

## **Michael F. Wehner**

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<https://crd.lbl.gov/departments/computational-science/ccmc/staff/staff-members/michael-wehner/>

### **Education:**

Ph.D., 1983, University of Wisconsin-Madison (Nuclear Engineering)

M.S., 1980, University of Wisconsin-Madison (Nuclear Engineering)

B.S., 1978, University of Delaware, Graduated with High Honors (Physics)

### **Dissertation:**

Numerical Evaluation of Path Integral Solutions to Fokker-Planck Equations  
(Advisor: Professor W.G. Wolfer)

### **Biography:**

Michael F. Wehner is a senior staff scientist in the Computational Research Division at the Lawrence Berkeley National Laboratory. Dr. Wehner's current research concerns the behavior of extreme weather events in a changing climate, especially heat waves, intense precipitation, drought and tropical cyclones. Before joining the Berkeley Lab in 2002, Wehner was an analyst at the Lawrence Livermore National Laboratory in the Program for Climate Modeling Diagnosis and Intercomparison. He is the author or co-author of over 230 scientific papers and reports. He was a lead author for the 2013 5<sup>th</sup> and 6<sup>th</sup> Assessment Reports of the Intergovernmental Panel on Climate Change and the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> US National Assessments on climate change. He is currently a lead author for the upcoming 5<sup>th</sup> US National Assessment.

### **Employment:**

*2013-present:* Senior Staff Scientist, Scientific Computing Group, Computational Research Division, Lawrence Berkeley National Laboratory, Berkeley, CA

*2002-2013:* Staff Scientist, Scientific Computing Group, Computational Research Division, Lawrence Berkeley National Laboratory, Berkeley, CA

*1998-2002:* Physicist, Program for Climate Modeling and Intercomparison, Lawrence Livermore National Laboratory, Livermore, CA

*1991-1998:* Physicist, Climate System Modeling group, A-division, Lawrence Livermore National Laboratory, Livermore, CA

*1985-1991:* Physicist, Code Development group, B-division, Lawrence Livermore National Laboratory, Livermore, CA

*1983-1984:* Post doctoral Research Associate, Nuclear Engineering Department, University of Wisconsin-Madison

### **Selected Professional Activities:**

- Member of Lead Author team, Intergovernmental Panel on Climate Change 6<sup>th</sup> Assessment Report (IPCC AR6), chapter 11, *Weather and climate extreme events in a changing climate* (2018-2021)
- Contributing author, SF Bay Area Regional Report for California's Fourth Climate Assessment 2018

- Member of Lead Author team, US Global Change Research Program, 2<sup>nd</sup>,3<sup>rd</sup>,4<sup>th</sup> and 5<sup>th</sup> US National Climate Assessment Reports 2009-present
- Chief Scientific Editor and co-founder, *Advances in Statistical Meteorology, Climatology and Oceanography*. A Copernicus journal. 2014-present
- Chair, Ad-Hoc International Detection and Attribution Group (IDAG), 2010-2020
- Member of Lead Author team, Intergovernmental Panel on Climate Change 5<sup>th</sup> Assessment Report (IPCC AR5), chapter 12, *Long Term Projections* (2010-2014)
- Chapter 14 Lead, US Government IPCC AR5 Review Committee (2012)
- Member of Lead Author team, US Climate Change Science Program, Unified Synthesis Report, “*Global Climate Change Impacts in the United States*” 2009
- Member of Lead Author team, US Climate Change Science Program Synthesis and Assessment Report 3.3, “*Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands.*” 2008
- Testified before the House Select Committee on Energy Independence and Global Warming at the briefing “*Extreme Weather in a Warming World*” September 23, 2010.
- Awarded 2010 Editors’ Citation for Excellence in Refereeing for *Geophysical Research Letters*
- Member, Climate Science Working Group of the National Climate Assessment Development and Advisory Committee, 2011-2012
- I am a frequent reviewer of scientific papers and proposals and also have been on many scientific meeting organizing committees and review panels.
- I am comfortable in dealing with the media, both in print and television/radio. Selected audio and video clips are linked on my website above.

### Publications

I have written over 230 scientific articles. According to google.scholar.com, my h-index is 71, my i10-index is 174, with over 24,000 total citations. A complete publication list is attached, also see this link:

<https://crd.lbl.gov/assets/Uploads/publications040622.pdf>

Publications since 2021:

1. Savin S. Chand, Kevin J. E. Walsh, Suzana J. Camargo, James Kossin, Kevin J. Tory, Michael F. Wehner, Johnny C. L. Chan, Philip J. Klotzbach, Andrew J. Dowdy, Samuel S. Bell, Hamish A. Ramsay, Hiroyuki Murakami (2022) Declining numbers of tropical cyclones and global warming. In final revisions for *Nature Climate Change*.
2. Kevin T. Smiley, Ilan Noy, Michael Wehner, Dave Frame, Christopher Sampson and Oliver E. Wing (2022) Social Inequalities in Climate Change-Attributed Impacts of Hurricane Harvey. In final revisions for *Nature Communications*.
3. Kevin A. Reed, Michael F. Wehner, Colin M. Zarzycki (2022) Attribution of 2020 Hurricane Season Extreme Rainfall. To appear April 12, 2022 in *Nature Communications*.
4. Christina M. Patricola, Michael F. Wehner, Emily Bercos-Hickey, Flor Vanessa Maciel, Christine May, Michael Mak, Olivia Yip, Anna M. Roche, Susan Leal (2022) Future Changes in Extreme Precipitation over the San Francisco Bay Area: Dependence on Atmospheric River and Extratropical Cyclone Events. To appear in *Weather and Climate Extremes*
5. Michael F. Wehner (2022) Attributing Extreme Weather: The New Science of Extreme Event Attribution. In *Mathematics for action: supporting science-based decision-making*. Jean-Stéphane Dhersin, Hans Kaper, Wilfred Ndifon, Fred Roberts, Christiane Rousseau, Günter M Ziegler, editors. UNESCO, pp 37-38 ISBN 978-92-3-100517-6  
<https://unesdoc.unesco.org/ark:/48223/pf0000380883.locale=en>
6. Michael Wehner and Kevin Reed (2022) Operational extreme weather event attribution can quantify climate change loss and damages. *PLOS Clim* 1(2): e0000013.  
<https://doi.org/10.1371/journal.pclm.0000013>
7. Perkins-Kirkpatrick, S.E., Stone, D.A., Mitchell, D.M., Rosier, S., King, A.D., Lo, Y. T. E., Pastor-Paz, J., Frame, D., Wehner, M. (2022) On the attribution of the impacts of extreme weather events to anthropogenic climate change. *Environmental Research Letters* 17 024009  
<https://iopscience.iop.org/article/10.1088/1748-9326/ac44c8>

8. Marquardt Collow, A.B., C. A. Shields, B. Guan, S. Kim, J. M. Lora, E. E. McClenny, K. Nardi, A. Payne, K. Reid, E. Shearer, R. Tomé, J. D. Wille, A. M. Ramos, I. Gorodetskaya, L. R. Leung, T. O'Brien, F. M. Ralph, J. Rutz, P. A. Ullrich, and M. Wehner (2022) An Overview of ARTMIP's Tier 2 Reanalysis Intercomparison: Uncertainty in the Detection of Atmospheric Rivers and their Associated Precipitation. *Journal of Geophysical Research-Atmospheres*. 127, e2021JD036155. <https://doi.org/10.1029/2021JD036155>
9. T. A. O'Brien, M. F. Wehner, A. E. Payne, C. A. Shields, J. J. Rutz, L.-R. Leung, F. M. Ralph, A. Collow, I. Gorodetskaya, B. Guan, J. M. Lora, E. McClenny, K. M. Nardi, A. M. Ramos, R. Tomé, C. Sarangi, E. Shearer, P. A. Ullrich, C. Zarzycki, B. Loring, H. Huang, H. A. Inda-Diaz, A. M. Rhoades and Y. Zhou (2022) Increases in Future AR Count and Size: Overview of the ARTMIP Tier 2 CMIP5/6 Experiment. *Journal of Geophysical Research-Atmospheres* 127, e2021JD036013. <https://doi.org/10.1029/2021JD036013>
10. Mark D. Risser, Daniel R. Feldman, Michael F. Wehner, David W. Pierce, Jeffrey R. Arnold (2021) Identifying and correcting biases in downscaling estimates of return values. *Climatic Change* 169, 33 (2021). <https://doi.org/10.1007/s10584-021-03265-z>
11. Claudia Tebaldi, Kalyn Dorheim, Michael Wehner, and Ruby Leung (2021) Extreme Metrics and Large Ensembles. *Earth System Dynamics*, 12, 1427–1501. <https://esd.copernicus.org/articles/12/1427/2021/>
12. Daithi Stone, Kamoru Lawal, Chris Lennard, Mark Tadross, Piotr Wolski, Michael Wehner (2021) The life and times of the Weather Risk Attribution Forecast. *Bulletin of the American Meteorological Society* special report “Explaining Extreme Events in 2020 from a Climate Perspective”
13. Michael Wehner (2021) Simulated Changes in Tropical Cyclone Size, Accumulated Cyclone Energy and Power Dissipation Index in a Warmer Climate. *Oceans* 2, 688-699. <https://doi.org/10.3390/oceans2040039>
14. Seneviratne, S. I., X. Zhang, M. Adnan, W. Badi, C. Dereczynski, A. Di Luca, S. Ghosh, I. Iskandar, J. Kossin, S. Lewis, F. Otto, I. Pinto, M. Satoh, S. M. Vicente-Serrano, M. Wehner, B. Zhou, 2021, Weather and Climate Extreme Events in a Changing Climate. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.
15. Federico Castillo, Armando Sanchez Vargas, J.Keith Gilles, Michael Wehner, (2021) The impact of heat waves on agricultural productivity and output. Chapter 2 in “Extreme Events and Climate Change: A Multidisciplinary Approach, Federico Castillo, Michael Wehner, Daithi Stone, editors. Wiley & Sons. ISBN: 978-1-119-41362-2
16. Federico Castillo, Michael Wehner, Daithi Stone, editors (2021) Extreme Events and Climate Change: A Multidisciplinary Approach. Wiley & Sons. 240 pages. ISBN: 978-1-119-41362-2
17. Mayur Mudigonda, Prabhat, Karthik Kashinath, Evan Racah, Ankur Mahesh, Yunjie Liu, Christopher Beckham, Jim Biard, Thorsten Kurth, Sookyung Kim, Samira Kahou, Tegan Maharaj, Burlen Loring, Christopher Pal, Travis O'Brien, Ken Kunkel, Michael F. Wehner, William D. Collins (2021) Deep Learning for Detecting Extreme Weather Patterns. In *Deep Learning for the Earth Sciences*. Editors: Gustau Camps-Valls, Xiang Zhu, Devis Tuia, Markus Reichstein, pp 163-185. Wiley & Sons. ISBN: 9781119646143. Expected date of publication: September 2021
18. Michael Wehner and Christopher Sampson (2021) Attributable human-induced changes in the magnitude of flooding in the Houston, Texas region during Hurricane Harvey. *Climatic Change*. 166, 20 (2021). <https://doi.org/10.1007/s10584-021-03114-z>
19. Alan Rhoades, Mark D Risser, Daithi A Stone, Michael F Wehner, Andrew D Jones (2021) Implications of warming on western United States landfalling atmospheric rivers and their flood damages. *Weather and Climate Extremes* 100326. <https://doi.org/10.1016/j.wace.2021.100326>
20. Chao Li, Francis Zwiers, Xuebin Zhang, Guilong Li, Ying Sun, Michael Wehner (2021) Changes in temperature and precipitation extremes in the new-generation CMIP6 models. *Journal of Climate*, , 1-61. <https://journals.ametsoc.org/view/journals/clim/aop/JCLI-D-19-1013.1/JCLI-D-19-1013.1.xml>

21. Michael Wehner, Jiwoo Lee, Mark Risser, Paul Ullrich, Peter Gleckler, William D. Collins (2021) Evaluation of extreme subdaily precipitation in high-resolution global climate model simulations. *The Philosophical Transactions of the Royal Society A* 379: 20190545. <https://royalsocietypublishing.org/doi/10.1098/rsta.2019.0545>
22. K. A. Reed, M. F. Wehner, A. M. Stansfield and C. M. Zarzycki (2021), Anthropogenic Influence on Hurricane Dorian’s Extreme Rainfall, [in “Explaining Extremes of 2019 from a Climate Perspective”]. *Bull. Amer. Meteor. Soc.*, 102 (1), S9–S15, doi:<https://doi.org/10.1175/BAMS-D-20-0160.1>.
23. Mark Risser, Michael Wehner, John P O'Brien, Christina Patricola, Travis O'Brien, William Collins, Christopher Paciorek, Huanping Huang (2021) Quantifying the influence of natural climate variability on in situ measurements of seasonal total and extreme daily precipitation. *Climate Dynamics* <https://doi.org/10.1007/s00382-021-05638-7>
24. Andrew D. King, Sarah E. Perkins-Kirkpatrick, Michael F. Wehner, Sophie C. Lewis (2021) Reply to “Numerically Bounded Linguistic Probability Schemes Are Unlikely to Communicate Uncertainty Effectively”. *Earth’s Future*. 9, e2020EF001757. DOI: 10.1029/2020EF001757
25. Prabhat, Karthik Kashinath, Mayur Mudigonda, Sol Kim, Lukas Kapp-Schwoerer, Andre Graubner, Ege Karaismailoglu, Leo von Kleist, Thorsten Kurth, Annette Greiner, Kevin Yang, Colby Lewis, Jiayi Chen, Andrew Lou, Sathyavat Chandran, Ben Toms, Will Chapman, Katherine Dagon, Christine Shields, Michael Wehner, and William Collins (2021) ClimateNet: an expert-labelled open dataset and Deep Learning architecture for enabling high-precision analyses of extreme weather. *Geoscientific Model Development*. 14, 107–124, doi.org/10.5194/gmd-14-107-2021