

Boniface Fosu

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EDUCATION

Ph.D., Climate Science Utah State University, Logan, UT. Advisor: Dr. Shih-Yu Wang Dissertation: Towards the Prediction of Climate Extremes with Attribution Analysis Through Climate Diagnostics & Modeling	2018
MSc, Climate Science Utah State University, Logan, UT. Advisor: Dr. Shih-Yu Wang Thesis: Bay of Bengal – Coupling of Pre-monsoon Tropical Cyclones with the Monsoon Onset in Myanmar	2014
BSc, Meteorology and Climate Science Kwame Nkrumah University of Science & Technology, Kumasi, Ghana.	2011

CURRENT APPOINTMENTS

Assistant Professor Department of Geosciences, Mississippi State University MS State, MS.	01/2022 – present
Affiliate Faculty Northern Gulf Institute, Mississippi State University MS State, MS.	01/2022 – present
Research Affiliate Georgia Institute of Technology Atlanta, GA.	01/2021 – present

PREVIOUS APPOINTMENTS

Adjunct Associate Research Scientist Lamont-Doherty Earth Observatory at Columbia University Palisades, NY.	01/2022 – 07/2023
Postdoctoral Research Scientist Columbia University Lamont-Doherty Earth Observatory Palisades, NY.	01/2021 – 12/2021
Postdoctoral Research Scientist School of Earth and Atmospheric Sciences Georgia Institute of Technology, Atlanta, GA.	10/2018 – 12/2020

PUBLICATIONS

Peer-reviewed Publications

1. He J., Deng Y., **Fosu B.**, Lin Y-H., and Lu K., 2024. Constraining Regional Hydrological Sensitivity over Tropical Oceans. *Geophysical Research Letters*. [link](#)

2. **Fosu B.**, Lee C.-Y., Sobel A.H., Camargo S.J., and Tippet M.K., 2024. Response of Atlantic and Pacific tropical cyclone activity in a warming climate using statistically–dynamically downscaled projections from CMIP6. *Journal of Catastrophe Risk and Resilience*. [link](#)
3. Finley J., **Fosu B.**, Fuhrmann C., Mercer A., Rudzin J., and Wood K., 2024. Quantifying off-equatorial and ENSO-related sea surface temperature patterns in the eastern Pacific over intra-seasonal and interannual time scales. *Frontiers in Earth Science*. [link](#)
4. He J., Lu K., and **Fosu B.**, 2024. Diverging Hydrological Sensitivity and Convection Threshold among Tropical Basins. *Nature Climate Change*. [link](#)
5. Zia A., Ambinakudige S., and **Fosu B.**, 2023. Does Integrating Climate Change Projection with Agriculture Policy Improve Agricultural Adaptation and Food Security? Evidence from Bangladesh. *Theoretical and Applied Climatology*
6. Sobel A., Bowen S., Camargo S., Cane M., Clement A., **Fosu B.**, Hart M., Lee C.-Y., Reede K., Seager R., and Tippet M. 2023. Near-Term Tropical Cyclone Risk and Coupled Model Biases. *PNAS*. [link](#)
7. Sharma S., Pokharel B., **Fosu B.**, Hamal K., Wang S.-Y., Gillies R., Aryal Deepak, and Khadka N., 2023. On the climate anomalies accompanying the 2020 extreme monsoonal precipitation in Nepal. *Climate Dynamics*. [link](#)
8. Borhara K., **Fosu B.**, and Wang S.-Y., 2023. The Role of the Western North Pacific precursor in the Development of El Niño-Southern Oscillation (ENSO) with future warming. *Climate Dynamics*. [link](#)
9. Lin Y.H., **Fosu B.**, and Ikuyajolu O., 2023. The Impact of Tropical SST Variability on the Northern Hemisphere Circumglobal Teleconnection Pattern. *Frontiers in Earth Science*. [link](#)
10. **Fosu B.**, Cook E., Biasutti M., and Buckley B., 2022. The feasibility of reconstructing hydroclimate over West Africa using tree-ring chronologies in the Mediterranean Region. *Environmental Research Letters*. [link](#)
11. Cook B, Smerdon J., Cook E., Williams P., and coauthors including **Fosu B.**, 2022. Megadroughts in the Common Era and the Anthropocene. *Nature Reviews Earth and Environment*. [link](#)
12. Lu Kezhou., He J., **Fosu B.**, and Rugenstein M., 2021. Robust fast strengthening of equatorial Walker circulation in response to anthropogenic CO₂ forcing. *Geophysical Research Letters*. [link](#)
13. **Fosu B.**, He J., and Liguori G., 2020. Equatorial Pacific warming attenuated by SST warming patterns in the tropical Atlantic and Indian Oceans. *Geophysical Research Letters*. [link](#)
14. **Fosu B.**, He J., Wang S.-Y., 2020. The influence of wintertime SST variability in the Western North Pacific on ENSO diversity. *Climate Dynamics*. [link](#)
15. **Fosu B.**, Wang S.-Y., Pegion K., 2018. Synoptic and Climate Attributions of the December 2015 Extreme Flood in Missouri, USA. *Water*. [link](#)
16. **Fosu B.**, Wang S.-Y., Wang S.-H., and Gillies R.R., 2017. Greenhouse Gases Stabilizing Winter Atmosphere in the Indo-Gangetic Plains May Increase Aerosol Loading. *Atmospheric Science Letters*. [link](#)

17. **Fosu B.**, Wang S.-Y., Yoon J.-H., 2016. The 2014/15 Snowpack Drought in Washington State and its Climate Forcing. *Bulletin of the American Meteorological Society*. [link](#)
18. Wang S.-Y., **Fosu B.**, Gillies R. R., and Singh P. M., 2015. The Deadly Himalayan Snowstorm of October 2014: Synoptic Conditions and Associated Trends. *Bulletin of the American Meteorological Society*. [link](#)
19. **Fosu B.**, and Wang S.-Y., 2014. Bay of Bengal: Coupling of pre-monsoon tropical cyclones with the monsoon onset in Myanmar. *Climate Dynamics*. [link](#)
20. Wang S.-Y., Jiang X., and **Fosu B.**, 2014. Global eastward propagation signals associated with the 4-5-year ENSO cycle. *Climate Dynamics*. [link](#)
21. Wang S.-Y., Buckley B., Yoon J.-H., and **Fosu B.**, 2013. Intensification of pre-monsoon tropical cyclones in the Bay of Bengal and its impacts on Myanmar. *Journal of Geophysical Research*. [link](#)

Other Publications

22. **Fosu B.**, He J., and Wang S.-Y., 2020. The influence of wintertime SST variability in the Western North Pacific on ENSO diversity. *44th NOAA Climate Prediction S & T Digest*. [link](#)
23. **Fosu B.**, and Wang S.-Y., 2014. Coupling of Bay of Bengal Tropical Cyclones with the Myanmar Monsoon Onset. *38th NOAA Climate Prediction S&T Digest*. [link](#)

ACTIVE GRANTS

Title: Shifting Drought Patterns in West Africa: Constraining Model Simulations with Paleo Reconstructions

Sponsor: National Science Foundation (P4Climate)

Role: PI

Performance Period: 08/2024 – 08/2027

Title: Assessing the Public Health Risk Due to Tropical Cyclone Impacts on Petrochemical Facilities

Sponsor: National Academy of Sciences Gulf Research Program (NAS|GRP)

Role: PI

Performance Period: 06/2023 – 06/2026

Title: Ultra-high Resolution Paleostreamflow in Southeast Asia: proxy/model comparison

Sponsor: National Science Foundation (P4Climate)

Role: PI

Performance Period: 07/2023 – 06/2026

Title: An Interdisciplinary Program for Research, Education, and Outreach on Climate Change and Adaptive Resilience in The Yazoo - Mississippi Delta

Sponsor: National Science Foundation (EPSCoR Track-2)

Role: Co-PI (PI: S. Ambinakudige, Mississippi State University)

Performance Period: 08/2023 – 07/2027

Title: Cyber Infrastructure Professionals Innovating and Broadening the Adoption of Advanced Technologies

Sponsor: National Science Foundation (SCIFE)

Role: Senior Personnel (PI: Michael Navicky, Mississippi State University)

Performance Period: 10/2023 – 09/2028

Title: Forced Trends in the Tropical Pacific and Global Tropical Cyclones

Sponsor: National Science Foundation (CLD)

Role: PI

Performance Period: 08/2022 – 07/2025

Title: Forced Trends in the Tropical Pacific and Global Tropical Cyclones in Earth System Models

Sponsor: Department of Energy (RGMA)

Role: PI

Performance Period: 07/2022 – 06/2025

SCIENTIFIC PRESENTATIONS

Invited talks

Climate Change and Hurricane Frequency: Will We See More Storms, or Not? 2023
National Weather Service Colloquium, University of Oklahoma, OK.

Climate Change and Hurricane Frequency: Will We See More Storms, or Not? 2023
EAS, Georgia Institute of Technology, GA.

From Data to Dialogue: Communicating Climate Change in a Meaningful Way. 2023
International Student Advisory Board, Mississippi State University, MS.

Climate Change and Hurricane Frequency: Will We See More Storms, or Not? 2023
Dept of Geology and Geological Engineering, University of Mississippi, MS.

How do we effectively communicate the science behind climate change? 2023
Students for a Sustainable Future, Mississippi State University, MS.

How Histories of Trees and Peoples Can Help West Africa Plan for the Future. 2023
History and Climate Change, Columbia Climate School, NY.

Extreme Events and Climate Change: Some Implications for Tibet. 2021
Understanding Climate Change on the Tibetan Plateau.
Modern Tibetan Studies Program Round Table, Columbia University, NY.

Equatorial Pacific Warming Attenuated by SST Warming Patterns in the 2021
Tropical Atlantic and Indian Oceans.
AGU Fall Meeting, New Orleans, LA.

The remote impacts of the pattern of SST changes in the Indian and Atlantic 2021
Oceans on equatorial pacific SST under increasing CO₂.
LDEO OCP Seminar, Columbia University, NY.

The Influence of Wintertime SST Variability in the Western North Pacific 2019
on ENSO diversity.
Lamont-Doherty Earth Observatory Seminar, Columbia University, NY.

Conference presentations

Discriminating the Roles of Anthropogenic Greenhouse Gases versus Aerosols on 2024
Tropical Cyclone Frequency from Downscaling CMIP6 Models increasing CO₂.
EESM PI Meeting, Rockville, MD

Remote influences of the structure of sea surface temperature changes from 2020

increasing CO ₂ . <i>AMS Annual Meeting, Boston, MA.</i>	
The Influence of Wintertime SST Variability in the Western North Pacific on ENSO diversity. <i>AMS Annual Meeting, Boston, MA.</i>	2020
The Influence of Wintertime SST Variability in the Western North Pacific on ENSO diversity. <i>Climate Diagnostics & Prediction Workshop, Durham, NC.</i>	2019
Long-lead ENSO Predictions in the Framework of Recent ENSO Events. <i>AMS Annual Meeting, Austin, TX.</i>	2018
Useful Prediction of Climate Extreme Risk for Texas-Oklahoma at 4-6 Years. <i>SERDP & ESTCP Symposium, Washington DC.</i>	2017
Understanding Snowpack Drought and Its Climate Forcing. <i>The National Diversity in STEM Conference, Salt Lake City, UT.</i>	2017
Understanding Long-lead ENSO Predictions within the Framework of Recent ENSO Events. <i>Climate Diagnostics & Prediction Workshop, Norman, Oklahoma, OK.</i>	2017
The Snowpack Drought in Washington State and its Climate Forcing. <i>Pacific Climate Workshop, Pacific Grove, CA.</i>	2017
Greenhouse Gases Stabilizing Winter Atmosphere in the Indo-Gangetic Plains May Increase Aerosol Loading. <i>CLIVAR Open Science Conference, Qingdao, China.</i>	2016
The Snowpack Drought in Washington State and its Climate Forcing. <i>CLIVAR Open Science Conference, Qingdao, China.</i>	2016
Texas Floods, El Nino, and Climate Change. <i>AGU Fall Meeting, San Francisco, CA.</i>	2015
Extended Inversions and worsening winter smog in the Indo-Gangetic Plains. <i>Climate Diagnostics & Prediction Workshop, Denver, CO.</i>	2015
Fire and Ice: California Drought and "Polar Vortex" in a Changing Climate. <i>Pacific Climate Workshop, Pacific Grove, CA.</i>	2015
Bay of Bengal: The Coupling of pre-monsoon Tropical Cyclones with the monsoon onset in Myanmar. <i>AMS Annual Meeting, Phoenix, AZ.</i>	2015
Precipitation in the Intermountain West: The ENSO-PDO Teleconnection. <i>National Weather Association 39th Meeting, Salt Lake City, UT.</i>	2014
The Coupling of pre-monsoon tropical Cyclones with the Myanmar Monsoon onset <i>World Weather Open Science Conference, Montreal, Canada.</i>	2014
Precipitation in the Intermountain West: The ENSO-PDO Teleconnection. <i>Spring Runoff Conference, Logan, UT.</i>	2014
Bengal Cyclones and the Myanmar Monsoon Onset in a Changing Climate.	2013

Climate Diagnostics & Prediction Workshop, College Park, MA.

Contributed presentations by group members

Understanding the Impacts of Tropical Sea Surface Temperature Biases on the Projection of Precipitation in North America <i>Edwards T., Fosu B., and Lin Y.H. AMS Annual Meeting, Baltimore, MD.</i>	2024
Downscaled Projections of Tropical Cyclone Precipitation in the U.S. Gulf Coast. <i>Lin Y.H. and Fosu B. AMS Annual Meeting, Baltimore, MD.</i>	2024
The Impact of Tropical SST Variability on the Northern Hemisphere Circumglobal Teleconnection Pattern. <i>Lin Y.H., Fosu B., and Ikuyajolu O. NOAAs CDPW, Logan, UT.</i>	2023
Discriminating the Roles of Anthropogenic Greenhouse Gases versus Aerosols on Tropical Cyclone Frequency from Downscaling CMIP6 Models. <i>Gyabaah G., Fosu B., and Lin Y.H. Graduate Climate Conference, Woods Hole, MA.</i>	2023
The Impact of Tropical SST Variability on the Northern Hemisphere Circumglobal Teleconnection Pattern (<i>invited</i>) <i>Lin Y.H. Fosu B., and Ikuyajolu O. Climate Seminar, UC Santa Barbara, CA.</i>	2023
The Impact of SST Biases on Tropical SST Variability (<i>invited</i>) <i>Lin Y.H. and Fosu B. Graduate Seminar, Utah State University, UT</i>	2023

AWARDS

Doctoral Student Researcher of the Year College of Agriculture and Applied Sciences, Utah State University	2017
Graduate Student Researcher of the Year Department of Plants, Soils and Climate, Utah State University	2016
Robert N. Love Scholarship Award College of Agriculture and Applied Sciences, Utah State University	2015
Robert N. Love Scholarship Award College of Agriculture and Applied Sciences, Utah State University	2013

TEACHING EXPERIENCE

Instructor GR 4643-6643 Physical Climatology I Mississippi State University, MS State, MS.	Fall 2024 last taught
Instructor GR 4613-6613 Applied Climatology Mississippi State University, MS State, MS.	Spring 2023 last taught
Guest Lecture GR 6900 Special Topics in Air Sea Interactions Mississippi State University, MS State, MS.	Spring 2023
Instructor	Spring 2022

GR 4613-6613 Applied Climatology
Mississippi State University, MS State, MS.

Guest Lecture

Spring 2021

ENVST-UA 226 Topics in Environmental Science: Climate Change
New York University, New York, NY.

Instructor

Fall 2020

EAS 4656 Atmospheric Dynamics Practicum
Georgia Institute of Technology, Atlanta, GA.

Guest Lecture

Spring 2019

EAS 6140 Thermodynamics of Atmospheres & Oceans
Georgia Institute of Technology, Atlanta, GA.

Instructor

Fall 2015

PSC 6900 Climate Data Analysis
Utah State University, Logan, UT.

STUDENTS AND POSTDOCTORAL SCHOLARS SUPERVISED

Postdoctoral Scholars

2022 – present, Dr. Yen-Heng Lin

Current Graduate Students

2023 – present, George Gyabaah

2023 – present, Brandon McDaniel

2023 – present, Davis Newton

2023 – present, Alana Shuvalau

2024 – present, Brett Violett

Completed Graduate Students

2024, William Tyler Edwards (MS)

Thesis: Understanding the impact of tropical sea surface temperature biases on the projection of North American precipitation

Undergraduate Researchers

2024 – present, Caleb Bowman (MSU Professional Meteorology)

2024 – present, Riley Newton (MSU Professional Meteorology)

TRAINING WORKSHOPS

2016, Community Earth System Model Tutorials
NCAR Mesa Lab, USA

2016, CLIVAR Early Career Scientist Workshop
Qingdao, China

2011, Intensive Practical Training in Weather Forecasting
Kwame Nkrumah University of Science & Technology, Ghana

2008, Ewiem Nimdee Summer School in Tropical Meteorology and Climate
Kwame Nkrumah University of Science & Technology, Ghana

PROFESSIONAL SERVICE

Journal Referee

Earths Future, Scientific Reports, Climate Dynamics, Journal of Climate, Nature Climate Change, Nature Communications, Geophysical Research Letters, MDPI – Atmosphere, Water, Climate, Journal of Advances in Modeling Earth Systems, Journal of Geophysical Research-Oceans, Atmospheres, Nature Communications Earth and Environment

Proposal Referee

National Science Foundations, Department of Energy

Active MSU Service

Member, University Institutional Effectiveness Committee
Member, Curriculum Committee, Department of Geosciences
Member, Strategic Planning Committee, Department of Geosciences

Other

Weather Observations – 01/2013 to 09/2018, Utah Climate Centre, UT.
Student poster and oral presentation judge – 2020 Annual AMS Meeting, Boston, MA.
Panel member – Modern Tibetan Studies Program Round Table, Columbia University, NY.

PROFESSIONAL AFFILIATIONS

American Meteorological Society. Joined 02/2015
American Geophysical Union. Joined 02/2018

CORE TECHNICAL COMPETENCIES

Data Analysis and Visualization: GrADS, NCL, Fortran, Python, MATLAB, SAS, CDO, NCO
Numerical and Statistical Models: CESM, WRF, Columbia HAZard model (CHAZ)

MEDIA

2024, GRP Award to Assess Risks from Tropical Cyclone Impacts on Energy Facilities. [Article Link.](#)
2023, VISION TV interview on Extreme Events. [Video Link.](#)
2023, MSU receives \$4 million to research Delta climate change. [Article Link.](#)
2023, MSU researchers investigate evolving tropical cyclones. [Article Link.](#)
2023, See what else El Niño may bring to Mississippi this winter. [Article Link.](#)
2023, Student Makes El Niño Discovery. [Article Link.](#)
2017, College of Agriculture & Science Doctoral Researcher of the Year. [Video Link.](#)
2017, USU weather station recognized for 50 years of service. Herald Journal. [Article Link.](#)
2017, USU: Climate change can play role in poor air quality. Herald Journal. [Article Link.](#)
2016, Researchers' Work in National Report on Extreme Weather. Utah State Today. [Article Link.](#)
2016, 50 years of daily weather observations. The National Cooperative Observer. [Article Link.](#)