

Forrest M. Hoffman

Distinguished Computational Earth System Scientist

Group Leader, Computational Earth Sciences
Computational Sciences & Engineering Division

ESM Theme Lead, Climate Change Science Institute (CCSI)
Oak Ridge National Laboratory (ORNL)
Oak Ridge, Tennessee 37831-6301, USA

Phone: (865) 576-7680, Email: forrest@climatemodeling.org

ORCID: <http://orcid.org/0000-0001-5802-4134>

Google Scholar: <https://scholar.google.com/citations?user=v7zIehDVGS4C>

Joint Faculty Professor

Dept. of Civil & Environmental Engineering (CEE)
College of Engineering

University of Tennessee, Knoxville (UTK)
325 John D. Tickle Building, 851 Neyland Drive
Knoxville, Tennessee 37996-2313, USA

Email: fhoffma3@utk.edu

GitHub: <https://github.com/climate-dude>

Education and Training

Ph.D., Earth System Science, 2015, University of California, Irvine, California, USA.

M.S., Earth System Science, 2012, University of California, Irvine, California, USA.

M.S., Physics, 2004, University of Tennessee, Knoxville, Tennessee, USA.

B.S., Physics, 1991, University of Tennessee, Knoxville, Tennessee, USA.

Research and Professional Experience

- November 1993–present: **Distinguished Computational Earth System Scientist** (May 2019–present) in the Computational Sciences & Engineering Division (CSED), **Senior Computational Earth System Scientist** (April 2017–May 2019) in CSED, **Senior Computational Earth System Scientist** (May 2014–March 2017) in the Computer Science & Mathematics Division (CSMD), **Computational Earth System Scientist** (October 2003–May 2014) in CSMD, **Research Staff Member** (November 1993–September 2003) in the Environmental Sciences Division (ESD), and **Earth System Modeling (ESM) Theme Lead** (2012–present) for the Climate Change Science Institute (CCSI), Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.
- June 2016–present: **Joint Faculty Professor**, Department of Civil & Environmental Engineering, University of Tennessee, Knoxville, Tennessee, USA.
- January 2002–October 2006: **Contributing Editor and Columnist**, “Extreme Linux” column, *Linux Magazine*.
- July 1992–November 1993: **Scientific Programmer/Analyst**, Department of Geological Sciences, University of Tennessee, position at Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.
- May 1989–June 1992: **Knowledge Engineer**, Automated Sciences Group, Inc., position at Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.
- September 1988–May 1989: **Researcher Intern**, Oak Ridge Associated Universities (ORAU), position at Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.
- 1987–September 1988: **Observer/Telescope Operator**, High Altitude Observatory, National Center for Atmospheric Research, position at Mauna Loa Solar Observatory, Hilo, Hawai‘i, USA.

Leadership Activities

Group Leader for the Computational Earth Sciences Group, Computational Sciences and Engineering Division (CSED), Oak Ridge National Laboratory, March 2020–present.

Laboratory Research Manager (Lead PI) for the DOE Science Focus Area, *Reducing Uncertainties in Biogeochemical Interactions through Synthesis and Computation (RUBISCO)*, October 2017–present.

Earth System Modeling (ESM) Theme Lead for the Climate Change Science Institute (CCSI), Oak Ridge National Laboratory, 2012–present.

Principal Investigator (PI) for the US Department of Agriculture (USDA) Forest Service project, *Big Data Methods for Detecting Forest Disturbance and Recovery Patterns and Imputing Expected Productivity Measures*, ORNL Project No. 1774-Z146-17, 2017–2022.

Principal Investigator (PI) for the ORNL Laboratory Directed Research and Development (LDRD) Directors' Research and Development (DRD) project, *Development of a Land Model Testbed (LMT) for Rapid Assessment and Benchmarking of Multiscale Complex Biogeochemistry in Earth System Models*, October 2018–September 2020.

Acting Group Leader for the Computational Earth Sciences Group, Computational Sciences and Engineering Division (CSED), Oak Ridge National Laboratory, September 2018–March 2020.

Laboratory Research Manager (Lead PI) for the DOE Science Focus Area, *Quantifying Feedbacks and Uncertainties of Biogeochemical Processes in Earth System Models*, 2014–2017.

Principal Investigator (PI) for the ORNL Laboratory Directed Research and Development (LDRD) Directors' Research and Development (DRD) project, *Model-Inspired Science Priorities for Evaluating Tropical Ecosystem Response to Climate Change*, 2013–2015.

Lead Principal Investigator (PI) for the multi-institutional DOE project, *Quantification and Reduction of Critical Uncertainties Associated with Carbon Cycle–Climate System Feedbacks*, 2013–2014.

Lead Principal Investigator (PI) for the multi-institutional DOE SciDAC-3 project, *Applying Computationally Efficient Schemes for BioGeochemical Cycles (ACES4BGC)*, 2012–2015.

Principal Investigator (PI) for the US Department of Agriculture (USDA) Forest Service project, *Development and Testing of Methods for Detecting Disturbance and Recovery Patterns and Imputing Expected Productivity Measures Using Big Data*, ORNL Project No. 1774-V598-12, 2012–2018.

ORNL Site Principal Investigator (PI) for the multi-Laboratory SciDAC-2 project, *A Scalable and Extensible Earth System Model for Climate Change Science*, 2010–2011.

Principal Investigator (PI) for the US Department of Agriculture (USDA) Forest Service project, *Development, Testing, and Automation of a Prototype Forest Incident Response and State Tracking (FIRST) Early Warning System for the USDA Forest Service*, ORNL Project No. 1774-T335-07, 2007–2012.

Co-Principal Investigator (Co-PI) for the TN & Associates project, *Identifying Next Potential Invaders to the Great Lakes*, ORNL Project No. NFE-06-00082, 2006–2008.

Co-Principal Investigator (Co-PI) for The Nature Conservancy project, *New Guinea and China Spatial Data Processing*, ORNL Project No. ERD-05-02504, 2005–2006.

Synergistic Activities

Contributing Author for Chapter 2: Changing State of the Climate System, and Chapter 5: Global Carbon and Other Biogeochemical Cycles and Feedbacks, Working Group I contribution to *Sixth Assessment Report (AR6) Climate Change 2021: The Physical Science Basis*, Intergovernmental Panel on Climate Change (IPCC), August 9, 2021.

Member, NOAA Climate and Global Change (C&GC) Steering Committee, participating in evaluation and selection for NOAA's C&GC Postdoctoral Fellows, 2020–present.

National Energy Research Supercomputing Center (NERSC) Users Group Executive Committee (NUGEX) Member, representing users from DOE's Biological and Environmental Research Office programs, 2019–present.

Co-organizer for the DOE CMIP6 Hackathon, July 31–August 6, 2019.

Editorial Board, *AI in Geosciences* (ISSN: 2666-5441), 2020–present.

Editor-in-Chief, Climate and Environment Section, *Climate* (ISSN 2225-1154; CODEN: CLIMC9), 2020–present; Editorial Board, *Climate* (ISSN 2225-1154; CODEN: CLIMC9), 2018–present.

Associate Editor, *Frontiers in Big Data, Data-Driven Climate Sciences* (ISSN: 2624-909X), 2018–present.

Frontiers Topic Editor, *Integrating Big Data with Earth System Models of Natural and Human Systems: Confronting Models with Observations to Constrain Emergent Behavior* in *Frontiers in Big Data, Data-Driven Climate Sciences*, 2018–present.

Lead Author for Chapter 10: Changes in Land Cover and Terrestrial Biogeochemistry, *Climate Science Special Report (CSSR): Fourth National Climate Assessment (NCA4), Volume 1*, U.S. Global Change Research Program (USGCRP), 2017.

Member of the Steering Committee for the Coupled Climate–Carbon Cycle Model Intercomparison Project (C⁴MIP) for the Sixth Phase of the Coupled Model Intercomparison Project (CMIP6), 2014–present.

Lead for the Earth System Modeling (ESM) Theme within the ORNL Climate Change Science Institute (CCSI), 2012–present.

Co-organizer of the International Land Model Benchmarking (ILAMB) Project, 2010–present.

DOE Laboratory lead for the Carbon-Land Model Intercomparison Project (C-LAMP), 2006–2009.

Teaching Experience

- **ENVE 595: Global Ecohydrology & Biogeochemistry**, University of Tennessee, Department of Civil & Environmental Engineering, Spring 2021.
- **ENVE 595, ENVE 691: Global Ecohydrology & Biogeochemistry**, University of Tennessee, Department of Civil & Environmental Engineering, Spring 2017.

Refereeing Experience

Funding Agencies:

- Austrian Science Fund (Der Wissenschaftsfonds, FWF)
- National Aeronautics and Space Agency (NASA), Earth Science Division
- National Science Foundation (NSF)
- US Department of Energy (DOE), Office of Science, Biological and Environmental Research
- Oak Ridge National Laboratory (ORNL), Laboratory Director’s Research & Development (LDRD) Fund
- Oak Ridge National Laboratory (ORNL), Oak Ridge Leadership Computing Facility (OLCF)

Peer Review Journals:

- *Biogeochemistry*
- *Biogeosciences*
- *Climate*
- *Environmental Modelling & Software*
- *Frontiers in Big Data*
- *Geophysical Model Development*
- *Geophysical Research Letters*
- *Global Biogeochemical Cycles*
- *Global Change Biology*
- *Journal of Advances in Modeling Earth Systems*
- *Journal of Climate*
- *Journal of Computing in Civil Engineering*
- *Journal of Geophysical Research – Biogeosciences*
- *Journal of Hydrometeorology*
- *New Phytologist*
- *Proceedings of the National Academy of Sciences*
- *Remote Sensing of the Environment*
- *Scientific Reports*

Sessions and Workshops Organized at Conferences:

- American Meteorological Society (AMS) Annual Meetings
- American Geophysical Union (AGU) Fall Meetings
- Asia Oceania Geosciences Society (AOGS) Annual Meetings
- Ecological Society of America (ESA) Annual Meetings
- International Workshop on Data Mining in Earth System Science (DMESS)
- International Conference on Computational Science (ICCS)
- IEEE International Conference on Data Mining (ICDM)
- International Workshop on Spatial and Spatio-Temporal Data Mining (SSTDM)
- International Workshop on Knowledge Discovery from Sensor Data (SensorKDD)
- Japan Geoscience Union (JpGU) Meetings and JpGU-AGU Joint Meetings

Awards

- **Distinguished Researcher Award**, Awards Night 2021. Oak Ridge National Laboratory/UT-Battelle LLC, December 2021.
- **2020 Fellow of the American Association for the Advancement of Science (AAAS)**, elected for distinction in developing, comparing, and evaluating Earth system models with an emphasis on global biogeochemical cycles and feedbacks to the climate system, December 2020.
- **Certificate of Excellence** in appreciation of leadership in conducting the First RGMA Hackathon for CMIP6 Analyses. Regional & Global Model Analysis Program Area, Earth and Environmental Systems Sciences Division, U.S. Department of Energy, October 2020.
- **Outstanding Reviewer** for the American Geophysical Union (AGU) for 2019.
- **Significant Event Award** for contributing to the release, simulations, and analysis of coupled biogeochemistry in the Energy Exascale Earth System Model (E3SM). Oak Ridge National Laboratory/UT-Battelle LLC, October 2019.
- **Significant Event Award** for leading coordination of the 2016 International Land Model Benchmarking (ILAMB) Workshop and development of the 2016 ILAMB Workshop Report. Oak Ridge National Laboratory/UT-Battelle LLC, October 2016.
- **Significant Event Award** for contributions to development of the Next Generation Ecosystem Experiments (NGEE) Tropics Project. Oak Ridge National Laboratory/UT-Battelle LLC, April 2015.
- **Significant Event Award** for contributions to development of the Accelerated Climate Modeling for Energy (ACME) Scientific Focus Area (SFA). Oak Ridge National Laboratory/UT-Battelle LLC, October 2014.
- **Employee of the Quarter** in the Computer Science & Mathematics Division. Oak Ridge National Laboratory/UT-Battelle LLC, July–September 2014.
- **Outstanding Paper in Landscape Ecology** for “Representativeness-based sampling network design for the State of Alaska” awarded by the U.S. Regional Association of the International Association of Landscape Ecology (US-IALE), May 2014.
- **Significant Event Award** for contributions to Intergovernmental Panel on Climate Change & National Climate Assessment Work. Oak Ridge National Laboratory/UT-Battelle LLC, May 2014.
- **2013 Chief’s Honor Award** from Thomas L. Tidwell, Chief, U.S. Department of Agriculture Forest Service. Co-recipient for ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project with the U.S. Department of Agriculture Forest Service, NASA Stennis Space Center, and the U.S. Geological Survey EROS Data Center, March 2014.
- **2013 Southern Research Station Director’s Award for Partnerships** from Dr. Robert Doudrick, Station Director of the U.S. Department of Agriculture Forest Service, Southern Research Station. Co-recipient for ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project with the U.S. Department of Agriculture Forest Service, NASA Stennis Space Center, and the U.S. Geological Survey EROS Data Center, December 2013.

- **Group Achievement Award** from Charles Bolden, Administrator of the National Aeronautics and Space Administration (NASA). Co-recipient for ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project with the U.S. Department of Agriculture Forest Service, NASA Stennis Space Center, and the U.S. Geological Survey EROS Data Center, August 2013.
- **2013 Interagency Partnership Award** from the Federal Laboratory Consortium (FLC) for Technology Transfer. Co-recipient for ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project with the U.S. Department of Agriculture Forest Service, NASA Stennis Space Center, and the U.S. Geological Survey EROS Data Center (plus congratulatory letters from Secretary of Energy Ernest Moniz and Secretary of Agriculture Thomas Vilsack), April 2013.
- **2012 Partnership Award** from the Federal Laboratory Consortium (FLC) for Technology Transfer, Southeastern Region. Co-recipient for ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project with the U.S. Department of Agriculture Forest Service, NASA Stennis Space Center, and the U.S. Geological Survey EROS Data Center, March 2013.
- **Most Distinguished Scientific or Technical Contribution Award** from Dr. Barney Maccabe, Director of the ORNL Computer Science & Mathematics Division, for the ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project, December 2012.
- **2012 Southern Research Station Director's Science Delivery Award** from Dr. Robert Doudrick, Station Director of the U.S. Department of Agriculture Forest Service, Southern Research Station. Co-recipient for ORNL contribution to the *ForWarn* Forest Disturbance Monitoring Project with the U.S. Department of Agriculture Forest Service, NASA Stennis Space Center, and the U.S. Geological Survey EROS Data Center, October 2012.
- **Distinguished Employee Award** from the ORNL Computing and Computational Science Directorate, May 2012.
- **1st Place, People's Choice Poster Award** for *A Cluster Analysis Approach to Comparing Atmospheric Radiation Measurement (ARM) Data with Global Climate Model (GCM) Results*, by Forrest M. Hoffman, Salil Mahajan, William W. Hargrove, Richard T. Mills, and Anthony Del Genio. The U.S. Department of Energy, Atmospheric Radiation Measurement (ARM) Program, at the 18th Annual ARM Science Team Meeting in Norfolk, Virginia, March 10–14, 2008.
- **ORNL Outstanding Mentor Award.** U.S. Department of Energy, Oak Ridge National Laboratory, and Oak Ridge Associated Universities, February 2008.
- **Significant Event Award** for contribution to NSF's National Ecological Observatory Network (NEON) Design Committee. Oak Ridge National Laboratory/UT-Battelle LLC, March 2006.
- **Outstanding Paper in the Discipline of Landscape Ecology Award.** W. W. Hargrove, F. M. Hoffman and P. M. Schwartz, "A fractal landscape realizer for generating synthetic maps," *Cons. Ecol.* 6(1):2 (2002). Awarded by the International Association for Landscape Ecology (IALE), U. S. Regional Chapter, April 2004.
- **World-Class Teamwork Award** for building and using the Stone SouperComputer, the first Beowulf-style supercomputer at ORNL. Oak Ridge National Laboratory Values Committee, October 19, 1999.
- **President's Award for Continuous Improvement.** Oak Ridge National Laboratory/Lockheed Martin Energy Research Corp., November 1997.
- **ORNL Technical Achievement Award.** Oak Ridge National Laboratory/Lockheed Martin Energy Research Corp., 1996.
- **Distinguished Achievement Award for Operational Support.** Oak Ridge National Laboratory, Environmental Sciences Division, August 1995.
- **Significant Event Award.** Oak Ridge National Laboratory/Martin Marietta Energy Systems, June 1995.

Professional Organizations

- American Association for the Advancement of Science (AAAS), 2007–present.
- American Geophysical Union (AGU), 1996–present.
- American Meteorological Society (AMS), 2011–present. AMS Smoky Mountain Chapter, 1998–present; Chapter President, 2005.
- Association for the Advancement of Artificial Intelligence (AAAI), 2021–present.
- Association for Tropical Biology and Conservation (ATBC), 2016–present.
- Ecological Society of America (ESA), 2015–present.
- International Association for Landscape Ecology, North America Regional Association (IALE-NA), 2014–present.
- Institute of Electrical and Electronics Engineers (IEEE), IEEE Computer Society, 1998–present.
- National Speleological Society (NSS), 2013–present.
- Sigma Pi Sigma ($\Sigma\Pi\Sigma$), Physics Honor Society, 1995–present.
- Sigma Xi ($\Sigma\Xi$), The Scientific Research Honor Society, 2021–present.

Publications (total: 146; h-index: 52; citations: 14,606; Google Scholar)

- B. Sharma, J. Kumar, N. Collier, A. R. Ganguly, and F. M. Hoffman. Quantifying carbon cycle extremes and attributing their causes under climate and land use & land cover change from 1850 to 2300. *J. Geophys. Res. Biogeosci.*, 127(6):e2021JG006738, June 2022. doi:10.1029/2021JG006738.
- Y. Yu, J. Mao, S. D. Wullschleger, A. Chen, X. Shi, Y. Wang, F. M. Hoffman, Y. Zhang, and E. Pierce. Machine learning–based observation-constrained projections reveal elevated global socioeconomic risks from wildfire. *Nat. Commun.*, 13(1):1250, Mar. 2022. doi:10.1038/s41467-022-28853-0.
- R. Chai, J. Mao, H. Chen, Y. Wang, X. Shi, M. Jin, T. Zhao, F. M. Hoffman, D. M. Ricciuto, and S. D. Wullschleger. Human-caused long-term changes in global aridity. *npj Clim. Atmos. Sci.*, 4(1), Dec. 2021. doi:10.1038/s41612-021-00223-5.
- R. Tang, J. Mao, M. Jin, A. Chen, Y. Yu, X. Shi, Y. Zhang, F. M. Hoffman, M. Xu, and Y. Wang. Interannual variability and climatic sensitivity of global wildfire activity. *Adv. Clim. Chang. Res.*, 12(5):686–695, Oct. 2021. doi:10.1016/j.accre.2021.07.001.
- Y. Wang, J. Mao, M. Jin, F. M. Hoffman, X. Shi, S. D. Wullschleger, and Y. Dai. Development of observation-based global multilayer soil moisture products for 1970 to 2016. *Earth Syst. Sci. Data*, 13(9):4385–4405, Sept. 2021. doi:10.5194/essd-13-4385-2021.
- L. Jiang, J. Liang, X. Lu, E. Hou, F. M. Hoffman, and Y. Luo. Country-level land carbon sink and its causing components by the middle of the twenty-first century. *Ecol. Process.*, 10(1):61, Sept. 2021. doi:10.1186/s13717-021-00328-y.
- P. L. Zarnetske, J. Gurevitch, J. Franklin, P. M. Groffman, C. S. Harrison, J. J. Hellmann, F. M. Hoffman, S. Kothari, A. Robock, S. Tilmes, D. Vioni, J. Wu, L. Xia, and C.-E. Yang. Potential ecological impacts of climate intervention by reflecting sunlight to cool Earth. *Proc. Nat. Acad. Sci.*, 118(15):e1921854118, Apr. 2021. doi:10.1073/pnas.1921854118.
- U. Mishra, G. Hugelius, E. Shelef, Y. Yang, J. Strauss, A. Lupachev, J. W. Harden, J. D. Jastrow, C.-L. Ping, W. J. Riley, E. A. G. Schuur, R. Matamala, M. Siewert, L. E. Nave, C. D. Koven, M. Fuchs, J. Palmtag, P. Kuhry, C. C. Treat, S. Zubrzycki, F. M. Hoffman, B. Elberling, P. Camill, A. Veremeeva, and A. Orr. Spatial heterogeneity and environmental predictors of permafrost region soil organic carbon stocks. *Sci. Adv.*, 7(9):eaa5236, Feb. 2021. doi:10.1126/sciadv.aaz5236.
- I. Fer, A. K. Gardella, A. N. Shiklomanov, E. E. Campbell, E. M. Cowdery, M. G. De Kauwe, A. De-sai, M. J. Duveneck, J. B. Fisher, K. D. Haynes, F. M. Hoffman, M. R. Johnston, R. Kooper, D. S. LeBauer, J. Mantooh, W. Parton, B. Poulter, T. Quafe, A. Raiho, K. Schaefer, S. P. Serbin, J. Simkins, K. R. Wilcox, T. Viskari, and M. C. Dietze. Beyond ecosystem modeling: A roadmap to community

- cyberinfrastructure for ecological data-model integration. *Glob. Change Biol.*, 27(1):13–26, Jan. 2021. doi:10.1111/gcb.15409.
- D. J. Durden, S. Metzger, H. Chu, N. Collier, K. J. Davis, A. R. Desai, J. Kumar, W. R. Wieder, M. Xu, and F. M. Hoffman. Automated integration of continental-scale observations in near-real time for simulation and analysis of biosphere–atmosphere interactions. In J. Nichols, B. Verastegui, A. B. Maccabe, O. Hernandez, S. Parete-Koon, and T. Ahearn, editors, *Driving Scientific and Engineering Discoveries Through the Convergence of HPC, Big Data and AI*, pages 204–225. 17th Smoky Mountains Computational Sciences and Engineering Conference, SMC 2020 (August 26–28, 2020), Springer International Publishing, Cham, Dec. 2020. ISBN 978-3-030-63393-6. doi:10.1007/978-3-030-63393-6_14.
- B. Beckage, K. Lacasse, J. M. Winter, L. J. Gross, N. Fefferman, F. M. Hoffman, S. S. Metcalf, T. Franck, E. Carr, A. Zia, and A. Kinzig. The Earth has humans, so why don’t our climate models? *Clim. Change*, 163(1):181–188, Nov. 2020. doi:10.1007/s10584-020-02897-x.
- U. Mishra, S. Gautam, W. J. Riley, and F. M. Hoffman. Ensemble machine learning approach improves predicted spatial variation of surface soil organic carbon stocks in data-limited northern circumpolar region. *Front. Big Data*, 3:40, Oct. 2020. doi:10.3389/fdata.2020.528441.
- V. S. Konduri, J. Kumar, W. W. Hargrove, F. M. Hoffman, and A. R. Ganguly. Mapping crops within the growing season across the United States. *Remote Sens. Environ.*, 251:112048, Dec. 2020. doi:10.1016/j.rse.2020.112048.
- S. Sreepathi, M. Xu, N. Collier, J. Kumar, J. Mao, and F. M. Hoffman. Land model testbed: Accelerating development, benchmarking and analysis of land surface models. In *Proceedings of the Gateways 2020 Conference*. Open Science Framework, Oct. 2020. doi:10.17605/OSF.IO/X32A8.
- A. Jayasinghe, S. Elliott, A. Piliouras, J. Clement Kinney, G. Gibson, N. Jeffery, F. M. Hoffman, J. Kumar, and O. Wingenter. Modeling functional organic chemistry in Arctic rivers: An idealized Siberian system. *Atmos.*, 11(10):1090, Oct. 2020. doi:10.3390/atmos11101090.
- K. Adhikari, U. Mishra, P. R. Owens, Z. Libohova, S. A. Wills, W. J. Riley, F. M. Hoffman, and D. R. Smith. Importance and strength of environmental controllers of soil organic carbon changes with scale. *Geoderma*, 375:114472, Oct. 2020. doi:10.1016/j.geoderma.2020.114472.
- C.-E. Yang, F. M. Hoffman, D. M. Ricciuto, S. Tilmes, L. Xia, D. G. MacMartin, B. Kravitz, J. H. Richter, M. Mills, and J. S. Fu. Assessing terrestrial biogeochemical feedbacks in a strategically geoengineered climate. *Environ. Res. Lett.*, 15(10):104043, Sept. 2020. doi:10.1088/1748-9326/abacf7.
- S. M. Burrows, M. Maltrud, X. Yang, Q. Zhu, N. Jeffery, X. Shi, D. M. Ricciuto, S. Wang, G. Bisht, J. Tang, J. Wolfe, B. E. Harrop, B. Singh, L. Brent, S. Baldwin, T. Zhou, P. Cameron-Smith, N. Keen, N. Collier, M. Xu, E. C. Hunke, S. M. Elliott, A. K. Turner, H.-Y. Li, H. Wang, J.-C. Golaz, B. Bond-Lamberty, F. M. Hoffman, W. J. Riley, P. E. Thornton, K. Calvin, and L. R. Leung. The DOE E3SM v1.1 biogeochemistry configuration: Description and simulated ecosystem-climate responses to historical changes in forcing. *J. Adv. Model. Earth Sy.*, 12(9):e2019MS001766, Sept. 2020. doi:10.1029/2019MS001766.
- Y. Yu, J. Mao, P. E. Thornton, M. Notaro, S. D. Wullschleger, X. Shi, F. M. Hoffman, and Y. Wang. Quantifying the drivers and predictability of seasonal changes in African fire. *Nat. Commun.*, 11(1):2893, June 2020. doi:10.1038/s41467-020-16692-w.
- W. Weijer, F. M. Hoffman, P. A. Ullrich, M. Wehner, and J. Liu. Hackathon speeds progress toward climate model collaboration. *Eos Trans. AGU*, 101(3):24–27, Mar. 2020. doi:10.1029/2019EO137735.
- B. Yan, J. Mao, R. E. Dickinson, P. E. Thornton, X. Shi, D. M. Ricciuto, J. M. Warren, and F. M. Hoffman. Modeling tree stem-water dynamics over an Amazonian rainforest. *Ecohydrol.*, 13(1):e2180, Jan. 2020. doi:10.1002/eco.2180.
- D. M. Lawrence, R. A. Fisher, C. D. Koven, K. W. Oleson, S. C. Swenson, G. Bonan, N. Collier, B. Ghimire, L. van Kampenhout, D. Kennedy, E. Kluzek, P. J. Lawrence, F. Li, H. Li, D. Lombardozzi, W. J. Riley,

- W. J. Sacks, M. Shi, M. Vertenstein, W. R. Wieder, C. Xu, A. A. Ali, A. M. Badger, G. Bisht, M. van den Broeke, M. A. Brunke, S. P. Burns, J. Buzan, M. Clark, A. Craig, K. Dahlin, B. Drewniak, J. B. Fisher, M. Flanner, A. M. Fox, P. Gentine, F. M. Hoffman, G. Keppel-Aleks, R. Knox, S. Kumar, J. Lenaerts, L. R. Leung, W. H. Lipscomb, Y. Lu, A. Pandey, J. D. Pelletier, J. Perket, J. T. Randerson, D. M. Ricciuto, B. M. Sanderson, A. Slater, Z. M. Subin, J. Tang, R. Q. Thomas, M. Val Martin, and X. Zeng. The Community Land Model version 5: Description of new features, benchmarking, and impact of forcing uncertainty. *J. Adv. Model. Earth Sy.*, 11(12):4245–4287, Dec. 2019. doi:10.1029/2018MS001583.
- X. Yang, D. M. Ricciuto, P. E. Thornton, X. Shi, M. Xu, F. M. Hoffman, and R. J. Norby. The effects of phosphorus cycle dynamics on carbon sources and sinks in the Amazon region: A modeling study using ELM v1. *J. Geophys. Res. Biogeosci.*, 124(12):3686–3698, Dec. 2019. doi:10.1029/2019JG005082.
- M. Xu, S. Mahajan, F. M. Hoffman, and X. Shi. Evaluating carbon extremes in a coupled climate-carbon cycle simulation. In *Proceedings of the 2019 IEEE International Conference on Data Mining Workshops (ICDMW 2019)*, pages 303–310. Institute of Electrical and Electronics Engineers (IEEE), Conference Publishing Services (CPS), Nov. 2019. doi:10.1109/ICDMW.2019.00052.
- Z. L. Langford, J. Kumar, and F. M. Hoffman. Deep transfer learning with field-based measurements for large area classification. In *Proceedings of the 2019 IEEE International Conference on Data Mining Workshops (ICDMW 2019)*, pages 262–269. Institute of Electrical and Electronics Engineers (IEEE), Conference Publishing Services (CPS), Nov. 2019a. doi:10.1109/ICDMW.2019.00047.
- G. B. Bonan, D. L. Lombardozzi, W. R. Wieder, K. W. Oleson, D. M. Lawrence, F. M. Hoffman, and N. Collier. Model structure and climate data uncertainty in historical simulations of the terrestrial carbon cycle (1850–2014). *Global Biogeochem. Cy.*, 33(10):1310–1326, Oct. 2019. doi:10.1029/2019GB006175.
- W. L. Forbes, J. Mao, D. M. Ricciuto, S.-C. Kao, X. Shi, A. A. Tavakoly, M. Jin, W. Guo, T. Zhao, Y. Wang, P. E. Thornton, and F. M. Hoffman. Streamflow in the Columbia River Basin: Quantifying changes over the period 1951–2008 and determining the drivers of those changes. *Water Resour. Res.*, 55(8):6640–6652, Aug. 2019. doi:10.1029/2018WR024256.
- Q. Zhu, W. J. Riley, J. Tang, N. Collier, F. M. Hoffman, X. Yang, and G. Bisht. Representing nitrogen, phosphorus, and carbon interactions in the E3SM Land Model: Development and global benchmarking. *J. Adv. Model. Earth Sy.*, 11(7):2238–2258, Aug. 2019. doi:10.1029/2018MS001571.
- A. N. Shiklomanov, B. A. Bradley, K. M. Dahlin, A. M. Fox, C. M. Gough, F. M. Hoffman, E. M. Middleton, S. P. Serbin, L. Smallman, and W. K. Smith. Enhancing global change experiments through integration of remote-sensing techniques. *Front. Ecol. Environ.*, 17(4):215–224, May 2019. doi:10.1002/fee.2031.
- S. Elliott, Z. Menzo, A. Jayasinghe, H. C. Allen, O. Ogunro, G. Gibson, F. M. Hoffman, and O. Wingerter. Biogeochemical equation of state for the sea-air interface. *Atmos.*, 10(5), Apr. 2019. doi:10.3390/atmos10050230.
- B. Yan, J. Mao, X. Shi, F. M. Hoffman, M. Notaro, T. Zhou, N. McDowell, R. E. Dickinson, M. Xu, L. Gu, and D. M. Ricciuto. Predictability of tropical vegetation greenness using sea surface temperatures. *Environ. Res. Commun.*, 1(3):031003, Apr. 2019. doi:10.1088/2515-7620/ab178a.
- P. A. Levine, J. T. Randerson, Y. Chen, M. S. Pritchard, M. Xu, and F. M. Hoffman. Soil moisture variability intensifies and prolongs eastern Amazon temperature and carbon cycle response to El Niño-Southern Oscillation. *J. Clim.*, 32(4):1273–1292, Feb. 2019. doi:10.1175/JCLI-D-18-0150.1.
- V. Eyring, P. M. Cox, G. M. Flato, P. J. Gleckler, G. Abramowitz, P. Caldwell, W. D. Collins, B. K. Gier, A. D. Hall, F. M. Hoffman, G. C. Hurtt, A. Jahn, C. D. Jones, S. A. Klein, J. Krasting, L. Kwiatkowski, R. Lorenz, E. Maloney, G. A. Meehl, A. Pendergrass, R. Pincus, A. C. Ruane, J. L. Russell, B. M. Sanderson, B. D. Santer, S. C. Sherwood, I. R. Simpson, R. J. Stouffer, and M. S. Williamson. Taking climate model evaluation to the next level. *Nat. Clim. Change*, 9(2):102–110, Feb. 2019. doi:10.1038/s41558-018-0355-y.

- Z. L. Langford, J. Kumar, F. M. Hoffman, A. L. Breen, and C. M. Iversen. Arctic vegetation mapping using unsupervised training datasets and convolutional neural networks. *Remote Sens.*, 11(1):69, Jan. 2019b. doi:10.3390/rs11010069.
- Y. Ergüner, J. Kumar, F. M. Hoffman, H. N. Dalfes, and W. W. Hargrove. Mapping ecoregions under climate change: A case study from the biological ‘crossroads’ of three continents, Turkey. *Landscape Ecol.*, 2018. doi:10.1007/s10980-018-0743-8.
- C. Le Quéré, R. M. Andrew, P. Friedlingstein, S. Sitch, J. Hauck, J. Pongratz, P. A. Pickers, J. I. Korsbakken, G. P. Peters, J. G. Canadell, A. Arneeth, V. K. Arora, L. Barbero, A. Bastos, L. Bopp, F. Chevallier, L. P. Chini, P. Ciais, S. C. Doney, T. Gkritzalis, D. S. Goll, I. Harris, V. Haverd, F. M. Hoffman, M. Hoppema, R. A. Houghton, G. Hurtt, T. Ilyina, A. K. Jain, T. Johannessen, C. D. Jones, E. Kato, R. F. Keeling, K. K. Goldewijk, P. Landschützer, N. Lefèvre, S. Lienert, Z. Liu, D. Lombardozzi, N. Metzl, D. R. Munro, J. E. M. S. Nabel, S.-I. Nakaoka, C. Neill, A. Olsen, T. Ono, P. Patra, A. Peregon, W. Peters, P. Peylin, B. Pfeil, D. Pierrot, B. Poulter, G. Rehder, L. Resplandy, E. Robertson, M. Rocher, C. Rödenbeck, U. Schuster, J. Schwinger, R. Séférian, I. Skjelvan, T. Steinhoff, A. Sutton, P. P. Tans, H. Tian, B. Tilbrook, F. N. Tubiello, I. T. van der Laan-Luijkx, G. R. van der Werf, N. Viovy, A. P. Walker, A. J. Wiltshire, R. Wright, S. Zaehle, and B. Zheng. Global carbon budget 2018. *Earth Syst. Sci. Data*, 10(4):2141–2194, Dec. 2018. doi:10.5194/essd-10-2141-2018.
- G. J. Kooperman, M. D. Fowler, F. M. Hoffman, C. D. Koven, K. Lindsay, M. S. Pritchard, A. L. S. Swann, and J. T. Randerson. Plant physiological responses to rising CO₂ modify simulated daily runoff intensity with implications for global-scale flood risk assessment. *Geophys. Res. Lett.*, 45(22):12,457–12,466, Nov. 2018a. doi:10.1029/2018GL079901.
- R. T. Mills, V. Sripathi, J. Kumar, S. Sreepathi, F. M. Hoffman, and W. W. Hargrove. Parallel k -means clustering of geospatial data sets using Manycore CPU architectures. In *Proceedings of the 2018 IEEE International Conference on Data Mining Workshops (ICDMW 2018)*. Institute of Electrical and Electronics Engineers (IEEE), Conference Publishing Services (CPS), Nov. 2018. doi:10.1109/ICDMW.2018.00118.
- Z. L. Langford, J. Kumar, and F. M. Hoffman. Wildfire mapping in Interior Alaska using deep neural networks on imbalanced datasets. In *Proceedings of the 2018 IEEE International Conference on Data Mining Workshops (ICDMW 2018)*. Institute of Electrical and Electronics Engineers (IEEE), Conference Publishing Services (CPS), Nov. 2018. doi:10.1109/ICDMW.2018.00116.
- N. Collier, F. M. Hoffman, D. M. Lawrence, G. Keppel-Aleks, C. D. Koven, W. J. Riley, M. Mu, and J. T. Randerson. The International Land Model Benchmarking (ILAMB) system: Design, theory, and implementation. *J. Adv. Model. Earth Sy.*, 10(11):2731–2754, Nov. 2018. doi:10.1029/2018MS001354.
- C.-E. Yang, J. Mao, F. M. Hoffman, D. M. Ricciuto, J. S. Fu, C. D. Jones, and M. Thurner. Uncertainty quantification of extratropical forest biomass in CMIP5 models over the Northern Hemisphere. *Sci. Rep.*, 8(1):10962, July 2018. doi:10.1038/s41598-018-29227-7.
- S. Elliott, S. Burrows, P. Cameron-Smith, F. M. Hoffman, E. Hunke, N. Jeffery, Y. Liu, M. Maltrud, Z. Menzo, O. Ogunro, L. Van Roekel, S. Wang, M. Brunke, M. Jin, R. Letscher, N. Meskhidze, L. Russell, I. Simpson, D. Stokes, and O. Wingenter. Does marine surface tension have global biogeography? Addition for the OCEANFILMS package. *Atmos.*, 9(6), June 2018. doi:10.3390/atmos9060216.
- O. O. Ogunro, S. M. Elliott, O. W. Wingenter, C. Deal, W. Fu, N. Collier, and F. M. Hoffman. Evaluating uncertainties in marine biogeochemical models: Benchmarking aerosol precursors. *Atmos.*, 9(5), May 2018. doi:10.3390/atmos9050184.
- W. L. Forbes, J. Mao, M. Jin, S.-C. Kao, W. Fu, X. Shi, D. M. Ricciuto, P. E. Thornton, A. Ribes, Y. Wang, S. Piao, T. Zhao, C. R. Schwalm, F. M. Hoffman, J. B. Fisher, A. Ito, B. Poulter, Y. Fang, H. Tian, A. K. Jain, and D. J. Hayes. Contribution of environmental forcings to US runoff changes for the period 1950–2010. *Environ. Res. Lett.*, 13(5):054023, May 2018. doi:10.1088/1748-9326/aabb41.

- Z. M. Menzo, S. Elliott, C. A. Hartin, F. M. Hoffman, and S. Wang. Climate change impacts on natural sulfur production: Ocean acidification and community shifts. *Atmos.*, 9(5), May 2018. doi:10.3390/atmos9050167.
- G. J. Kooperman, Y. Chen, F. M. Hoffman, C. D. Koven, K. Lindsay, M. S. Pritchard, A. L. S. Swann, and J. T. Randerson. Forest response to rising CO₂ drives zonally asymmetric rainfall change over tropical land. *Nat. Clim. Change*, 8(5):434–440, May 2018b. doi:10.1038/s41558-018-0144-7.
- G. Keppel-Aleks, S. J. Basile, and F. M. Hoffman. A functional response metric for the temperature sensitivity of tropical ecosystems. *Earth Interact.*, 22(7):1–20, Apr. 2018. doi:10.1175/EI-D-17-0017.1.
- J. K. Moore, W. Fu, F. Primeau, G. L. Britten, K. Lindsay, M. Long, S. C. Doney, N. Mahowald, F. M. Hoffman, and J. T. Randerson. Sustained climate warming drives declining marine biological productivity. *Science*, 359(6380):1139–1143, Mar. 2018. doi:10.1126/science.aao6379.
- B. Beckage, L. J. Gross, K. Lacasse, E. Carr, S. S. Metcalf, J. M. Winter, P. D. Howe, N. Fefferman, T. Franck, A. Zia, A. Kinzig, and F. M. Hoffman. Linking models of human behaviour and climate alters projected climate change. *Nat. Clim. Change*, 2018. doi:10.1038/s41558-017-0031-7.
- Z. L. Langford, J. Kumar, and F. M. Hoffman. Convolutional neural network approach for mapping Arctic vegetation using multi-sensor remote sensing fusion. In *Proceedings of the 2017 IEEE International Conference on Data Mining Workshops (ICDMW 2017)*. Institute of Electrical and Electronics Engineers (IEEE), Conference Publishing Services (CPS), Nov. 2017. doi:10.1109/ICDMW.2017.48.
- X. Song, F. M. Hoffman, C. M. Iversen, Y. Yin, J. Kumar, C. Ma, and X. Xu. Significant inconsistency of vegetation carbon density in CMIP5 Earth system models against observational data. *J. Geophys. Res. Biogeosci.*, 122(9):2282–2297, Sept. 2017. doi:10.1002/2017JG003914.
- S. Sreepathi, J. Kumar, R. T. Mills, F. M. Hoffman, V. Sripathi, and W. W. Hargrove. Parallel multi-variate spatio-temporal clustering of large ecological datasets on hybrid supercomputers. In *Proceedings of the 19th IEEE International Conference on Cluster Computing (Cluster 2017)*, pages 267–277, Honolulu, Hawai‘i, USA, Sept. 2017. Institute of Electrical and Electronics Engineers (IEEE). doi:10.1109/CLUSTER.2017.88.
- F. M. Hoffman, C. D. Koven, G. Keppel-Aleks, D. M. Lawrence, W. J. Riley, J. T. Randerson, A. Ahlström, G. Abramowitz, D. D. Baldocchi, M. J. Best, B. Bond-Lamberty, M. G. De Kauwe, A. S. Denning, A. R. Desai, V. Eyring, J. B. Fisher, R. A. Fisher, P. J. Gleckler, M. Huang, G. Hugelius, A. K. Jain, N. Y. Kiang, H. Kim, R. D. Koster, S. V. Kumar, H. Li, Y. Luo, J. Mao, N. G. McDowell, U. Mishra, P. R. Moorcroft, G. S. H. Pau, D. M. Ricciuto, K. Schaefer, C. R. Schwalm, S. P. Serbin, E. Shevliakova, A. G. Slater, J. Tang, M. Williams, J. Xia, C. Xu, R. Joseph, and D. Koch. International Land Model Benchmarking (ILAMB) 2016 workshop report. Technical Report DOE/SC-0186, U.S. Department of Energy, Office of Science, Germantown, Maryland, USA, Apr. 2017.
- N. M. Mahowald, J. T. Randerson, K. Lindsay, E. Muñoz, S. C. Doney, P. Lawrence, S. Schlunegger, D. S. Ward, D. Lawrence, and F. M. Hoffman. Interactions between land use change and carbon cycle feedbacks. *Global Biogeochem. Cy.*, 31(1):96–113, Jan. 2017. doi:10.1002/2016GB005374.
- Y. Luo, Z. Shi, X. Lu, J. Xia, J. Liang, J. Jiang, Y. Wang, M. J. Smith, L. Jiang, A. Ahlström, B. Chen, O. Hararuk, A. Hastings, F. M. Hoffman, B. Medlyn, S. Niu, M. Rasmussen, K. Todd-Brown, and Y.-P. Wang. Transient dynamics of terrestrial carbon storage: Mathematical foundation and its applications. *Biogeosci.*, 14(1):145–161, Jan. 2017. doi:10.5194/bg-14-145-2017.
- J. Kumar, F. M. Hoffman, W. W. Hargrove, and N. Collier. Understanding the representativeness of FLUXNET for upscaling carbon flux from eddy covariance measurements. *Earth Syst. Sci. Data Discuss.*, 2016:1–25, Aug. 2016. doi:10.5194/essd-2016-36.
- M. Rasmussen, A. Hastings, M. J. Smith, F. B. Augusto, B. M. Chen-Charpentier, F. M. Hoffman, J. Jiang, K. E. O. Todd-Brown, Y. Wang, Y.-P. Wang, and Y. Luo. Transit times and mean ages for nonau-

- tonomous and autonomous compartmental systems. *J. Math. Biol.*, 73(6):1379–1398, Dec. 2016. doi: 10.1007/s00285-016-0990-8.
- J. Mao, A. Ribes, B. Yan, X. Shi, P. E. Thornton, R. Séférian, P. Ciais, R. B. Myneni, H. Douville, S. Piao, Z. Zhu, R. E. Dickinson, Y. Dai, D. M. Ricciuto, M. Jin, F. M. Hoffman, B. Wang, M. Huang, and X. Lian. Human-induced greening of the northern extratropical land surface. *Nat. Clim. Change*, 6(10):959–963, Oct. 2016. doi:10.1038/nclimate3056.
- Z. Langford, J. Kumar, F. M. Hoffman, R. J. Norby, S. D. Wullschleger, V. L. Sloan, and C. M. Iversen. Mapping Arctic plant functional type distributions in the Barrow Environmental Observatory using WorldView-2 and LiDAR datasets. *Remote Sens.*, 8(9):733, Sept. 2016. doi:10.3390/rs8090733.
- A. L. S. Swann, F. M. Hoffman, C. D. Koven, and J. T. Randerson. Plant responses to increasing CO₂ reduce estimates of climate impacts on drought severity. *Proc. Nat. Acad. Sci.*, 113(36):10019–10024, Sept. 2016. doi:10.1073/pnas.1604581113.
- C. D. Jones, V. Arora, P. Friedlingstein, L. Bopp, V. Brovkin, J. Dunne, H. Graven, F. Hoffman, T. Ilyina, J. G. John, M. Jung, M. Kawamiya, C. Koven, J. Pongratz, T. Raddatz, J. Randerson, and S. Zaehle. C4MIP – The Coupled Climate–Carbon Cycle Model Intercomparison Project: Experimental protocol for CMIP6. *Geosci. Model Dev.*, 9(8):2853–2880, Aug. 2016. doi:10.5194/gmd-9-2853-2016.
- X. Yang, P. E. Thornton, D. M. Ricciuto, and F. M. Hoffman. Phosphorus feedbacks may constrain tropical ecosystem responses to changes in atmospheric CO₂ and climate. *Geophys. Res. Lett.*, 43(13):7205–7214, July 2016. doi:10.1002/2016GL069241.
- B. Bond-Lamberty, D. Epron, J. Harden, M. E. Harmon, F. M. Hoffman, J. Kumar, A. D. McGuire, and R. Vargas. Estimating heterotrophic respiration at large scales: Challenges, approaches, and next steps. *Ecosphere*, 7(6), June 2016. doi:10.1002/ecs2.1380.
- G. Tang, F. Yuan, G. Bisht, G. E. Hammond, P. C. Lichtner, J. Kumar, R. T. Mills, X. Xu, B. Andre, F. M. Hoffman, S. L. Painter, and P. E. Thornton. Addressing numerical challenges in introducing a reactive transport code into a land surface model: A biogeochemical modeling proof-of-concept with CLM–PFLOTRAN 1.0. *Geosci. Model Dev.*, 9(3):927–946, Mar. 2016. doi:10.5194/gmd-9-927-2016.
- Y. P. Wang, J. Jiang, B. Chen-Charpentier, F. B. Augusto, A. Hastings, F. M. Hoffman, M. Rasmussen, M. J. Smith, K. Todd-Brown, Y. Wang, X. Xu, and Y. Q. Luo. Responses of two nonlinear microbial models to warming and increased carbon input. *Biogeosci.*, 13(4):887–902, Feb. 2016. doi:10.5194/bg-13-887-2016.
- J. Kumar, J. Weiner, W. W. Hargrove, S. P. Norman, F. M. Hoffman, and D. Newcomb. Characterization and classification of vegetation canopy structure and distribution within the Great Smoky Mountains National Park using LiDAR. In P. Cui, J. Dy, C. Aggarwal, Z.-H. Zhou, A. Tuzhilin, H. Xiong, and X. Wu, editors, *Proceedings of the 15th IEEE International Conference on Data Mining Workshops (ICDMW 2015)*, pages 1478–1485. Institute of Electrical and Electronics Engineers (IEEE), Conference Publishing Services (CPS), Nov. 2015. doi:10.1109/ICDMW.2015.178.
- O. O. Ogunro, S. M. Burrows, S. Elliott, A. A. Frossard, F. M. Hoffman, R. T. Letscher, J. Moore, L. M. Russell, S. Wang, and O. W. Wingenter. Global distribution and surface activity of macromolecules in offline simulations of marine organic chemistry. *Biogeochemistry*, 126(1–2):25–56, Nov. 2015. doi: 10.1007/s10533-015-0136-x.
- J. Mao, W. Fu, X. Shi, D. M. Ricciuto, J. B. Fisher, R. E. Dickinson, Y. Wei, W. Shem, S. Piao, K. Wang, C. R. Schwalm, H. Tian, M. Mu, A. Arain, P. Ciais, R. Cook, Y. Dai, D. Hayes, F. M. Hoffman, M. Huang, S. Huang, D. N. Huntzinger, A. Ito, A. Jain, A. W. King, H. Lei, C. Lu, A. M. Michalak, N. Parazoo, C. Peng, S. Peng, B. Poulter, K. Schaefer, E. Jafarov, P. E. Thornton, W. Wang, N. Zeng, Z. Zeng, F. Zhao, Q. Zhu, and Z. Zhu. Disentangling climatic and anthropogenic controls on global terrestrial evapotranspiration trends. *Environ. Res. Lett.*, 10(9):094008, Sept. 2015. doi:10.1088/1748-9326/10/9/094008.

- M. Xu and F. M. Hoffman. Evaluations of CMIP5 simulations over cropland. In *Proc. SPIE*, volume 9610, pages 961003–961003–15, Sept. 2015. doi:10.1117/12.2192586.
- J. T. Randerson, K. Lindsay, E. Munoz, W. Fu, J. K. Moore, F. M. Hoffman, N. M. Mahowald, and S. C. Doney. Multicentury changes in ocean and land contributions to the climate–carbon feedback. *Global Biogeochem. Cy.*, 29(6):744–759, June 2015. doi:10.1002/2014GB005079.
- K. J. Anderson-Teixeira, S. J. Davies, A. C. Bennett, E. B. Gonzalez-Akre, H. C. Muller-Landau, S. J. Wright, K. Abu Salim, A. M. Almeyda Zambrano, A. Alonso, J. L. Baltzer, Y. Basset, N. A. Bourg, E. N. Broadbent, W. Y. Brockelman, S. Bunyavejchewin, D. F. R. P. Burslem, N. Butt, M. Cao, D. Cardenas, G. B. Chuyong, K. Clay, S. Cordell, H. S. Dattaraja, X. Deng, M. Detto, X. Du, A. Duque, D. L. Erikson, C. E. N. Ewango, G. A. Fischer, C. Fletcher, R. B. Foster, C. P. Giardina, G. S. Gilbert, N. Gunatilleke, S. Gunatilleke, Z. Hao, W. W. Hargrove, T. B. Hart, B. C. H. Hau, F. He, F. M. Hoffman, R. W. Howe, S. P. Hubbell, F. M. Inman-Narahari, P. A. Jansen, M. Jiang, D. J. Johnson, M. Kanzaki, A. R. Kassim, D. Kenfack, S. Kibet, M. F. Kinnaird, L. Korte, K. Kral, J. Kumar, A. J. Larson, Y. Li, X. Li, S. Liu, S. K. Y. Lum, J. A. Lutz, K. Ma, D. M. Maddalena, J.-R. Makana, Y. Malhi, T. Marthews, R. Mat Serudin, S. M. McMahon, W. J. McShea, H. R. Memiaghe, X. Mi, T. Mizuno, M. Morecroft, J. A. Myers, V. Novotny, A. A. de Oliveira, P. S. Ong, D. A. Orwig, R. Ostertag, J. den Ouden, G. G. Parker, R. P. Phillips, L. Sack, M. N. Sainge, W. Sang, K. Sri-ngernyuang, R. Sukumar, I.-F. Sun, W. Sungpalee, H. S. Suresh, S. Tan, S. C. Thomas, D. W. Thomas, J. Thompson, B. L. Turner, M. Uriarte, R. Valencia, M. I. Vallejo, A. Vicentini, T. Vrška, X. Wang, X. Wang, G. Weiblen, A. Wolf, H. Xu, S. Yap, and J. Zimmerman. CTFS-ForestGEO: A worldwide network monitoring forests in an era of global change. *Glob. Change Biol.*, 21(2):528–549, Feb. 2015. doi:10.1111/gcb.12712.
- K. Lindsay, G. B. Bonan, S. C. Doney, F. M. Hoffman, D. M. Lawrence, M. C. Long, N. M. Mahowald, J. K. Moore, J. T. Randerson, and P. E. Thornton. Preindustrial-control and twentieth-century carbon cycle experiments with the Earth system model CESM1(BGC). *J. Clim.*, 27(24):8981–9005, Dec. 2014. doi:10.1175/JCLI-D-12-00565.1.
- Y. Sun, L. Gu, R. E. Dickinson, R. J. Norby, S. G. Pallardy, and F. M. Hoffman. Impact of mesophyll diffusion on estimated global land CO₂ fertilization. *Proc. Nat. Acad. Sci.*, 111(44):15774–15779, Nov. 2014. doi:10.1073/pnas.1418075111.
- Y. P. Wang, B. C. Chen, W. R. Wieder, M. Leite, B. E. Medlyn, M. Rasmussen, M. J. Smith, F. B. Augusto, F. M. Hoffman, and Y. Q. Luo. Oscillatory behavior of two nonlinear microbial models of soil carbon decomposition. *Biogeosci.*, 11(7):1817–1831, Apr. 2014. doi:10.5194/bg-11-1817-2014.
- F. M. Hoffman, J. T. Randerson, V. K. Arora, Q. Bao, P. Cadule, D. Ji, C. D. Jones, M. Kawamiya, S. Khattiwala, K. Lindsay, A. Obata, E. Shevliakova, K. D. Six, J. F. Tjiputra, E. M. Volodin, and T. Wu. Causes and implications of persistent atmospheric carbon dioxide biases in Earth System Models. *J. Geophys. Res. Biogeosci.*, 119(2):141–162, Feb. 2014. doi:10.1002/2013JG002381.
- W. M. Christie, W. W. Hargrove, S. P. Norman, J. P. Spruce, J. Kumar, F. Hoffman, and S. W. Schroeder. ForWarn forest change detection system provides a weekly snapshot of US forest contributions to aid forest managers. In *Proceedings of the 9th Southern Forestry and Natural Resource Management GIS Conference*, Dec. 2013.
- F. M. Hoffman, J. Kumar, R. T. Mills, and W. W. Hargrove. Representativeness-based sampling network design for the State of Alaska. *Landscape Ecol.*, 28(8):1567–1586, Oct. 2013. doi:10.1007/s10980-013-9902-0.
- G. Keppel-Aleks, J. T. Randerson, K. Lindsay, B. B. Stephens, J. K. Moore, S. C. Doney, P. E. Thornton, N. M. Mahowald, F. M. Hoffman, C. Sweeney, P. P. Tans, P. O. Wennberg, and S. C. Wofsy. Atmospheric carbon dioxide variability in the Community Earth System Model: Evaluation and transient dynamics during the twentieth and twenty-first centuries. *J. Clim.*, 26(13):4447–4475, July 2013. doi:10.1175/JCLI-

D-12-00589.1.

- R. T. Mills, J. Kumar, F. M. Hoffman, W. W. Hargrove, J. P. Spruce, and S. P. Norman. Identification and visualization of dominant patterns and anomalies in remotely sensed vegetation phenology using a parallel tool for principal components analysis. *Procedia Comput. Sci.*, 18(0):2396–2405, June 2013. doi:10.1016/j.procs.2013.05.411.
- J. Mao, X. Shi, P. E. Thornton, F. M. Hoffman, Z. Zhu, and R. B. Myneni. Global latitudinal-asymmetric vegetation growth trends and their driving mechanisms: 1982–2009. *Remote Sens.*, 5(3):1484–1497, Mar. 2013. doi:10.3390/rs5031484.
- K. E. O. Todd-Brown, J. T. Randerson, W. M. Post, F. M. Hoffman, C. Tarnocai, E. A. G. Schuur, and S. D. Allison. Causes of variation in soil carbon simulations from CMIP5 Earth system models and comparison with observations. *Biogeosci.*, 10(3):1717–1736, Mar. 2013. doi:10.5194/bg-10-1717-2013.
- Y. Q. Luo, J. T. Randerson, G. Abramowitz, C. Bacour, E. Blyth, N. Carvalhais, P. Ciais, D. Dalmonech, J. B. Fisher, R. Fisher, P. Friedlingstein, K. Hibbard, F. Hoffman, D. Huntzinger, C. D. Jones, C. Koven, D. Lawrence, D. J. Li, M. Mahecha, S. L. Niu, R. Norby, S. L. Piao, X. Qi, P. Peylin, I. C. Prentice, W. Riley, M. Reichstein, C. Schwalm, Y. P. Wang, J. Y. Xia, S. Zaehle, and X. H. Zhou. A framework for benchmarking land models. *Biogeosci.*, 9(10):3857–3874, Oct. 2012. doi:10.5194/bg-9-3857-2012.
- W. L. Bauerle, R. Oren, D. A. Way, S. S. Qian, P. C. Stoy, P. E. Thornton, J. D. Bowden, F. M. Hoffman, and R. F. Reynolds. Photoperiodic regulation of the seasonal pattern of photosynthetic capacity and the implications for carbon cycling. *Proc. Nat. Acad. Sci.*, 109(22):8612–8617, May 2012. doi:10.1073/pnas.1119131109.
- D. N. Huntzinger, W. M. Post, Y. Wei, A. M. Michalak, T. O. West, A. R. Jacobson, I. T. Baker, J. M. Chen, K. J. Davis, D. J. Hayes, F. M. Hoffman, A. K. Jain, S. Liu, A. D. McGuire, R. P. Neilson, C. Potter, B. Poulter, D. Price, B. M. Raczka, H. Q. Tian, P. Thornton, E. Tomelleri, N. Viogy, J. Xiao, W. Yuan, N. Zeng, M. Zhao, and R. Cook. North American Carbon Program (NACP) regional interim synthesis: Terrestrial biospheric model intercomparison. *Ecol. Model.*, 232(0):144–157, May 2012. doi:10.1016/j.ecolmodel.2012.02.004.
- R. Sisneros, J. Huang, G. Ostrouchov, and F. Hoffman. Visualizing life zone boundary sensitivities across climate models and temporal spans. In M. Sato, S. Matsuoka, P. M. Sloot, G. D. van Albada, and J. Dongarra, editors, *Proceedings of the International Conference on Computational Science (ICCS 2011)*, volume 4 of *Procedia Comput. Sci.*, pages 1582–1591, Amsterdam, June 2011. Elsevier. doi:10.1016/j.procs.2011.04.171.
- R. T. Mills, F. M. Hoffman, J. Kumar, and W. W. Hargrove. Cluster analysis-based approaches for geospatiotemporal data mining of massive data sets for identification of forest threats. In M. Sato, S. Matsuoka, P. M. Sloot, G. D. van Albada, and J. Dongarra, editors, *Proceedings of the International Conference on Computational Science (ICCS 2011)*, volume 4 of *Procedia Comput. Sci.*, pages 1612–1621, Amsterdam, June 2011. Elsevier. doi:10.1016/j.procs.2011.04.174.
- J. Kumar, R. T. Mills, F. M. Hoffman, and W. W. Hargrove. Parallel k -means clustering for quantitative ecoregion delineation using large data sets. In M. Sato, S. Matsuoka, P. M. Sloot, G. D. van Albada, and J. Dongarra, editors, *Proceedings of the International Conference on Computational Science (ICCS 2011)*, volume 4 of *Procedia Comput. Sci.*, pages 1602–1611, Amsterdam, June 2011. Elsevier. doi:10.1016/j.procs.2011.04.173.
- F. M. Hoffman, J. W. Larson, R. T. Mills, B.-G. J. Brooks, A. R. Ganguly, W. W. Hargrove, J. Huang, J. Kumar, and R. R. Vatsavai. Data Mining in Earth System Science (DMESS 2011). In M. Sato, S. Matsuoka, P. M. Sloot, G. D. van Albada, and J. Dongarra, editors, *Proceedings of the International Conference on Computational Science (ICCS 2011)*, volume 4 of *Procedia Comput. Sci.*, pages 1450–1455, Amsterdam, June 2011. Elsevier. doi:10.1016/j.procs.2011.04.157.

- X. Shi, J. Mao, P. E. Thornton, F. M. Hoffman, and W. M. Post. The impact of climate, CO₂, nitrogen deposition, and land use change on simulated contemporary global river flow. *Geophys. Res. Lett.*, 38(8): L08704, Apr. 2011. doi:10.1029/2011GL046773.
- G. A. Alexandrov, D. Ames, G. Bellocchi, M. Bruen, N. Crout, M. Erechtkoukova, A. Hildebrandt, F. Hoffman, C. Jackisch, P. Khaiteer, G. Mannina, T. Matsunaga, S. T. Purucker, M. Rivington, and L. Samaniego. Technical assessment and evaluation of environmental models and software: Letter to the editor. *Environ. Modell. Softw.*, 26(3):328–336, Mar. 2011. doi:10.1016/j.envsoft.2010.08.004. Thematic issue on the assessment and evaluation of environmental models and software.
- N. M. Mahowald, S. Kloster, S. Engelstaedter, J. K. Moore, S. Mukhopadhyay, J. R. McConnell, S. Albani, S. C. Doney, A. Bhattacharya, M. A. J. Curran, M. G. Flanner, F. M. Hoffman, D. M. Lawrence, K. Lindsay, P. A. Mayewski, J. Neff, D. Rothenberg, E. Thomas, P. E. Thornton, and C. S. Zender. Observed 20th century desert dust variability: Impact on climate and biogeochemistry. *Atmos. Chem. Phys.*, 10(22):10875–10893, Nov. 2010. doi:10.5194/acp-10-10875-2010.
- F. M. Hoffman, R. T. Mills, J. Kumar, S. S. Vulli, and W. W. Hargrove. Geospatiotemporal data mining in an early warning system for forest threats in the United States. In *Proceedings of the 2010 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2010)*, pages 170–173, July 2010. ISBN 978-1-4244-9566-5. doi:10.1109/IGARSS.2010.5653935. Invited.
- S. Kloster, N. M. Mahowald, J. T. Randerson, P. E. Thornton, F. M. Hoffman, S. Levis, P. J. Lawrence, J. J. Feddema, K. W. Oleson, and D. M. Lawrence. Fire dynamics during the 20th century simulated by the Community Land Model. *Biogeosci.*, 7(6):1877–1902, June 2010. doi:10.5194/bg-7-1877-2010.
- K. W. Oleson, D. M. Lawrence, G. B. Bonan, M. G. Flanner, E. Kluzek, P. J. Lawrence, S. Levis, S. C. Swenson, P. E. Thornton, A. Dai, M. Decker, R. Dickinson, J. Feddema, C. Heald, F. Hoffman, J.-F. Lamarque, N. Mahowald, G.-Y. Niu, T. Qian, J. Randerson, S. Running, K. Sakaguchi, A. Slater, R. Stöckli, A. Wang, Z.-L. Yang, X. Zeng, and X. Zeng. Technical description of version 4.0 of the Community Land Model (CLM). Technical Note NCAR/TN-478+STR, National Center for Atmospheric Research, Boulder, Colorado, USA, Mar. 2010. URL http://www.cesm.ucar.edu/models/cesm1.0/clm/CLM4_Tech_Note.pdf.
- B. Baker, H. Diaz, W. Hargrove, and F. Hoffman. Use of the Köppen-Trewartha climate classification to evaluate climatic refugia in statistically derived ecoregions for the People’s Republic of China. *Clim. Change*, 98(1):113–131, Jan. 2010. ISSN 0165-0009. doi:10.1007/s10584-009-9622-2.
- J. T. Randerson, F. M. Hoffman, P. E. Thornton, N. M. Mahowald, K. Lindsay, Y.-H. Lee, C. D. Nevison, S. C. Doney, G. Bonan, R. Stöckli, C. Covey, S. W. Running, and I. Y. Fung. Systematic assessment of terrestrial biogeochemistry in coupled climate-carbon models. *Glob. Change Biol.*, 15(10):2462–2484, Oct. 2009. ISSN 1365-2486. doi:10.1111/j.1365-2486.2009.01912.x.
- W. W. Hargrove, J. P. Spruce, G. E. Gasser, and F. M. Hoffman. Toward a national early warning system for forest disturbances using remotely sensed phenology. *Photogramm. Eng. Rem. Sens.*, 75(10):1150–1156, Oct. 2009.
- F. M. Hoffman and M. Mancip. Working group report on terrestrial biosphere model evaluation. *Integrated Land Ecosystem-Atmosphere Processes Study (iLEAPS) Newsletter*, 7:64, June 2009. ISSN 1796-0363.
- C. R. Johnson, M. Glatter, W. Kendall, J. Huang, and F. M. Hoffman. Querying for feature extraction and visualization in climate modeling. In G. Allen, J. Nabrzyski, E. Seidel, G. D. van Albada, J. Dongarra, and P. M. Slood, editors, *Proceedings of the 9th International Conference on Computational Science (ICCS 2009)*, volume 5545 of *Lecture Notes in Computer Science (LNCS)*, pages 416–425, Heidelberg, May 2009. Springer-Verlag. ISBN 978-3-642-01972-2. doi:10.1007/978-3-642-01973-9_46.
- Y. Xue, F. M. Hoffman, and D. Liu. GeoComputation 2009. In G. Allen, J. Nabrzyski, E. Seidel, G. D. van Albada, J. Dongarra, and P. M. Slood, editors, *Proceedings of the 9th International Conference on*

- Computational Science (ICCS 2009)*, volume 5545 of *Lecture Notes in Computer Science (LNCS)*, pages 345–348, Heidelberg, May 2009. Springer-Verlag. ISBN 978-3-642-01972-2. doi:10.1007/978-3-642-01973-9_38.
- R. T. Mills, F. M. Hoffman, P. H. Worley, K. S. Perumalla, A. Mirin, G. E. Hammond, and B. F. Smith. Coping at the user-level with resource limitations in the Cray Message Passing Toolkit MPI at scale: How not to spend your summer vacation. In *Proceedings of the 2009 Cray User Group (CUG) Conference*, May 2009.
- R. Sisneros, M. Glatter, B. Langley, J. Huang, F. Hoffman, and D. J. Erickson III. Time-varying multivariate visualization for understanding terrestrial biogeochemistry. *J. Phys.: Conf. Ser.*, 125(1):012093, Dec. 2008. doi:10.1088/1742-6596/125/1/012093.
- F. M. Hoffman, W. W. Hargrove, R. T. Mills, S. Mahajan, D. J. Erickson, and R. J. Oglesby. Multivariate Spatio-Temporal Clustering (MSTC) as a data mining tool for environmental applications. In M. Sánchez-Marrè, J. Béjar, J. Comas, A. E. Rizzoli, and G. Guariso, editors, *Proceedings of the iEMSs Fourth Biennial Meeting: International Congress on Environmental Modelling and Software Society (iEMSs 2008)*, pages 1774–1781, July 2008a. ISBN 978-84-7653-074-0.
- F. M. Hoffman, J. T. Randerson, I. Y. Fung, P. E. Thornton, Y.-H. J. Lee, C. C. Covey, G. B. Bonan, and S. W. Running. The Carbon-Land Model Intercomparison Project (C-LAMP): A protocol and evaluation metrics for global terrestrial biogeochemistry models. In M. Sánchez-Marrè, J. Béjar, J. Comas, A. E. Rizzoli, and G. Guariso, editors, *Proceedings of the iEMSs Fourth Biennial Meeting: International Congress on Environmental Modelling and Software Society (iEMSs 2008)*, pages 1039–1046, July 2008b. ISBN 978-84-7653-074-0.
- M. Keller, D. Schimel, W. Hargrove, and F. Hoffman. A continental strategy for the National Ecological Observatory Network. *Front. Ecol. Environ.*, 6(5):282–284, June 2008. doi:10.1890/1540-9295(2008)6[282:ACSFTN]2.0.CO;2. Special Issue on Continental-Scale Ecology.
- W. Kendall, M. Glatter, J. Huang, F. Hoffman, and D. E. Bernholdt. Web enabled collaborative climate visualization in the earth system grid. In *Proceedings of the International Symposium on Collaborative Technologies and Systems 2008 (CTS 2008)*, pages 212–220, May 2008. ISBN 978-1-4244-2248-7. doi:10.1109/CTS.2008.4543934.
- D. J. Erickson III, R. T. Mills, J. Gregg, T. J. Blasing, F. M. Hoffman, R. J. Andres, M. Devries, Z. Zhu, and S. R. Kawa. An estimate of monthly global emissions of anthropogenic CO₂: Impact on the seasonal cycle of atmospheric CO₂. *J. Geophys. Res.*, 113(G1):G01023, Mar. 2008. doi:10.1029/2007JG000435.
- F. M. Hoffman, C. C. Covey, I. Y. Fung, J. T. Randerson, P. E. Thornton, Y.-H. Lee, N. A. Rosenbloom, R. C. Stöckli, S. W. Running, D. E. Bernholdt, and D. N. Williams. Results from the Carbon-Land Model Intercomparison Project (C-LAMP) and availability of the data on the Earth System Grid (ESG). *J. Phys.: Conf. Ser.*, 78(1):012026, Dec. 2007. doi:10.1088/1742-6596/78/1/012026.
- J. V. Pittman, E. M. Weinstock, R. J. Oglesby, D. S. Sayres, J. B. Smith, J. G. Anderson, O. R. Cooper, S. C. Wofsy, I. Xueref, C. Gerbig, B. C. Daube, E. C. Richard, B. A. Ridley, A. J. Weinheimer, M. Loewenstein, H.-J. Jost, J. P. Lopez, M. J. Mahoney, T. L. Thompson, W. W. Hargrove, and F. M. Hoffman. Transport in the subtropical lowermost stratosphere during the Cirrus Regional Study of Tropical Anvils and Cirrus Layers-Florida Area Cirrus Experiment. *J. Geophys. Res.*, 112(D8):D08304, Apr. 2007. doi:10.1029/2006JD007851.
- D. Schimel, W. Hargrove, F. Hoffman, and J. McMahon. NEON: A hierarchically designed national ecological network. *Front. Ecol. Environ.*, 5(2):59, Mar. 2007. doi:10.1890/1540-9295(2007)5[59:NAHDNE]2.0.CO;2.
- C. Ehlschlaeger, J. Westervelt, H. Balbach, H. R. Akcakaya, T. Hctor, C. Goodison, W. W. Hargrove, F. M. Hoffman, W. Rose, and R. C. Lozar. Habitat fragmentation handbook for installation planners. Technical

- Report ERDC/CERL TR-06-36, U.S. Army Corps of Engineers, Engineer Research and Development Center, Dec. 2006.
- F. M. Hoffman, I. Fung, J. Randerson, P. Thornton, J. Foley, C. Covey, J. John, S. Levis, W. M. Post, M. Vertenstein, R. Stöckli, S. Running, F. A. Heinsch, D. Erickson, and J. Drake. Terrestrial biogeochemistry in the Community Climate System Model (CCSM). *J. Phys.: Conf. Ser.*, 46(1):363–369, Sept. 2006. doi:10.1088/1742-6596/46/1/051.
- W. W. Hargrove, F. M. Hoffman, and P. F. Hessburg. Mapcurves: A quantitative method for comparing categorical maps. *J. Geograph. Syst.*, 8(2):187–208, July 2006. doi:10.1007/s10109-006-0025-x.
- R. E. Dickinson, K. W. Oleson, G. Bonan, F. Hoffman, P. Thornton, M. Vertenstein, Z.-L. Yang, and X. Zeng. The Community Land Model and its climate statistics as a component of the Community Climate System Model. *J. Clim.*, 19(11):2302–2324, June 2006. doi:10.1175/JCLI3742.1.
- R. C. Lozar, W. Hargrove, and F. Hoffman. Use of the Corridor Tool in support of threatened and endangered species habitat fragmentation. Technical Report ERDC/CERL TR-05-23, U.S. Army Corps of Engineers, Engineer Research and Development Center, Sept. 2005.
- F. M. Hoffman, W. W. Hargrove, D. J. Erickson, and R. J. Oglesby. Using clustered climate regimes to analyze and compare predictions from fully coupled general circulation models. *Earth Interact.*, 9(10): 1–27, Aug. 2005a. doi:10.1175/EI110.1.
- F. M. Hoffman, M. Vertenstein, H. Kitabata, and J. B. White III. Vectorizing the Community Land Model (CLM). *Int. J. High Perf. Comput. Appl.*, 19(3):247–260, Aug. 2005b. doi:10.1177/1094342005056113.
- G. R. Carr, M. J. Cordery, J. B. Drake, M. W. Ham, F. M. Hoffman, and P. H. Worley. Porting and performance of the Community Climate System Model (CCSM3) on the Cray X1. In *Proceedings of the 2005 Cray Users Group (CUG) Conference*, May 2005.
- W. W. Hargrove, F. M. Hoffman, and R. A. Efroymsen. A practical map-analysis tool for detecting potential dispersal corridors. *Landscape Ecol.*, 20(4):361–373, May 2005. doi:10.1007/s10980-004-3162-y.
- M. A. White, F. Hoffman, W. W. Hargrove, and R. R. Nemani. A global framework for monitoring phenological responses to climate change. *Geophys. Res. Lett.*, 32(4):L04705, Feb. 2005. doi:10.1029/2004GL021961.
- E. Saxon, B. Baker, W. Hargrove, F. Hoffman, and C. Zganjar. Mapping environments at risk under different global climate change scenarios. *Ecol. Lett.*, 8(1):53–60, Jan. 2005. doi:10.1111/j.1461-0248.2004.00694.x.
- M. Vertenstein, K. Oleson, S. Levis, and F. Hoffman. Community Land Model version 3.0 (CLM3.0) user’s guide. Technical report, National Center for Atmospheric Research, Boulder, Colorado, USA, June 2004. URL <http://www.cgd.ucar.edu/tss/clm/distribution/clm3.0/UsersGuide/UsersGuide.pdf>.
- F. Hoffman, M. Vertenstein, P. Thornton, K. Oleson, and S. Levis. Community Land Model version 3.0 (CLM3.0) developer’s guide. Technical Memorandum ORNL/TM-2004/119, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, June 2004a. URL <http://www.cgd.ucar.edu/tss/clm/distribution/clm3.0/DevelopersGuide/doc/CodeReference/DevGuideAndReference.pdf>.
- W. W. Hargrove and F. M. Hoffman. A flux atlas for representativeness and statistical extrapolation of the AmeriFlux network. Technical Memorandum ORNL/TM-2004/112, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, Apr. 2004a. URL <http://www.geobabble.org/flux-ecoregions/>.
- F. M. Hoffman, M. Vertenstein, H. Kitabata, J. B. White, P. Worley, J. Drake, and M. Cordery. Adventures in vectorizing the Community Land Model. In *Proceedings of the 2004 Cray Users Group (CUG) Conference*, May 2004b.
- K. W. Oleson, Y. Dai, G. Bonan, M. Bosilovich, R. Dickinson, P. Dirmeyer, F. Hoffman, P. Houser,

- S. Levis, G.-Y. Niu, P. Thornton, M. Vertenstein, Z.-L. Yang, and X. Zeng. Technical description of the Community Land Model. Technical Note NCAR/TN-461+STR, National Center for Atmospheric Research, Boulder, Colorado, USA, May 2004. URL http://www.cgd.ucar.edu/tss/clm/distribution/clm3.0/TechNote/CLM_Tech_Note.pdf.
- W. W. Hargrove and F. M. Hoffman. Potential of multivariate quantitative methods for delineation and visualization of ecoregions. *Environ. Manage.*, 34(Supplement 1):S39–S60, Apr. 2004b. doi:10.1007/s00267-003-1084-0.
- W. W. Hargrove, F. M. Hoffman, and B. E. Law. New analysis reveals representativeness of the AmeriFlux Network. *Eos Trans. AGU*, 84(48):529, 535, Dec. 2003. doi:10.1029/2003EO480001.
- W. W. Hargrove, F. M. Hoffman, and P. M. Schwartz. A fractal landscape realizer for generating synthetic maps. *Conserv. Ecol.*, 6(1):2, Feb. 2002. URL <http://www.consecol.org/vol6/iss1/art2/>. Part of Special Feature on Ralf Yorke Memorial Competition 2001.
- J.-P. Gwo, E. F. D’Azevedo, H. Frenzel, M. Mayes, G.-T. Yeh, P. M. Jardine, K. M. Salvage, and F. M. Hoffman. HBGC123D: A high performance computer model of coupled hydrogeological and biogeochemical processes. *Comput. Geosci.*, 27(10):1231–1242, Dec. 2001. doi:10.1016/S0098-3004(01)00027-9.
- W. W. Hargrove, F. M. Hoffman, and T. Sterling. The do-it-yourself supercomputer. *Sci. Am.*, 265(2):72–79, Aug. 2001. URL <http://www.sciam.com/article.cfm?articleID=000E238B-33EC-1C6F-84A9809EC588EF21>.
- W. W. Hargrove and F. M. Hoffman. An analytical assessment tool for predicting changes in a species distribution map following changes in environmental conditions. In B. O. Parks, K. M. Clarke, and M. P. Crane, editors, *Proceedings of the Fourth International Conference on Integrating GIS and Environmental Modeling (GIS/EM4): Problems, Prospects and Research Needs*, Boulder, Colorado, Sept. 2000. University of Colorado, Cooperative Institute for Research in Environmental Sciences (CIRES). ISBN 0-9743307-0-1. URL <http://www.colorado.edu/research/cires/banff/pubpapers/104/>.
- J.-P. Gwo, F. M. Hoffman, and W. W. Hargrove. Mechanistic-based genetic algorithm search on a Beowulf cluster of Linux PCs. In *Proceedings of the High Performance Computing 2000 (HPC2000) Conference*, Apr. 2000.
- G. Mahinthakumar, F. M. Hoffman, W. W. Hargrove, and N. T. Karonis. Multivariate geographic clustering in a metacomputing environment using Globus. In *Supercomputing ’99: Proceedings of the 1999 ACM/IEEE conference on Supercomputing (CDROM)*, Supercomputing ’99, New York, NY, USA, Nov. 1999. ACM Press. ISBN 1-58113-091-0. doi:10.1145/331532.331537.
- F. M. Hoffman and W. W. Hargrove. Parallel computing with Linux. *Crossroads*, 6(1):23–27, Sept. 1999a. doi:10.1145/331636.331643.
- W. W. Hargrove and F. M. Hoffman. Using multivariate clustering to characterize ecoregion borders. *Comput. Sci. Eng.*, 1(4):18–25, July 1999. doi:10.1109/5992.774837.
- F. M. Hoffman and W. W. Hargrove. Multivariate geographic clustering using a Beowulf-style parallel computer. In H. R. Arabnia, editor, *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA ’99)*, volume III, pages 1292–1298. CSREA Press, June 1999b. ISBN 1-892512-11-4.
- W. M. Post, A. W. King, S. D. Wullschleger, and F. M. Hoffman. Historical variations in terrestrial biospheric carbon storage. *DOE Research Summary*, (34), June 1997. URL <http://cdiac.esd.ornl.gov/pns/doers/doer34/doer34.htm>.
- K. D. Barnes, J. M. Donato, D. M. Flanagan, N. W. Grady, J. A. Green, F. M. Hoffman, J. A. Kohl, M. R. Leuze, P. M. Papadopoulos, and R. F. Sincovec. The Financial automated Management On-line User System (FaMOUS): A prototype interactive hypertext-based financial planning and reporting system. Technical Memorandum ORNL/TM-13139, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, Nov.

1995.

- D. A. Levine, W. W. Hargrove, and F. M. Hoffman. Characterization of sediments in the Clinch River, Tennessee, using remote sensing and multi-dimensional GIS techniques. In M. Heit, H. D. Parker, and A. Shortreid, editors, *GIS Applications in Natural Resources 2*. GIS World, Inc., Fort Collins, Colorado, Aug. 1995a. ISBN 1-882610-17-2.
- D. A. Levine, W. W. Hargrove, and F. M. Hoffman. Characterization of sediments in the Clinch River, Tennessee, using remote sensing and multi-dimensional GIS techniques. In *Proceedings of the Ninth Annual Symposium on Geographic Information Systems*, pages 548–551, Mar. 1995b.
- W. W. Hargrove, F. M. Hoffman, and D. A. Levine. Interpolation of bottom bathymetry and potential erosion in a large Tennessee reservoir system using GRASS. In *Proceedings of the Ninth Annual Symposium on Geographic Information Systems*, pages 552–557, Mar. 1995.
- S. Y. Lee, M. Elless, and F. M. Hoffman. Solubility measurement of Uranium in Uranium-contaminated soils. Technical Memorandum ORNL/TM-12401, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, Aug. 1993.
- M. A. Unseren and F. M. Hoffman. Errata report on Herbert Goldstein's *Classical Mechanics*, second edition. Technical Memorandum ORNL/TM-12176, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, Jan. 1993.
- F. M. Hoffman and V. S. Tripathi. A geochemical expert system prototype using object-oriented knowledge representation and a production rule system. *Comput. Geosci.*, 19(1):53–60, Jan. 1993. doi:10.1016/0098-3004(93)90042-4.
- F. M. Hoffman. A Unix print filter for controlling an HP Laserjet printer. Technical Memorandum ORNL/TM-12190, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, Sept. 1992.

Collaborators and Co-Authors

Samantha J. Basile (U. Michigan), Brian Beckage (U. Vermont), Gordon B. Bonan (NCAR), Susannah Burrows (PNNL), Katherine Calvin (PNNL), Philip Cameron-Smith (LLNL), Eric Carr (U. Tennessee), Yang Chen (U. California Irvine), Housen Chu (LBNL), Nathan Collier (ORNL), Kenneth J. Davis (Penn State U.), Clara Deal (U. Alaska), Ankur Desai (U. Wisconsin), Scott C. Doney (U. Virginia), David J. Durden (NEON), Scott M. Elliott (LANL), Nina Fefferman (U. Tennessee), Joshua B. Fisher (NASA JPL), Whitney L. Forbes (U. Tennessee), Janet Franklin (U. California Riverside), Joshua S. Fu (U. Tennessee), Weiwei Fu (U. California Irvine), Auroop R. Ganguly (Northeastern U.), Peter M. Groffman (City U. of New York), Louis J. Gross (U. Tennessee), Jessica Gurevitch (Stony Brook U.), William W. Hargrove (USDA Forest Service), Corinne Hartin (PNNL), Daniel J. Hayes (U. Maine), Jessica J. Hellmann (U. Minnesota), Elizabeth Hunke (LANL), Akihiko Ito (NIES, Japan), Nicole Jeffery (LANL), Chris D. Jones (UK Met Office, UK), Shih-Chieh Kao (ORNL), Gretchen Keppel-Aleks (U. Michigan), Gabriel J. Kooperman (U. Georgia), Shan Kothari (U. Minnesota), Charles D. Koven (LBNL), Jitendra Kumar (ORNL), Zachary L. Langford (ORNL), David M. Lawrence (NCAR), Keith Lindsay (NCAR), Matthew Long (NCAR), Melissa Lucash (U. Oregon), Yiqi Luo (N. Arizona U.), Natalie M. Mahowald (Cornell U.), Mathew Maltrud (LANL), Jifafu Mao (ORNL), Zachary Menzo (LANL), Stefan Metzger (NEON), Richard T. Mills (ANL), Umakant Mishra (SNL), J. Keith Moore (U. California Irvine), Mingquan Mu (U. California Irvine), Keith W. Oleson (NCAR), Steven P. Norman (USDA Forest Service), Shilong Piao (Peking U.), Benjamin Poulter (NASA GSFC), Michael S. Pritchard (U. California Irvine), James T. Randerson (U. California Irvine), Daniel M. Ricciuto (ORNL), William J. Riley (LBNL), Alan Robock (Rutgers U.), Christopher R. Schwalm (WHRC), Xiaoying Shi (ORNL), Sarat Sreepathi (ORNL), Vamsi Sripathi (Intel Corp.), Abigail L. S. Swann (U. of Washington), Peter E. Thornton (ORNL), Simone Tilmes (NCAR), Kathe E. O. Todd-Brown (PNNL), Daniele Visioni (Cornell U.), Ying Ping Wang (CSIRO, Australia), William R. Wieder (NCAR), Jin Wu (U. Hong Kong, China), Jianyang Xia (East China Normal U., China), Lili Xia (Rutgers U.), Min Xu (ORNL),

Xiaofeng Xu (San Diego State U.), Cheng-En Yang (U. Tennessee), Xiaojuan Yang (ORNL), Phoebe L. Zarnetske (Michigan State U.), Qing Zhu (LBNL), Asim Zia (U. Vermont).

Graduate Advisors

William W. Blass, C. C. Shih (U. Tennessee); James S. Famiglietti, Michael L. Goulden, J. Keith Moore, James T. Randerson (UC Irvine).

Postdoctoral Advisees

Yasemin Ergüner Baytok (TÜBİTAK, Turkey), Damian M. Maddalena (ORNL), Oluwaseun O. Ogunro (LANL and ORNL), Zheng Shi (ORNL), Xia Song (ORNL).

Ph.D. Advisees

Katherine Duffy (Northeastern U.), Sudershan Gangrade (U. Tennessee), Pragya Kandel (U. Tennessee), Venkata Shashank Koduri (Northeastern U.), Zachary L. Langford (U. Tennessee), Bo Liu (U. Tennessee), Bharat Sharma (Northeastern U.), Jiani Tan (U. Tennessee), Cheng-En Yang (U. Tennessee).

Undergraduate and Graduate Interns

Oluwatomisin (Tosin) Adeyeye (Fisk U.), Rahul Barman (U. Illinois), Shamik Bhattacharya (North Carolina State U.), Riley Brady (U. Colorado), Chance Brown (U. Tennessee), Wenting Fu (U. Texas), Wesley J. Kendall (U. Tennessee), Grace Kirkpatrick (Bowdoin College), Venkata Shashank Koduri (Northeastern U.), Jitendra Kumar (North Carolina State U.), Zachary L. Langford (U. Tennessee), Salil Mahajan (Texas A&M), Aaron Marshall (William and Mary), Adrian E. Mendez Torres (U. Missouri), Zachary M. Reichle (Ball State U.), Andrew J. Schultz (U. Tulsa), Bharat Sharma (Northeastern U.), Shijie Shu (U. Illinois), Shivakar Vulli (U. Missouri), J. Anthony Wachira (Knoxville College), Thomas P. Wiegand (U. Tennessee Chattanooga), Cheng-En Yang (U. Tennessee).