



The future of African weather forecasting – The way forward and its sustainability for socio-economic development?

GCRF African SWIFT Seminars, 17th Feb 2022
Doug Parker and many others





Weather forecasts save lives.

In a changing climate, African weather events ***are already more intense than in recent decades***, and expected to get worse.

Climate is changing now: this is not a rehearsal for the future: solutions are needed now.

The “HIGHWAY” project (WMO / WISER, 2017-2020) is saving hundreds of lives every year on Lake Victoria.

Watkiss, P., Powell, R. and Hunt, A. (2020). Socio-Economic Benefits of the HIGHWAY project. Policy brief. Published July 2020.



30%

Estimated reduction
in weather-related
deaths on Lake
Victoria due to
HIGHWAY activities

About 300 lives
saved per annum.

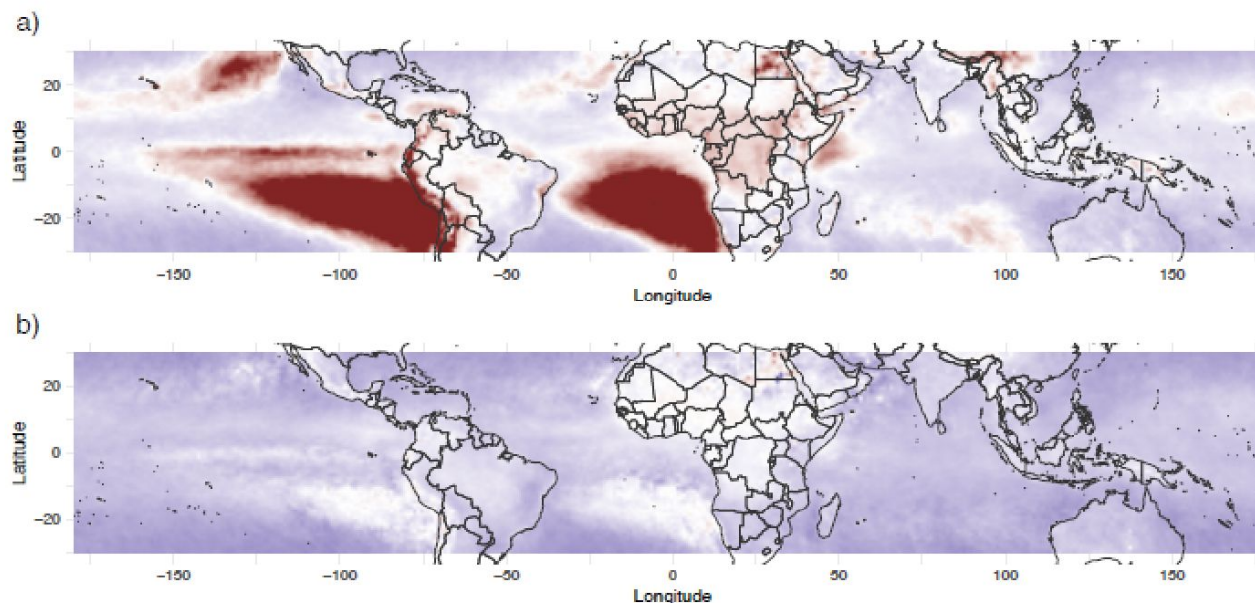


Do not assume that African forecast products are as good as those we enjoy in the Global North,

“... even post-processed forecasts are hardly better than climatology.”

Vogel et al. 2020. Skill of Global Raw and Postprocessed Ensemble Predictions of Rainfall in the Tropics

Continuous Ranked Probability Skill Score (CRPSS) for 1-day ECMWF (a) raw and (b) postprocessed forecasts for accumulated precipitation amount relative to Extended Probabilistic Climatology during 2009–2017.



Only 44% of Africans have any access to early warnings.

- Cullmann *et al.* (2020) 2020 State of climate services ..., WMO-No. 1252. ISBN 978-92-63-11252-2



Research remains to be done: Misinformation is widespread.

This diagram implies that the quality and communication of weather forecasts is almost perfect in Africa.

How is this measured and what evidence is it based on?

- “Good quality, for example, is representative of a state where the data used to produce the climate science information is accurate and of high resolution. In addition, the information produced is in a form which is usable and applicable.”

Bharwani S., and Coauthors, 2020: ... Rapid Evidence Assessment for the CLARE programme. UK Foreign, Commonwealth & Development Office (FCDO). Available from FCDO on request.

Figure 1 Assessment of the Quality and Application of Weather and Climate Information for Adaptation

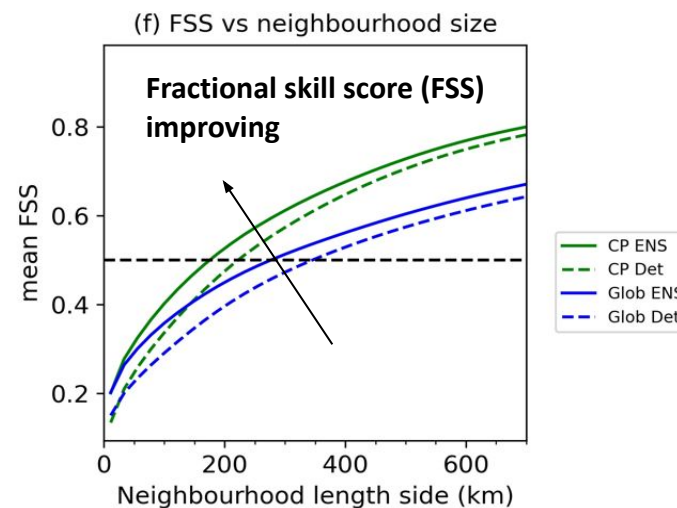
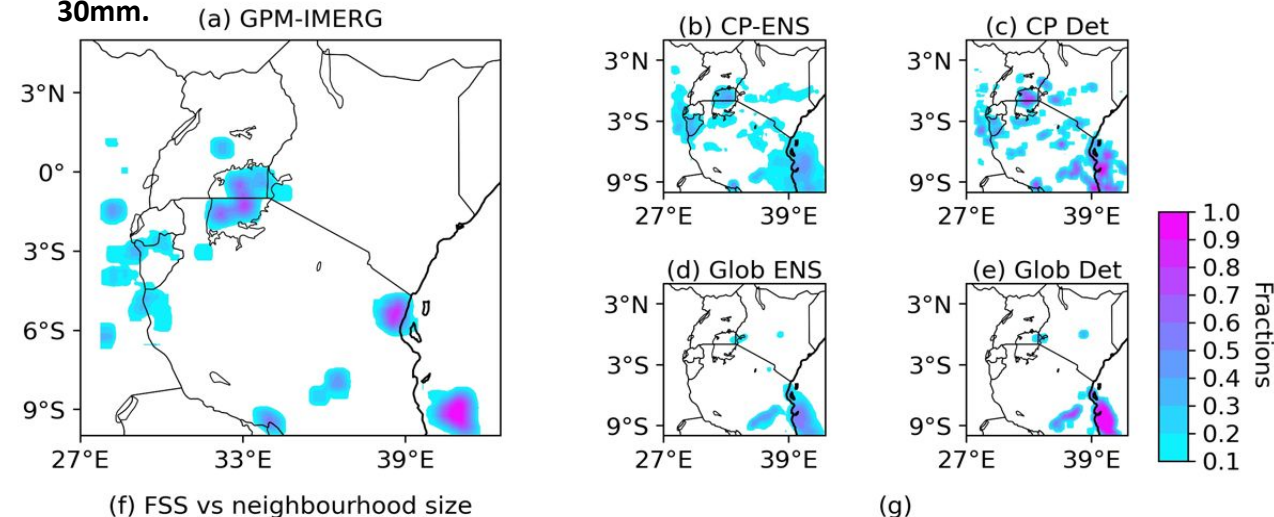


“Failure to provide comprehensive evaluation of weather prediction products is to offer life-critical information whose value we do not know, and which could potentially be harmful.”

SWIFT-ForPAC White Paper, August 2021

In general, the CP ensemble shows improved skill relative to the global ensemble; the diurnal cycle of precipitation was improved, the spatial distribution of rainfall was more accurate, the RMSE was reduced and the spread was greater.

Systematic evaluation of CP ensemble forecasts, Testbed 1, 29th April 2019 . (a-e) show observational or forecast probability of 24h rainfall accumulation exceeding 30mm.





Builds upon existing partnerships between forecasting centres and universities combining strengths of academic and operational forecasting

AFRICAN lead



Senegal



Nigeria



Ghana



Greater Horn



Kenya

UK lead



National Centre for
Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL



JUMUIYA YA AFRIKA MASHARIKI



Centre for
Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL



World Meteorological
Organisation



UNIVERSITY OF LEEDS



University of
Reading

INTERNATIONAL



Project Aims

- I. Significant **improvements in weather forecasts in Africa**, and the tropics, from hourly to seasonal timescales.
- II. Build capability among UK and African partners to **improve, maintain and evaluate** operational tropical forecasts in future.
- III. Develop African capacity for **sustained training of forecasters.**



Policy briefs

- The future of African nowcasting
- The future of African weather forecasting
- Using co-production to improve the appropriate use of sub-seasonal forecasts in Africa

White Paper

- GCRF African SWIFT and ForPac SHEAR White Paper on the Potential of Operational Weather Prediction to Save Lives and Improve Livelihoods and Economies in Sub-Saharan Africa

SWIFT paper in BAMS just published, February 2022:
<https://doi.org/10.1175/BAMS-D-20-0047.1>

See <https://africanswift.org/publications/>



The future of African weather forecasting

May 2021



There is a huge opportunity for the African continent to benefit from the 'silent revolution' in weather forecasting that has been realised in the mid-latitudes throughout the twentieth century. While there are tremendous societal and economic benefits from advancing the science behind weather forecasting in

Key Messages

- In Africa, lives and livelihoods are directly and significantly impacted by weather-related events.
- Strengthening national and international meteorological and climate science capacity has the potential for transformational change across the African continent.
- Research remains to be done, to deliver adequate performance of forecasting systems, but significant improvements in accuracy and relevance are within our reach.
- Co-production of weather and climate services is needed, but depends on meteorological agencies having the tools and know-how to meet decision-makers' needs.
- Systematic and impact-based forecast evaluation is critical to forecast improvement,

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<https://africanswift.org/>



Parker *et al.*, BAMS, Feb 2022

Coproduction of new services is necessary, if the benefits of forecasts are to reach a majority of African stakeholders, and the potential of forecast information is to be achieved.

Scientific work ..., is necessary if forecast skill and impact is to improve, because performance of the scientific solutions is currently very low for Africa ... We argue that improvement in this skill is achievable, ..., right across the time scales.

Transparent, systematic, and independent evaluation of weather information services is needed in order to improve services, justify investment, and allow customers to judge competing products.

Building capability in African skills is necessary, to take ownership of the coproduction of services ... both in scientific methods and in user-engagement practice. ... this will best be achieved by investment in operational-academic cooperation within Africa ... empowering women and prioritizing gender equality.

All these are necessary – none are sufficient in isolation.



Thank you for your attention !

New scientific solutions for Nowcasting, Synoptic and Subseasonal-to-Seasonal prediction.

Co-production and delivery of new services with a range of partners across Africa.

Academic – Operational partnerships in Africa : making the solutions sustainable beyond SWIFT.

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