

The JULES Academy

Dr Toby Marthews (with huge thanks to many colleagues at UKCEH, the UKCEH West Africa Office, WASCAL and other colleagues across Africa)

08-SEP-2026

NATIONAL CAPABILITY
FOR GLOBAL CHALLENGES
International science for net zero plus



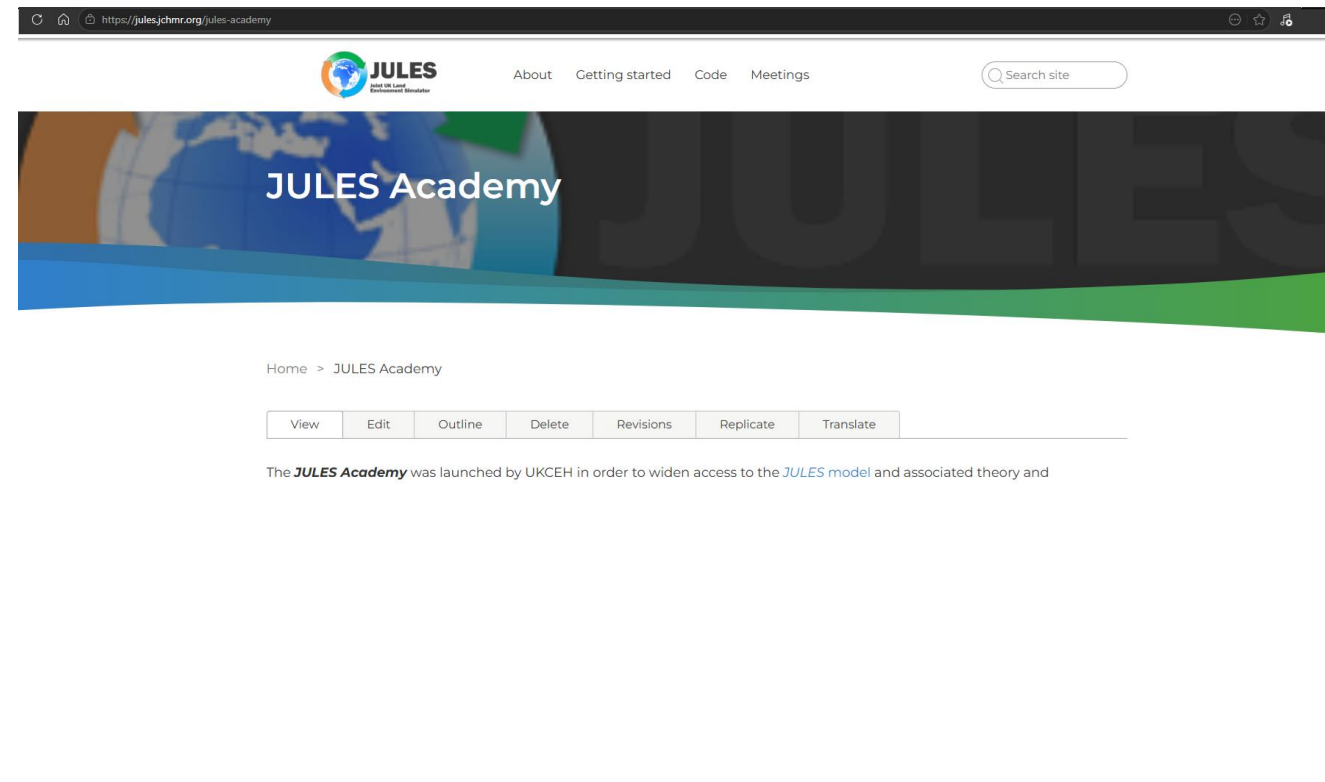
The JULES Academy

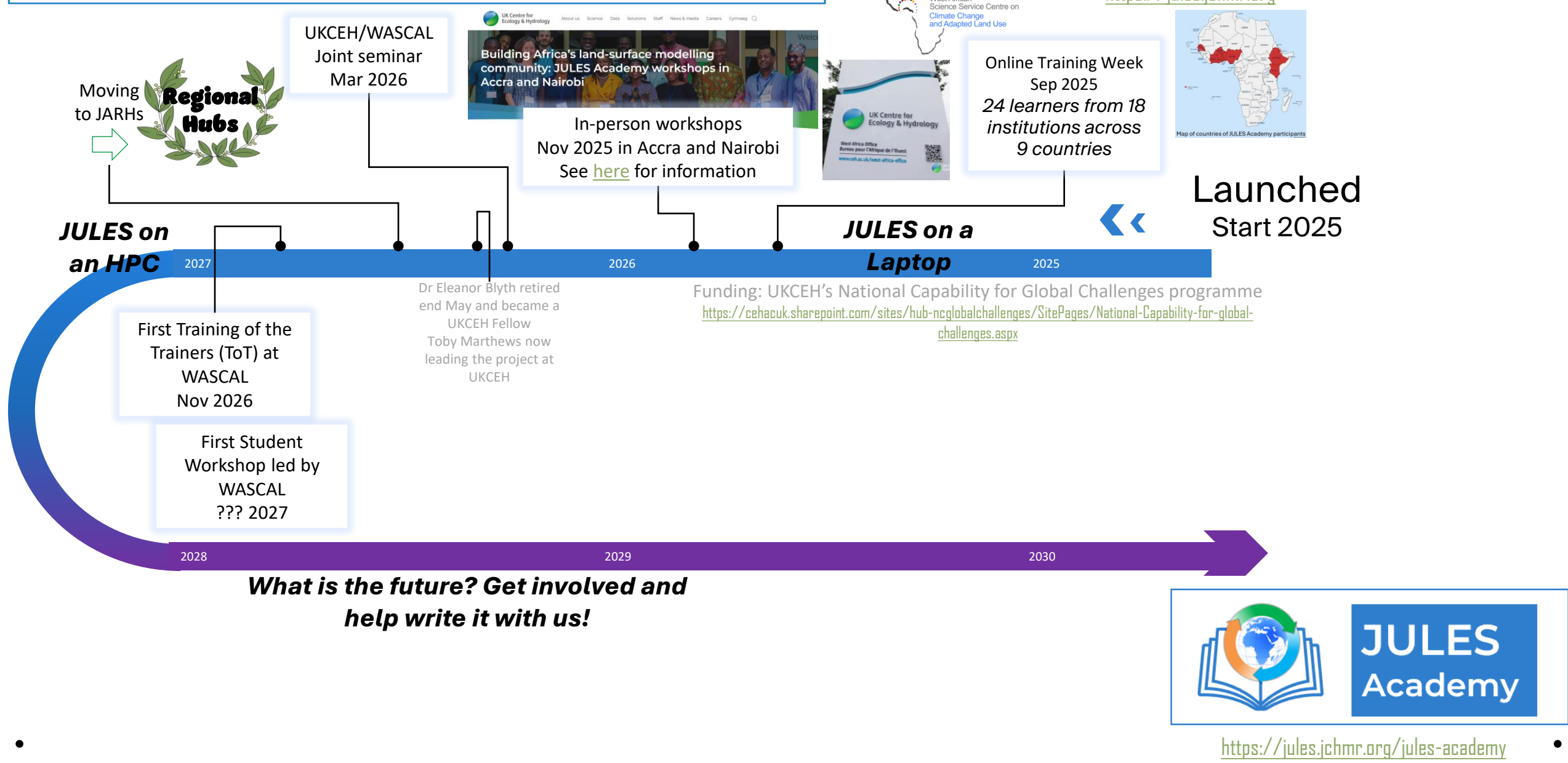
The **JULES Academy** was launched by UKCEH in 2025 in order to widen access to the [JULES model](#) and associated theory and techniques, especially in Africa.

The JA was initially funded by the UKCEH *National Capability for Global Challenges* programme [NCGC](#), which is designed to enhance the UK's contributions to regional and global initiatives that deepen our understanding of how land–water–air system management influences the transition to Net Zero, supports climate adaptation, and addresses broader environmental challenges.

The JA will:

- a) Link up academic and operational climate, water and land research through use of a shared modelling platform, leading to a much more efficient transition from model simulation to real-world impact,
- b) Fast-track academics into international science by using a world-leading land surface model [JULES],
- c) Improve the model in its representation of African environments from large catchment to continental scale, and
- d) Work to foster development of a self-sustaining network of international JULES users and developers





The JULES Model in Africa

- The JULES model is used by leading international academics to explore the impact of climate change and extremes on the land. It is one of only about 10 such models in the world.
- The JULES model is already used by many African agencies e.g. weather forecasting and drought forecasting.
- In comparison to existing observational data, JULES works acceptably well in Africa, but observations are relatively sparse (e.g. flux towers) and the model remains based on global parameterisations that are at best approximate. Experience in other dry-land ecosystems (e.g., Australia) suggest that the model could be improved, leading to a better representation of Africa's unique ecosystems and environments.
- Bridging across scales is essential (this is a key component of the NCGC approach): we need to support two-way interactions between global initiatives and national-to regional-scale activities.

RESEARCH ARTICLE

Assessment of JULES Land Surface Model Coupled With CaMa-Flood for an Operational Streamflow Forecasting Across Australia

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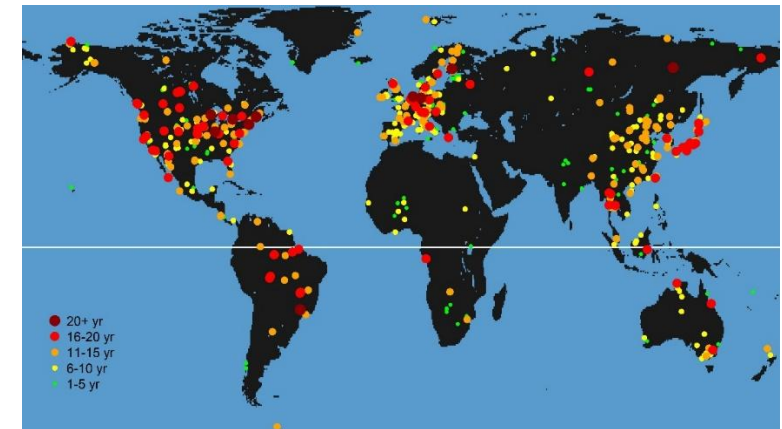
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Received: 1 August 2025 | **Revised:** 19 November 2025 | **Accepted:** 19 November 2025

Keywords: continental streamflow forecasting | gridded river routing | land surface model

ABSTRACT

Operational hydrology forecasts provide crucial information to manage the water resources and offer early warnings to prepare for extreme events. Hydrological modelling and forecasting are challenging particularly in Australia due to its high hydro-climatic variability, numerous intermittent or ephemeral rivers as well as flat terrain. This study has two primary objectives: (i) to implement the Catchment-based Macro-scale Floodplain (CaMa-Flood) model to simulate river hydrodynamics across Australia; (ii) to evaluate the performance of land surface models coupled with CaMa-Flood in simulating streamflow for an operational forecasting service.

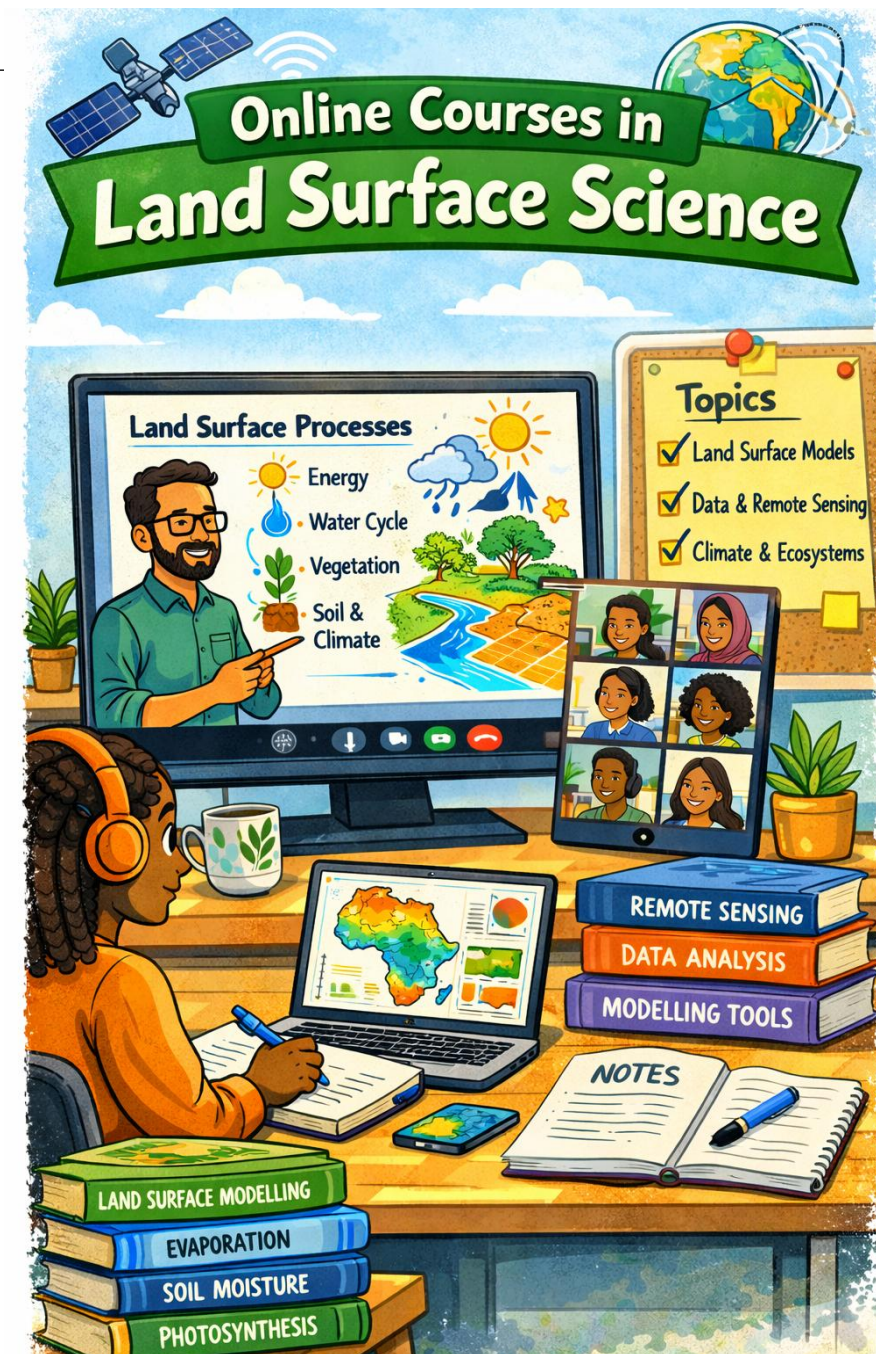


Global flux tower network 2020 (from <https://fluxnet.org/data/fluxnet2015-dataset/>).

The JULES Model in Africa

Expected benefits:

- Academic institutions and operational centres in Africa related to climate, water and land research developed improved capacity on land-surface modelling through improved access to and expertise on a leading land-surface model (JULES).
- Access to training on JULES in Africa is improved through the **JULES Academy Regional Hub (JARH)** model.
- Land surface modellers in Africa are better connected across the continent, and with the international **JULES community**, as a result of the JULES Academy Network.
- The representation of the African land-atmosphere system in the JULES model benefits from increased use of the model by African researchers and is improved, resulting in further benefits where JULES is applied (weather forecasting, land-use planning, water resources modelling agriculture, etc).



JULES Academy Regional Hubs (JARHs)

The **JULES Academy Regional Hub (JARH)** idea is still being formulated. At the moment, this is a summary of what we are proposing (right):

UKCEH will take a step back from directly running student workshops. Partly, this is because we no longer have a budget to do so, but more importantly, we have listened to feedback from the workshops in 2025/Jan2026 and we believe that in-country institutions are both very capable and very keen to run these workshops themselves.

If UKCEH steps back and assumes a more background support role, then we just need to be careful about Intellectual Property issues (IP) and potential reputational risk.

Thinking about these issues has led to the JARH scheme.

The UK Centre for Ecology & Hydrology would like to invite[institution Name]..... to become a JULES Academy Regional Hub (JARH). This would involve the following agreement:

THE JARH UNDERTAKES:

1. To attend a Train the Trainer workshop provided by UKCEH.
2. To run at least one training workshop within the duration of this Agreement. The details of the workshops will be decided by the JARHs (including whether it is online/in person, how long it is, what materials and training will be presented and delivered):
3. To keep UKCEH branding and logo prominent on all materials provided by UKCEH.
4. All workshops are to be notified to UKCEH to be registered centrally on the JULES Academy website.

IN RETURN, UKCEH UNDERTAKES:

1. To provide a Train the Trainers session to the JARH (and others) as part of its ongoing Jules Academy training.
2. To maintain and provide access to current JULES Academy materials.
3. To provide support at the workshops if requested and subject to availability (e.g. UKCEH people can appear online and do a session or two).

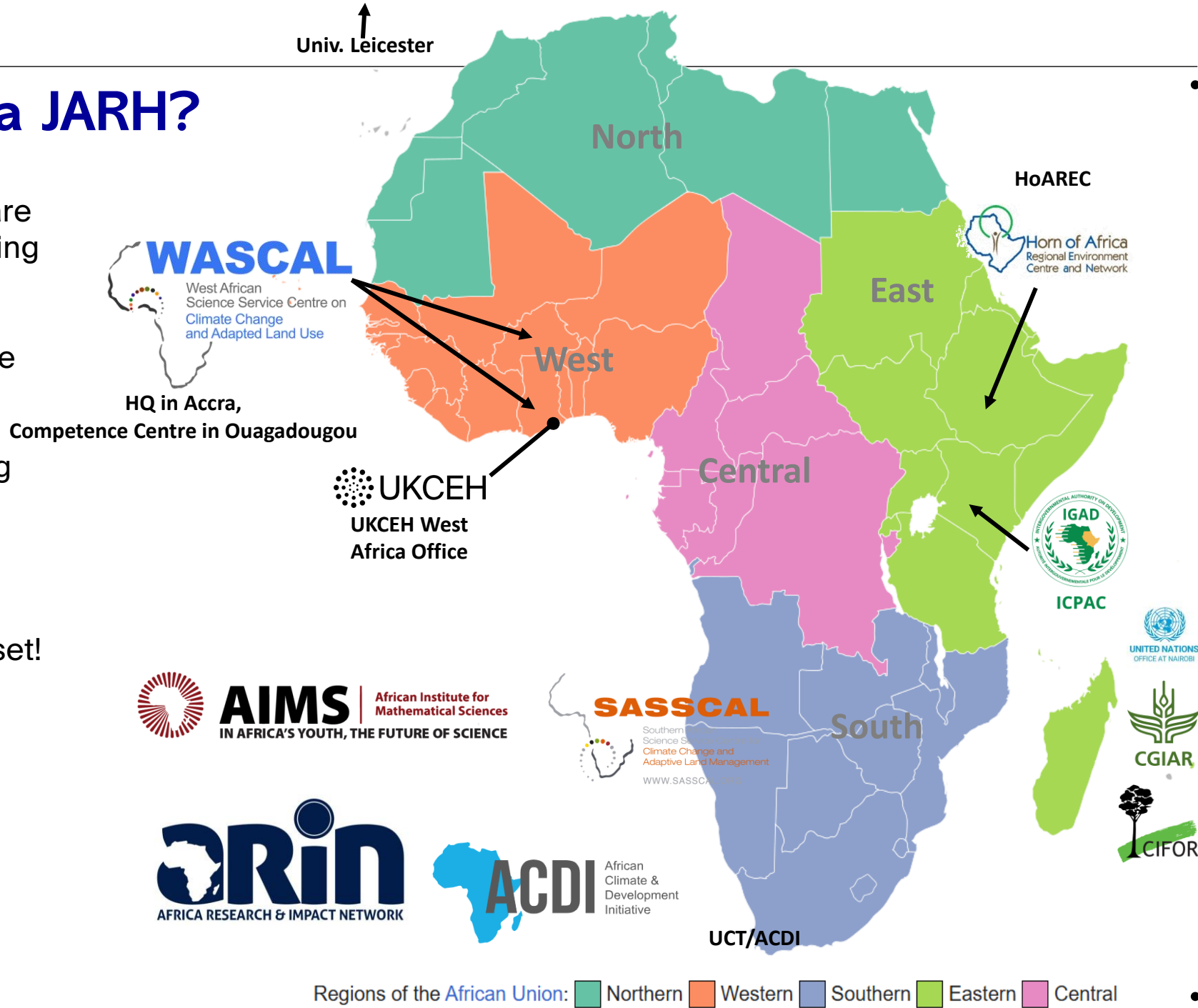
Who might become a JARH?

As of Sep 2026, Leicester and WASCAL are keen to become JARHs and are considering a draft collaboration agreement.

We are also in discussions with Univ. Cape Town, HoAREC and ICPAC.

Many other bodies (e.g. AIMS) have strong overlap in terms of what they do and strategic aims, but have not yet been approached.

Adelaide Asante at our WAO is a huge asset!

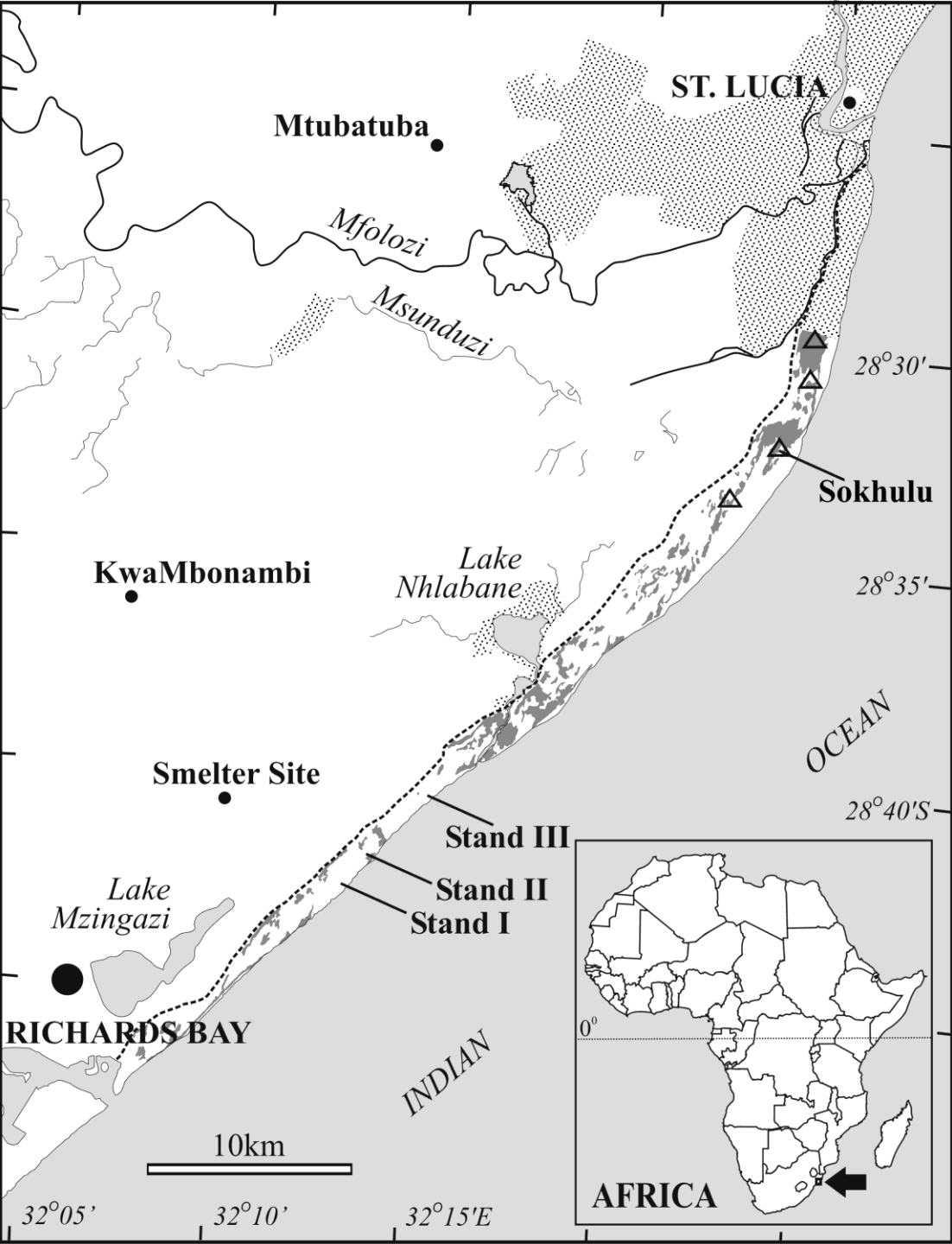


My first ever African project was 2003 for my masters:

**An Assessment of Succession in Dune Forest
by Markov Chain Simulation**

Investigator: **Toby Marthews**

Research proposed as part of an **MSc. Conservation Ecology & Planning.**



Since then, I have been involved with several Africa-related projects, so getting involved in the JULES Academy has given me an opportunity to reawaken old contacts.

NbS-TISE: Nature-based Solutions Tool for assessing the full impact of Soil Erosion



Figure 2: Map of the study region for this report, showing the Berg & Breede rivers in the Western Cape (West Region) and the Umtsimbuzi river system in the Eastern Cape (East R

The RUSLE will provide a r sheet and rill processes. JL processes based on the lat 1). Because gully erosion is (Table 1), this combination erosion from most sources. South African catchment sy rivers, and the Eastern Cap



About the TES NbS Research Project

Nature-based Solutions (NbS) involve working with nature to promote human well-being and ecosystem benefits, and can support climate mitigation and adaptation actions and reduce climate risk. However, the widespread popularisation of NbS through various northern-driven, high-level campaigns has raised concern amongst scholars in the Global South regarding the appropriateness of some of these solutions in local contexts. This is especially applicable in Africa where many peoples' livelihoods are heavily dependent on their landscapes and the multiple ecosystem services derived from these landscapes. Furthermore, the impacts of climate change on many of these critical ecosystem services are not yet fully understood. NbS tend to be much more complex and contested in practice than is generally implied in the dominant narratives. The outcomes of these solutions are often mixed and dependent on the institutions, politics, and particularities of place. Little work has been undertaken on the longevity of NbS under a constantly changing climate. The TES NbS project explores the role of NbS in reducing risk and vulnerability to climate change in developing regions, focusing on Southern African Water Towers, which are mountainous areas (including high-lying hills and plateaus) important for water supply to lowland areas (e.g. Viviroli *et al.* 2007, 2020 and Nel *et al.* 2017).



17. THE 2014 DROUGHT IN THE HORN OF AFRICA: ATTRIBUTION OF METEOROLOGICAL DRIVERS

T. R. MARTHEWS, F. E. L. OTTO, D. MITCHELL, S. J. DADSON, AND R. G. JONES



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The Impact of Human-Induced Climate Change on Regional Drought in the Horn of Africa

T. R. Marthews, R. G. Jones, S. J. Dadson, F. E. L. Otto, D. Mitchell, B. P. Guillod, M. R. Allen

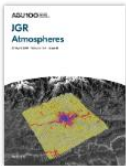
First published: 08 April 2019 | https://doi.org/10.1029/2018JD030085 | VIEW METRICS

SECTIONS



Abstract

A severe drought hit the Greater Horn of Africa (GHA) in 2014, but it remains unclear whether this extreme event was attributable to anthropogenic climate change or part of longer-term natural cycles. Precipitation patterns are known to be changing across the GHA, but trajectories in land surface variables are much less well known. We simulated the GHA land surface environment to assess the balance between natural cycles and human-induced climate change. Using a new form of event attribution study where we focused on both climate variables and also directly simulated land surface variables, we combined publicly volunteered distributed computing with land surface simulations to quantify land surface responses. Uncertainty was quantified both for climate model and land surface model outputs. We identified two distinct "drought trajectories" in the GHA bimodal seasonality area during the March–May (Long Rains season) of 2014. Human-induced climate change may have resulted in regions from Lake Nalubaale (Lake Victoria)



Volume 124, Issue 8
27 April 2019
Pages 4549-4566

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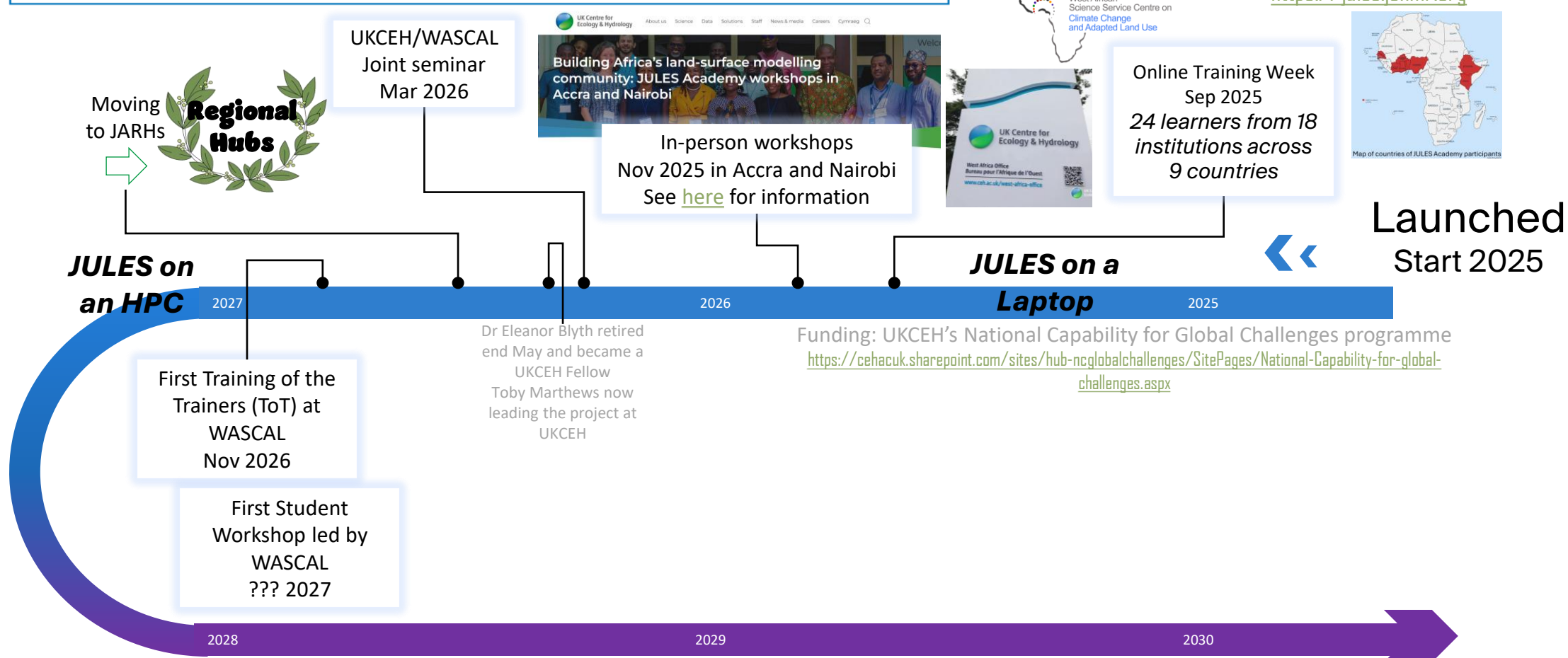
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Figures References Related Information

Recommended

Projected Impacts of Climate Change on
Drought Patterns Over East Africa



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