AI for EW4All in Malawi:

Lessons from a WMO CREWS Pilot Project

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On behalf of colleagues at DCCMS and MET Norway

Main goal:

Deploy and evaluate AI weather prediction in Malawi, and explore how AI can strengthen early warning capabilities.

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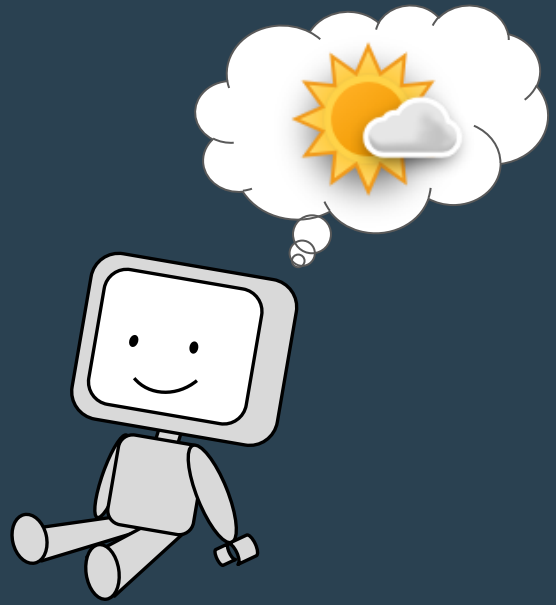
Artificial Intelligence-based Weather Prediction (AI-WP):

a class of weather forecasting systems that use machine learning (ML) or artificial intelligence (AI) to produce forecasts.



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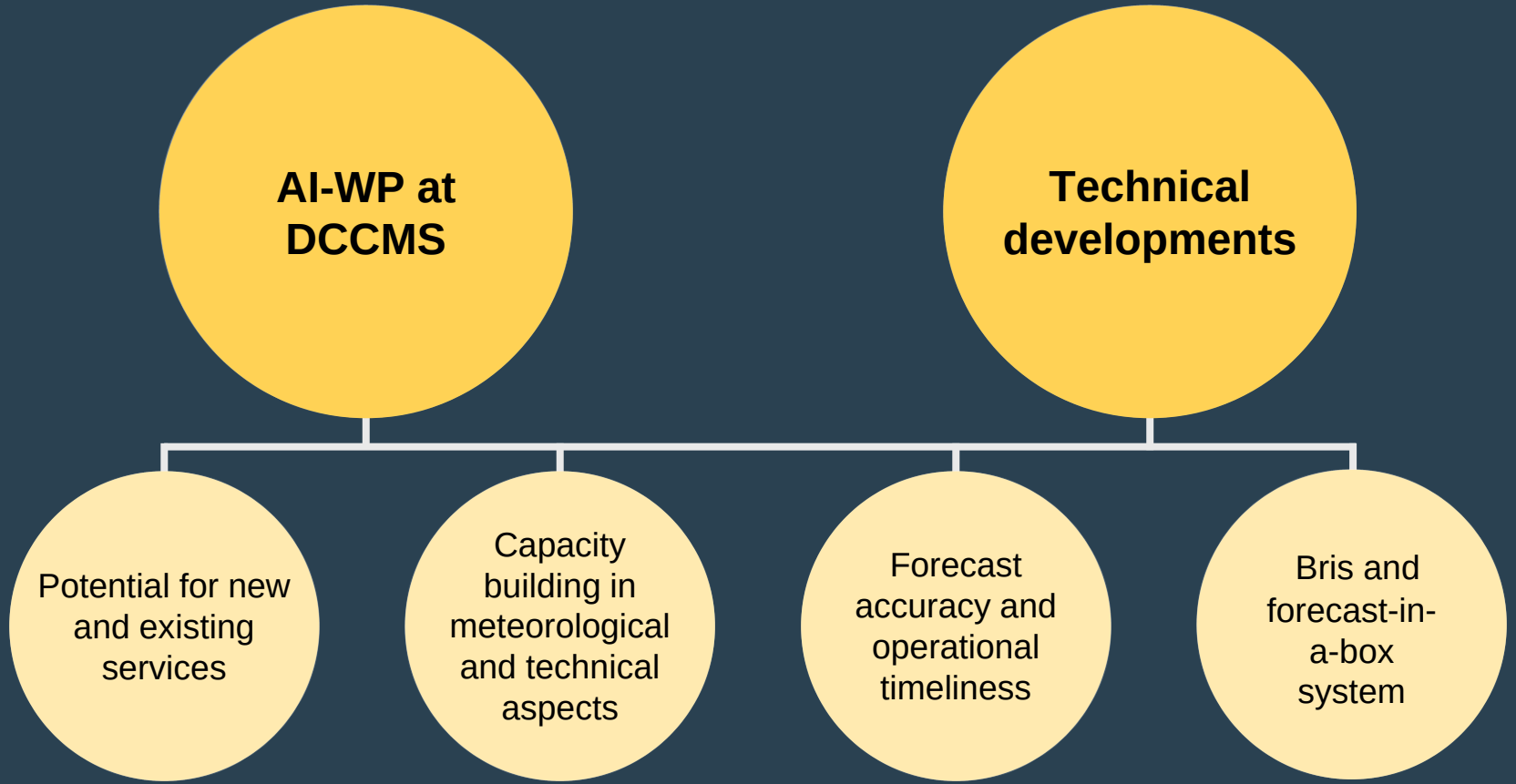

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Opportunities on how AI-WP can benefit DCCMS

General interactivity

AI assistant for daily tasks

Strengthen early warning

Specialized forecasts

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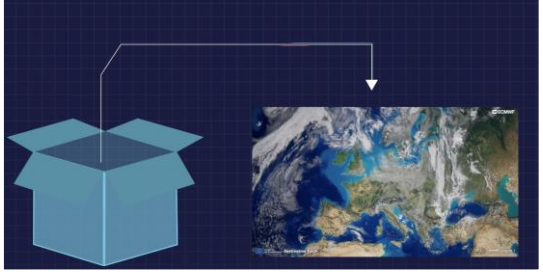
Forecast-in-a-Box



What's in the Box?

- Prepare initial conditions
- Run the model
- Create user products
- Visualise

Key Features

- Deploy anywhere
- Easy to run
- Choose your own model
- Tailor your products

Bris

- Based on the global AIFS from ECMWF.
- Uses Anemoi, a common framework for AI modelling by ECMWF and European countries
- Clouds, precipitation, temperature, winds, etc
- Running daily since November 2024

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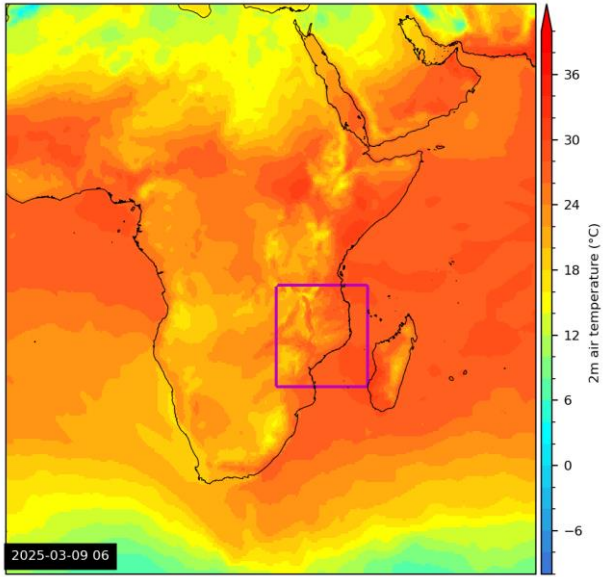
anemoi

ECMWF

Bris for Malawi

- Run AI-WP model Bris using Forecast-in-a-Box.
- Modify Bris to run for the Malawi domain.
- Downscale global data as input data to Bris.
- Runs on a wide range of infrastructure configurations.



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Producing a 10 day forecast with Bris-Malawi

On MET Norway cloud infrastructure

- Run on 1 NVIDIA H200 GPU (70G MIG instance)
- Run time: 2 minutes

On consumer hardware

- Mac Studio (Apple M4 Max, 128G memory)
- Run time: 19 minutes

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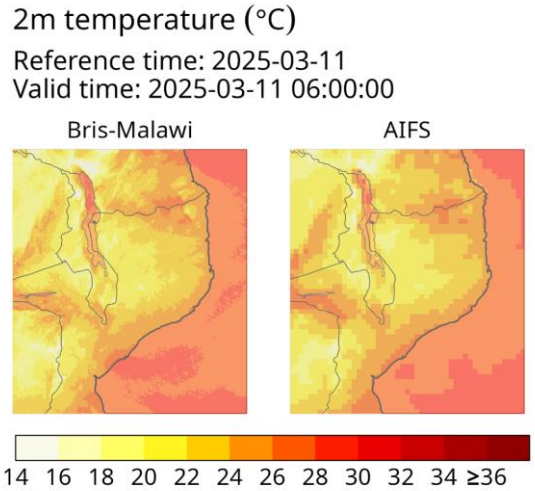
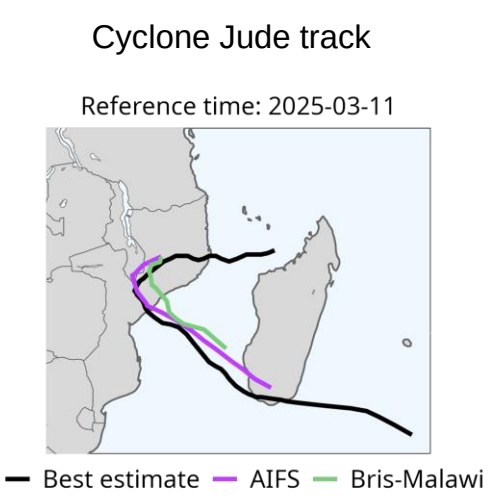
Early results show that Bris-Malawi is comparable to IFS and AIFS from ECMWF

Normal conditions seem to be well forecast, but extremes need to be improved.





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Main lesson learned

Close collaboration between all partners is crucial for continuous improvements of technical solutions, and forecast quality and usability.

Other lessons + Future work

- Forecast-in-a-box makes AI weather prediction easily accessible.
- Bris forecasts show promising results, but needs to be improved for extreme events. More systematic evaluation is needed.
- Explore possibilities and benefits with including local data.
- Assess how different Bris configurations affect forecast quality and run time

General Observations

- AI is proving to be a possible solution of improving climate services
- It is also cheap and quick to generate the products
- Measures need to be put in place to minimize many sources of climate information/ warnings – regulations, policies, standards

THANK YOU

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