

# Sub-seasonal forecasting in African-SWIFT reflections and outlook

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# Sub-seasonal Testbed

- Examples of users with positive feedback from access to forecasts through the WMO S2S Project Realtime Pilot
  - Access to data has allowed forecasters to produce specific products which could be: multi-index (e.g. Meningitis); user guided temporal spatial averaging; tailoring the visualization; combining monitoring and forecasting data.
  - Help to develop forecaster-user conversations, which has not only benefitted the S2S timescales but other forecasting timescales
  - African Centres have ownership

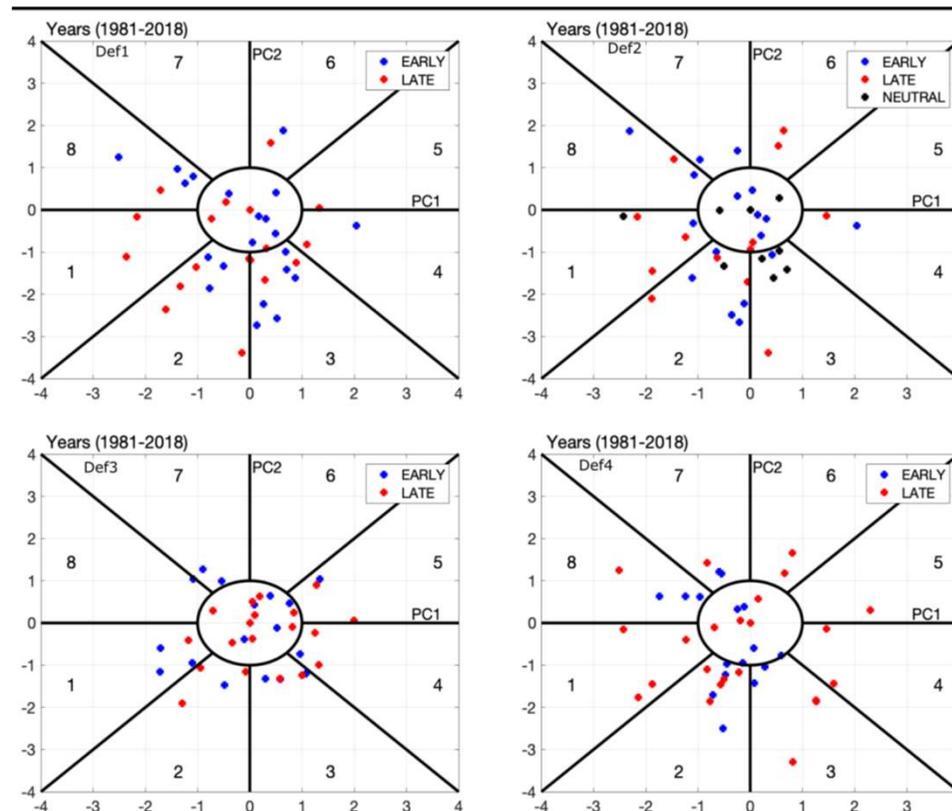


# Sub-seasonal Forecasting: Future and Challenges

- Co-evaluation of forecasts
  - building skill assessment of the products into the forecasts
  - Assessing the value of the forecasts to the user decision making
- Building co-production into business as usual
  - Human Resource intensive both from a user and a forecaster perspective
  - Building a business model for sustainable forecast production and development
- All of this is only possible with access to real-time forecasting data

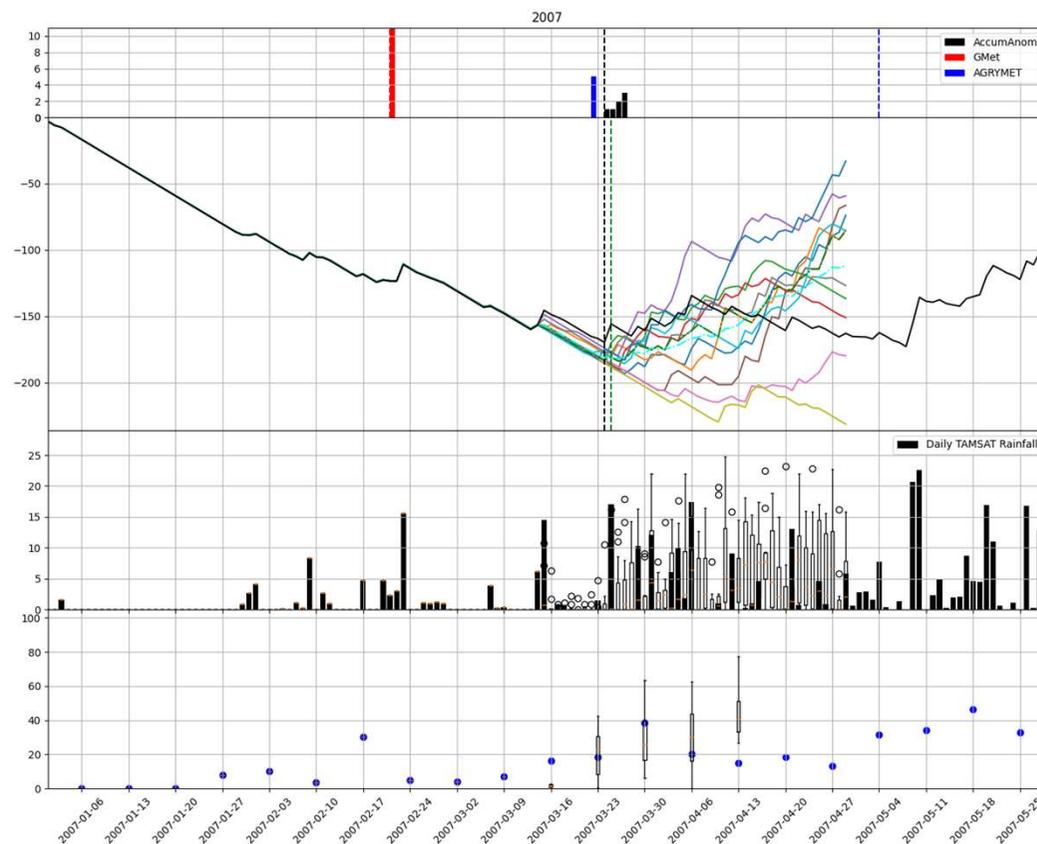
# Forecasting rainy season onset

- Linking variability in EA short rain onset to SST (Gudoshava et al, in review)
- West African Monsoon Onset linked to MJO phase but results dependent on onset definition (Niang et al, in prep)



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- Linking variability in EA short rain onset to SST (Gudoshava et al, in review)
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- Developing methods for onset forecasting using 3 definitions (Thompson et al, in prep)
  - Needs calibration of daily forecast rainfall
  - Only moderate skill for predicting monsoon onset
  - But valuable for identifying if recent rains are onset



*Observed and forecast rainfall an onset for 3 definitions for Accra in start date 16 Mar 2007: local agricultural; accumulated anomaly; weekly*

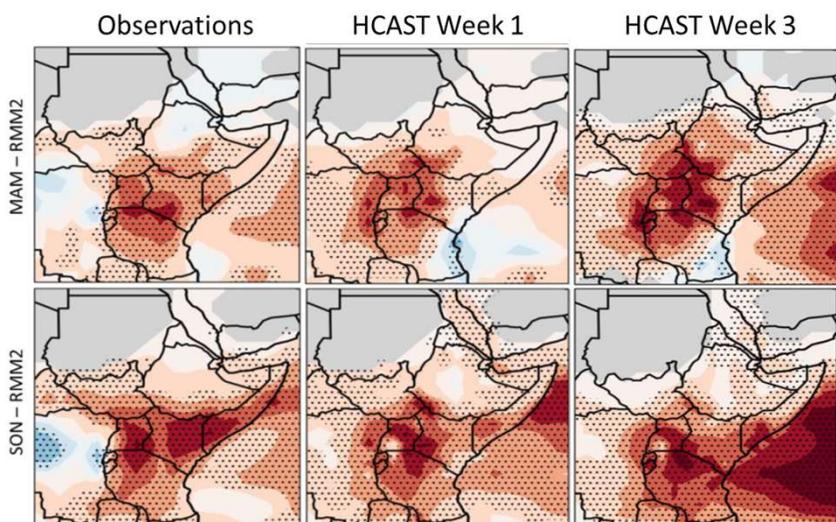


# Model Evaluation

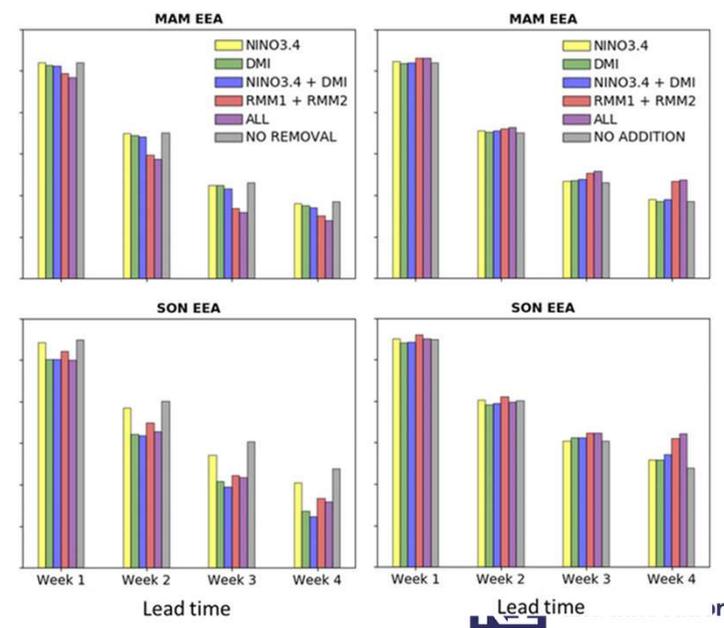
- Africa wide evaluation of weekly rainfall forecasts (de Andrade et al, 2021)
- Evaluation of Monthly rainfall forecasts for MAM season over East Africa (Endris et al, 2021)
- Evaluation of West African Monsoon Onset (Olaniyan et al, 2019)

Not only skill assessments, but also an evaluation of the representation of the relationship between drivers and precipitation

- Removing observed and modelled linear response to drivers shows role of drivers as source of skill
- Correcting modelled response to drivers shows impact of poor modelled response to drivers on skill



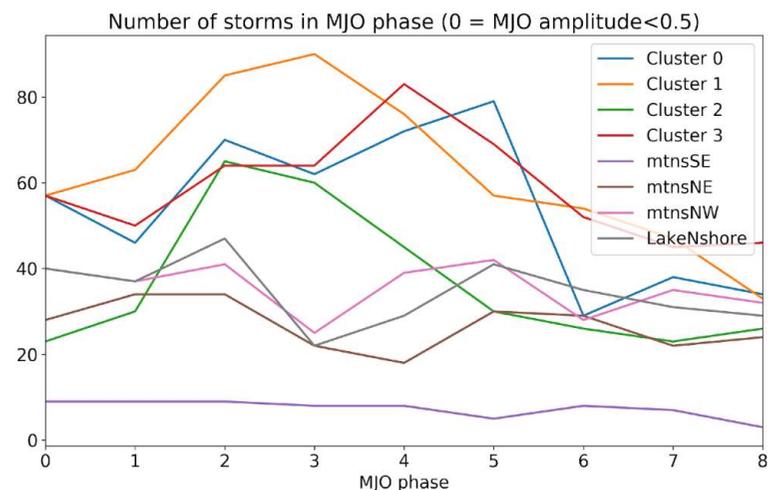
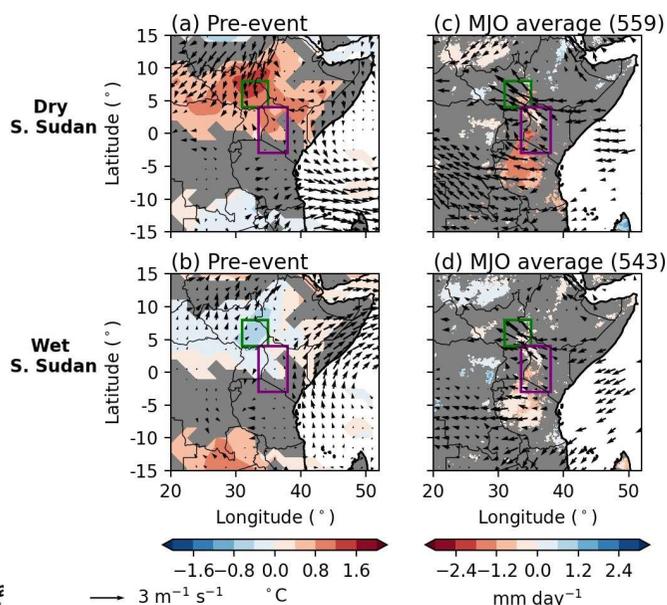
*Left: Observed and modelled regression patterns between RMM2 and rainfall over East Africa  
Right: Average Correlation over East Africa for weekly rainfall when removing the observed and forecast affect of drivers (left column) and when replacing the modelled linear regression with the observed regression de Andrade et al. (2021)*



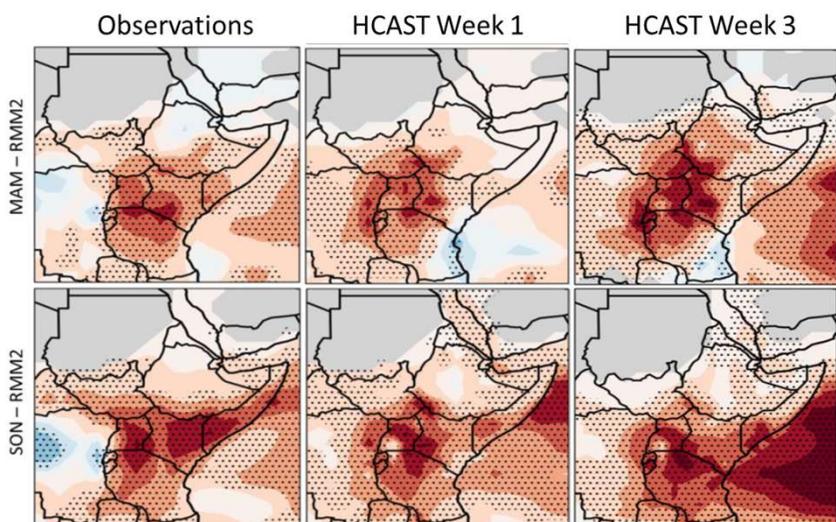
- Composite MJO dry phases for wet or dry South Sudan before dry phase.
- Stronger response for dry initial states
- Is this causal or a signal of MJO/land surface response to a common driver  
(courtesy Josh Talib, CEH)

- Tracking Storms over Lake Victoria Basin (*Peter Hill, University of Reading*)
- Stationary storms linked to topography have small sensitivity to MJO
- Propagating storms over lake have strong sensitivity to MJO

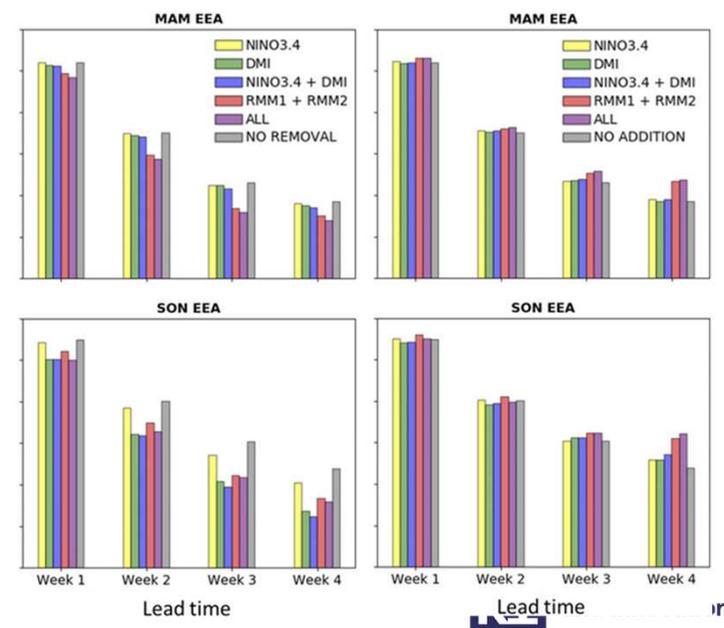
(courtesy Jennifer Fletcher, U. of Leeds)



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# Summary

- Some good examples of value of S2S forecasts in testbed
  - Need ongoing access to be able to continue to provide these forecasts
  - Co-production is resource intensive and needs a plan for sustained services
  - More work need on evaluation of forecasts and benefit of forecasts
- Large demand for onset forecasting
  - Drivers of variability sensitive to onset definition
  - Some definitions very threshold dependent
  - Potential benefit in confirming onset
- Understanding drivers and links to skill
  - Lots of work to do to identify physical links between large-scale drivers and local response
  - Need to evaluate local response in models from a process level

# Funder Acknowledgement

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