Events - GCRF African SWIFT Closing Seminars February 2022

Tuesday 15th: **Improving nowcasting and synoptic forecasting of extreme weather across Africa**

Seminar

11am – 12pm UTC

Speakers: John Marsham (University of Leeds), Maureen Abla Ahiataku (GMet), Alex Roberts (University of Leeds), Estelle de Coning (WMO)

Wednesday 16th: **Bridging the gap between African meteorological research and operations**

Seminar

11am – 12pm UTC

Speakers: Benjamin Lamptey (GMet), Coumba Niang (UCAD), Leonard Amedkudzi (KNUST), Bashiru Yahaya (GMet)

Thursday 17th: **The future of African weather forecasting - The way forward and its sustainability for socio-economic development?**

Seminar

11am – 12pm UTC

Speakers: Douglas Parker (NCAS), Benjamin Lamptey (GMet), Emma Visman (UKCEH), Mariane Diop-Kane (WMO)

Tuesday 15th: **Developing subseasonal forecasting techniques to improve climate resilience across Africa**

Seminar

12pm – 1pm UTC

Speakers: Linda Hirons (NCAS-Reading), Masilin Gudoshava (ICPAC), Cheikh Dione (ACMAD), Steve Woolnough (NCAS-Reading)

Wednesday 16th: **Ensuring sustainability of African meteorological research and solutions**

Seminar

12pm – 1pm UTC

Speakers: Elijah Adefisan (ACMAD), Andre Foamouhoue (ACMAD), Joseph Mutemi (University of Nairobi), Fionne Marshall (TBC) (UKMO), Helen Ticehurst (TBC) (UKMO/WISER)

Thursday 17th: **The future of African weather forecasting - How can international resources be best used and distributed?**

Seminar

12pm – 1pm UTC

Speakers: Lorraine Youds (WMO), Douglas Parker (NCAS), Ousmane Ndiaye (ANACIM), Felipe Lucio (WMO), Katherine Marsden (FCDO, UKMO)

GCRF

UK Research and Innovation

GCRF AFRICAN SWIFT
SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

Developing sub-seasonal forecasting techniques to improve climate resilience across Africa

Linda Hirons[1], Cheikh Dione[2], Steve Woolnough[1]
[1] *National Centre for Atmospheric Science (NCAS) – University of Reading*
[2] *African Centre of Meteorological Applications for Development (ACMAD)*

SWIFT External Seminar Series 15th Feb



National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

GCRF

Subseasonal-to-Seasonal S2S Prediction Project

UK Research and Innovation

GCRF AFRICAN SWIFT

SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

https://africanswift.org

GCRF African SWIFT's (Science for Weather Information and Forecasting Techniques) overarching goal **deliver a step change in African weather forecasting capability** from hourly to seasonal timescales, and build research capability to continue forecasting improvements in Africa for the foreseeable future.

1: Users and evaluation *interdisciplinary engagement linking forecast users requirements with the provision of quantitative measures of forecast accuracy*

2: Science coordination *scientific research required to deliver quality-controlled weather predictions*

3: Cross-cutting activities *needed to increase research capability and provide a legacy to the project outcomes.*

Sub-seasonal to seasonal (S2S) Prediction

Launch meeting in Dakar, Senegal, November 2017

GCRF

UK Research and Innovation

GCRF AFRICAN SWIFT
SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

https://africanswift.org

S2S predictability WP

[252 person months of resource across 10 African and 4 UK partners – atmospheric scientists, social scientists, operational forecasters]

Objectives

O6.1 Identify **sources of predictability** for African rainfall on sub-seasonal timescales and **assess the skill** of operational S2S prediction systems

O6.2 **Build research capability** in the UK and Africa to inform the development of operational forecast products on the sub-seasonal timescale for decision making across a range of sectors

Sub-seasonal forecasting testbed

Forecasting testbed: a forum where prototype forecast products are co-produced and operationally trialled in real-time

S2S testbed Kick-off: *Nov 2019; Kenya*

National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

GCRF

UK Research and Innovation

GCRF AFRICAN SWIFT
SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

Subseasonal-to-Seasonal S2S Prediction Project

Sub-seasonal forecasting testbed

- SWIFT: two-year (2020-2021) sub-seasonal forecasting testbed; part of the WMO **S2S Real-Time Pilot Initiative**
- Brought together forecast users (8), forecast producers (~15 in SWIFT partner countries) and researchers (~17 African & UK) to jointly develop new S2S forecast products
  - ***Co-production:*** *transforms users' role from recipient of information to participant in forecast development process.*
- Users in sectors *agriculture, food security, energy, health and disaster risk reduction*

Building blocks and principles of co-production

Direct **access to S2S data** has been transformational for African Met services to develop capacity in data manipulation and allow user-guided iterations to bespoke forecast products.

Continued access to data is key to sustaining these project-initiated services and associated benefits.

UK Research and Innovation

S2S forecasting testbed operational groups

6 operational groups
1x Pan-Africa (ACMAD),
1x EA regional (ICPAC)
4x SWIFT partner countries (Kenya, Nigeria, Ghana, Senegal)

Unique to SWIFT – building collaboration between research institutions and NMHSs

Co-production action plans with individual key users

	O1	O2	O3	O4	O5	O6
Operational partner	**ACMAD**	**ICPAC**	**GMet**	**KMD**	**NiMet**	**ANACIM**
Location; Type	Niger; pan-Africa	Kenya; EA regional	Ghana; NMHS	Kenya; NMHS	Nigeria; NMHS	Senegal; NMHS
Supporting University	-	-	KNUST	UoN	FUTA	UCAD
Key user organisation	CAPC-AC	FSNWG	MoFA	KenGen	IFAD	MWG
Key user sector	Disaster risk reduction; Health	Food security	Agriculture	Energy	Agriculture	Agriculture

GCRF AFRICAN SWIFT
SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

S2S testbed co-production outputs

Peer-reviewed outputs

- Using co-production to improve the appropriate use of sub-seasonal forecasts in Africa. *Climate Services.* 23. 100246. ISSN 2405-8807. **Hirons et al. 2021**
- Progress and challenges of demand-led co-produced sub-seasonal to seasonal (S2S) climate forecasts in Nigeria. *Frontiers in climate.* 3. 712502. ISSN 2624-9553. **Lawal et al 2021.**
- Understanding the role of user needs and perceptions related to sub-seasonal and seasonal forecasts on farmers decisions in Kenya: a systematic review. *Frontiers in climate.* **Mutai et al 2021.**
- Co-producing Real-Time S2S forecasts for improved food security in Eastern Africa. *Climate Services.* In review. **Gudoshava et al 2022**.
- Improved sub-seasonal forecasts to support preparedness action of Meningitis outbreak in Africa. *Climate Services.* In review. **Dione et al 2022.**

Non-peer-reviewed outputs

- S2S policy brief on exploiting sub-seasonal Forecast Predictability in Africa: A key to sustainable development.

https://doi.org/10.5518/100/72

- ECMWF newsletter article on importance of African access to data for effective co-production.

https://www.ecmwf.int/en/newsletter/168/news/real-time-access-sub-seasonal-forecasts-africa

- SWIFT co-production case study in the WMO state of climate services report 2021.

https://library.wmo.int/doc_num.php?explnum_id=10826 P33.

S2S testbed case studies

Supporting food security in Nigeria

NiMet working with CASP (Nigerian government's Climate Change Adaptation and Agribusiness Support Programme) to support farmers decision-making.

- Eg prepare for irrigation during a dry spell

Improving energy generation planning in Kenya

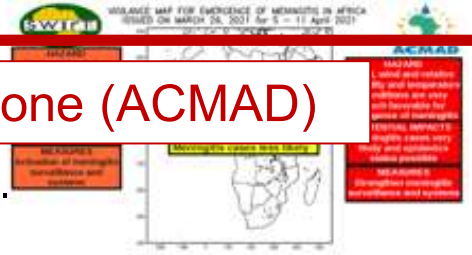
KMD working with KenGEN to produce bespoke forecasts for hydropower generation planning

- Forecasts help manage dam levels.
- Impact: uninterrupted power for Kenya, eliminated use of emergency diesel generators.

Application Highlight – Chiekh Dione (ACMAD)

Introducing meningitis forecasting

ACMAD working with WHO to supply bespoke, multi-variable sub-seasonal forecast products for meningitis vigilance across 26 countries in the meningitis belt (~300 million people)

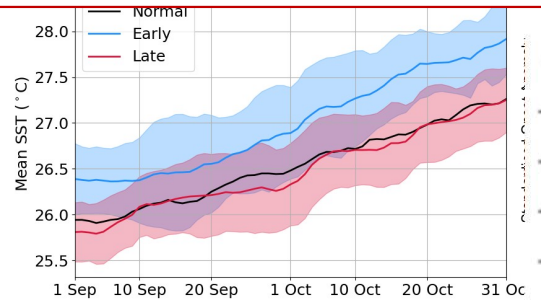


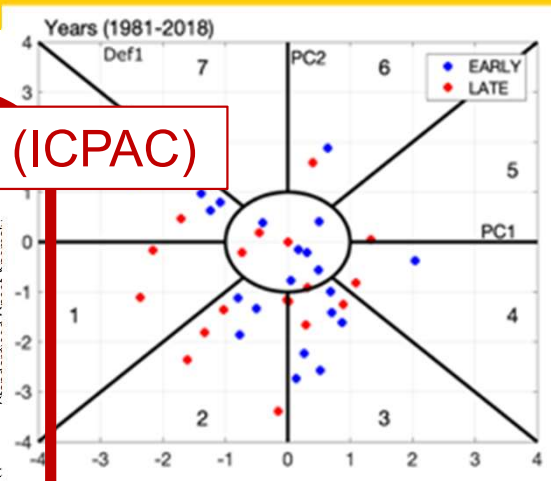
Sub-seasonal science

S2S Improvements in scientific understanding:

Science Highlight – Masilin Gudoshava (ICPAC)

- Drivers of onset variability for EA and WA
- Land-atmosphere feedbacks
- Evaluation of S2S forecasting systems
- Linking skill to S2S drivers





Figures from Masilin G. (ICPAC) and Coumba N. (UCAD)

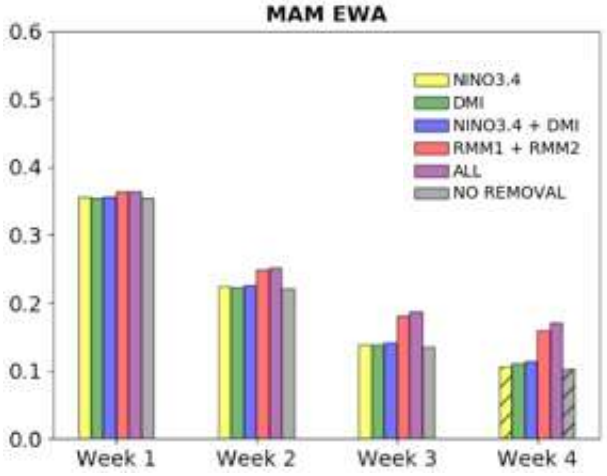


Figure from Felipe A. (NCAS-UoR)

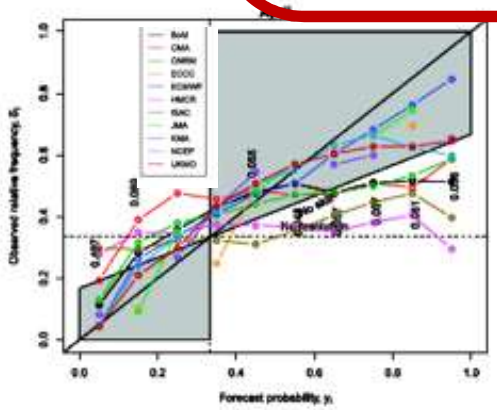


Figure from Hussen E. (ICPAC)

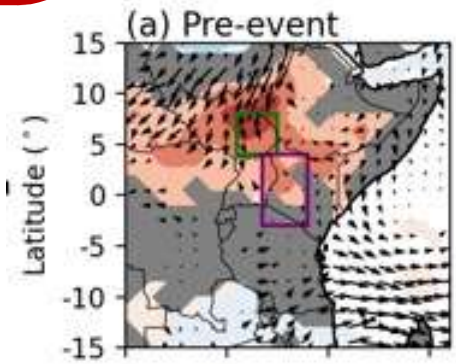


Figure from Josh T. (UKCEH)

GCRF AFRICAN SWIFT
SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

Developing sub-seasonal forecasting techniques to improve climate resilience across Africa

SWIFT S2S Science highlight

Masilin Gudoshava (ICPAC): Drivers of early and late onset for the East African short rains

SWIFT S2S Application highlight

Cheikh Dione (ACMAD): Improved sub-seasonal forecasts to support preparedness action for Meningitis outbreak in Africa

Steve Woolnough (NCAS-UoR): S2S forecasting - progress, lessons learnt and open questions

Discussion

National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

GCRF

UK Research and Innovation

GCRF AFRICAN SWIFT
SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

Thank you for your attention !

This work was supported by UK Research and Innovation as part of the Global Challenges Research Fund, grant number NE/P021077/1.

National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

GCRF

UK Research and Innovation