GCRF AFRICAN SWIFT

SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES

Progress and challenges of demand-led co-produced subseasonal-to-seasonal (S2S) climate forecasts in Nigeria

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This paper identifies fundamental incidents mitigating against proper uptake of climate information services in Nigeria.

Climate Information services, in Nigeria, evolve around timely transfer of meteorological data and forecast products to users in various segments of socio-economic endeavors.

Challenges.....

- **Weather forecasts in Nigeria are reliably limited to two days in advance. Outlooks cover up to 5 days at most. Medium- (7 to 15 days) and long-range (3 to 12 months) weather and or climate forecasts are therefore not covered.**

- **There have been weak links, very little contacts and or no collaborations between the country's weather and climate forecasting establishments and the stakeholders, i.e. forecast end-users.**

Proposed solutions.....

- **A timely and reliable sub-seasonal-to-seasonal (S2S) climate forecast algorithms that will extend the short-range forecast timescales beyond that of medium-range timescales becomes necessary for operational purposes.**

- **Scientists and forecasters need to develop a platform that opens and utilizes communication channels with forecast end-users.**

Benefits of the proposed solutions……

- The deployment of this S2S climate forecast algorithm, that extends the short-range forecast timescales beyond that of medium-range timescales, may help in mitigating the risks of sub-seasonal climate variability on socio-economic activities in Nigeria.

- Stakeholders' platform for collaboration will enhance the joint development of user-tailored impact-based forecasts; increase users' trusts in the forecasts; and, seamlessly help in the evaluation of the performance of the forecasts.

How.....

Global Challenges Research Fund (GCRF) African Science Weather Information for Forecasting Techniques (SWIFT) (i.e. GCRF African-SWIFT; https://africanswift.org/) project has been funding and hosting series of operational weather forecasting 'testbeds' in Africa.

Four countries, e.g. Senegal, Ghana, Nigeria, and Kenya, are participating in this project through their meteorological establishments and academic institutions.

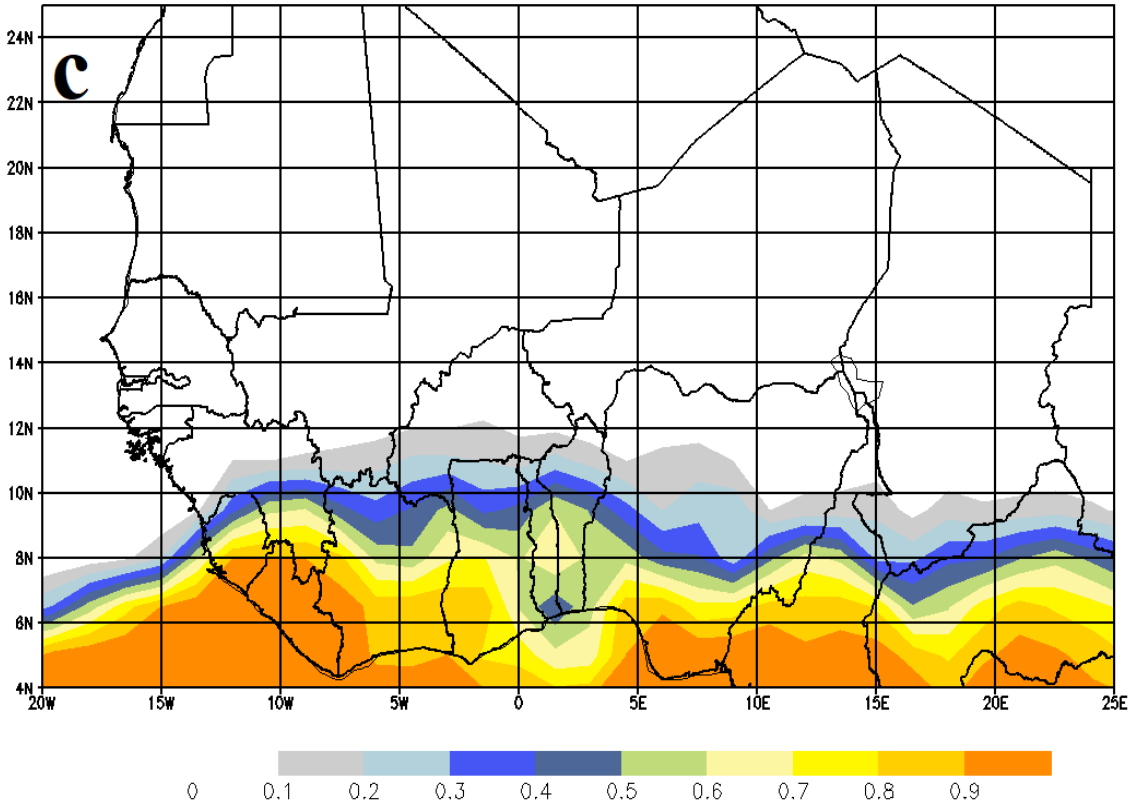
The testbeds have been bringing together researchers, forecasters, as well as forecast users from these participating African countries.

As a follow-up to the testbed.....

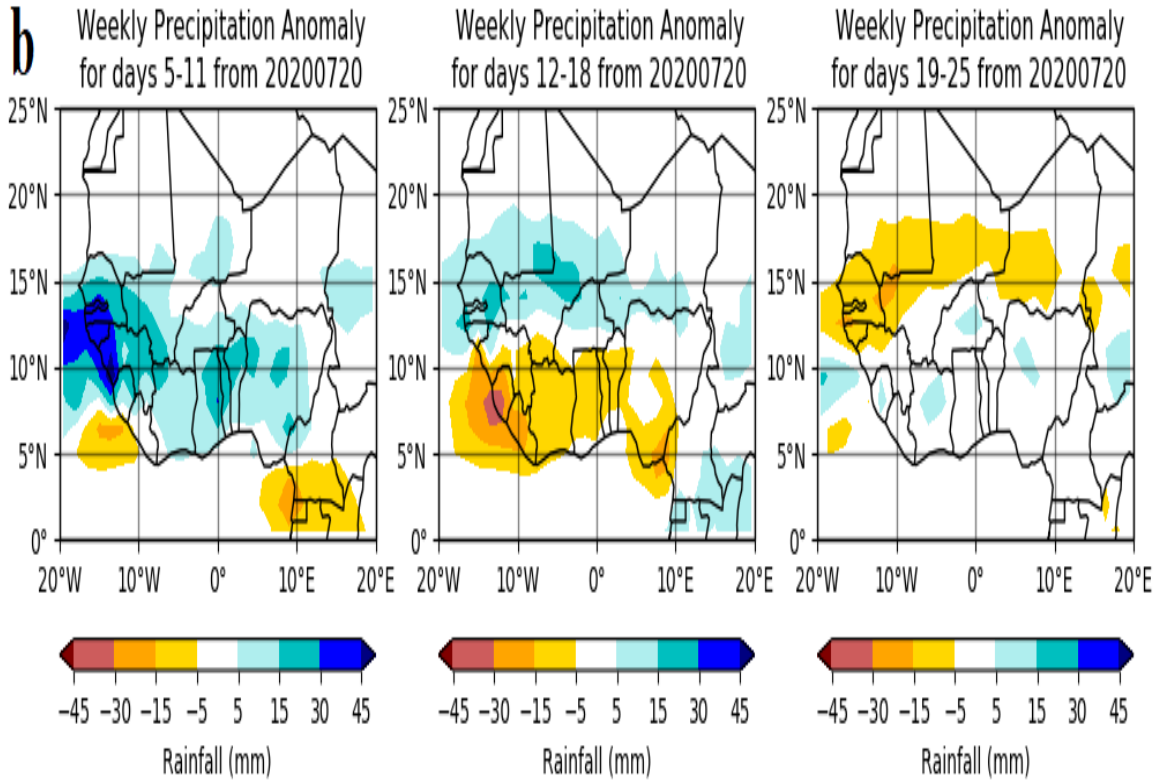
- GCRF African-SWIFT project has been providing the Nigerian Meteorological Agency (NiMet; www.nimet.gov.ng) with some real-time S2S forecast data on weekly basis.
- E.g. the European Centre for Medium-Range Weather Forecasts (ECMWF) seasonal forecasts System 4, Meteo-France seasonal forecasting system 5 and the UK Met Office operational seasonal forecasting system (GloSea5).
- They have the capabilities to forecast, all meteorological variables, on daily basis from 1 to 46, 1 to 61 and 1 to 60 days in advance respectively

Questions asked.....

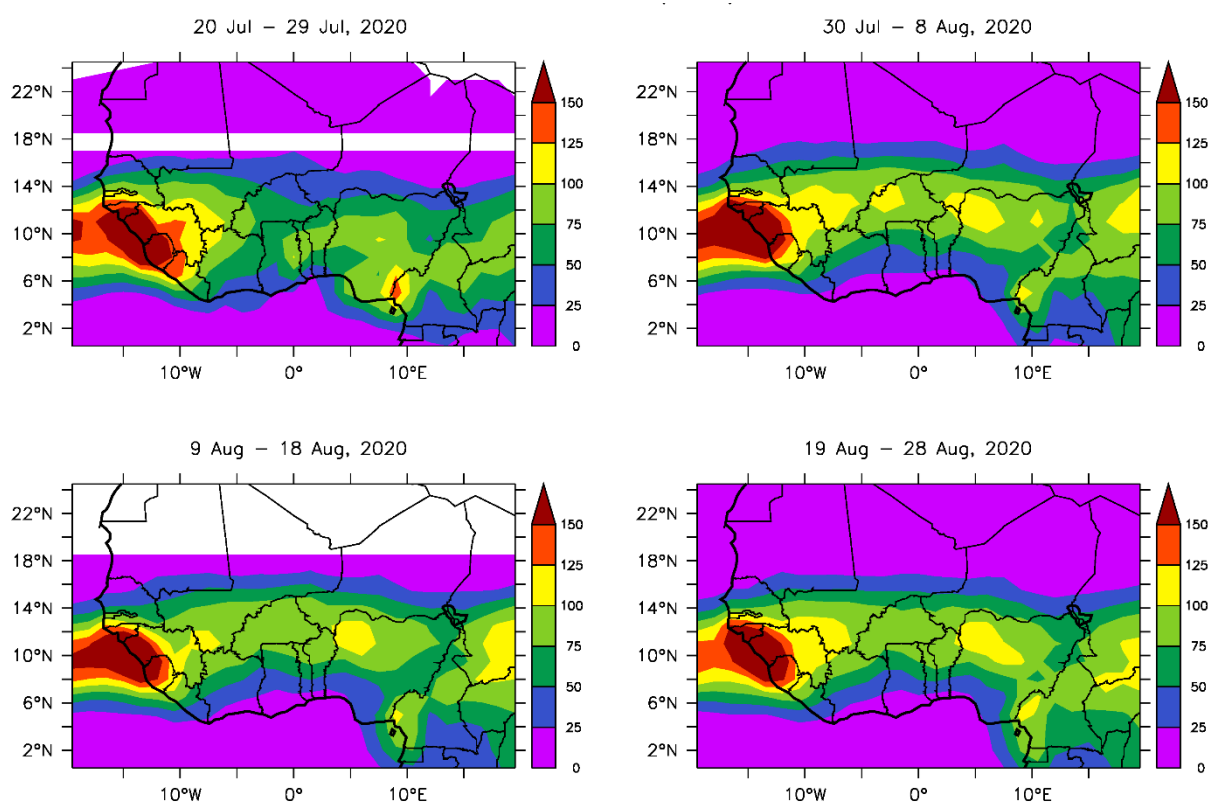
- 1. What product(s) are being given to people and why?
- 2. How were the products developed?
- 3. What decisions have these forecasts been used to inform?
- 4. Did the forecast information change the decision that was made? If so, how?
- 5. How would the users like to see the forecast product(s) improved?
- 6. What are the likely new product(s) users would like to see?
- 7. How were the forecast product(s) evaluated?



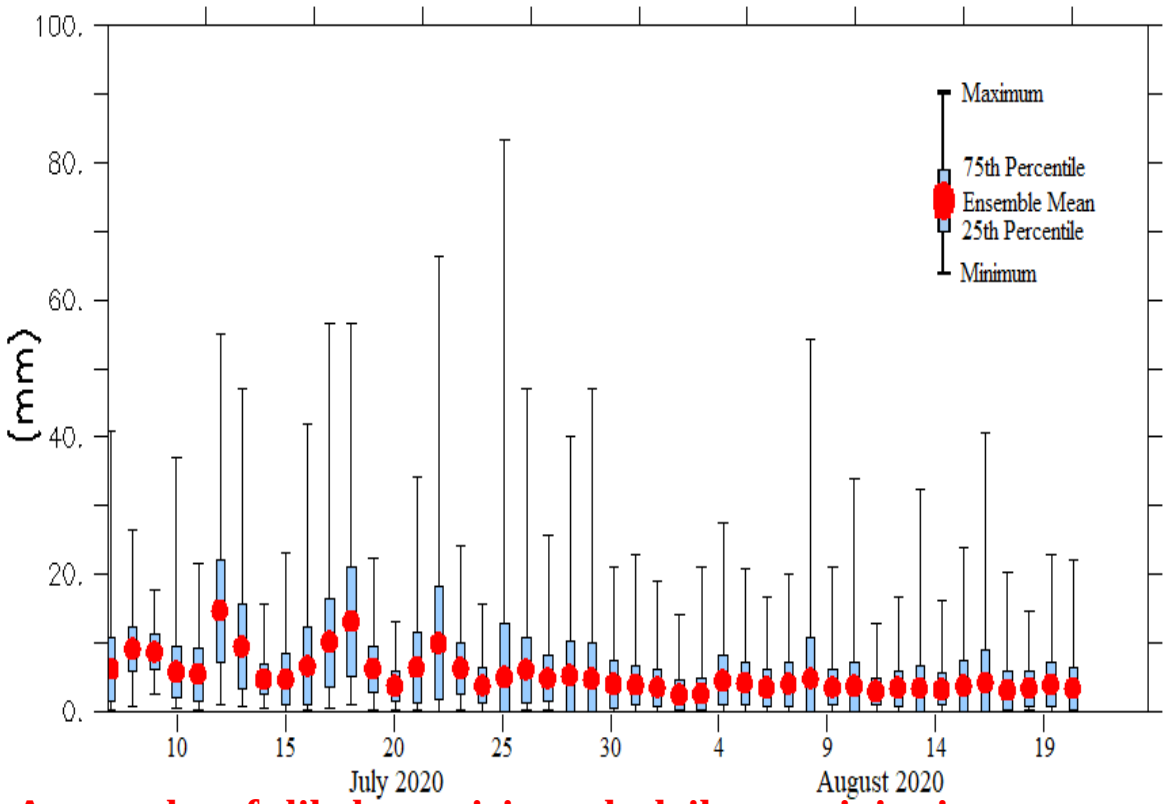
A sample of co-produced probabilities (x100%) of dekadal rainfall accumulation ≥ 25mm but < 50mm, produced from the ECMWF-S2S base forecast of March 16, 2020 and valid from April 5, 2020 to April 14, 2020. Probability of, for instance, 0.8 on the scale = 80%.



A sample of weekly anomalies of precipitation (mm) produced from the ECMWF-S2S base forecast of July 20, 2020.



Sample of a co-produced anticipated cumulative dekadal rainfall amount (mm) produced from the ECMWF-S2S base forecast of July 20, 2020.



A sample of likely anticipated daily precipitation amount (mm) over Ibadan (latitude 7.38°N, longitude 3.95°E; days from July 7 to August, 2020), produced from the ECMWF-S2S base forecast of July 6, 2020. Top and bottom of the bars indicate the likely maximum and minimum precipitation as predicted, respectively, by at least one ensemble member in each case.

Beneficiaries of the forecasts……

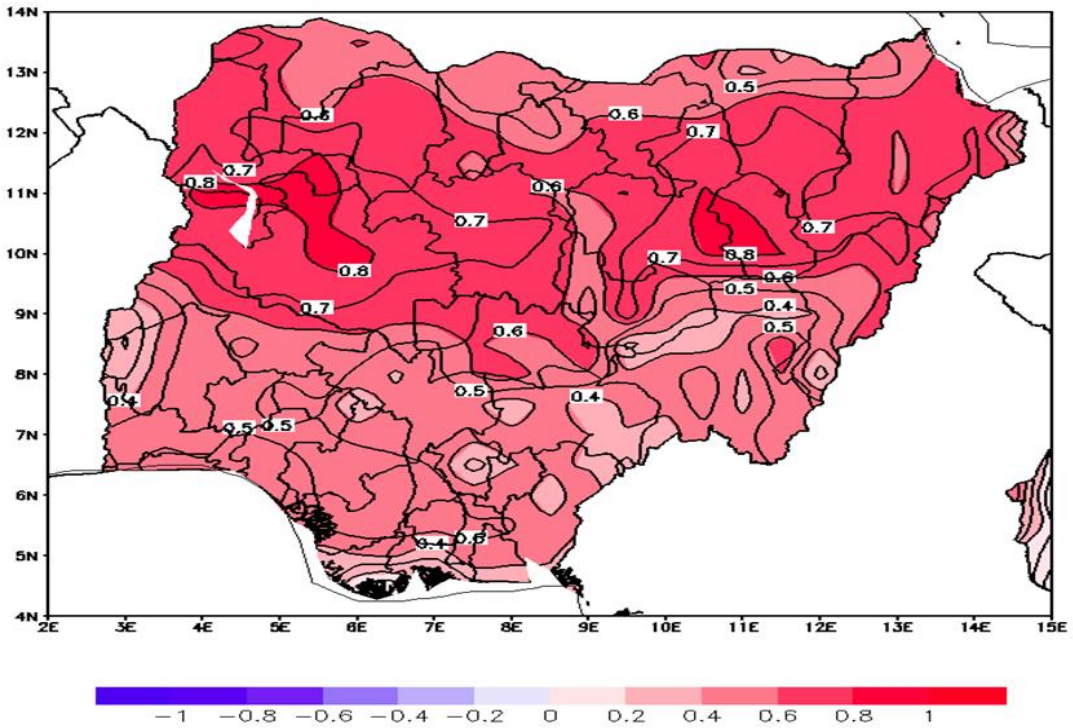
- Health sector
- Natural disaster and humanitarian sector
- Agricultural sector
- General public and insurance
- Water resources and construction sectors
- Aviation sector
- Etc.

Improvement in the forecast products from the stakeholders' perspectives.....

1. graphics of presentation of the forecast products;
2. understanding and simplicity of language of presentation;
3. local / point specific (instead of spatial) presentation of forecast products on daily timescale; and
4. inclusion of specific forecast products.

Performance evaluation of the forecast product(s)

- **Collections and collations of extreme weather events reported by print media in Nigeria.**
- **Letters of acknowledgement and appreciation from some stakeholders.**
- **Eye-witness narrations (**e.g. https://bit.ly/2Tdf9zT and https://reliefweb.int/disaster/fl-2020-000196-nga**).**
- **Utilization of some quantitative statistical metrics (**e.g. FSS, spatio-temporal correlations, etc.**).**



Spatio-temporal correlation between daily surface mean temperature values from the ECMWF-S2S forecasts and the gridded observations over Nigeria.

Summary and conclusions.....

- This paper has examined the steps that were taken towards achieving some desired goals of climate information services in Nigeria, as well as some challenges that have to be surmounted.
- Two things have been achieved here:

1. short-range forecast timescales have been extended beyond the medium range forecast timescales by over 40 days; and,

2. Collaboration and communication channels have been opened between the forecast producers and the forecast users.

However, there remained some unresolved issues such as 'operational' writing skills and inadequate forecasting facilities.

Thank you.....!

Funder Acknowledgement

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