

PROJECT TITLE: Understanding the Role of Land-Atmosphere Interactions for Extreme Tropical Thunderstorms under Global Warming

Project Science Theme: Climate Change and Risk

Project keywords: Extreme Weather, Climate Change, Tropics

Lead Institution: UKCEH

Lead Supervisor: Cornelia Klein

Co-Supervisor: Rachel James, Bristol, Geography

Co-Supervisor: Emma Barton, UKCEH, Water and Climate Science

Co-Supervisor: Huw Lewis, Met Office

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Project aims and methods:

This PhD project offers you a unique opportunity to explore the complex role that the land plays in influencing development and intensification of extreme thunderstorms, known as mesoscale convective systems (MCSs). These storm clusters cause some of the most extreme rainfall events in tropical regions.

Your project will focus on Africa and South America, where populations are especially vulnerable to their impacts. Recent research has revealed that soil moisture gradients can strengthen MCSs, underscoring the critical role of land-atmosphere interactions in driving extreme weather events. However, the impact of such processes under climate change is not yet fully understood.

In your project, you will use state-of-the-art climate models and observational data from satellites and field campaigns to better understand how the land affects storm intensification, and gain experience in scientific programming and high-performance computing. You will have the flexibility to shape your research within this theme and will gain valuable experience through stays at the Met Office and University of Bristol.

Optional travel to research partners in the US or Africa to present findings and collaborate will also be possible. This studentship is ideal if you are interested in extreme weather, climate science, and land-atmosphere interactions in vulnerable tropical regions.

Project collaborative partner:

The Met Office will provide data access (MetUM simulations) and student co-supervision, support in data accessing and handling, collaboration and co-development of student research and access to Met Office research facilities and hosting of student on-site.

Useful recruitment links:

For information relating to the research project please contact the lead Supervisor via:

cornkle@ceh.ac.uk

This Project will be hosted by UKCEH but you will need to apply to the University of Bristol as the registered University who will be awarding the PhD.

Bristol NERC GW4+ DTP Prospectus:

<https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/>

How to apply to the University of Bristol:

<http://www.bristol.ac.uk/study/postgraduate/apply/>

The application deadline is Thursday 8 January 2026 at 2359 GMT