

Kwesi Akumenyi Quagraine, PhD

National Center for Atmospheric Research, Boulder, Colorado, United States

kwesiq@ucar.edu

<https://scholar.google.com/citations?user=hol1ZjkAAAAJ&hl=en>

EDUCATION

University of Cape Town, Private Bag X3, Rondebosch 7701, Cape Town, South Africa.

Date: 2016 - 2021

Degree: PhD Program in Environmental and Geographical Science

Evaluated as the equivalent of a U.S. Doctoral degree by Educational Credential Evaluators (ECE) Evaluation, January 2024

University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.

Date: 2012 – 2014

Degree: M.Phil. Physics

University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.

Date: 2007 – 2011

Degree: B.Sc. (Hons.) (Physics)

NAMES AND ADDRESSES OF PREVIOUS AND CURRENT EMPLOYERS

• Postdoctoral Research Fellow

Atmospheric Chemistry Observation & Modeling Lab & Climate & Global Dynamics Lab

National Center for Atmospheric Research

University of Cape Town, South Africa.

Date: 2023 – Till date

• Lecturer

Department of Physics,

University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.

Date: 2021 – 2023

• Postdoctoral Research Fellow

Climate System Analysis Group, Department of Environmental and Geographical Science,

University of Cape Town, South Africa.

Date: 2020 – 2023

• Graduate Teaching Assistant

Department of Environmental and Geographical Science, University of

Cape Town, South Africa

Date: 2016 – 2021

• Senior Research Assistant

University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.

Date: 2013 – 2021

• Junior Research Fellow

Centre National de Calcul et Centre National D'Analyses, University of Felix Houphouët-Boigny, Cote d'Ivoire
Date: 2016

• **Teaching Assistant**

Department of Physics,
University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.
Date: 2012 – 2013

RESEARCH INTERESTS

1. Climate geoengineering
2. Extreme climate events
3. Regional climate modeling
4. Climate change impacts and adaptation
5. Climate resilience and vulnerability
6. Tropical meteorology and large-scale processes
7. Monsoon dynamics
8. Climate data analytics & machine learning approaches

SCIENTIFIC PUBLICATIONS

1. **Quagraine, K. A.**, Hewitson, B., Nkrumah, F., Quagraine, K. T., & Egbebiyi, T. S. (2024). A Simple Subtropical High-Pressure System Index over the South Atlantic. *Atmospheric Science Letters*.
2. Odoulami, R. C., Hirasawa, H., Kouadio, K., Patel, T. D., **Quagraine, K. A.**, Pinto, I., Egbebiyi, T. S., Abiodun, B. J., Lennard, C., and New, M. G. (2024). Africa's Climate Response to Marine Cloud Brightening Strategies is Highly Sensitive to Deployment Region. *Journal of Geophysical Research - Atmospheres*.
3. Klutse, N. A. B., Abiodun, B. J., **Quagraine, K. A.**, Nkrumah, F., Abatan, A., Adekoke, J., Sylla, M. B., Berkoh-Oforiwa, R., Koffi, H. A., Essien, P. (2024). Projected changes in rainfall extremes over West African Cities under specific global warming levels using CORDEX and NEX-GDDP datasets. *Earth Systems and Environment*.
4. Nkrumah, F., Klein, C., **Quagraine, K. A.**, Berkoh-Oforiwa, R., Klutse, N. A. B., et al. (2023). Classification of Large-Scale Environments that drive the formation of Mesoscale Convective Systems over Southern West Africa. *Weather and Climate Dynamics Discussions*, 1-8.
5. Essien, P., Figueiredo, C. A. O. B., Takahashi, H., Klutse, N. A. B., Wrasse, C. M., Afonso, J. M. D. S., ... & **Quagraine, K. A.**, "Intertropical Convergence Zone as the Possible Source Mechanism for Southward Propagating Medium-Scale Traveling Ionospheric Disturbances over South American Low-Latitude and Equatorial Region", *Atmosphere*, 13(11) (2022) 1836
6. Nkrumah, F., **Quagraine, K. A.**, Quagraine, K. T., Wainwright, C., Quenum, G. M. D. L., Amankwah, A. & Klutse, N. A. B. (2022). Performance of CMIP6 HighResMIP on the Representation of Onset and Cessation of Seasonal Rainfall in Southern West Africa. *Atmosphere* 13, 1–20.
7. Klutse, N. A. B., **Quagraine, K. A.**, Nkrumah, F., Quagraine, K. T., Berkoh-Oforiwa, R., Dzrobi, J. F. & Sylla, M. B. (2021). The climatic analysis of summer monsoon extreme precipitation events over West Africa in CMIP6 simulations". *Earth Systems and Environment*. 17.

8. **Quagraine, K. A.**, Nkrumah, F., Klein, C., Klutse, N. A. B. & Quagraine, K. T. (2020). West African Summer Monsoon Precipitation Variability as Represented by Reanalysis Datasets. *Climate* 8(10), 111.
9. **Quagraine, K. A.**, Hewitson, B., Jack, C., Wolski, P., Pinto, I. & Lennard, C. (2020). Using Co- Behavior Analysis to Interrogate the Performance of CMIP5 GCMs over Southern Africa. *Journal of Climate* 33(7). 2891–2905.
10. **Quagraine, K. A.**, Hewitson, B., Jack, C., Wolski, P., Pinto, I. & Lennard, C. (2019). A Methodological Approach to Assess the Co-Behavior of Climate Processes over Southern Africa. *Journal of Climate* 33(7). 2891–2905.
11. Egbegiyi, T., Lennard, C., Crespo, O., Mukwenha, P., Lawal, S. & **Quagraine, K. A.** (2019). Assessing Future Spatio-Temporal Changes in Crop Suitability and Planting Season over West Africa: Using the Concept of Crop-Climate Departure. *Climate* 7(9). 102.
12. Klutse, N. A. B., Ajayi, V. O., Gbobaniyi, E. O., Egbegiyi, T. S., Kouadio, K., Nkrumah, F., **Quagraine, K. A.**, Olusegun, C., Diasso, U., Abiodun, B. J., Lawal, K., Nikulin, G., Lennard, C. & Dosio, A. (2018). Potential impact of 1.5 deg.C and 2 deg.C global warming on consecutive dry and wet days over West Africa. *Environmental Research Letters* 13. 055013.
13. **Quagraine, K. A.**, Klutse, N. A. B., Nkrumah, F., Adukpo, D. C. & Owusu. K. (2017). Changes in rainfall characteristics in Wenchi and Saltpond farming areas in Ghana. *International Journal of Geosciences* 8. 305–317.
14. Nkrumah, F., Klutse, N. A. B., Adukpo, D. C., **Quagraine, K. A.**, Owusu, K. & Owusu, A. & Gutowski, W. (2014). Rainfall variability over Ghana: Model versus Rain gauge observation. *International Journal of Geosciences* 5. 673–683.
15. Klutse, N. A. B., Owusu, K., Adukpo, D. C., Nkrumah, F., **Quagraine, K. A.**, Owusu, A. & Gutowski, W. (2013). *Research Journal of Agriculture and Environmental Management* 2(12). 394–402.

- Under review

1. **Quagraine, K. A.**, Tye, M. R., Quagraine, K. T., Tilmes, S., Simpson, I. R., Nkrumah, F., Egbegiyi, T. S., Odoulami, R. C. & Klutse, N. A. B., Impact of Stratospheric Aerosol Injection on Precipitation Extremes Across Africa. *Submitted to Geophysical Research Letters*.
2. Nkrumah, F., **Quagraine, K. A.**, Quenum, G. M. L. D., Vioni, D., Koffi, H. A. & Klutse, N. A. B., Assessing Regional Climate Trends in West Africa Under Geoengineering: A Multi-model Comparison of UKESM1 and CESM2. *Submitted to Journal of Geophysical Research- Atmospheres*.
3. Nkrumah, F., Quenum, G. M. L. D., **Quagraine, K. A.**, Tilmes, S., Klutse, N. A. B., Dommo, A., Koffi, H. A., Essien, P. & Bediako, R., Climate Response to Stratospheric Aerosol Injection During the Harmattan Season in West Africa. *Submitted to Environmental Research: Climate*.
4. Egbegiyi, T. S., Lennard, C., Pinto, I., Odoulami, R. C., Abiodun, B. J., Wolski, P. & **Quagraine, K. A.**, Investigating the Impact of Stratospheric Aerosol Injection on Cereal Crop Suitability in Southern Africa. *Submitted to Environmental Research: Climate*.
5. Tang, W., Kumar, R., ..., **Quagraine K. A.**, et al., Unlocking the Potential of Collaborative

Research on Africa's Environmental Challenges: Perspectives on Air Quality and Health, Climate and Weather, Land and Water, and Society. *Submitted to Bulletin of American Meteorological Society.*

- In Preparation

1. **Quagraine, K. A.** et al., An Index to Characterize the South Indian Ocean High-Pressure System and its Variability.
2. **Quagraine, K. A.** et al., Assessing the Impact of South Indian Ocean High-Pressure System using a novel index.
3. **Quagraine K. T., & Quagraine, K. A.** et al., Impacts of Stratospheric Aerosol Injection on Global Precipitation and Moisture Transport.

PROJECTS & GRANTS

- The DEGREES Initiative Solar Radiation management Governance Socio-Political Research (2024-2026)
Assessment of knowledge and governance towards Solar Radiation Modification across Ghana: Implications for more efficient Ethical, Policy and Social Practices (Co-Investigator).
- TWAS Solar Radiation Management Governance Initiative (SRMGI) DECIMALS (2023 - 2025)
Solar Radiation Management With Stratospheric Aerosol interactions with Harmattan and associated impacts on some climate variables over Southern West Africa (Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon) (Co-Investigator).
- Future Resilience for African CiTies And Lands, FRACTAL (2016 - 2021)
Advance scientific knowledge about regional climate responses to human activities and work with decision-makers to integrate this knowledge into climate-sensitive decisions at a city & regional scale (Worked on the regional climate understanding package).
- **C**ORDinated **D**ownscaling **E**Xperiment, CORDEX (2018 - to date)
The CORDEX-Africa initiative has been developed to analyse downscaled regional climate data over the CORDEX-African domain, train young climate scientists in climate data analysis techniques and engage users of climate information in both sector specific and region/space-based applications.

CONSULTANCIES

- UNEP-Green Climate Fund; Ghana National Adaptation Project (2022 -2023) together with the Environmental Protection Agency (EPA) of Ghana
Enhancing multi-sector planning and capacity for effective adaptation in Ghana.
- World Meteorological Organization (WMO) User Interface Project (WMO-UIP) (2022)
Developing of a UIP for worldwide use in Climate Services
- ICLEI Local Government for Sustainability (2021 - 2022)
Development of Climate Change Projections for Bo City, Sierra Leone and Cape Coast, Ghana.

FELLOWSHIPS, SCHOLARSHIPS & AWARDS

- **National Research Foundation (NRF) South Africa Research Chair in Climate Change (SARCHI) Scholarships (2016–2023)**
-Postdoctoral Fellowship (2020-2023) & Doctoral Funding Fellowship (2016 –2020)
- **German Academic Exchange Service (DAAD) (2022) Postdoctoral Researchers Climate Change Networking Tour Fellow**
- **Newton Research Fellow (September2017 –January2018)**
Tyndall Climate Research Centre/Climate Research Unit (CRU)
University of East Anglia (UEA), Norwich, UK
- **Fall Meeting Student Travel Grant (2020)**
American Geophysical Union (AGU) Conference, Washington, USA
- **International/Refugee Scholarship (2017 - 2020)**
University of Cape Town, South Africa
- **University of Cape Town Travel Grant (2018, 2022)**
- **USAID Partnership for Enhanced Engagement in Research (PEER) Project (2012-2014)**
Funding for Graduate Studies
Department of Physics, University of Cape Coast, Cape Coast, Ghana

SUPERVISION

1. Hawa Djibril (B.Sc.) (2022)
Department of Physics
University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.
2. Collins Fynn (B.Sc.) (2022)
Department of Physics
University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.
3. Abdulai Shaibu Ndetega (B.Sc.) (2022)
Department of Physics
University of Cape Coast, Private Mail Bag, Cape Coast, Ghana.

PROFESSIONAL COURSES AND WORKSHOPS/CONFERENCES

- São Paulo School of Advanced Science on Ocean Interdisciplinary Research and Governance
University of São Paulo, São Paulo, Brazil (13 August - 2 September 2019).
- R for Environmental Science Workshop (8 -10 January 2018)
University of Kent, Canterbury, United Kingdom
- National Centre for Atmospheric Science (NCAS)
Introduction to Scientific Computing Course for Environmental Scientist Leeds,
United Kingdom (11 – 17 November 2017)
- COordinated Regional Climate Downscaling Experiment (CORDEX) (2 – 6 February 2016) Africa
Phase 2 Workshop 3, University of Cape Town, South Africa
- COordinated Regional Climate Downscaling Experiment (CORDEX) (16 – 20 November 2015) Africa
Phase 2, Workshop 2, University of Cape Town, South Africa

PROFESSIONAL AFFILIATIONS

- America Geophysical Union (AGU) – Member (2018 – present)
- South African Society of Atmospheric Science (SASAS) – Member (2018 – present)
- Ghana Science Association (GSA) – Member (2022 – present)

REVIEWER ACTIVITIES

- Journal of Climate
- Climate Dynamics
- International Journal of Climatology
- Meteorology and Atmospheric Physics
- Weather and Climate Extremes
- Theoretical and Applied Climatology

OUTREACH/COMMUNITY SERVICE

1. Lead Facilitator for Recycle Up! Ghana by Technik Ohne Grenzen e.V., Germany (2016-present)
-Training the youth on the benefits of reducing, reusing and recycling of plastics for the benefit of the climate.
2. Lead Trainer for Teaching Computer Basics by Technik Ohne Grenzen e.V., Germany for Nkanfoa community Junior High Schools (2016 – to present).
-Training youth in high schools on the use and opportunities attached to the use of computers.
3. Provision of Solar back-up power for Ekwe Catholic Hospital by Technik Ohne Grenzen e.V., Germany (2018)
-Set up a back-up solar system to facilitate easy and swift hospital operation.
4. Founding Member & Lead Facilitator for BarCamp Cape Coast and Cape Coast Connect (2014 – to present)
-Organising networking events in Cape Coast and its environs for the youth to share ideas, discuss interests and learn how to add values to their lives and make an impact in their communities.