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Education

2009 Purdue University, West Lafayette, IN, USA (*Ph.D. in Atmospheric Sciences*)
2003 Quaid-i-Azam University, Islamabad, Pakistan (*M.Phil in Computational Physics*)
2000 Quaid-i-Azam University, Islamabad, Pakistan (*M.Sc in Physics*)
1997 Government College, Lahore, Pakistan (*B.Sc in Mathematics and Physics*)

Appointments

2013-2018 Joint Faculty, Department of Civil and Environmental Engineering, University of Tennessee, Knoxville, TN, U.S.A.
2011- Computational Climate Scientist, Computing and Computational Sciences Directorate, Oak Ridge National Lab, Oak Ridge, Tennessee, USA
2010-2011 Postdoctoral Research Fellow, Joint Institute for Computational Sciences, Oak Ridge National Lab, Oak Ridge, Tennessee, USA
2009-2010 Postdoctoral Research Fellow, Department of Environmental Earth System Science, Stanford University, Stanford, California, USA
2009 Postdoctoral Research Fellow, Earth and Atmospheric Sciences Department, Purdue University, West Lafayette, Indiana, USA
2005-2009 Research Assistant, Earth and Atmospheric Sciences Department, Purdue University West Lafayette, Indiana, USA
2004-2007 Short Term Visitor, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

Publications [Published]

- [64] 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*, 10, e2022EF002734. <https://doi.org/10.1029/2022EF002734>
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- [56] Almazroui, M., M. Ashfaq, M.N. Islami, I. Rashid, et al. (2021), Assessment of CMIP6 climate models and projected temperature and precipitation changes over South America. *Earth Syst Environ.* <https://doi.org/10.1007/s41748-021-00233-6>

- [55] Dullo, T. T., S. Gangrade, M. Morales-Hernández, M. B. Sharif, A. J. Kalyanapu, S-C Kao, S. Ghafoor, M. Ashfaq (2021), Assessing Climate Change-Induced Flood Risk in the Conasauga River Watershed: An Application of Ensemble Hydrodynamic Inundation Modeling, *Nat. Hazards Earth Syst. Sci.*, <https://doi.org/10.5194/nhess-21-1739-2021>
- [54] Dosio, A., M. Jury, M. Almazroui, M. Ashfaq, I. Diallo, F.A. Engelbrecht, N. A. B. Klutse, C. Lennard, I. Pinto, M. B. Sylla, Alain T. Tamoffo (2021), Projected future daily characteristics of African precipitation based on global (CMIP5, CMIP6) and regional (CORDEX, CORDEX-CORE) climate models, *Clim Dyn.*, <https://doi.org/10.1007/s00382-021-05859-w>
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- [50] Almazroui, M., M.N. Islam, F. Saeed, *et al.* (2021). Projected Changes in Temperature and Precipitation Over the United States, Central America, and the Caribbean in CMIP6 GCMs. *Earth Syst Environ* **5**, 1–24. <https://doi.org/10.1007/s41748-021-00199-5>
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- [32] Devanand A., M. Huang, M. Ashfaq, B. Barik, S. Ghosh (2019), Choice of Irrigation Water Management Practice Affects Indian Summer Monsoon Rainfall and Its Extremes, *Geophys. Res. Lett.*, <https://doi.org/10.1029/2019GL083875>
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- [4] Ashfaq, M., C.B. Skinner, N.S. Diffenbaugh (2010), Influence of SST biases in future climate projections, *Climate Dynamics*, doi: 10.1007/s00382-010-0875-2
- [3] Ashfaq, M., Y. Shi, W. Tung, R. J. Trapp, X. Gao, J. S. Pal, and N. S. Diffenbaugh (2009), Suppression of south Asian summer monsoon precipitation in the 21st century, *Geophys. Res. Lett.*, 36, L01704, doi:10.1029/2008GL036500
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Publications [In Press/Submitted]

- [4] Diez-Sierra J et al 2021 The worldwide C3S CORDEX grand ensemble: A major contribution to assess regional climate change in the IPCC AR6 Atlas, *Bull. Am. Meteorol. Soc.*, in press.
- [3] Ashfaq, M., D. Rastogi, M.A. Abid, et al., Evaluation of CMIP6 GCMs over the CONUS for downscaling studies, *J. Geophys. Res.-Atmos.*, accepted, <https://doi.org/10.1002/essoar.10510589.1>
- [2] Horan, M., F. Batibeniz, F. Kucharski, M. Almazroui, M. Abid, J. Fu, M. Ashfaq, Moisture sources for precipitation variability over the Arabian Peninsula, *Climate Dynamics*, in review, <https://doi.org/10.21203/rs.3.rs-1136144/v2>
- [1] Syed, F., M. Latif, M. Ashfaq, A. Nabeel, Regional Climate Models: Sensitivity to Lateral Boundary Conditions, *Int J. of Climatology*, in review.

Technical Reports/Other Publications

- [6] Contributing author – U.S. Department of Energy (2022), Artificial Intelligence for Earth System Predictability (AI4ESP) Workshop Report, Department of Energy, Washington, DC.

- [5] Contributing author – U.S. Department of Energy (2017), Effects of Climate Change on Federal Hydropower: The Second Report to Congress, Department of Energy, Washington, DC.
- [4] Kao, S.-C., M. Ashfaq, B. S. Naz, R. Uría Martínez, D. Rastogi, R. Mei, Y. Jager, N. M. Samu, and M. J. Sale (2016), The Second Assessment of the Effects of Climate Change on Federal Hydropower, ORNL/SR-2015/357, Oak Ridge National Laboratory, Oak Ridge, TN, doi:10.2172/1340431
- [3] Schubel, J., J. A. Lentz, F. Qader, A. Kishaba, D. Bader, L. Perkins, E. Yam, A. Kaneda, L. Brown, B. R. Pagán, J. S. Pal, C. Gao, J. Reichenberger, D. R. Kendall, M. Ashfaq, D. Rastogi, S.-C. Kao, B. S. Naz, and D. Otto (2015), City of Long Beach Climate Resiliency Assessment Report, prepared by the Aquarium of the Pacific (AOP), for the City of Long Beach, CA, doi: 10.13140/RG.2.1.2252.2644
- [2] Contributing author – U.S. Department of Energy (2013), Effects of Climate Change on Federal Hydropower: Report to Congress, DOE/GO-102016-4869, Department of Energy, Washington, DC.
- [1] Sale, M. J., S.-C. Kao, M. Ashfaq, D. P. Kaiser, R. Uría Martínez, C. Webb, and Y. Wei (2012), Assessment of the Effects of Climate Change on Federal Hydropower, ORNL/TM-2011/251, Oak Ridge National Laboratory, Oak Ridge, TN, doi:10.2172/1220238

Research in News (Selected)

Khan, R.K., Climate scientists explain Pakistan's 'unprecedented' floods, Aug 2022, (<https://tinyurl.com/mr4yky8x>)

Co-occurring droughts could threaten global food security, Science Daily, (<https://tinyurl.com/4z5d7uth>)

Barry, D., A tale of two cities: 2041, what if a deadly heatwave hit India? *The Economist*, July 2021 (<https://tinyurl.com/d35muz7j>)

Padma, T.V., The health impact of global warming is real, widespread and non-trivial, *The Wire*, June 2021 (<https://tinyurl.com/x2w4dsj3>)

Deadly heat stress will be common in South Asia, even at 1.5 degree of warming (Mar 2021), American Geophysical Union (<https://tinyurl.com/7eh65jmh>)

Millions More Americans Will Face Climate Disasters with Warming (May 2020), American Geophysical Union (<https://tinyurl.com/y8co342b>), Scientific American (<https://tinyurl.com/y695r64f>)

Freak events': Karachi floods hint at shifting monsoon, Sep 2020, Reuters (<https://tinyurl.com/y5y7bbgl>)

Regional Monsoon Changes (2020), *Nat. Clim. Chang.*, <https://doi.org/10.1038/s41558-020-0843-8>

Monsoon Mele (2013), *Science*, doi: 10.1126/science.340.6139.1400

Summer heatwaves to increase across U.S. (2010) (<https://tinyurl.com/y264ckvt>)

Suppression of South Asian monsoon (2009) (<https://tinyurl.com/y6bkje5t>)

Leadership and Services

- [7] Member of Climate and Ocean: Variability, Predictability, and Change (**CLIVAR**) Monsoons Panel's Working Group on American Monsoons (**WG-AMM**) (up to 2024)
- [6] Affiliate member World Climate Research Programme (**WCRP**) Explaining and Predicting Earth System Change (**EPESC**) Lighthouse Activity (2022-)
- [5] Organizing committee member, International **CORDEX** 2023 Workshop
- [4] Editorial Board member **npj climate and atmospheric science**
- [3] Editorial Board member **Earth Systems and Environment**
- [2] Guest Editor **Atmosphere**
- [1] Editorial Board member **Meteorology**

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Interns: Munir Nayak (Cornell University, *Graduate Student*), Aamir Iqbal (Louisiana State University, *Graduate Student*), Brandon Bonds (Western Kentucky University, *Undergraduate Student*), Brianna Pagan (UCLA, *Graduate Student*), Mariana Alifa (Loyola Marymount University, Los Angeles, *Undergraduate Student*), Anjana Devanand (IIT Bombay, India, *Graduate Student*), Amin Bandeghi (Loyola Marymount University, Los Angeles, *Graduate Student*), Kevin McGee (Loyola Marymount University, Los Angeles, *Graduate Student*)

Peer Reviews

Journals: Nature Communications, Scientific Reports, Nature Climate Change, npj Climate and Atmospheric Science, Water Resources Research, Geophysical Research Letters, Meteorology and Atmospheric Physics, Journal of Climate, Climate Dynamics, Climate Research, Atmospheric Science Letters, International Journal of Climatology, Journal of Hydrometeorology, Climatic Change, Journal of Geophysical Research, Stochastic Environmental Research and Risk Assessment, Natural Hazards, Journal of Environmental Management, Journal of Earth System Science, Journal of Applied Meteorology and Climatology, Dynamics of Atmospheres and Oceans, Weather and Climate Extremes, Earth's Future
Proposals: NASA, DOE, NSF

Climate Data Contributions (Selected/Lead)

[3] Dynamically downscaled (25km) CMIP6 GCMs data over the U.S – The Third 9505 Assessment for the U.S Congress (ongoing)

[2] CORDEX simulations (25km) over South Asia (2019) (<https://esg-dn1.nsc.liu.se/search/cordex/>)

[1] Dynamically downscaled (18km) CMIP5 GCMs data over the U.S – The second 9505 Assessment for the U.S Congress (2016)

Current Projects

[4] NOAA-ORNL High-Performance Computing Collaboration, R&D PI

[3] U.S. Air Force Specialized High-Performance Computing Collaboration, R&D Co-I

[2] Effects of Climate Change on Federal Hydropower – The Third 9505 Assessment. Sponsor: Waterpower Technologies Office, U.S. Department of Energy, Co-I

[1] Identifying Ecosystems Vulnerable to Climate Change. Sponsor: Laboratory Directed Research and Development Program, ORNL, Co-I