/opinions/take-the-long-view-on-environmental-issues-in-the-age-of-trump>)
- Let's Call It: 30 Years of Above Average Temperatures Means the Climate Has Changed, Richard B. Rood, February 26, 2015, *The Conversation* (<https://theconversation.com/lets-call-it-30-years-of-above-average-temperatures-means-the-climate-has-changed-36175>)
- What Would Happen to the Climate If We Stopped Emitting Greenhouse Gases Today? Richard B. Rood, December 11, 2014, *The Conversation* (<https://theconversation.com/what-would-happen-to-the-climate-if-we-stopped-emitting-greenhouse-gases-today-35011>)

- Climate Informatics: Human Experts and the End-to-End System, Richard B. Rood and Paul N. Edwards, May 22, 2014, *Earthzine*
(<http://www.earthzine.org/2014/05/22/climate-informatics-human-experts-and-the-end-to-end-system/>)
- Climate Change: A Fundamental Shift of Our Place in the World, Richard B. Rood, 2014, *Michigan Journal of Sustainability*
(<http://blog.climatepolicy.org/2014/05/14/climate-change-a-fundamental-shift-of-our-place-in-the-world/>)
- To Be the Best in Weather Forecasting: Why Europe is Beating the U.S., Richard B. Rood, March 8, 2013, *Washington Post* (http://www.washingtonpost.com/blogs/capital-weather-gang/post/to-be-the-best-in-weather-forecasting-why-europe-is-beating-the-us/2013/03/08/429bfd0-8806-11e2-9d71-f0feafdd1394_blog.html)
- Stop with the Abstract and Think Through Real Scenarios in Real Places, Richard B. Rood, February 20, 2013, *Zocalo Public Square*
(<http://www.zocalopublicsquare.org/2013/02/19/its-getting-hot-in-here-so-what-exactly/ideas/up-for-discussion/#Richard+B.+Rood>)
- U.S. Obsessed over the Superstorm, but Ignored the Climate Behind It, Richard B. Rood, October 31, 2012, *The Globe and Mail*
(<http://www.theglobeandmail.com/commentary/us-obsessed-over-the-superstorm-but-ignored-the-climate-behind-it/article4789420/>)
- Changing the Media Discussion on Climate and Extreme Weather, Christine Shearer and Richard B. Rood, April 17, 2011, *Earthzine*
(<http://www.earthzine.org/2011/04/17/changing-the-media-discussion-on-climate-and-extreme-weather/>)
- Federal Climate Services and Academic Institutions, Richard B. Rood et al.,
(http://climateknowledge.org/openclimate/doclink/20090515_NOAA_RFI_Climate_Services_final_v1.pdf)
- Don't 'Sell Short' the Earth: Carbon Tax Will Ease Transition to Sensible Climate Policy, Richard B. Rood and Gabriel Thoumi, August 13, 2008
(http://news.mongabay.com/2008/0813-rood_thoumi.html)

PUBLIC ENGAGEMENT: INTERVIEWS (Selected)

Complete List: <https://sites.google.com/a/umich.edu/press-clippings/home>

- Hurricane Response 2.0, June 26, 2020, *Trade Only Today* (<https://www.tradeonlytoday.com/post-type-feature/hurricane-response-2-0>)
- Long Live the Laurentian Great Lakes, May 18, 2020, *EOS: Transactions of the American Geophysical Union* (<https://eos.org/articles/long-live-the-laurentian-great-lakes>)
- The Great Lakes depend on ice. This winter, they barely froze, March 24, 2020, *National Geographic* (<https://www.nationalgeographic.com/science/2020/03/great-lakes-depend-on-winter-ice-low-cover/>)
- Homeowners near the Great Lakes face a ‘very scary’ challenge: How do you handle a generation’s worth of water level changes in just a few years?, January 9, 2020, *Chicago Tribune* (<https://www.chicagotribune.com/news/environment/great-lakes/ct-lake-huron-climate-change-water-levels-20200109-oiw7nunhnh3hm2vg5lrfiimou-story.html>)
- The impact of the US leaving the Paris Accords, November 5, 2019, *Scott Thompson Show* (<https://omny.fm/shows/scott-thompson-show/podcast-the-national-unity-question-in-other-provi?t=20m47s>)
- ‘A planet full of ifs’: Young people express climate angst, September 25, 2019, *AP* (<https://apnews.com/2d7ccb5d1b3242b9923deb2ca197a56b>)
- Great Lake dwarfs sea-level rise. Water is up 6 feet, August 22, 2019, *E&E News* (<https://www.eenews.net/stories/1061024613>)
- Answers sought on cause of high Lake Ontario waters, July 7, 2019, *NNY660/Watertown Daily Times* (https://www.nny360.com/top_stories/answers-sought-on-cause-of-high-lake-ontario-waters/article_a7054b90-50e0-57cd-a5f3-007c0caa396e.html)
- There Is No New Normal, June 12, 2019, *Radio Ecoshock* (<https://www.ecoshock.org/2019/06/there-is-no-new-normal.html>)
- Floods, tornadoes, snow in May: Extreme weather driven by climate change across US, May 29, 2019, *USA Today* (<https://www.usatoday.com/story/news/2019/05/29/severe-weather-across-us-driven-climate-change-trump-administration-new-jersey-kansas-dallas-fort/1271937001/>)
- A Look at Climate Change and Why Black People Will Be Among Those Hardest Hit, May 1, 2019, *BLAC: Black Life, Arts and Culture* (<https://www.blac.media/news-features/a-local-look-at-climate-change-and-why-black-people-will-be-among-those-hardest-hit>)
- How a Battle to Build the Best Weather Model Impacts Everyone on Earth, August 30, 2018, *Gizmodo* (<https://earth.gizmodo.com/how-a-battle-to-build-the-best-weather-model-impacts-ev-1828636632>)
- Why the World Would Keep Warming if Greenhouse Gas Emissions were to Cease, September 29, 2017, *Michigan Radio: Stateside* (<http://michiganradio.org/post/why-world-would-keep-warming-even-if-we-stopped-emitting-greenhouse-gases>)

- What Caused the Ongoing Flooding on Lake Ontario? August 3, 2017, *EOS: Transactions of the American Geophysical Union* (<https://eos.org/articles/what-caused-the-ongoing-flooding-on-lake-ontario>)
- Can We Stop Climate Change? July 13, 2017, *Calgary Today*, (<https://omny.fm/shows/calgary-today-with-angela-kokott/can-we-stop-climate-change>)
- The Weather Master, April 14, 2017, *Science*, (<http://science.sciencemag.org/content/356/6334/128>)
- Climate Change and Trump Administration, January 20, 2017, *WILS Lansing: Capital City Recap* (<http://1320wils.com/assets/files/1-20-17%20Richard%20Rood.mp3>)
- How Trump's White House Could Mess With Government Data, December 15, 2016, *Five Thirty Eight* (<https://fivethirtyeight.com/features/how-trumps-white-house-could-mess-with-government-data/>)
- Climate Change And Weather For The Coming Winter, December 14, 2016, *Issues Of The Environment*, WEMU Radio (<http://wemu.org/post/issues-environment-climate-change-and-weather-coming-winter>)
- Future of Weather Forecasting, September 11, 2016, *WX Geeks*, Weather Channel (<https://drive.google.com/file/d/0B0L4uN5fZjQ1NFVYNWpFa3cxd2M/view>)
- It Still Gets Cold, 2016, CLaSP (<https://www.youtube.com/watch?v=QL-ApepPr1w>)
- 2015 Hottest Year, January 22, 2016, *WILS Lansing: Capital City Recap* (<http://1320wils.com/assets/files/1-22-16%206th%20Richard%20Rood.mp3>)
- 2015 Review: Ricky Rood on 30 Years of Warming, December, 30, 2015, *Climate Crock of the Week* (<http://climatecrocks.com/2015/12/30/2015-review-ricky-rood-on-30-years-of-warming/>)
- How Paris Climate Agreement Will Affect U.S. Policy Going Forward, December 14, 2015, *Wisconsin Public Radio* (<http://www.wpr.org/how-paris-climate-agreement-will-affect-us-policy-going-forward>)
- Dr. Ricky Rood: Why It's So Freaking Cold, February 27, 2015, *Climate Crock of the Week* (<http://climatecrocks.com/2015/02/27/dr-ricky-rood-why-its-so-freaking-cold/>)
- Dr. Ricky Rood on The Arctic Oscillation, March 9, 2014, *Climate Crock of the Week* (<http://climatecrocks.com/2014/03/09/dr-ricky-rood-on-the-arctic-oscillation/>)
- Dr. Richard Rood on Atmospheric Cycles, March 8, 2014, *Climate Crock of the Week* (<http://climatecrocks.com/2014/03/08/dr-richard-rood-on-atmospheric-cycles/>)
- 2012 Warmest Year on Record? January 2, 2013, *Michigan Radio: Stateside with Cynthia Canty*, (<http://michiganradio.org/post/stateside-wednesday-january-2-2013>)
- Weird Weather and Climate Change, June 13, 2011, *KCRW: To the Point*, (<http://www.kcrw.com/people/richard-rood>)
- Why Has the Weather Gone Cuckoo? May 23, 2011, *Philadelphia Inquirer*, (http://articles.philly.com/2011-05-23/news/29574489_1_extreme-weather-warming-extreme-precipitation-events)

PUBLIC ENGAGEMENT: MEDIA COVERAGE (Selected)

Complete List: <https://sites.google.com/a/umich.edu/press-clippings/home>

- COVID-19 owns the headlines, but there's no shortage of topics for 'solutions journalism', April 23, 2020, *MLive*, (<https://www.mlive.com/news/2020/04/letter-from-the-editor-covid-19-owns-the-headlines-but-theres-no-shortage-of-topics-for-solutions-journalism.html>)
- New engine is driving NOAA's flagship weather forecast model, June 12, 2019, NOAA Research News (<https://www.research.noaa.gov/article/ArtMID/587/ArticleID/2465/New-engine-is-driving-NOAA's-flagship-weather-forecast-model>)
- NOAA's emerging effort in community modeling, Winter 2019, *Transitions* (<https://dtcenter.org/news/2019/01/ricky-rood-university-michigan>)
- AccuWeather developed a hurricane category scale, and it worries some meteorologists, January 10, 2019, *The Washington Post* (<https://www.washingtonpost.com/weather/2019/01/11/accuweather-developed-hurricane-category-scale-it-worries-some-meteorologists/>)
- Our Most Read Stories, September 15, 2018, *The Conversation* (<https://theconversationus.email19.com/t/ViewEmail/r/7FF7AD21A197AFB72540EF23F30FEDED/E54A91508C02DB087EEA1DAE616D4B3C>)
- The Trump Administration, Slanted Science and the Environment: 4 Essential Reads, April 10, 2018, *The Conversation* (<https://theconversation.com/the-trump-administration-slanted-science-and-the-environment-4-essential-reads-94711>)
- Calls for Red Team-Blue Team Just Another Effort to Debunk Climate Science, August 16, 2017, *Nonprofit Quarterly* (<https://nonprofitquarterly.org/2017/08/16/calls-red-team-blue-team-just-another-effort-debunk-climate-science/>)
- Michigan Mayors Vow to Uphold Paris Agreement in Wake of U.S. Abandonment, June 2, 2017, *Michigan Radio* (<http://www.michiganradio.org/post/michigan-mayors-vow-uphold-paris-agreement-wake-us-abandonment>)
- Earth Sets Heat Record in 2016 – for the Third Year in a Row, January 18, 2017, *Los Angeles Times* (<https://www.latimes.com/science/sciencenow/la-sci-sn-hottest-year-2016-20170118-story.html>)
- University Faculty Consider Effects of Trump Presidency on Climate Change Policy, November 29, 2016, *Michigan Daily* (<https://www.michigandaily.com/section/campus-life/university-faculty-assess-climate-change-policy-under-trump-administration>)
- This New Weather Satellite Isn't Just Good for the U.S. – It's Good for the World, November 19, 2016, *The Washington Post* (https://www.washingtonpost.com/news/capital-weather-gang/wp/2016/11/19/u-s-launches-next-generation-weather-satellite-that-will-revolutionize-forecasting/?utm_term=.7e5d6d54c561)

- All the Questions You Had about Climate Models but Were Afraid to Ask, July 14, 2017, *Popular Science* (<http://www.popsci.com/all-questions-you-had-about-climate-models-but-were-afraid-to-ask>)
- Research Only Beginning On Relationship Between El Niño, Climate Change, November 19, 2015, *Wisconsin Public Radio* (<http://www.wpr.org/research-only-beginning-relationship-between-el-nino-climate-change>)
- Too Hot for Hajj? Scientists Raise Alarm About Persian Gulf's Future Climate, October, 26, 2015, *Forbes* (<http://www.forbes.com/sites/alanboyle/2015/10/26/too-hot-for-hajj-scientists-raise-alarm-about-persian-gulfs-future-climate/#6f5e44972d3f>)
- Great Lakes buoy to new heights after 15 years of low water levels, March 20, 2015, *Christian Scientist Monitor* (<http://www.csmonitor.com/Science/2015/0320/Great-Lakes-buoy-to-new-heights-after-15-years-of-low-water-levels-video>)
- The 'Super El Niño' Forecast Fadeout, November, 7, 2014, *New York Times* (<http://dotearth.blogs.nytimes.com/2014/11/07/the-super-el-nio-forecast-fadeout>)
- Game-changing improvements in the works for U.S. weather prediction, May 15, 2012, *Washington Post* (<https://www.washingtonpost.com/news/capital-weather-gang/wp/2013/05/15/game-changing-improvements-in-the-works-for-u-s-weather-prediction/>)
- 2012 was the hottest year ever for Lower 48, January 8, 2013, *Los Angeles Times* (<http://articles.latimes.com/2013/jan/08/nation/la-na-noaa-hottest-20130109>)
- Are Meteorologists Scientific Journalists?, April 15, 2012, *Society for Environmental Journalists* (<http://www.sej.org/publications/sejournal-sp12/are-meteorologists-environmental-journalists>)
- Climate Talks End with Small Steps Forward, December 12, 2011, *LiveScience* (<http://www.livescience.com/17432-durban-climate-change-talks.html>)
- Get Used to New Weather Extremes, July 19, 2011, *Mother Jones* (<http://www.motherjones.com/blue-marble/2011/07/new-weather-extremes>)
- Framing the Framers, October 22, 2010, *American Meteorological Society* (<http://blog.ametsoc.org/uncategorized/framing-the-framers-updating-science-communication/>)
- Computer Modelling: Our Virtual Planet, April 11, 2002, *Nature* (<http://www.nature.com/nature/journal/v416/n6881/full/416579a.html>)
- Scientists Call for a Climate Research Agency, April 14, 2001, *Government Computing News* (<https://gcn.com/articles/2001/04/14/scientists-call-for-a-climate-research-agency.aspx>)
- NASA Scientist Makes Dire Supercomputing Prediction, October 24, 1999, *Government Computing News* (<https://gcn.com/Articles/1999/10/24/NASA-scientist-makes-dire-supercomputing-prediction.aspx?m=1>)

PUBLICATIONS

BOOK:

Demystifying Climate Models: A Users Guide to Earth System Models

Andrew Gettelman

Richard B. Rood

Springer-Verlag, Berlin, Heidelberg

ISBN: 978-3-662-48957-4

2016

This book demystifies the models we use to simulate present and future climates, allowing readers to better understand how to use climate model results. In order to predict the future trajectory of the Earth's climate, climate-system simulation models are necessary. When and how do we trust climate model predictions? The book offers a framework for answering this question. It provides readers with a basic primer on climate and climate change, and offers non-technical explanations for how climate models are constructed, why they are uncertain, and what level of confidence we should place in them.

REFEREED BOOK CHAPTERS:

6. Validation of Climate Models: An Essential Practice, Richard B. Rood, in: Beisbart C., Saam N. (eds) *Computer Simulation Validation. Simulation Foundations, Methods and Applications*. Springer, Cham, 2019. https://doi.org/10.1007/978-3-319-70766-2_30
5. [A Perspective on the Role of the Dynamical Core in the Development of Weather and Climate Models](#), Richard B. Rood, in *Numerical Techniques for Global Atmospheric Models*, Springer, ISBN 978-3-642-11639-1, 556pp, 2011.
4. [Reanalysis: Data Assimilation for Scientific Investigation of Climate](#), Richard B. Rood and Michael G. Bosilovich in *Data Assimilation: Making Sense of Observations*, Springer, Springer, ISBN 978-3-540-74702-4, 732 pp, 2010.
3. [Atmospheric Modeling in Data Assimilation](#), Richard B. Rood, in *Data Assimilation: Making Sense of Observations*, Springer, SBN 978-3-540-74702-4, 732 pp 2010.
2. [Reanalysis](#), Richard B. Rood, *Data Assimilation for the Earth System*, NATO Science Series: IV: Earth and Environmental Sciences, 26, Swinbank, R., Shutyaev, V.; Lahoz, W. A. (Eds.), Kluwer, ISBN 978-1-4020-1593-9, 388 pp, 2003.
1. [Ozone Assimilation](#), Richard B. Rood, *Data Assimilation for the Earth System*, NATO Science Series: IV: Earth and Environmental Sciences, 26, Swinbank, R., Shutyaev, V.; Lahoz, W. A. (Eds.), Kluwer, ISBN 978-1-4020-1593-9, 388 pp, 2003.

REFEREED JOURNAL PUBLICATIONS:

98. Uncovering the Treatment of Large Lakes in CMIP5: A Great Lakes Case Study, Briley, L. J., Rood R. B., Notaro, M., *Journal of Great Lakes Research*, submitted, 2020.
97. Increasing the Usability of Climate Models through the use of Consumer-Report Style Resources for Decision Making, Briley, L., Dougherty, R., Blackmer, E. D., Troncoso, A. V., Rood, R. B., Andresen, J., and Lemos, M. C., *Bull. Amer. Meteor. Soc.*, <https://doi.org/10.1175/BAMS-D-19-0099.1> , 2020.
96. Water Level Changes across Earth's Largest Lake System and Implications for Future Variability, Gronewold, A. D., and Rood, R. B., *Journal of Great Lakes Research*, <https://doi.org/10.1016/j.jglr.2018.10.012> , 2019.
95. Modeling Seasonal Onset of Coastal Ice, Ji, X., Gronewold, A. D., Daher, H., and Rood, R. B., *Climatic Change*, **154**, 125-141, 2019.
94. A Decision Tree Algorithm for Investigation of Model Biases Related to Dynamical Cores and Physical Parameterizations, Yorgun, M. S., and Rood, R. B., *J. Adv. Model. Earth Syst.*, **8**, doi:10.1002/2016MS000657, 2016.
93. Evaluating the Appropriateness of Downscaled Climate Information for Projecting Risks of *Salmonella*, Guentchev, G. S., Rood, R. B., Ammann, C. M., Barsugli, Ebi, K., J. J., Berroca, V., O'Neill, M. S., Gronlund, C. J., Vigh, J. L., Koziol, B., and Cinquini, L., *Int. J. Environ. Res. Public Health*, **13**, 267, doi:[10.3390/ijerph13030267](https://doi.org/10.3390/ijerph13030267), 2016.
92. The Role of Meteorological Processes in the Description of Uncertainty for Climate Change Decision-making, Briley, L. J., Ashley, W. S., Rood, R. B., Krmenc, K., *Theoretical and Applied Climatology*, **127**, 643-654, <http://dx.doi.org/10.1007/s00704-015-1652-2>, 2017.
91. An Object-Based Approach for Quantification of GCM Biases of the Simulation of Orographic Precipitation. Part II: Quantitative Analysis, Yorgun, M. S., and Rood, R. B., *J. Climate*, **28**, 4863-4876, 2015.
90. Introduction: Solving the Problems of Climate Change and Sustainability, Rood, R. B., *Mich. J. Sustainability*, **2**, 3-7, <http://dx.doi.org/10.3998/mjs.12333712.0002.002>, 2014.
89. Determining the Effective Resolution of Advection Schemes. Part II: Numerical Testing, Kent, J., Jablonowski, C., Whitehead, J. P., and Rood, R. B., *J. Comp. Phys*, **278**, 497-508, <http://dx.doi.org/10.1016/j.jcp.2014.08.045>, 2014.
88. An Object-Based Approach for Quantification of GCM Biases of the Simulation of Orographic Precipitation. Part I: Idealized Simulations, Yorgun, M. S., and Rood, R. B., *J. Climate*, **27**, 9139-9154, <http://dx.doi.org/10.1175/JCLI-D-14-00051.1>, 2014.
87. Potential Vorticity: A Diagnostic Tool for General Circulation Models, Whitehead, J. L., Jablonowski, C., Kent, J. and Rood, R. B., *Q. J. Roy. Meteorol. Soc.*, **141**, 739-751, <http://onlinelibrary.wiley.com/doi/10.1002/qj.2389/abstract> , 2015.
86. Determining the Effective Resolution of Advection Schemes. Part I: Dispersion Analysis, Kent, J., Whitehead, J. P., Jablonowski, C., and Rood, R. B., *J. Comp. Phys.*, **278**, 485-496, <http://dx.doi.org/10.1016/j.jcp.2014.01.043>, 2014.

85. Moving Climate Information Off the Shelf: Boundary Chains and the Role of RISAs as Adaptive Organizations, Lemos, M. C., Kirchoff, C. J., Kalafatis, S. E., Scavia, D., and Rood, R. B., *Weather, Climate, and Society*, **6**, 273-285, 2014.
84. Using Forecast and Observed Weather Data to Assess Performance of Forecast Products in Identifying Heat Waves and Estimating Heat Wave Effects on Mortality, Zhang, K., Chen, Y.-H., Schwartz, J. D., Rood R. B., O' Neill, M. S., *Environ. Health Perspectives*, **122**, 912-918, <http://dx.doi.org/10.1289/ehp.1306858>, 2014.
83. The Practitioner's Dilemma: How to Assess the Credibility of Downscaled Climate Projections, Barsugli, J. J., Guentchev, G., Horton, R., Wood, A., Mearns L. O., Liang, X. Z., Winkler, J., Dixon, K., Hayhoe, K., Rood, R. B., Goddard, L. Ray, A., Buja, L., Ammann, C., *EOS, Trans. Amer. Geophys. Union*, **94**, 424-425, DOI: 10.1002/2013EO460005, 2013.
82. A Trend Analysis of the 1930-2010 Extreme Heat Events in the Continental U.S., Oswald E. M., and Rood. R. B., *J. Appl. Meteorol. Clim.*, **53**, 565-582, doi: 10.1175/JAMC-D-13-071.1, 2014.
81. Coupling Climate and Hydrological Models: Interoperability through Web Services, Goodall, J. L., Saint K. D., Ercan M. B., Briley, L. J., Murphy, S., You, H., DeLuca, C. and Rood, R. B., *Environmental Modeling and Software*, **46**, 250-259, 2013.
80. Downscale Cascades in Tracer Transport Test Cases: An Intercomparison of the Dynamical Cores in the Community Atmosphere Model CAM5, Kent, J., Jablonowski, C., Whitehead J. P., and Rood, R. B., *Geosci. Model Dev.*, **5**, 1517-1530, doi:10.5194/gmd-5-1517-2012, 2012.
79. An Investigation into the Spatial Variability of Near-Surface Air Temperatures in the Detroit, MI Metropolitan Region, Oswald, E. M., Rood, R. B., Zhang, K., Gronland, C. J., O'Neill, M. S., White-Newsome, J. L., Brines, S. J., and Brown, D. G., *J. Appl. Meteorol. Clim.*, **51**, 1290-1304, doi:10.1175/JAMC-D-11-0127.1, 2012.
78. Comparing Methods for Classifying 'Dangerous Heat' in Heat Wave and Health Warning Systems, Zhang, K., Rood, R. B., Michailidis, G., Oswald, E. M., Schwartz, J. D., Zanobetti, A., Ebi, K. L., and O'Neill, M. S., *Environment International*, **46**, 23-29, 2012.
77. Assessing Tracer Transport Algorithms and the Impact of Vertical Resolution in a Finite-Volume Dynamical Core, Kent, J., Jablonowski, C., Whitehead, J. L., and R. B. Rood, *Mon. Weather Rev.*, **140**, 1620-1638, doi:http://dx.doi.org/10.1175/MWR-D-11-00150.1, 2012.
76. Software Testing and Verification in Climate Model Development, Thomas L. Clune, T. L. and Rood, R. B., *IEEE Software*, **28**, 49-55, doi:10.1109/MS.2011.117, 2011.
75. Geostatistical Exploration of Spatial Variation of Summertime Temperatures in the Detroit Metropolitan Region, Zhang, K., Oswald, E. M., Brown, D. G., Brines, S. J., Gronlund, C. J., White-Newsome, J. L., Rood, R. B., O' Neill, M. S., *Environ. Res.*, **111**, 1046-1053, 2011.

74. A Stability Analysis of Divergence Damping on a Latitude-Longitude Grid, Whitehead, J.L., Jablonowski, C., Rood, R. B., and Lauritzen, P. H., *Mon. Weather Rev.*, **139**, 2976-2993, doi:10.1175/2011MWR3607.1, 2011.
73. The Impact of Climate Change on Public Health in India: Future Research Directions, Bush, K. F. *et al.*, *Environ. Health Perspectives*, doi:10.1289/ehp.1003000, 2011.
72. Revisiting projected shifts in the climate envelopes of North American trees using updated general circulation models, McKenney, D. W., Pedlar, J. H., Rood, R. B., and Price, D. *Global Change Biology*, **17**, 2720-2730, DOI: 10.1111/j.1365-2486.2011.02413.x, 2011.
71. Climate Projections and their Impact on Policy and Practice, Lemos, M. C. and Rood, R. B. *Wiley Interdisciplinary Reviews: Climate Change*, **1**, 670-682, DOI: 10.1002/wcc.71, 2010.
70. Climate Change, Heat Waves, and Environmental Justice: Advancing Knowledge and Action, White-Newsome, J., O'Neill, M. S., Gronlund, C., Sunbury, T. M., Brines, S. J., Parker, E., Brown, D. G., Rood, R. B., and Rivers, Z., *Environmental Justice*, **2**, doi:10.1089/env.2009.0032, 2009.
69. Simulated Climate near Steep Topography: Sensitivity to Dynamical Methods for Atmospheric Transport, Bala, G., Rood, R. B. Bader, D., Mirin, A., Ivanova, D., and Drui, C., *Geophys. Res. Lett.*, **35**, L14807, doi:10.1029/2008GL033204, 2008.
68. Evaluation of a CCSM3 Simulation with a Finite Volume Dynamical Core for the Atmosphere at 1° lat x 1.25° lon resolution, Bala, G., Rood, R. B., Mirin, A., McClean, J., Achutarao, K., Bader, D., Gleckler, P., Neale, R., and Rasch, P., *J. Clim.*, **21**, 207-229, 2008.
67. Assimilation of Ozone Data from the Michelson Interferometer for Passive Atmospheric Sounding, Wargan, K., Stajner, I., Pawson, S., Rood, R. B., and Tan, W.-W., *Quart. J. Royal. Met. Soc.*, **131**, 2713-2734 Part A, 2005.
66. Monitoring of Observation Errors in the Assimilation of Satellite Ozone Data, Stajner, I., Winslow, N., Rood, R. B., and Pawson, S., *J. Geophys. Res.*, **109**, D06309, 2004.
65. High Frequency Planetary Waves in the Polar Middle Atmosphere as seen in a Data Assimilation System, Coy. L., Stajner, I., da Silva A., Joiner, J., Rood, R. B., Pawson, S., and Lin, S.-J., *J. Atmos. Sci.*, **60**, 2975-2992, 2003.
64. A Finite-Volume General Circulation Model, Yeh, K.-S., Lin, S.-J., and Rood, R. B., *Computing in Science and Engineering*, **4**, 49-54, 2002.
63. Evaluation of Transport in the Lower Tropical Stratosphere in a Global Chemistry and Transport Model, Douglass, A. R., Schoeberl, M. R., Rood, R. B., and Pawson, S., *J. Geophys. Res.*, **108**, doi:10.1029/2002JD002696, 2003
62. How can we advance our weather and climate models as a community? Dickinson R. E., Zebiak S. E., Anderson J. L., Blackmon M. L., DeLuca C., Hogan T. F., Iredell M., Ji M., Rood R. B., Suarez M. J., and Taylor K. E., *Bull. Amer. Meteor. Soc.*, **83**, 431, 2002.
61. Global Modeling Initiative Assessment Model: Model Description, Integration, and Testing of the Transport Shell, Rotman D. A., Tannahill J. R., Kinnison D. E., Connell P.

- S., Bergmann D., Proctor D., Rodriguez J. M., Lin S.-J., Rood R. B., Prather M. J., Rasch P. J., Considine D. B., Ramaroson R., and Kawa S. R., *J. Geophys. Res.*, **106**, 1669-1691, 2001.
60. Stratospheric Temperature Trends: Observations and Model Simulations, Ramaswamy, V., *et al.*, *Rev. of Geophysics*, **39**, 71-122, 2001.
59. Atmospheric Sulfur Cycle Simulated in the Global Model GOCART: Model Description and Global Properties, Chin M., Rood R. B., Lin S.-J., Muller J. F., Thompson, A. M., *J. Geophys. Res.*, **105**, 24671-24687, 2000.
58. The GCM-Reality Intercomparison Project for SPARC (GRIPS): Scientific Issues and Initial Results, Pawson, S., *et al.*, *Bull. Amer. Meteor. Soc.*, **81**, 781-796, 2000.
57. The GEOS Ozone Data Assimilation System: Specification of Error Statistics, Stajner, I., Riishojgaard, L. P., and Rood, R. B., *Quart. J. Royal. Met. Soc.*, **127**, 1069-1094, Part A, 2001.
56. Seasonal Variability of Middle Latitude Ozone in the Lowermost Stratosphere Derived from Probability Distribution Functions, Rood, R. B., Douglass, A. R., Cerniglia, M. C., Sparling, L. C., and Nielsen, J. E., *J. Geophys. Res.*, **104**, 17,793-17,805, 2000.
55. Lamination Frequencies as a Diagnostic for Horizontal Mixing in a 3D Transport Model, Weaver, C. J., Douglass, A. R., and Rood, R. B., *J. Atmos. Sci.*, **57**, 247-261, 2000.
54. Assimilating TOVS Humidity into the GEOS-2 Data Assimilation System, Chen, M., Rood, R. B., and Joiner, J., *J. Climate*, **12**, 2983-2995, 1999.
53. Seasonal Variations of Upper Tropospheric Water Vapor and High Clouds Observed from Satellites. Chen, M., Rood, R. B., and Read, W. G., *J. Geophys. Res.*, **104**, 6193-6197, 1999.
52. Upper Tropospheric Water Vapor from GEOS Reanalysis and UARS MLS Observation, Chen, M., Rood, R. B., and Read, W. G., *J. Geophys. Res.*, **103**, 19587-19594, 1998.
51. A Study on Assimilating Potential Vorticity Data, Li, Y., Menard, R., Riishojgaard, L. P., Cohn, S. E., and Rood, R. B., *Tellus A*, **50A**, 490-506, 1998.
50. A Three-Dimensional Simulation of the Evolution of the Middle Latitude Winter Ozone in the Middle Stratosphere, Douglass, A. R., Rood, R. B., Kawa, S. R., and Allen, D. J., *J. Geophys. Res.*, **102**, 19217-19232, 1997.
49. Processes Controlling Dimethylsulfide Over the Ocean: Case Studies Using a 3-D Model Driven by Assimilated Meteorological Fields, Chin, M., Rood, R. B., Allen, D. J., Andreae, M. O., Thompson, A. M., Lin, S.-J., Atlas, R. M., and Ardizzone, J. V., *J. Geophys. Res.*, **103**, 8341-8353, 1998.
48. Synoptic-Scale Mass Exchange from the Troposphere to the Stratosphere, Rood, R. B., Douglass, A. R., Cerniglia, M. C., and Read, W. G., *J. Geophys. Res.*, **102**, 23467-23485, 1997.
47. Impact of a Semi-Lagrangian and an Eulerian Dynamical Core on Climate Simulations, Chen, M., Rood, R. B., and Takacs, L. L., *J. Climate*, **10**, 2374-2389, 1997.

46. The Impact of Diabatic Initialization on Stratospheric Analyses, Forecasts, and Transport Experiments, Fox-Rabinovitz, M. S., Rood, R. B., Lamich, D. J., Govindaraju, R. C., Coy, L., and Weaver, C. J., *Quart. J. Royal Met. Soc.*, **124**, 297-315 Part A, 1998.
45. An Explicit Flux-Form Semi-Lagrangian Shallow Water Model on the Sphere, Lin, S.-J., and Rood, R. B., *Quart. J. Royal Met. Soc.*, **123**, 2477-2498 Part B, 1997.
44. Measurements of Polar Vortex Air in the Midlatitudes, Newman, P. A., Lait, L. R., Schoeberl, M., R., Seablom, M., Coy, L., Rood, R. B., Swinbank, R., Proffitt, M., Lowenstein, M., Podolske, J.R., Elkins, J. W., Webster, C. R., May, R. D., Fahey, D. W., Dutton, G. S., and Chan, K. R., *J. Geophys. Res.*, **101**, 12, 879 - 891, 1996.
43. Multidimensional Flux-Form Semi-Lagrangian Transport Schemes, Lin, S.-J., and Rood, R. B., *Mon. Wea. Rev.*, **124**, 2046-2070, 1996.
42. Transport-Induced Interannual Variability of Carbon Monoxide Determined Using a Chemistry and Transport Model, Allen, D. J., Kasibhatla, P., Thompson, A. M., Rood, R. B., Doddridge, B. G., Pickering, K. E., Hudson, R. D., and Lin, S.-J., *J. Geophys. Res.*, **101**, 28,655 - 28,669, 1996.
41. Three-dimensional Radon 222 Calculations Using Assimilated Meteorological Data and Convective Mixing Algorithm, Allen, D. J., Rood, R. B., Thompson, A. M., and Hudson, R. D., *J. Geophys. Res.*, **101**, 6871-6881, 1996.
40. A Three-Dimensional Simulation of the Ozone Annual Cycle Using Winds from a Data Assimilation System, Douglass, A. R., Weaver, C. J., Rood, R. B., and Coy, L., *J. Geophys. Res.*, **101**, 1463-1474, 1996.
39. Upper-Tropospheric Water Vapor from UARS MLS, Read, W. G., Waters, J. W., Flower, D. A., Froidevaux, L., Jarnot, R. F., Hartmann, D. L., Harwood, R. S., and Rood, R. B., *Bull. American Met. Soc.*, **76**, 2381-2389, 1995.
38. 2D and 3D Model Simulations, Measurements, and Interpretation of the Influence of the October 1989 Solar Proton Events on the Middle Atmosphere, Jackman, C. H., Cerniglia, M. C., Nielsen, J. E., Allen, D. J., Zawodny, J. M., McPeters, R. D., Douglass, A. R., Rosenfield, J. E., and Rood, R. B., *J. Geophys. Res.*, **100**, 11,641-11,660; 1995.
37. Stratosphere-Troposphere Exchange, Holton, J. R., Haynes, P. H., McIntyre, M. E., Douglass, A. R., Rood, R. B., and Pfister, L., *Rev. Geophys.*, **33**, 403-439, 1995.
36. Vertical Transport by Convective Clouds: Comparisons between Cloud-Scale and Global-Scale Models, Pickering, K. E., Thompson, A. M., Tao, W.-K., Rood, R. B., McNamara, D. P., and Molod, A. M., *Geophys. Res. Lett.*, **22**, 1089-1092, 1995.
35. A 3D Simulation on the Influence of a Cut-Off Low on the Distribution of Northern Hemispheric Processed Air in Late January, 1992, Cerniglia, M. C., Rood, R. B., and Douglass, A. R., *J. Geophys. Res.*, **100**, 11,641-11,660, 1995.
34. Tracer Transport for Realistic Aircraft Emission Scenarios Calculated Using a Three-Dimensional Model, Weaver, C. J., Douglass, A. R., and Rood, R. B., *J. Geophys. Res.*, **100**, 5203-5214, 1995.

33. Tracer Evolution in Winds Generated by a Global Spectral Mechanistic Model, Nielsen, J. E., Rood, R. B., Douglass, A. R., Cerniglia, M. C., Allen, D. J., and Rosenfield, J. E., *J. Geophys. Res.*, **99**, 5399-5420, 1994.
32. A Comparison of Winds from the STRATAN Data Assimilation System to Geostrophic and Balanced Wind Estimates, Coy, L., Rood, R. B., and Newman, P. A., *J. Atmos. Sci.*, **51**, 2309-2315, 1994.
31. An Assimilated Data Set for Earth Science Applications, Schubert, S. D., Rood, R. B., and Pfaendtner, J., *Bull Amer. Meteor. Soc.*, **74**, 2331-2342, 1993.
30. A 3D Simulation of the Early Winter Distribution of Reactive Chlorine in the North Polar Vortex, Douglass, A. R., Rood, R. B., Waters, J., Froidevaux, L., Read, W., Elson, L., Geller, M., Chi, Y., Cerniglia, M., and Steenrod, S., *Geophys. Res. Lett.*, **20**, 1271-1274, 1993.
29. The Effects of the October 1989 Solar Proton Events on the Stratosphere as Computed Using a Three-Dimensional Model, Jackman, C. H., Nielsen, J. E., Allen, D. J., Cerniglia, M. C., McPeters, R. D., Douglass, A. R., and Rood, R. B., *Geophys. Res. Lett.*, **20**, 459-462, 1993.
28. Implications of 3D Tracer Studies for 2D Assessments of the Impact of Supersonic Aircraft on Stratospheric Ozone, Douglass, A. R., Rood, R. B., Weaver, C. J., Cerniglia, M., and Brueske, K., *J. Geophys. Res.*, **98**, 8949-8963, 1993.
27. Thermodynamic Balance of Three Dimensional Stratospheric Winds Derived from a Data Assimilation Procedure, Weaver, C. J., Douglass, A. R., and Rood, R. B., *J. Atmos. Sci.*, **50**, 2987-2993, 1993.
26. Characteristics of Wintertime and Autumn Nitric Acid Chemistry as Defined by LIMS Data, Rood, R. B., Douglass, A. R., Kaye, J. A., and Considine, D. B., *J. Geophys. Res.*, **98**, 18533-18545, 1993.
25. Tracer Exchange between Tropics and Middle Latitudes, Rood, R. B., Douglass, A. R., and Weaver, C. J., *Geophys. Res. Lett.*, **19**, 805-808, 1992.
24. Episodic Total Ozone Minima and Associated Effects on Heterogeneous Chemistry and Lower Stratospheric Transport, Rood, R. B., Nielsen, J. E., Stolarski, R. S., Douglass, A. R., Kaye, J. A., and Allen, D. J., *J. Geophys. Res.*, **97**, 7979-7996, 1992.
23. The Minor Stratospheric Warming of January 1989: Results from STRATAN, a Stratospheric/Tropospheric Data Assimilation System, Steenrod, S. D., Rood, R. B., Lamich, D. J., Rosenfield, J. E., and Govindaraju, R. C., *Mon. Wea. Rev.*, **120**, 221-229, 1992.
22. Application of a Monotonic Upstream Transport Scheme to Three Dimensional Constituent Transport Calculations, Allen, D. J., Douglass, A. R., Rood, R. B., and Guthrie, P. D., *Mon. Wea. Rev.*, **119**, 2456-2464, 1991.
21. Three Dimensional Simulation of Wintertime Ozone Variability in the Lower Stratosphere, Rood, R. B., Douglass, A. R., Kaye, J. A., Geller, M. A., Chi, Y., Allen, D. J., Larson, E. M., Nash, E. R., and Nielsen, J. E., *J. Geophys. Res.*, **96**, 5055-5072, 1991.

20. Spatial and Temporal Variability of the Extent of Chemically Processed Stratospheric Air, Kaye, J. A., Douglass, A. R., Rood, R. B., Stolarski, R. S., Newman, P. A., Allen, D. J., and Larson, E. M., *Geophys. Res. Lett.*, **18**, 29-32, 1991.
19. The Influence of Polar Heterogeneous Processes on Reactive Chlorine at Middle Latitudes: Three-dimensional Model Implications, Douglass, A. R., Rood, R. B., Kaye, J. A., Stolarski, R. S., Allen, D. J., and Larson, E. M., *Geophys. Res. Lett.*, **18**, 25-28, 1991.
18. Stratospheric Temperatures During AASE: Results from STRATAN, Rood, R. B., Newman, P. A., Lait, L. R., Lamich, D. J., and Chan, R., *Geophys. Res. Lett.*, **17**, 337-340, 1990.
17. Three Dimensional Simulation of Hydrogen Chloride and Hydrogen Fluoride During the Airborne Arctic Stratosphere Expedition, Kaye, J. A., Douglass, A. R., Rood, R. B., Stolarski, R. S., Newman, P. A., Allen, D. J., Larson, E. M., Coffey, M. T., Mankin, W. G., and Toon, G. C., *Geophys. Res. Lett.*, **17**, 529-532, 1990.
16. The Effect of Solar Proton Events on the Middle Atmosphere during the Past Two Solar Cycles as Computed Using a Two-Dimensional Model, Jackman, C. H., Douglass, A. R., Rood, R. B., McPeters, R. D., and Meade, P. E., *J. Geophys. Res.*, **95**, 7417-7428, 1990.
15. Global Three-Dimensional Constituent Fields Derived from Profile Data, Douglass, A. R., Rood, R. B., Stolarski, R. S., Schoeberl, M. R., Proffitt, M. H., Margitan, J. J., Lowenstein, M., Podolske, J. R., and Strahan, S. E., *Geophys. Res. Lett.*, **17**, 525-528, 1990.
14. Wintertime Nitric Acid Chemistry: Implications from Three-Dimensional Model Calculations, Rood, R. B., Kaye, J. A., Douglass, A. R., Allen, D. J., Steenrod, S. D., and Larson, E. M., *J. Atmos. Sci.*, **47**, 2696-2709, 1990.
13. Three Dimensional Simulation of Spatial and Temporal Variability of Stratospheric Hydrogen Chloride, Kaye, J. A., Rood, R. B., Allen, D. J., Larson, E. J., and Jackman, C. H., *Geophys. Res. Lett.*, **16**, 1149-1150, 1989.
12. The Use of Assimilated Stratospheric Data in Constituent Transport Calculations, Rood, R. B., Allen, D. J., Baker, W., Lamich, D., and Kaye, J. A., *J. Atmos. Sci.*, **46**, 687-701, 1989.
11. Chemistry and Transport in a Three-Dimensional Stratospheric Model, Chlorine Species during a Simulated Stratospheric Warming, Kaye, J. A., and Rood, R. B., *J. Geophys. Res.*, **94**, 1057-1083, 1989.
10. Numerical Advection Algorithms and their Role in Atmospheric Transport and Chemistry Models, Rood, R. B., *Rev. Geophys.*, **25**, 71-100, 1987.
9. Nitric Acid Forecast Experiments, Rood, R. B., Kaye, J. A., Nielsen, J. E., Schoeberl, M. R., and Geller, M. A., *Physica Scripta*, **36**, 337-354, 1987.
8. Global Ozone Minima in the Historical Record, Rood, R. B., *Geophys. Res. Lett.*, **13**, 1244-1247, 1986.
7. The Derivation of Photochemical Information near 1 mbar from Ozone and Temperature Data, Douglass, A. R., and Rood, R. B., *J. Geophys. Res.*, **91**, 13153-13166, 1986.

6. A Critical Analysis of the Concept of Planetary Wave Breaking, Rood, R. B., *PAGEOPH*, 123, 733-755, 1985.
5. Interpretation of Ozone Temperature Correlations: 2. Analysis of SBUV Ozone Data, Douglass, A. R., Rood, R. B., and Stolarski, R. S., *J. Geophys. Res.*, 90, 10693-10708, 1985.
4. Interpretation of Ozone Temperature Correlations: 1. Theory, Rood, R. B., and Douglass, A. R., *J. Geophys. Res.*, 90, 5733-5743, 1985.
3. Transport and the Seasonal Variation of Ozone, Rood, R. B., *PAGEOPH*, 121, 1049-1064, 1983.
2. Ozone Transport by Diabatic and Planetary Wave Circulations on a σ -plane, Rood, R. B., and Schoeberl, M. R., *J. Geophys. Res.*, 88, 8491-8504, 1983.
1. A Mechanistic Model of Eulerian, Lagrangian Mean, and Lagrangian Ozone Transport by Steady Planetary Waves, Rood, R. B., and Schoeberl, M. R., *J. Geophys. Res.*, 88, 5208-5218, 1983.

REFEREED CONFERENCE PROCEEDINGS:

8. The Tropical Upper Troposphere and Lower Stratosphere in the GEOS-2 GCM, Pawson, S., Takacs, L., Molod, A., Nebuda, S., Chen, M., Rood, R. B., Read, W., and Fiorino, M., *Adv. Space Res.*, **27**, 1457-1465, 2001.
7. 3-D Transport-Chemistry Studies of the Stratosphere using Satellite Data Together with Data Assimilation, Geller, M. A., Chi, Y., Rood, R. B., Douglass, A. R., Allen, D. J., Cerniglia, M., and Waters, J. W., *NATO ASI*, **18**, 180-197, 1993.
6. Atmospheres Panel Report to the Payload Panel, Schoeberl, M., Pfaendtner, J., Rood, R., Thompson, A., and Wielicki, B., *Global and Planetary Change*, **98**, 9-21, 1992.
5. Satellite Observation and Mapping of Wintertime Ozone Variability in the Lower Stratosphere, Geller, M. A., Chi, Y., Rood, R. B., Douglass, A. R., Kaye, J. A., and Allen, D. J., *J. Atmos. Terr. Phys.*, **55**, 1081-1088, 1992.
4. Three-dimensional Constituent Transport Models and the Study of Interannual Variability, Rood, R. B., *J. of Geomagnetism and Geoelectricity*, **43**, 687-694, 1991.
3. Variability of Chlorine Containing Species as Revealed by Three-Dimensional Stratospheric Transport and Chemistry Models, Kaye, J. A., Rood, R. B., and Allen, D. J., *Proceedings of the Quadrennial Ozone Symposium 1988 and Tropospheric Ozone Workshop*, edited by R. D. Bojkov and P. Fabian, pp. 676-679, 4-13 August 1988, Gottingen, Federal Republic of Germany, A. Deepak Publishing, 1989.
2. The Use of Winds and Temperatures from a Stratospheric Assimilation Model in Three-Dimensional Constituent Transport Studies, Rood, R. B., Kaye, J. A., Allen, D. J., Wayman E. Baker, and Lamich, D. J., *Proceedings of the Quadrennial Ozone Symposium 1988 and Tropospheric Ozone Workshop*, edited by R. D. Bojkov and P. Fabian, pp. 625- 629, 4-13 August 1988, Gottingen, Federal Republic of Germany, A. Deepak Publishing, 1989.
1. Quasi-biennial and Interannual Variability in High Resolution Total Ozone Data (TOMS), Schuster, G. S., Rood, R. B., and Schoeberl, M. R., *Proceedings of the Quadrennial Ozone Symposium 1988 and Tropospheric Ozone Workshop*, edited by R. D. Bojkov and P. Fabian, pp. 260-264, 4-13 August 1988, Gottingen, Federal Republic of Germany, A. Deepak Publishing, 1989.

OTHER SELECTED PUBLICATIONS: (Technical Reports, Project Reports, Professional Publications)

33. Evaluating the Impacts of Sea Level Rise and Storm Surges on Seyshelles' Critical Infrastructure, Lisa Maillardm Tonya Summerlin, Annalisa Wilder, Harold Rice, Jacob Rumschlag, Daniel Xie, Richard Rood, and Avik Basu, 2020. (<https://www4.unfccc.int/sites/NWPSStaging/pages/item.aspx?ListItemId=28770&ListUrl=/sites/NWPSStaging/Lists/MainDB>)
32. Take the Long View on Environmental Issues in the Age of Trump, Richard B. Rood, *Eos*, **98**, 9 – 11, 2017 (<https://eos.org/opinions/take-the-long-view-on-environmental-issues-in-the-age-of-trump>)
31. Climate Change Scenario Planning Workshop Summary, Jonathan Star, Nicholas Fisichelli, Gregor Schuurman, Leigh Welling, Richard Rood, Laura Briley, William Baule, 2015. (<https://www.nps.gov/subjects/climatechange/upload/Apostle-Island-Scenario-Workshop-Report.pdf>)
30. Climate Informatics: Human Experts and the End-to-End System, Richard B. Rood and Paul N. Edwards, *Earthzine*, May 22, 2014. (<http://www.earthzine.org/2014/05/22/climate-informatics-human-experts-and-the-end-to-end-system/>)
29. Climate Change: A Fundamental Shift of Our Place in the World, Richard B. Rood, *Michigan Journal of Sustainability*, 2014. (<http://graham.umich.edu/mjs/2014/03/the-conversation-climate-change-a-fundamental-shift-of-our-place-in-the-world/>)
28. Obituary: Jerry Mahlman, Richard B. Rood, V. Ramaswamy, and Rosina M. Bierbaum, *Bulletin of the American Meteorology Society*, 167-169, 2014.
27. *Using Climate Change Scenarios to Explore Management as Isle Royale National Park: January 2013 Workshop Report*, N. Fisichelli, C. Hawkins Hoffman, L. Welling, L. Briley, and R. Rood, Natural Resource Report NPS/NRSS/CCRPNRR – 2013/714, National Park Service, Fort Collins, CO, 2013. (<http://irmafiles.nps.gov/reference/holding/483446>)
26. To Be the Best in Weather Forecasting: Why Europe is Beating the U.S., Richard B. Rood, *Washington Post*, March 8, 2013. (http://www.washingtonpost.com/blogs/capital-weather-gang/post/to-be-the-best-in-weather-forecasting-why-europe-is-beating-the-us/2013/03/08/429bfd0-8806-11e2-9d71-f0feafdd1394_blog.html)
25. Changing the Media Discussion on Climate and Extreme Weather, Christine Shearer and Richard B. Rood, *Earthzine*, April 17, 2011. (<http://www.earthzine.org/2011/04/17/changing-the-media-discussion-on-climate-and-extreme-weather/>)
24. Assimilation of Stratospheric Meteorological and Constituent Observations: A Review, Richard B. Rood, *SPARC Newsletter*, 25, 31-37, 2005. (<http://www.atmosp.physics.utoronto.ca/SPARC/News25/AssimilationRood.html>)

23. *Reanalysis Efforts in the United States: NASA and National Reanalysis Program*, Richard B. Rood, Arthur Y. Hou, Steven Pawson, Siegfried D. Schubert, Proceedings of ECMWF Reanalysis Workshop, 2002.
22. *Effectiveness of US Climate Modeling*, E. Sarachik et al., available from National Academy Press, 2001. (http://www.nap.edu/catalog.php?record_id=10087)
21. *High-end Climate Science: Development of Modeling and Related Computing Capabilities*, Richard B. Rood, Jeffery L. Anderson, David C. Bader, Maurice L. Blackmon, Timothy F. Hogan, and Patricia K. Esborg, available from US Global Change Research Program, 2000. (<http://www.usgcrp.gov/usgcrp/Library/models2001/models2001.pdf>)
20. *Algorithm Theoretical Basis Document*, Data Assimilation Office, 2000.
19. *Algorithm Theoretical Basis Document*, Data Assimilation Office, 1996. (http://eosps0.gsfc.nasa.gov/eos_homepage/for_scientists/atbd/docs/DAO/atbd-dao.pdf)
18. Proceedings of the Workshop on the GEOS-1 Five-Year Assimilation, S. D. Schubert and R. B. Rood, *NASA Technical Memorandum 104606*, Vol. 7, 1995.
17. A Multiyear Assimilation with the GEOS-1 System: Overview and Results, S. Schubert, C.-K. Park, C.-Y. Wu, W. Higgins, Y. Kondratyeva, A. Molod, L. Takacs, M. Seablom, and R. Rood, *NASA Technical Memorandum 104606*, Vol. 6, 1995.
16. *Scientific Assessment of Ozone Depletion: 1994* Co-author of Chapter 3, Polar Ozone, 1995.
15. A 3D Model Study of the Effects of the October 1989 Solar Proton Events on the Stratosphere, M. C. Cerniglia, C. H. Jackman, J. E. Nielsen, D. J. Allen, A. R. Douglass, and R. B. Rood, *STEP GBRSC News, Proceedings of the Second SOLTIP Symposium*, 1994.
14. 3-D Transport-Chemistry Studies of the Stratosphere Using Satellite Data Together with Data Assimilation, M. A. Geller, Y. Chi, R. B. Rood, A. R. Douglass, D. J. Allen, M. Cerniglia, J. W. Waters, *The Role of the Stratosphere in Global Change*, NATO ASI Series, Vol. I 8, 1993.
13. *The Atmospheric Effects of Stratospheric Aircraft: An Interim Assessment Report*, Author of Chapter 8, Credibility of Assessment Models, with M. J. Prather, 1993.
12. Three-Dimensional Model Calculations of the Global Dispersion of High Speed Aircraft Exhaust and Implications for Stratospheric Ozone Loss, Anne R. Douglass, Richard B. Rood, Charles H. Jackman, and Clark J. Weaver, *Ozone in the Troposphere and Stratosphere*, NASA Conf. Pub. 3266, 281-284, 1994.
11. *The Atmospheric Effects of Stratospheric Aircraft: A First Program Report*, M. J. Prather et al., NASA Reference Publication 1272, Co-author Chapter 3, Natural Cycles Gases, 1992.
10. The Dynamics of the HSCT Environment, Anne R. Douglass and Richard B. Rood, *Proceedings of AIAA Aircraft Design and Systems Meeting*, 1991.
9. *Three Dimensional Transport Models*, Richard B. Rood, tutorial paper for World Climate Research Program Symposium on Global Tracer Transport Model, 1991.

8. *Scientific Assessment of Stratospheric Ozone: 1989*, Co-author of Chapter 3, Theoretical Predictions, 1989.
7. A Strategy for Using General Circulation Models and Satellite Data for Improving Understanding of the Stratosphere, M. A. Geller, R. B. Rood, and J. A. Kaye, *Proceedings of the Interannual Symposium on Middle Atmosphere Studies*, Dushanbe, USSR, 1989.
6. Simulations and Short-Term Variability of Atmospheric Trace Constituents, J. A. Kaye and R. B. Rood, *Proceedings of the 28th International Astrophysical Colloquium, Our Changing Atmosphere*, Liege, Belgium, 1989.
5. Stratospheric Ozone Models and Supercomputers, R. B. Rood and J. A. Kaye, in *Proc. of the Fourth International Conference on Supercomputing*, 1989.
4. Stratospheric General Circulation with Chemistry Project, J. E. Nielsen, R. B. Rood, and M. R. Schoeberl, in *CCM Progress Report*, October 1988, NCAR/TN-324, 1988.
3. *National Plan for Stratospheric Monitoring: 1988-1997*, A. J. Miller, R. D. Hudson, W. G. Planet, E. Hilsenrath, R. B. Rood, D. F. Heath, J. Mentall, A. M. Thompson, J. A. Kaye, NOAA FCM, 1988.
2. *Constituent Forecasts in the Stratosphere*, Richard B. Rood, Jack A. Kaye, and Marvin A. Geller, NASA/GSFC, R and T Report, 1986.
1. *Mechanisms of Stratospheric Ozone Transport*, Richard B. Rood and Mark R. Schoeberl, *Memorandum Report 4969*, Naval Research Laboratory, 1982.