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

Project Science Theme: Climate Change and Risk
Project keywords: Extremes, rainfall, climate model, thunderstorm

Lead Institution: UK Centre for Ecology & Hydrology (UKCEH)
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Webpage: https://www.ceh.ac.uk/our-science/science-departments/hydro-climate-risks

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 UK Met Office and the 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 UK Met Office will support you in your research by co-developing the project with you, provide input and access to datasets and facilities, as well as training sessions and workshops where needed. This includes several-weeks stays with the Met Office.

For application:

Please send your CV, your qualification certificates, a personal statement cover letter (please follow link) and the names of 2 consenting referees to cornkle@ceh.ac.uk. Feel free to get in touch for any questions.

Further links:

- For more information on PhD studentships at UKCEH: https://www.ceh.ac.uk/studentships
- The studentship will build on knowledge from the LMCS project: https://gotw.nerc.ac.uk/list_full.asp?pcode=NE%2FW001888%2F1
- Related reference: C. Klein, C.M. Taylor, Dry soils can intensify mesoscale convective systems, *Proc. Natl. Acad. Sci.* https://doi.org/10.1073/pnas.2007998117 (2020).

The application deadline is Monday 13 January 2025 at 2359 GMT. For more information about the NERC GW4+ Doctoral Training Partnership please visit: https://www.nercgw4plus.ac.uk.