

DEEKSHA RASTOGI

Email- rastogid@ornl.gov

EDUCATION

Aug' 2016 – Dec' 2019	PhD, Energy Science and Engineering Focus: Environmental and Climate Sciences The University of Tennessee, Knoxville, TN
Aug' 2010 – Dec' 2012	M.S., Atmospheric Sciences University of Illinois Urbana-Champaign, Urbana, IL
Aug' 2006 – Jun' 2010	B. Tech., Environmental Engineering Indian School of Mines, Dhanbad, Jharkhand, India

WORK EXPERIENCE

Dec' 2019 – Present	Research Scientist, Computational Urban Climate, Computational Urban Sciences Group Computational Sciences and Engineering Division Oak Ridge National Laboratory, Oak Ridge TN
Aug' 2016 – Dec' 2019	Graduate Research Assistant, The University of Tennessee, Knoxville, TN - Oak Ridge National Laboratory, Oak Ridge, TN
Jun' 2019 – Aug' 2019	Graduate Visitor, Advanced Study Program Climate & Global Dynamics/Research Applications, Laboratory, National Center for Atmospheric Research Boulder, CO
Jan' 2013 – Jun' 2016 May 2012 – Aug' 2012	Post Master's Research Associate, Summer Intern, Oak Ridge Associated Universities/Oak Ridge National Laboratory, Oak Ridge, TN
Aug' 2010 – Dec' 2012	Graduate Research Assistant, University of Illinois Urbana-Champaign, Urbana, IL

Critical Expertise

- More than fourteen years of experience working in the field of environmental science with a focus on atmospheric, climate and energy sciences.
- Unique expertise in investigating hydroclimate, weather/climate extremes, and infrastructure and human health responses to environmental and atmospheric processes.
- Advanced skills in the development and application of numerical modeling frameworks and scientific data analysis.

Technical Skills

Numerical weather/climate modeling (WRF, RegCM), high-performance computing, statistical data analysis, big data analysis, AI/ML applications for earth system modeling, Python, shell scripting, Fortran 90, NCO, NCAR command language (NCL)

LIST OF PUBLICATIONS

Journal Articles [26] ([Google Scholar Profile](#)) (cited 990 times, h-index 15)

- **Rastogi, D.**, Christian, J., Tuccillo, J., Christian, B., Kapadia, A. J., & Hanson, H. A. (2023). Exploring the spatial patterning of sociodemographic disparities in extreme heat exposure at multiple scales across the conterminous United States. *GeoHealth*, 7(10), e2023GH000864, <https://doi.org/10.1029/2023GH000864>
- **Rastogi, D.**, Trok, J., Depsky, N., Monier, E., & Jones, A. (2023). Historical evaluation and future projections of compound heatwave and drought extremes over the conterminous United States in CMIP6. *Environmental Research Letters*, 19(1), 014039, <https://doi.org/10.1088/1748-9326/ad0efe>
- Jones, A. D., **Rastogi, D.**, Vahmani, P., Stansfield, A. M., Reed, K. A., Thurber, T., ... & Rice, J. S. (2023). Continental United States climate projections based on thermodynamic modification of historical weather. *Scientific Data*, 10(1), 664, <https://doi.org/10.1038/s41597-023-02485-5>
- **Rastogi, D.**, Kao, S. C., & Ashfaq, M. (2022). How may the choice of downscaling techniques and meteorological reference observations affect future hydroclimate projections? *Earth's Future*, 8(10), <https://doi.org/10.1029/2022EF002734>
- **Rastogi, D.**, Lehner, F., Kuruganti, T., Evans, K. J., Kurte, K. R., & Sanyal, J. (2021). The role of humidity in determining future electricity demand in the southeastern United States. *Environmental Research Letters*, 16(11), doi: [10.1088/1748-9326/ac2fdf](https://doi.org/10.1088/1748-9326/ac2fdf)
- **Rastogi, D.**, D. Touma, K. J. Evans, and M. Ashfaq (2020), Shift towards intense and widespread precipitation events over the United States by mid 21st century. *Geophysical Research Letters*, 47, e2020GL089899, <https://doi.org/10.1029/2020GL089899>.
- **Rastogi, D.**, Lehner, F., & Ashfaq, M. Revisiting Recent United States Heatwaves in a Warmer and More Humid Climate (2020). *Geophysical Research Letters*, 47, e2019GL086736, <https://doi.org/10.1029/2019GL086736>
- **Rastogi, D.**, J.S. Holladay, K. J. Evans, K., B.L. Preston, and M. Ashfaq (2019), Shift in seasonal climate patterns likely to impact residential energy consumption. *Environmental Research Letters*, 14(7), doi: 10.1088/1748-9326/ab22d2.
- **Rastogi, D.**, M. Ashfaq, L. R. Leung, S. Ghosh, A. Saha, K. Hodges, and K. J. Evans (2018), Characteristics of Bay of Bengal Monsoon Depressions in the 21st Century. *Geophysical Research Letters*, 45(13), 6637-6645, doi:10.1029/2018GL078756.
- **Rastogi, D.**, S.-C. Kao, M. Ashfaq, R. Mei, E.D. Kabela, S. Gangrade, B. S. Naz, B. L. Preston, N. Singh, and V.G. Anantharaj (2017), Effects of climate change on probable maximum precipitation: A sensitivity study over the Alabama-Coosa-Tallapoosa River Basin. *Journal of Geophysical Research: Atmospheres*, 122(9), 4808-4828, doi: /10.1002/2016JD026001.

- Ashfaq, M., **Rastogi, D.**, Kitson, J., Abid, M. A., & Kao, S. C. (2022). Evaluation of CMIP6 GCMs over the CONUS for downscaling studies. *Journal of Geophysical Research: Atmospheres*, 127(21), e2022JD036659.
- Srivastava, A.K., Ullrich, P. A., **Rastogi D.**, Vahmani P., Jones A., and Grotjahn R. (2023), Assessment of WRF dynamically downscaled precipitation on subdaily and daily timescales over CONUS, *Geoscientific Model Development*, 16, 3699–3722, <https://doi.org/10.5194/gmd-16-3699-2023>
- Zhao, B., Kao, S. C., Zhao, G., Gangrade, S., **Rastogi, D.**, Ashfaq, M., & Gao, H. (2023). Evaluating Enhanced Reservoir Evaporation Losses From CMIP6-Based Future Projections in the Contiguous United States. *Earth's Future*, 11(3), e2022EF002961.
- Fan, M., Lu, D., Rastogi, D., & Pierce, E. M. (2022). A Spatiotemporal-Aware Weighting Scheme for Improving Climate Model Ensemble Predictions. *Journal of Machine Learning for Modeling and Computing*, 3(4).
- Lai, L., Kumar, S., **Rastogi, D.**, & Ashfaq, M. (2022). Temporal variabilities of soil carbon dioxide fluxes from cornfield impacted by temperature and precipitation changes through high-frequent measurement and DAYCENT modelling. *The Journal of Agricultural Science*, <https://doi.org/10.1017/S0021859622000132>
- Allen-Dumas M. R., Xu H., Kurte K.R., and **Rastogi D.** (2020), Towards urban water security: broadening the use of machine learning methods for mitigating urban water hazards. *Frontiers in Water: Water and Hydrocomplexity*, 2, 75.
- Gangrade, S., Kao S.-C., Naz B.S., **Rastogi D.**, Ashfaq M., Singh N., and Preston B.L. (2018), Sensitivity of probable maximum flood in a changing environment, *Water Resources Research*, 54(6), 3913-3936, doi:10.1029/2017WR021987.
- Naz, B. S., Kao S.-C., Ashfaq M., Gao H., **Rastogi D.**, and Gangrade S. (2018), Effects of climate change on streamflow extremes and implications for reservoir inflow in the United States, *Journal of Hydrology*, 556, 359-370, doi: 10.1016/j.jhydrol.2017.11.027.
- Paull, S. H., Horton D. E., Ashfaq M., **Rastogi D.**, Kramer L. D., Diffenbaugh N. S., and Kilpatrick A. M. (2017), Drought and immunity determine the intensity of West Nile virus epidemics and climate change impacts. *Proceedings of the Royal Society B: Biological Sciences*, 284(1848), 20162078, doi:10.1098/rspb.2016.2078.
- Ashfaq, M., **Rastogi D.**, Mei R., Touma D., and Leung L.R. (2017), Sources of errors in the simulation of south Asian summer monsoon in the CMIP5 GCMs. *Climate dynamics*, 49(1-2), 193-223, doi: 10.1007/s00382-016-3337-7.
- Ashfaq, M., **Rastogi D.**, Mei R., Kao S.-C., Gangrade S., Naz B.S., and Touma D. (2016), High-resolution ensemble projections of near-term regional climate over the continental United States, *Journal of Geophysical Research: Atmospheres*, 121(17), 9943-9963, doi:10.1002/2016JD025285.
- Pagán, B. R., Ashfaq M., **Rastogi D.**, Kendall D. R., Kao S.-C., Naz B. S., Mei R., and Pal. J.S. (2016), Extreme hydrological changes in the southwestern US drive reductions in water supply to Southern California by mid century. *Environmental Research Letters*, 11(9), 094026, doi:10.1088/1748-9326/11/9/094026.

- Naz, B. S., Kao S.-C., Ashfaq M., **Rastogi D.**, Mei R., and Bowling L.C., (2016), Regional hydrologic response to climate change in the conterminous United States using high-resolution hydroclimate simulations. *Global and Planetary Change*, 143, 100-117, doi:10.1016/j.gloplacha.2016.06.003.
- Mani, A., F. Tsai T.-C., Kao S.-C., Naz B.S., Ashfaq M., and **Rastogi D.** (2016), Conjunctive management of surface and groundwater resources under projected future climate change scenarios. *Journal of Hydrology*, 540, 397-411, doi:10.1016/j.jhydrol.2016.06.021.
- Mei, R., Ashfaq M., **Rastogi D.**, Leung L. R., and Dominguez F. (2015), Dominating controls for wetter South Asian summer monsoon in the twenty-first century. *Journal of Climate*, 28(8), 3400-3419, doi:10.1175/JCLI-D-14-00355.1.
- Singh, D., Horton D. E., Tsiang M., Haugen M., Ashfaq M., Mei R., **Rastogi D.**, Johnson N.C., Charland A., Rajaratnam B., and Diffenbaugh N.S. (2014), Severe precipitation in Northern India in June 2013: Causes, historical context, and changes in probability. *Bulletin of the American Meteorological Society*, 95(9), S58.

Journal Articles in Review/Submitted [3]

- Wang Y., Mao J., Brelford C. M., Ricciuto D.M., Yuan F., Shi X., **Rastogi D.**, Mayers M. M., Kao S.-C., Warren J. M., Griffiths N.A., Weston D. J., Zhou Y., Gu L., and Thornton P. E. (2023) Water, Thermal, and Land Cover Factors Led to Contrasting Urban and Rural Vegetation Resilience to Heat Waves. *PNAS*, (In Review).
- Peluso, A., **Rastogi, D.**, Klasky, H., Christian, B., Hanson, H. (2023) Environmental Determinants of Health: Measuring Multiple Physical Environmental Exposures at United States County Level, EPA: Economy and Space, (Submitted).
- Rubin H. J., Zhang L., Fu J. S., **Rastogi D.**, Kao S.C., Ashfaq M., Sensitivity of Regional Heat Wave Projections to Downscaling Method, Resolution, and Index, (Submitted).

Conference Paper

- Fan, P., Lu, D., & **Rastogi, D.** Multimodel Ensemble Predictions of Precipitation using Bayesian Neural Networks (2022). *The International Conference on Learning Representations (ICLR)*. (Peer Reviewed)

Datasets

- Jones, A., **Rastogi, D.**, Vahmani P., Stansfield A., Reed K, Thurber, T., Ullrich, P., Rice, J.S., (2022), IM3/HyperFACETS Thermodynamic Global Warming (TGW) Simulation Datasets. United States: N. p., Web. doi:10.57931/1885756.
- Kao, S. C., Ashfaq, M., **Rastogi, D.**, Gangrade, S. (2022) CMIP6-based Multi-model Hydroclimate Projection over the Conterminous US. HydroSource. Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. DOI: <https://doi.org/10.21951/SWA9505V3/1887469>
- Bass, B., J. New, **D. Rastogi**, S.-C. Kao (2022) Future Typical Meteorological Year (fTMY) US Weather Files for Building Simulation (1.0). Zenodo. <https://doi.org/10.5281/zenodo.6939750>

Technical Reports

- Kao, S. C., Ashfaq, M., **Rastogi, D.**, Gangrade, S., Uria Martinez, R., Fernandez, A., ... & Zhao, G. (2022). The Third Assessment of the Effects of Climate Change on Federal Hydropower (No. ORNL/TM-2021/2278). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States).

- Christian B., Klasky H., Sparks K., Peluso A., Tuccillo J., **Rastogi D.**, Branstetter M., Whitehead M., Hamaker A., Watson R. VA EDH Data Curation Documentation FY22-Q2, Rev. 2 (No. ORNL/SPR-2022/2391). Oak Ridge National Lab., Oak Ridge, TN. March 2022
- Christian, B., Klasky, H., Sparks, K., Peluso, A., **Rastogi, D.**, Tuccillo, J., Yoon, H.J. and Watson, R., 2022. CTSA MHRI Datasets (No. ORNL/SPR-2022/2400). Oak Ridge National Lab, Oak Ridge, TN. March 2022
- Brelsford, C., Jones, A., Allen-Dumas, M., Bukovsky, M., Dronova, I., Hong, T., Iwaniec, D., Markolf, S., Newcomer, M., Nico, P., **Rastogi, D.**, Reid, S., Sparks, K., Tuccillo, J., Zheng, Z. (2021). Needs to Inform Pathways to More Resilient Communities in a Changing Climate (MSD Working Group Workshop Report). <https://multisectordynamics.org/working-groups/urban/workshop-report-multi-sectoral-urban-interactions/> October 2021.
- Kao, S.-C., M. Ashfaq, B. S. Naz, R. Martinez, **D. Rastogi**, R. Mei, J. Yetta, N. M. Samu, M. J. Sale (2016), The Second Assessment of the Effects of Climate Change on Federal Hydropower, ORNL Technical Report, Oak Ridge National Laboratory, Oak Ridge, TN, United States: N. p., 2016. Web. doi:10.2172/1340431
- Pagan, B. R., J.S. Pal, C. Gao, J. Reichenberger, D.R. Kendall, M. Ashfaq, **D. Rastogi**, S.-C. Kao, B. S. Naz, J. Schubel (2015), *Long Beach Climate Resiliency Study: Impacts on Water Supply and Demand*. United States: N. p., 2015. Web. doi:10.2172/1502614.

Encyclopedia Chapter

- Roy, S. B. and **D. Rastogi** (2014), Land--Atmosphere Interactions. In Encyclopedia of Natural Resources: Water and Air. Taylor and Francis: New York, Published online: 21 Oct 2014; 1040-1043, doi: 10.1201/9780203757611

SELECTED PRESENTATIONS

- **Rastogi, D.**, Kao, S. C., & Ashfaq, M. Evaluating Widespread and Persistent Temperature Extremes: Implications for the United States Electric Grid Infrastructure, American Geophysical Fall Meeting 2023, 11-15 December 2023, San Francisco, CA
- **Rastogi D.**, Modeling Climate Extremes for Impact Assessment, the International Building Performance Simulation Association (IBPSA), USA, March 30, 2023 (**Invited Webinar**)
- **Rastogi D.**, Lehner F., Kuruganti T., Evans K. J., Kurte K. and Sanyal J., Evaluating future changes in electricity demand over the southeastern United States using a set of high-resolution climate projections, American Geophysical Fall Meeting 2022, 12-16 December 2022, Chicago, IL (**Invited**)
- A. Peluso, **Rastogi D.**, Klasky H., Christian B., Hanson H., Environmental Determinants of Health: Measuring Multiple Physical Environmental Exposures at United States County Level, Meeting of the NH Commission to Study Environmentally Triggered Chronic Illness, September 2022 (**Invited**)
- S. Gangrade, **Rastogi D.**, S.-C. Kao, M. Ashfaq, Evaluation of CMIP6 based Multi-Model Ensemble Hydroclimate Projections and their Associated Uncertainties over the Conterminous United States, *2022 World Environmental & Water Resources Congress*, June 5-8, 2022, Atlanta, GA
- Eldardiry H., N. Sun, H. Yan, P. Reed, A. Jones, **D. Rastogi**, Propagation of Meteorological Forcing Uncertainty into Community Land Model Simulations: Evaluation of Hydrologic Signatures over the Conterminous United States, American Meteorological Society Annual Meeting 2022, January 23-27, 2022, Houston, TX

- **Rastogi D.**, S.-C. Kao, M. Ashfaq, How may the choice of downscaling techniques and meteorological reference observations affect future hydroclimate projections? American Geophysical Fall Meeting 2021, 13-17 December 2021, New Orleans, LA
- **Rastogi D.**, D. Touma, K. J. Evans, and M. Ashfaq, European Geophysical Union Meeting, April 2021, Investigating Future Changes in the Spatial Characteristics of Precipitation Extremes over the United States (April 29, 2021) (**Invited**)
- **Rastogi D.**, S.-C. Kao, M. Ashfaq, Downscaling and Intercomparison of CMIP6 Models over the Conterminous United States. SECURE Water Act Section 9505 Assessment Workshop, February 23-25, 2021
- **Rastogi D.**, D. Touma, M. Ashfaq (2019), Shift towards intense and widespread precipitation events over the United States by mid 21st century. American Geophysical Fall Meeting 2019, 9-13 December 2018, San Francisco, CA.

RESEARCH PROJECTS

- Power Planning for Alignment of Climate and Energy Systems (PACES) funded by U.S. Department of Energy (DOE), Office of Electricity, Grid Modernization Initiative, Oct' 2023-Present
- Terrestrial Ecosystem Science Scientific Focus Area, funded by DOE-Biological and Environmental Research (BER), Office of Science, Oct'2023-Present
- Future Extreme Weather funded by U.S. DOE, Building Technology Office, Oct'2022-Present
- Widespread and Persistent Climate Extremes: Identification and Impact Assessment. Laboratory Directed Research and Development (LDRD) Program, Oak Ridge National Laboratory. Role: Principal Investigator, March' 2023-Present
- US DOE-Tennessee Valley Authority Climate R&D Collaboration, Oct'2022-Present
- Ecosystem Resilience to Thermal Extremes: Urbanization Impacts. LDRD Program, Oak Ridge National Laboratory. Role: Contributor, Oct' 2021-Sept' 2023
- Veterans Affairs (VA) Veterans Care Improvement via Computation and Outcomes-driven Research (VICTOR) Environmental Determinants of Health (EDH). Apr' 2021- Mar' 2023
- Georgetown University Center for Clinical and Translational Science-Environmental Determinants of Health, funded by National Institute of Health. Jan'2021-Mar' 2023
- Identifying Ecosystems Vulnerable to Climate Change: LDRD Program, Oak Ridge National Laboratory. Role: Co-Investigator, Oct'2020-Sept' 2022
- Effects of Climate Change on Federal Hydropower – The Third 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. DOE, Aug'2020-Present
- Integrated Multi-Sector Multi-Scale Modeling (IM3) funded by U.S. DOE-BER, Office of Science, Dec'2019-Sep'2023.
- Multiscale Methods for Accurate, Efficient, and Scale-Aware Models of the Earth funded by Advanced Scientific Computing Research (ASCR) program within the U.S. DOE, Office of Science, Dec'2019-Nov'2020.
- Energy Exascale Earth System Model (E3SM), U.S. DOE, Office of Science, Office of Biological and Environmental Research, Aug' 2016 – Dec' 2019.
- Towards the Development of an Integrated Energy-Water Risk Assessment Tool for Probable Maximum Precipitation and Flood. Sponsor: LDRD Program, Oak Ridge National Laboratory. Mar' 2014 – June' 2016.
- Effects of Climate Change on Federal Hydropower – The Second 9505 Assessment. Sponsor: Water Power Technologies Office, U.S. DOE. Oct' 2013 – Jun' 2016.

- A Hierarchical Regional Modeling Framework for Decadal-Scale Hydro-climatic Predictions and Impact Assessments, funded by LDRD Program, Jan' 2013 – Sep' 2013.
- Development of Frameworks for Robust Regional Climate Modeling, funded by U.S. DOE-BER, Jan' 2013 – Sep' 2013.

AWARDS AND RECOGNITIONS

- Invited to talk to the Health and Environment Class at Wofford College
- **Invited** to talk in U.S. Green Building Council (USGBC), [Better Buildings, Better Lives: Big South, Response & Resilience panel](#). (December 9, 2020)
- **Invited** to talk in Urban Land Institute – [Panel on Extreme Heat in Urban Environments](#). (July 15, 2020)
- Appointed as an **Editor of [Journal of Water and Climate Change](#)**. (June 2020 - April 2022)
- Invited to serve as **Guest Editor for a [special issue of Sustainability Journal](#)** on “The Impact of Climate Change on Urban Water Infrastructure”. (July 2020)
- Graduate Student Researcher Award in the Science and Technology Category, UT-Battelle Awards. (2019)
- Graduate Student Fellowship, Advanced Study Program, National Center for Atmospheric Research, Boulder, CO. (2019)
- Bredesen Center Fellowship, The University of Tennessee, Knoxville, TN. (August 2016 – December 2019)
- Graduate Research Fellowship, Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, Urbana IL. (2010-2012)

PROFESSIONAL SERVICES & TRAININGS

- **Served as Session chair/convener:**
 - American Geophysical Fall Meeting 2023, 11-15 December 2023, San Francisco, CA
 - American Geophysical Fall Meeting 2022, 12-16 December 2022, Chicago, IL.
 - Urban Science workshop, “Extreme Heat” breakout session, 21-23 July, 2021.
 - American Geophysical Fall Meeting 2021, 13-17 December 2021, New Orleans, LA.
 - American Geophysical Fall Meeting 2020, 1-17 December 2020 (Virtual).
 - American Geophysical Fall Meeting 2019, 9-13 December 2019, San Francisco, CA.
 - American Geophysical Fall Meeting 2018, 10-14 December 2018, Washington D.C.
- **Peer Reviews (Conducted >70 peer reviews for 20 Journals):**
Nature Climate Change, Nature Communications, Joule, Journal of Geophysical Research-Atmospheres, Earth's Future, Journal of Climate, Climate Dynamics, Water Resources Research, Journal of the American Water Resources Association, International Journal of Climatology, Journal of Cleaner Production, Journal of Hydrometeorology, Journal of Hydrology: Regional Studies, Journal of Hydrology, Journal of Water and Climate Change, Climate Risk Management, Climate Change, Water, Catena, MethodsX