



ECMWF NWP products for Africa

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With inputs from Matthieu Chevalier, Claudia Di Napoli, Thomas Haiden and Emma Pidduck



ECMWF – Who we are

Established in 1975, Intergovernmental Organisation

- 23 Member States | 12 Co-operating States
- 500+ staff in 3 sites

24/7 operational service

- Operational NWP – 4x forecasts / day
- Supporting NWS (coupled models) and businesses

Research institution

- Experiments to continuously improve our models
- Reforecasts and Climate Reanalysis
- Advancements on AI/ML: AIFS

Computing

High Performance Computing, Cloud Infrastructure and Data Archive: one of the largest of its type in Europe and the World.

Training and knowledge transfer

- Delivering advanced training and assisting WMO and its members
- WMO Fellowship Programme
- Training and knowledge transfer on weather, atmosphere and climate to the wider community

Copernicus Services

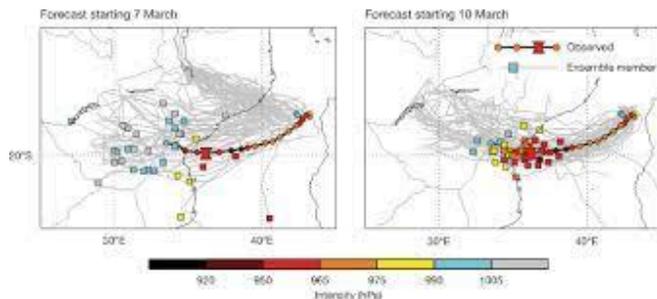
- Climate Change Service (C3S)
- Atmosphere Monitoring Service (CAMS)
- Support JRC on Copernicus Emergency Management Service (CEMS)



Destination Earth (ECMWF-ESA-EUMETSAT)

- Operates the DestinE Digital Twin Engine (DTE)
- Operates two Digital Twins on Weather-induced extremes and Climate Adaptation

ECMWF data in support of weather and environmental data needs in Africa



Support to **ICPAC** and other African countries via Horizon and **Copernicus:** GloFAS, ERA5 (C3S), CAMS data products and training



Support to **ACMAD:** Co-operation Agreement

Since 1995



Support to **WMO SWFP** and **ACMAD countries** (WMO RAI) via **EUMETCast**

Since 2006

Since 2015

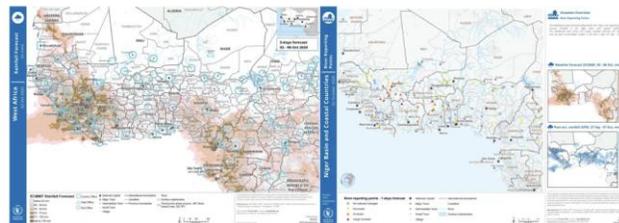
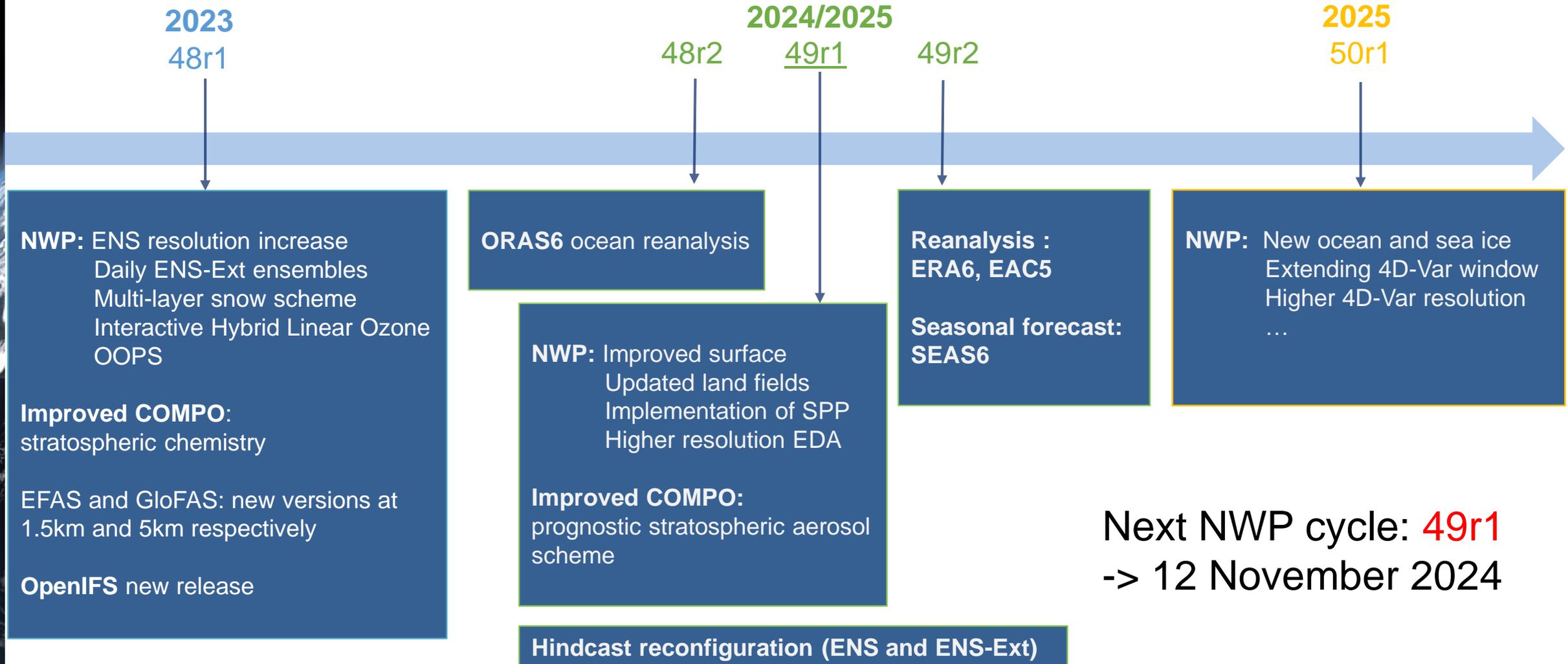


Figure 1. Information from the World Food Programme 'Alert Detection and Mapping (ADAM) platform making use of ECMWF rainfall forecast (left) and CEMS-GloFAS flood forecasts (right). Source: WFP, GFP virtual conference 2020

Since 2023

Support via **WMO SOFF**, use of ECMWF's weather data products

Integrated Forecast System (IFS) upgrades



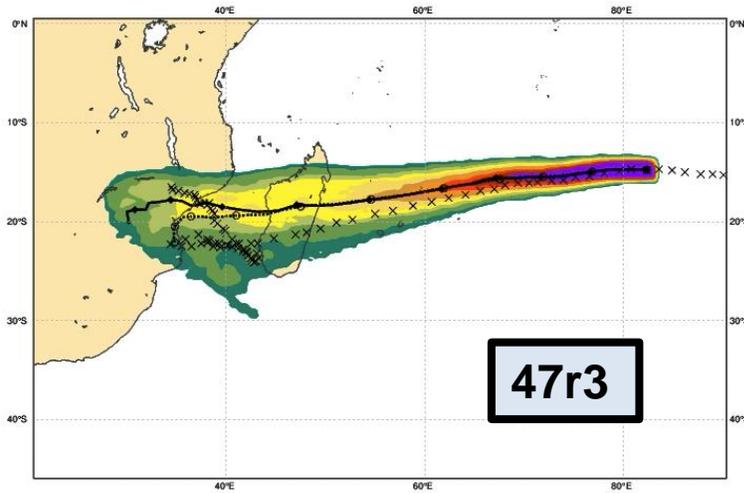
Next NWP cycle: **49r1**
-> 12 November 2024

Increased model resolution improve the forecast of severe events: example 48r1

Tropical Cyclone FREDDY (07S) Forecast 16th Feb 2023 00Z

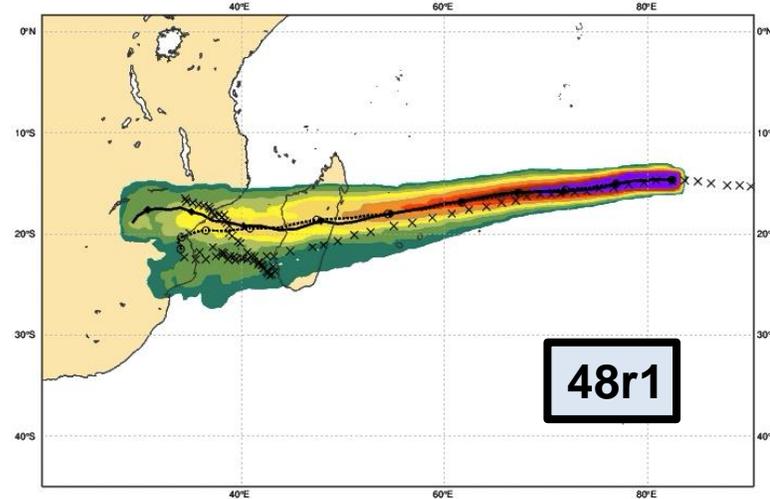
Date 20230216 00 UTC @ECMWF
 Probability that **FREDDY** will pass within 120 km radius during the next 240 hours
 tracks: **solid**=HRES; **dot**=Ens Mean [reported minimum central pressure (hPa) 939]

5-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 > 90%

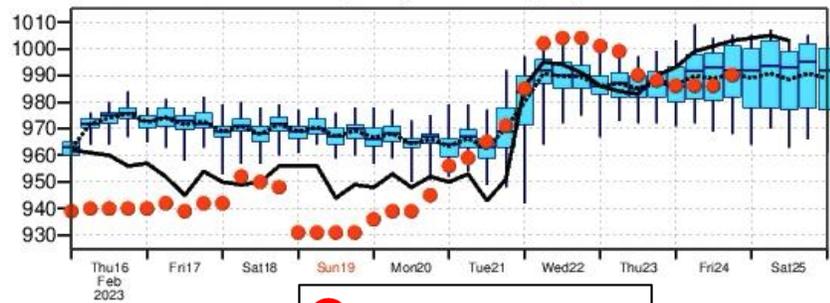


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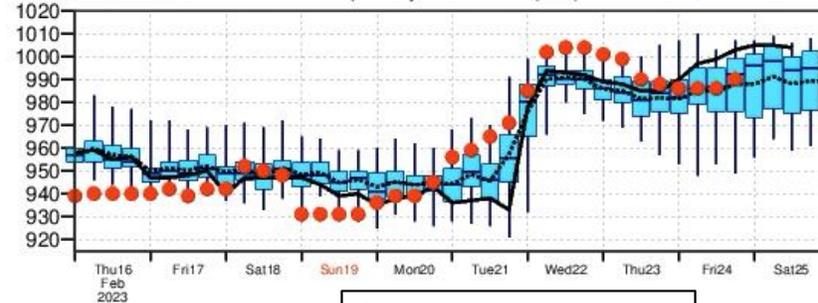


Mean Sea Level Pressure in Tropical Cyclone Centre (hPa) **solid**=HRES; **dot**=Ens Mean



● reported pressure

Mean Sea Level Pressure in Tropical Cyclone Centre (hPa) **solid**=HRES; **dot**=Ens Mean



● reported pressure

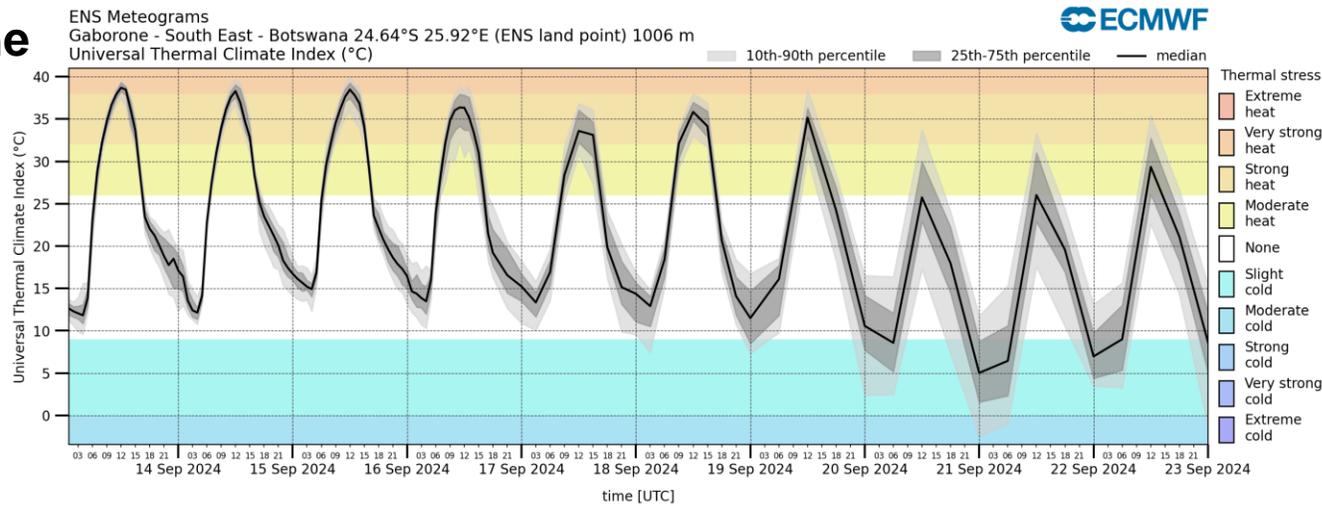
Tropical cyclones intensity forecasts improved in 48r1



Feeding Impact-based Forecasts: example heat indices in upcoming 49r1 cycle

UTCI and WBGT are measures of environmental heat (from temperature, humidity, wind, radiation) as it affects humans

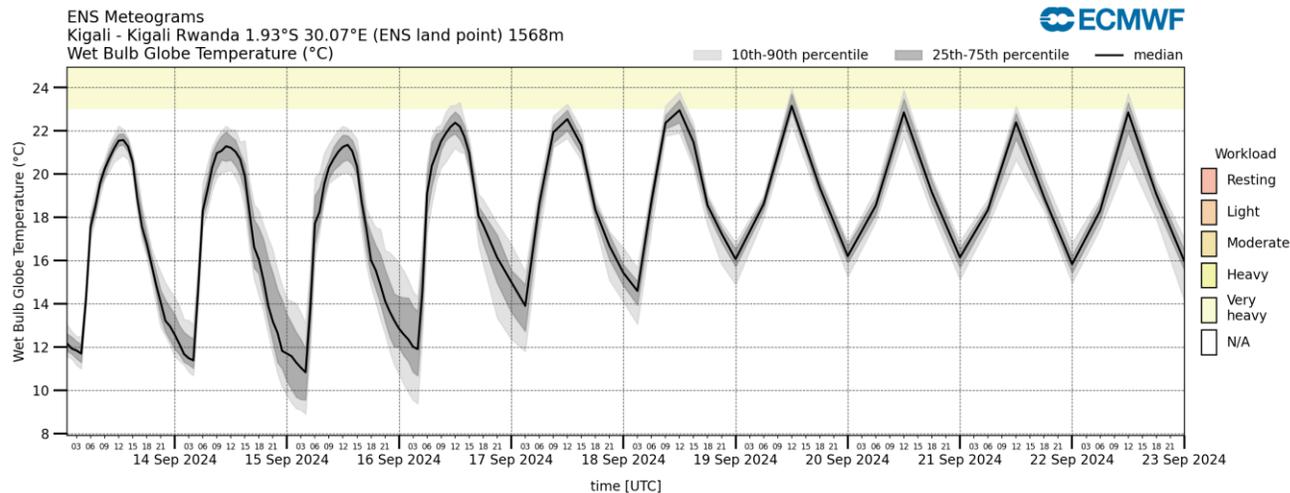
Gaborone



UTCI: Universal Thermal Climate Index

- Represents physiological stress
- Considers clothing
- Valid both in the heat and cold range

Kigali



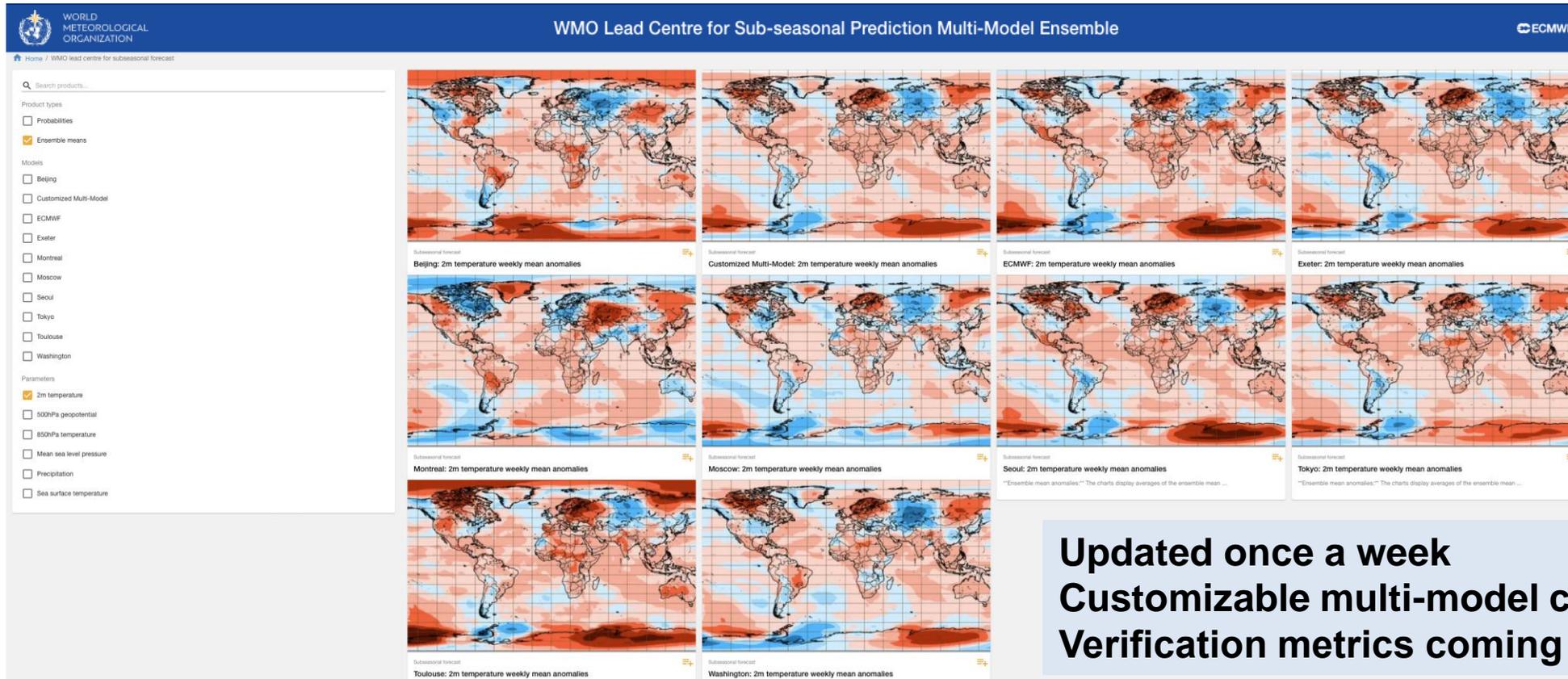
WBGT: Wet Bulb Globe Temperature

Represents occupational exposure limits

- Is an ISO (the International Organization for Standardization) standard 7243:2017
- Valid in the heat range only

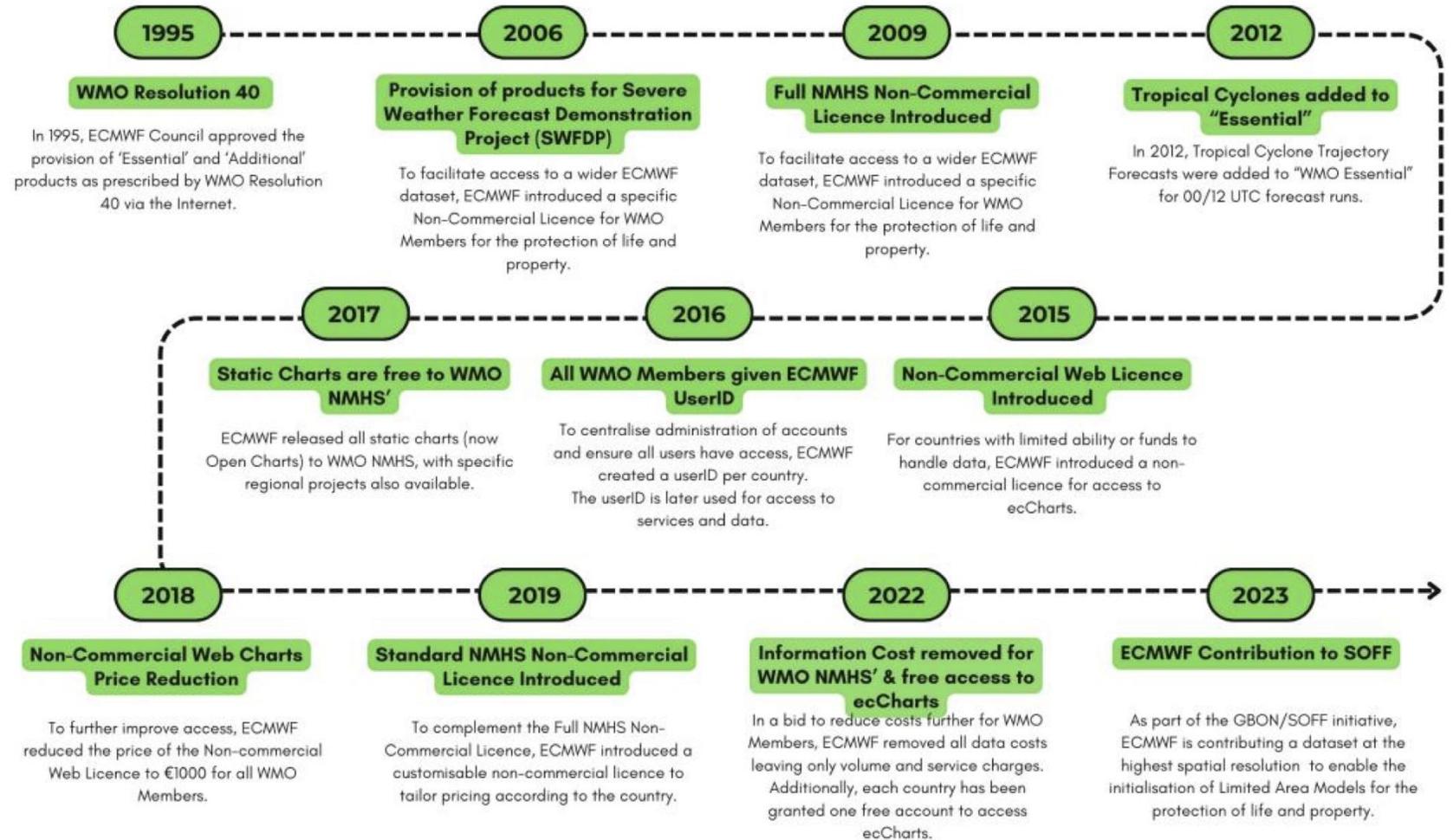
Feeding Impact-based Forecasts: example fo sub-seasonal forecasts

- ECMWF designated Lead Centre for Sub-seasonal Predictions Multi-Model Ensemble (LC-SSPMME) in WMO WIPPS.
- Built on the legacy of the WWRP/WCRP S2S project and relies on S2S archive infrastructure.
 - Near-real-time forecasts from ECMWF and 8 centres contributing to S2S database.

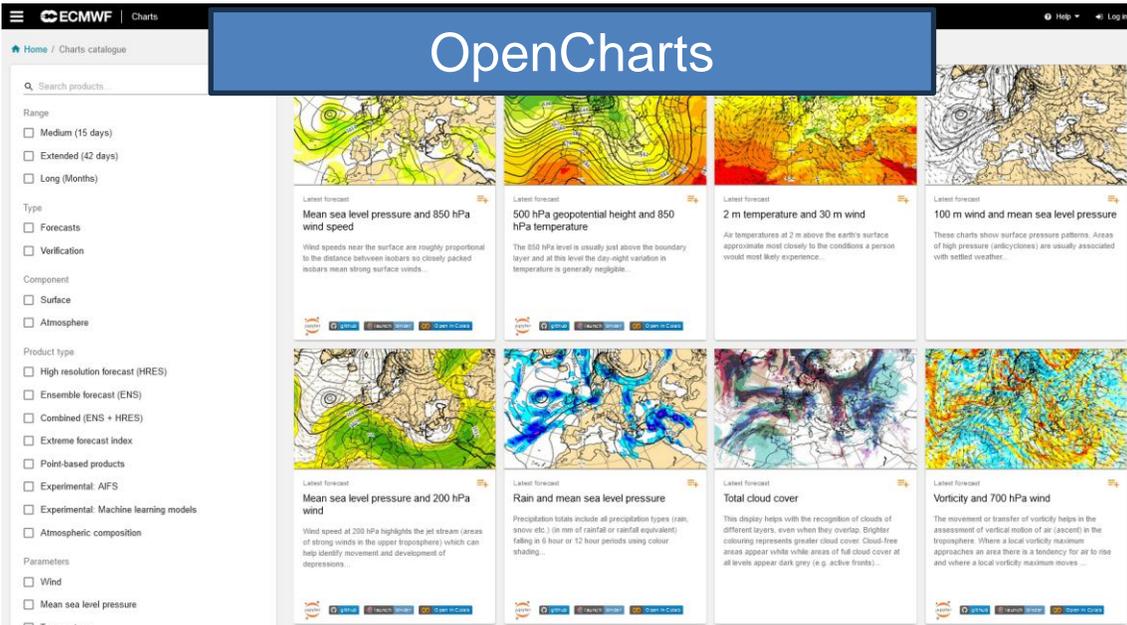
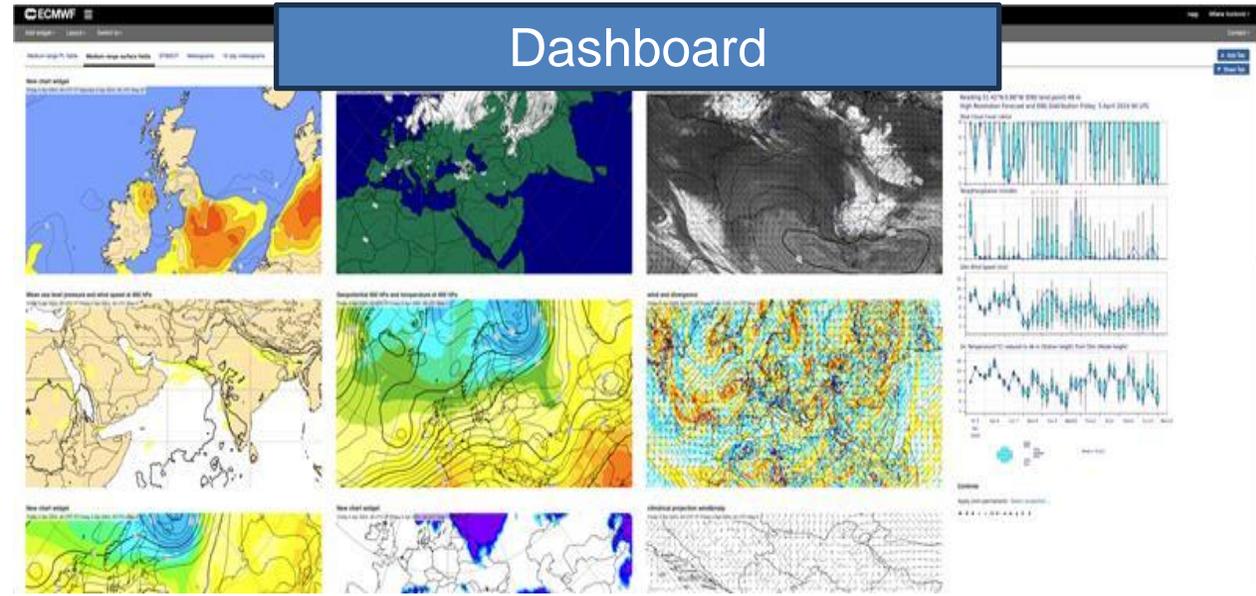
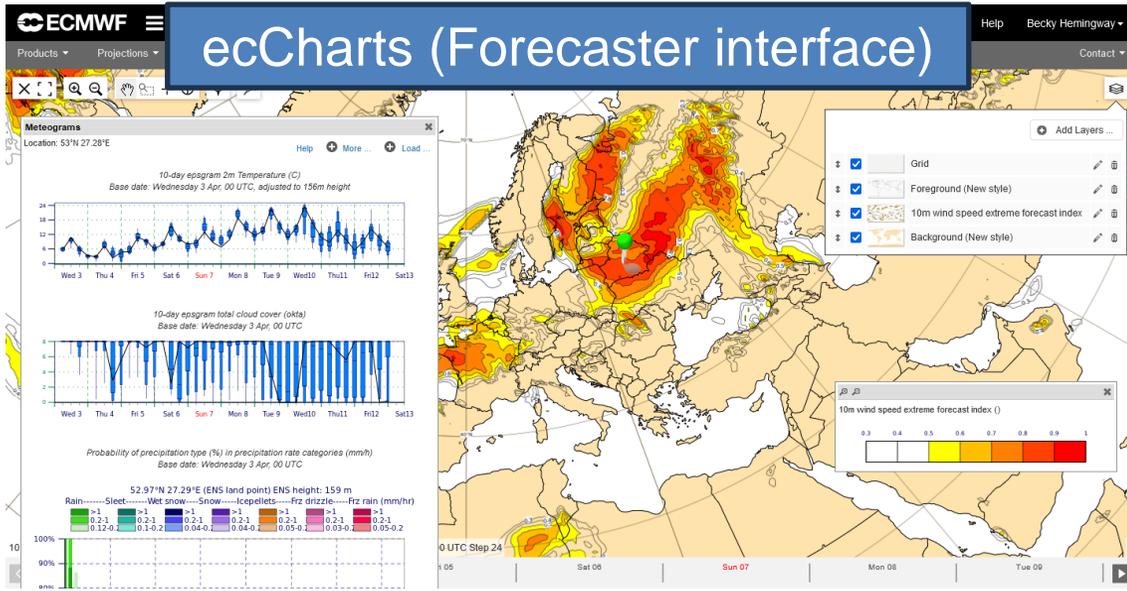


Support on provision of data and services to WMO and RAI countries

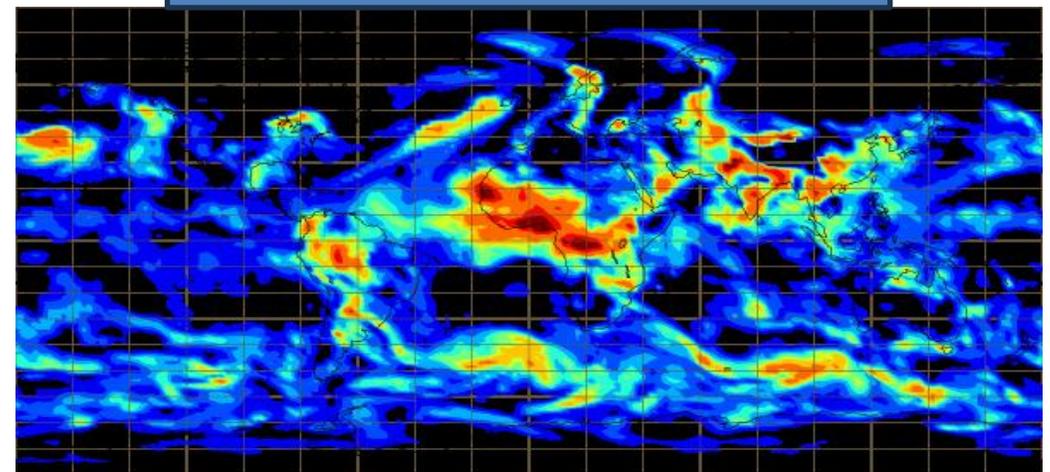
Provision of data & services to WMO



ECMWF Forecast Products Access interfaces



Web Map Services (WMS)



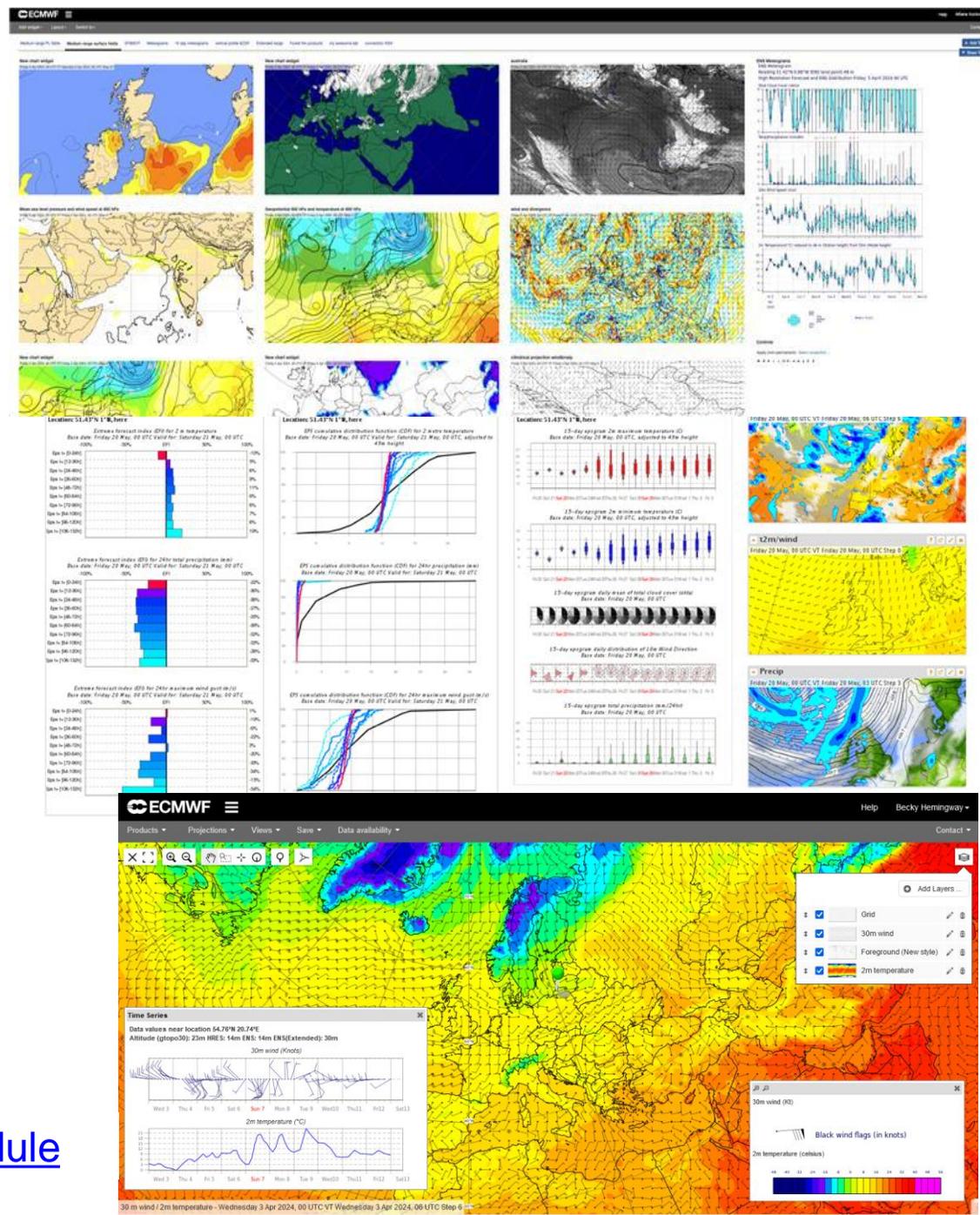
ecCharts

Web based interactive application to inspect and visualise ECMWF medium-range and extended-range data

- Web based immediate access to charts
- Rich and dynamically growing content - **Overlay any combination of parameters** (currently more than 400) from HRES/ENS/CAMS/Extended range/ML models...
- Native data resolution
- **Interactive features** (zoom, pan, click, extract point data information, ...)
- User controlled visualisation - Control projection and time (animations ...)
- **Customisable parameters**
- Download charts (through WMS)
- **Build your own products**
- Restricted access – every WMO country will have access in 2024

<https://eccharts.ecmwf.nt>

<https://confluence.ecmwf.int/display/DAC/Dissemination+schedule>



Africa-EU Space Partnership: Space for Early Warning in Africa (SEWA)

Aim	Development of Space- based services and applications/tools to strengthen Early Warning Systems
Funding	European Commission DG INTPA
Implementation roles	Partnership between EUMETSAT, AUC and ECWMF, each with dedicated roles
Focus ECMWF	<p>Provision of ECMWF NWP and Copernicus products</p> <p>Facilitate actions for European and African entities to join forces to co-design and develop regional pilots on Impact-based Forecast (IbF) services & tools</p> <p>Provision of Cloud infrastructure resources to run IbF tools and applications close to ECMWF data</p> <p>Training activities on the use of ECMWF data, Cloud infrastructure and Impact-based Forecasts in scope of Early Warning</p>
Start activities	Subject to approval by ECMWF Council in December, activities would start early 2025 for a period of 4 years.



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