# NWC SAF products in forecaster training in Europe and Africa

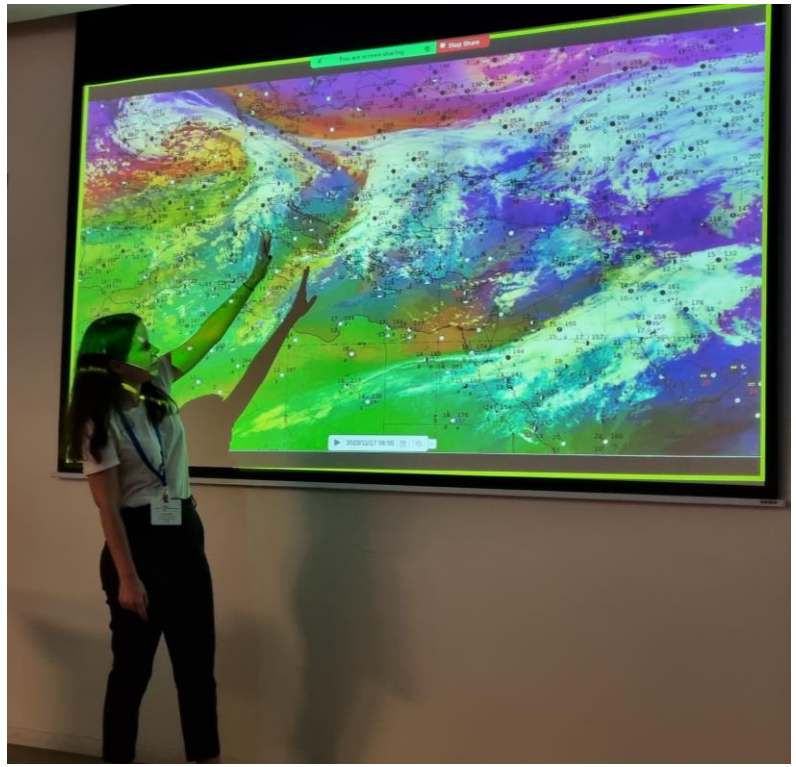
**Vesa Nietosvaara and Natasa Strelec Mahovic**
**EUMETSAT**

# Forecasters' training

**Forecasters need regular training** to improve their nowcasting and forecasting skills!

**Forecasting and nowcasting of extreme and hazardous weather**

- one of the most needed training topics among European forecasters
- monitoring of convective environments and wider nowcasting applications
- operational use of satellite data and products integrated with other data sources



**Target audience** of the forecaster trainings are

- operational meteorologists - general, aviation and marine weather forecasters,
- trainers that train forecasters
- users in different application areas

Trainees come primarily from **EUMETSAT Member States**, then wider Europe and Central Asia, as well as Africa, Middle East and Latin America.

Objectives of the trainings are planned in line with **WMO Guidelines on Satellite Skills and Knowledge for Operational Meteorologists.**

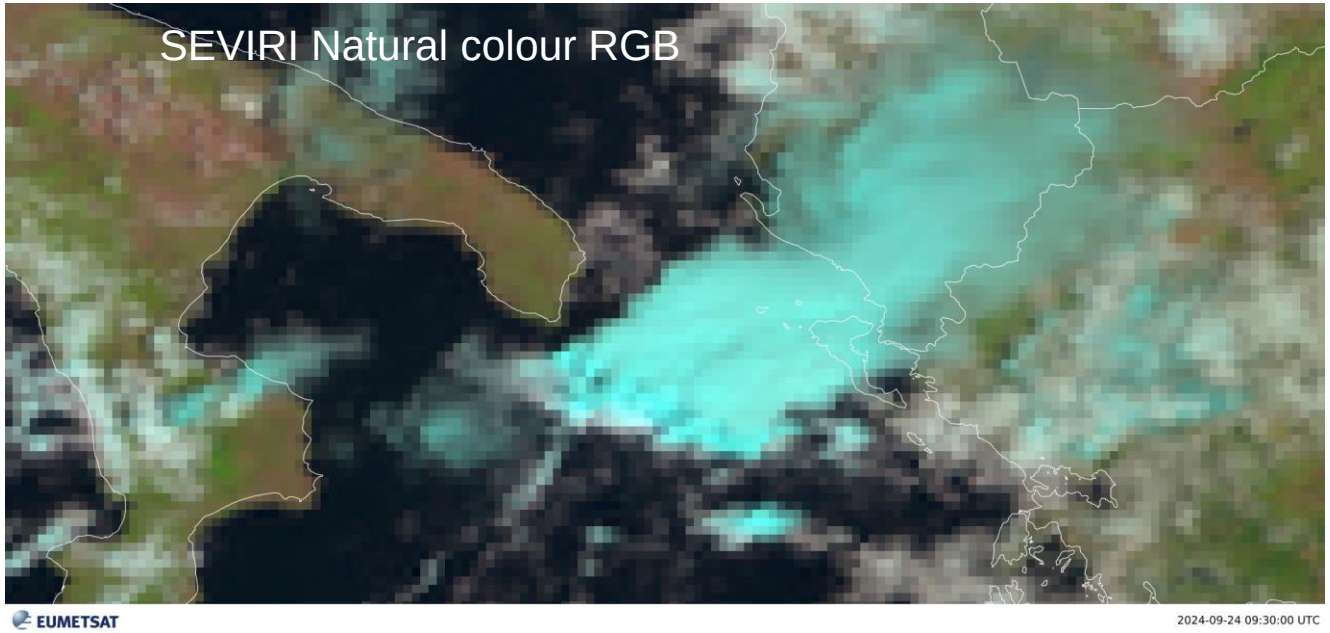
# Training focus – new programmes data

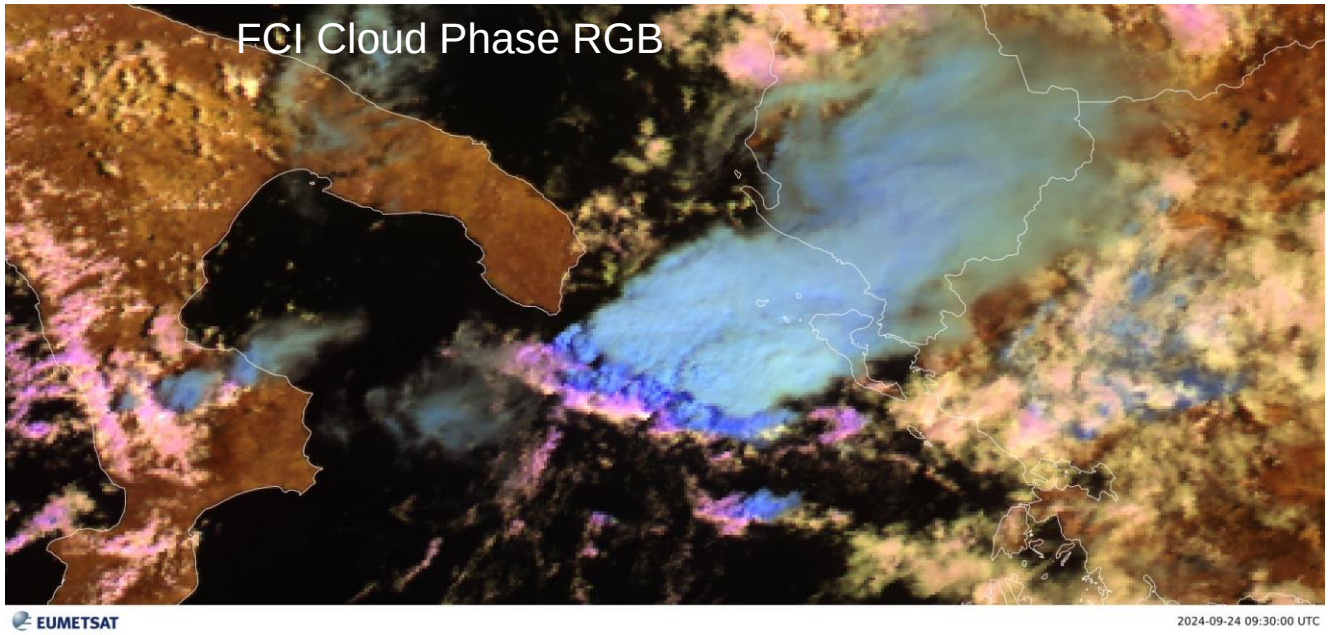
Special focus in training is given to the **applications of MTG data** in order to:

- **ensure smooth transition** to the next-generation programs
- **highlight the benefits** of the new sensors' data
- **foster improvements** in forecasting severe weather events using the information from current and new satellite data and products
- improve **applications** in general, aviation and marine forecasting

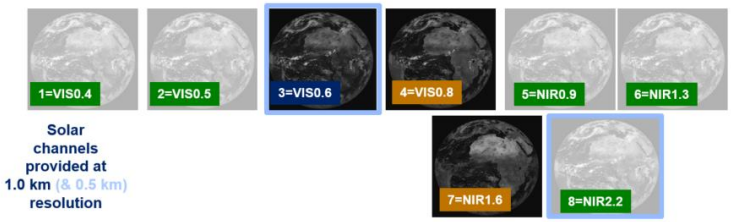
**Learning objectives**

- What **novel data** are available for use in the operations with newest satellites
- **similarities and differences** between current and new satellite data
- **physical basis** of remote sensing
- basic **scientific background** of the new instruments, channels, products
- most useful **products for specific application areas** and how they are used

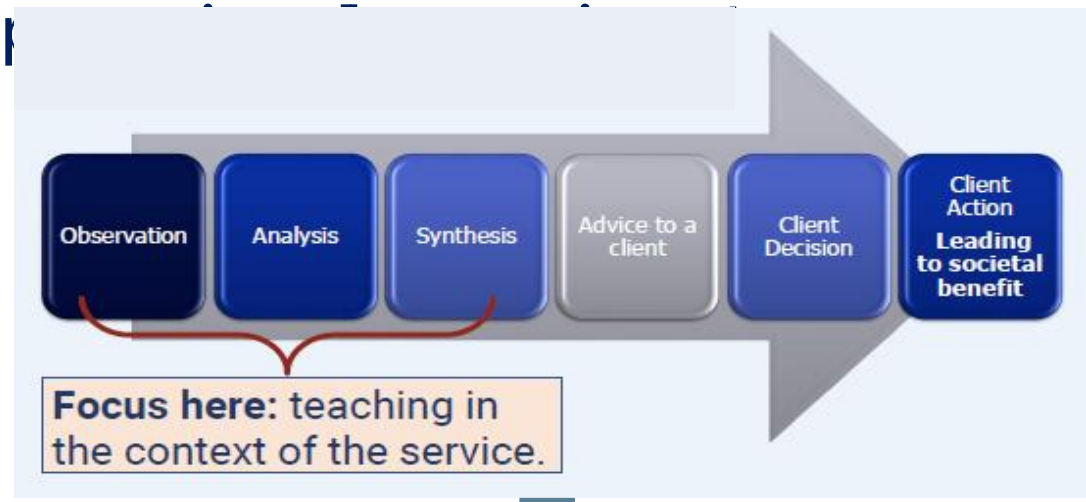


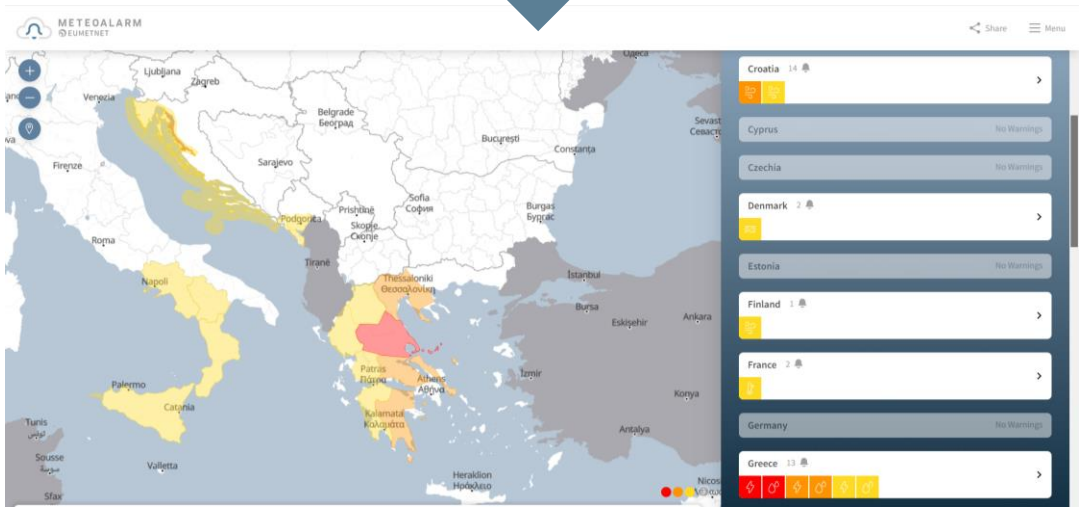



# Training in the context of operational service



## Teaching about new data and products in the context of the op



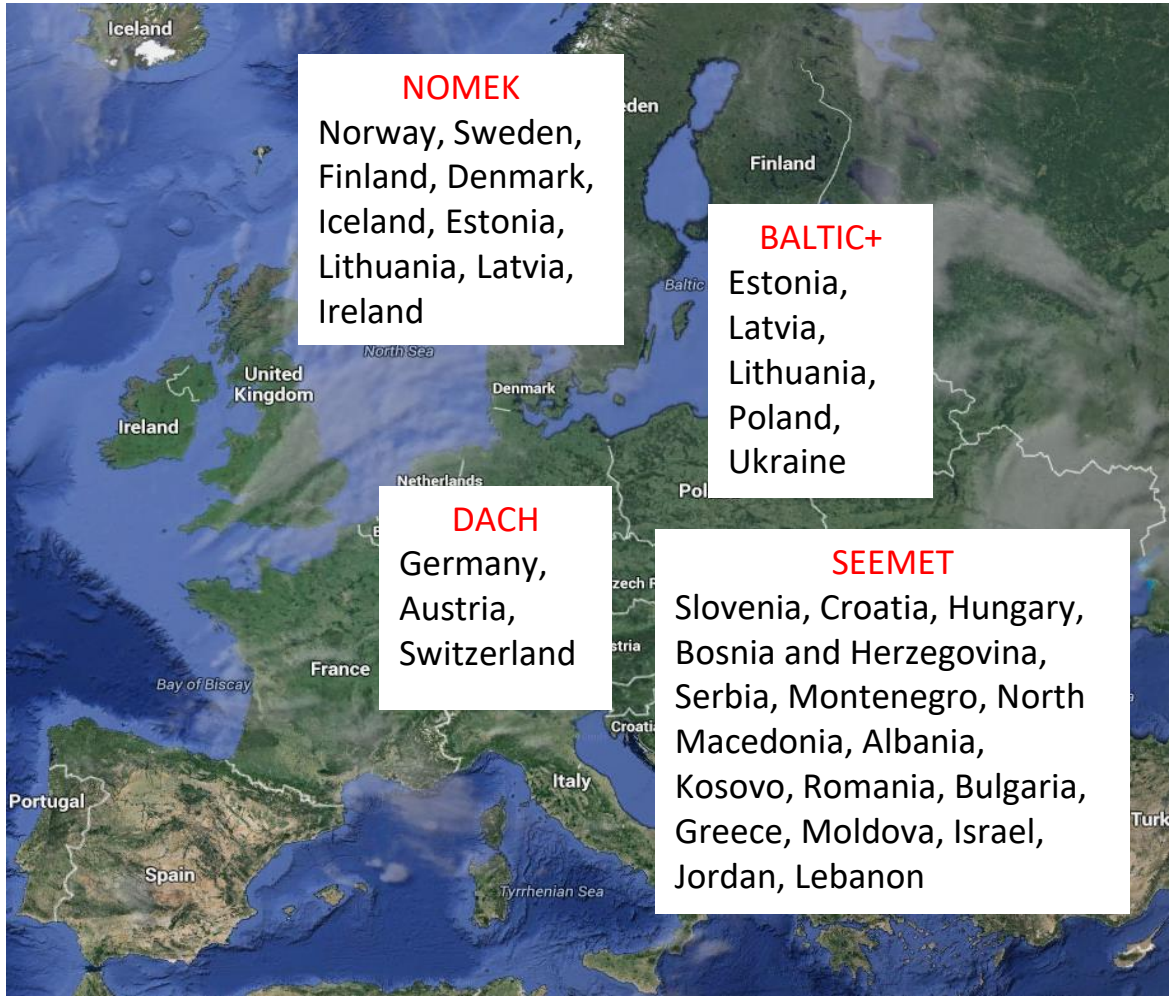
# Regional courses

**Regional courses** in Europe:

**NOMEK, BALTIC+, SEEMET, DACH**

- Initiated and organized by regional NMSs
- Include partner organizations and consortia (EUMETSAT, ECMWF, EUMeTrain, Eumetcal, NWC SAF)
- focus on everyday challenges of the operational forecasters.

These courses combine general forecast topics, relevant for each community, with training on satellite data applications in everyday work.



# Embedding NWC SAF products in training exercises –Baltic SIM

EUMETSAT

**Simulator** Baltic+ 2024 Simulator

23/06/2021 AM

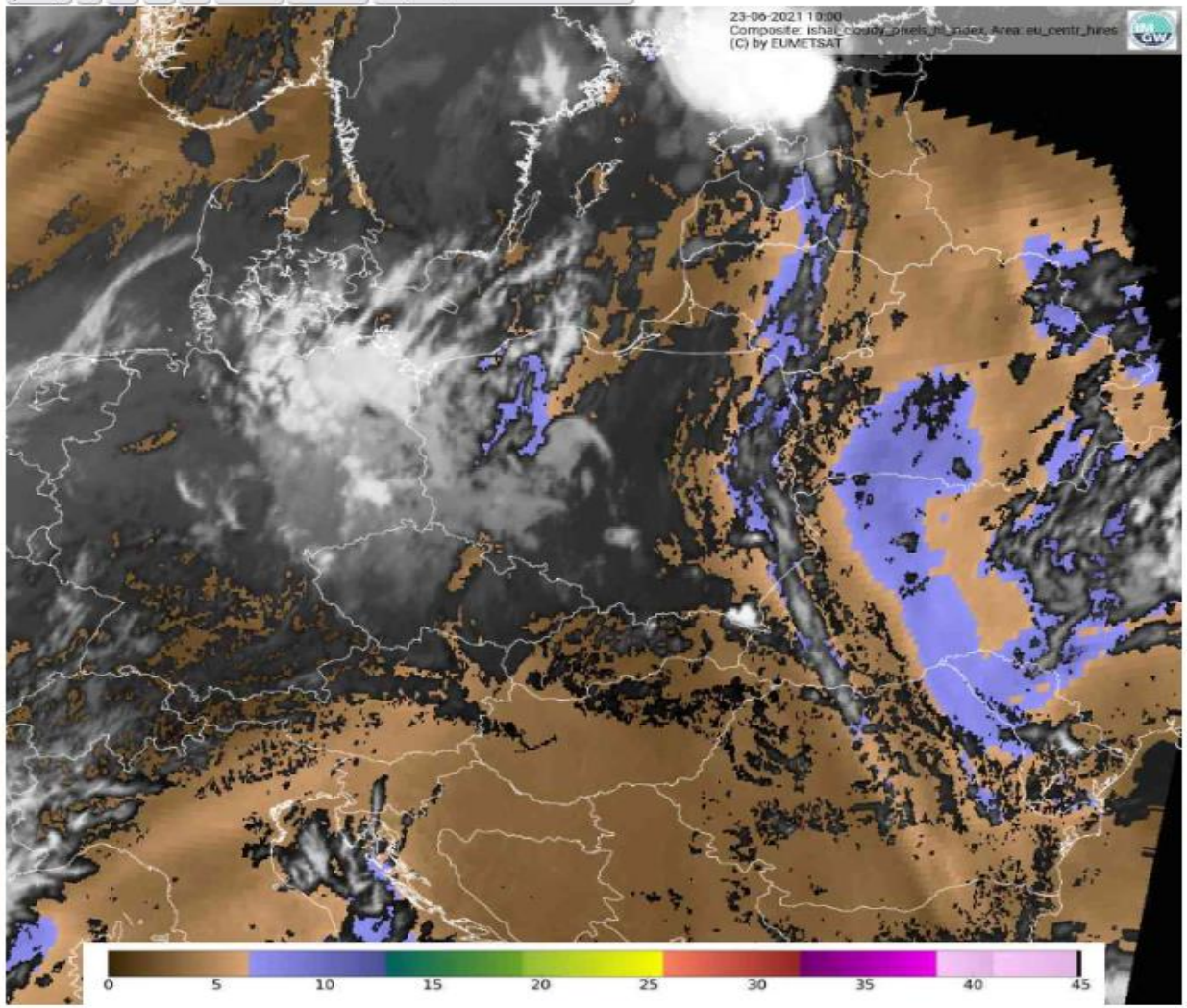
Tasks

Overview

NWP global model | NWP overview | NWP Regional model | Radar and Lightning | Satellite | Surface observations | Vertical Profiles (regional model) | NWC SAF

Precipitable water High layer | Precipitable water Medium layer | Precipitable water Low layer | Total precipitable water | Showalter index NWC | Lifted index NWC | K index NWC

Stop | - | + | < | > | Rock | Zoom | 23/06/2021 10:00 UTC



# Testbeds

- a physical or virtual simulation of an operational meteorological forecasting environment
- intended to enhance the skill of forecasters in using (EUMETSAT satellite) data and products
- enabling the testing of new products

## Severe Convective Storms Testbeds

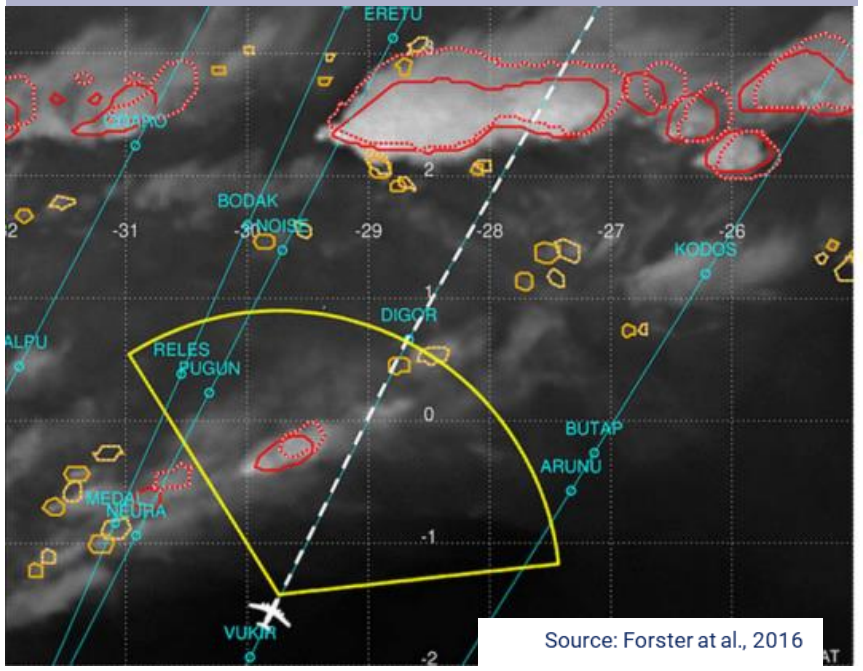
- Run by **ESSL**

ESSL Testbed

## Aviation Testbeds

- Run by **FMI**

FMI



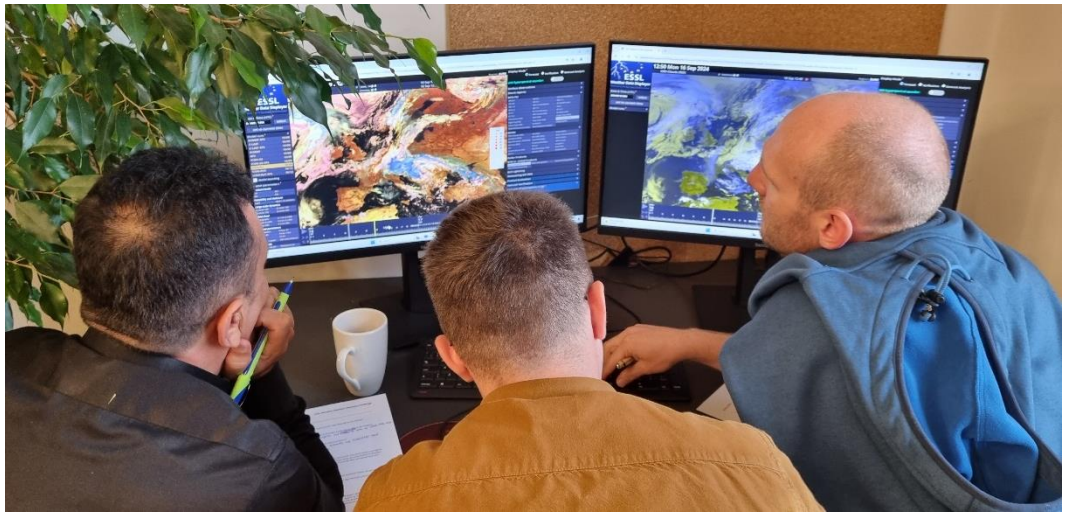

Source: Forster at al., 2016

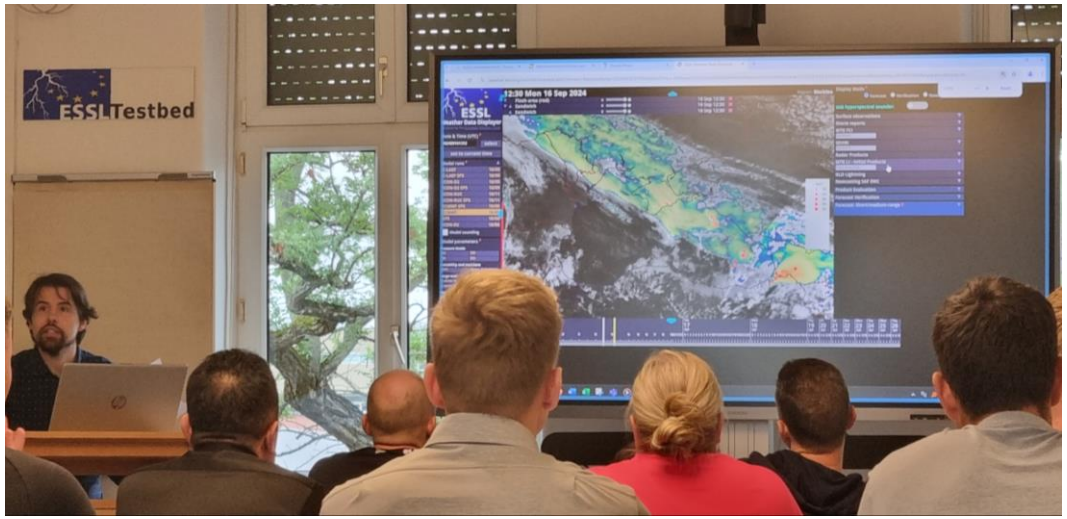
# Severe Convective Storms Testbed

## Severe Convective Storms Testbeds for MTG and EPS-SG User Preparation

- **training partnership between EUMETSAT and ESSL**
- **hands-on courses** where forecasters learn how to use satellite, radar and model data in real-time for forecasting convective development and associated threats
- each course trains 15 forecasters from EUMETSAT member states NMSs

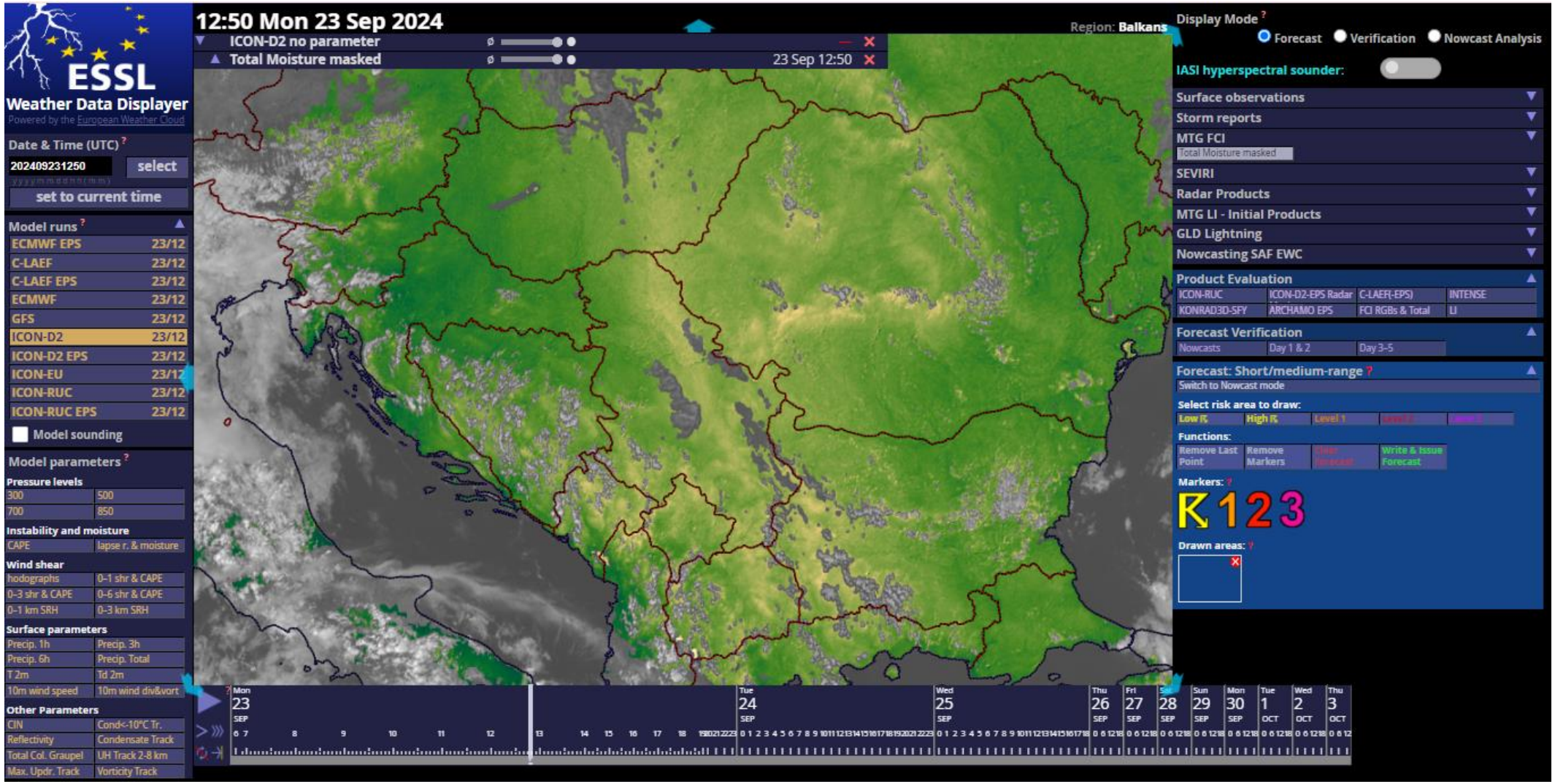
| Forecaster Testbeds 2025 |
| --- |
| 5 - 9 May 2025 |
| 12 – 16 May 2025 |
| 2 – 6 June 2025 |
| 1 – 5 September 2025 |
| 13 – 17 October 2025 |





# Severe Convective Storms Testbed

Satellite and model data are displayed through a **web based displayer tool** and the forecasters can analyze and produce forecasts and nowcasts, guided by the ESSL experts on convective storms forecasting.



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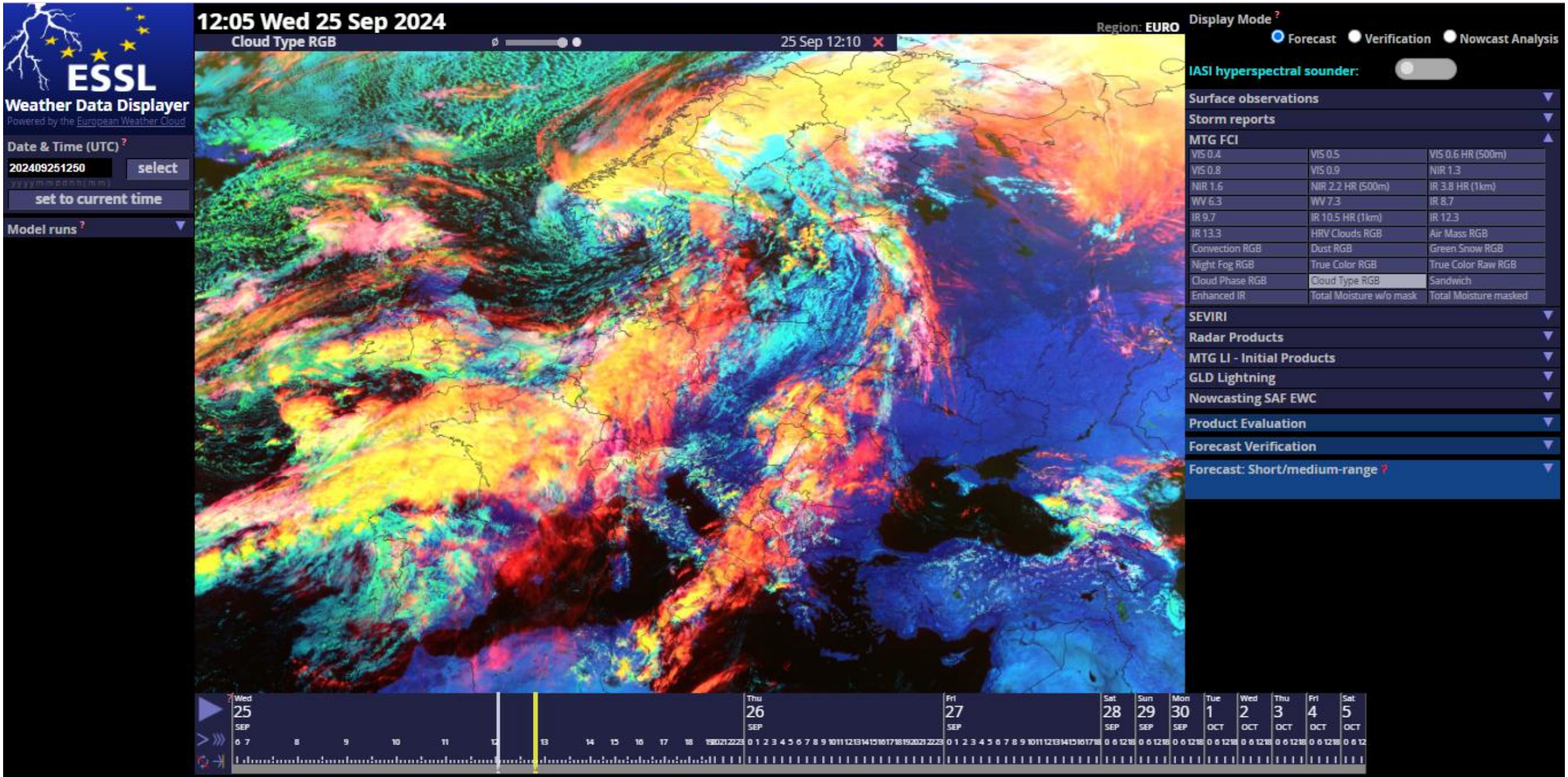
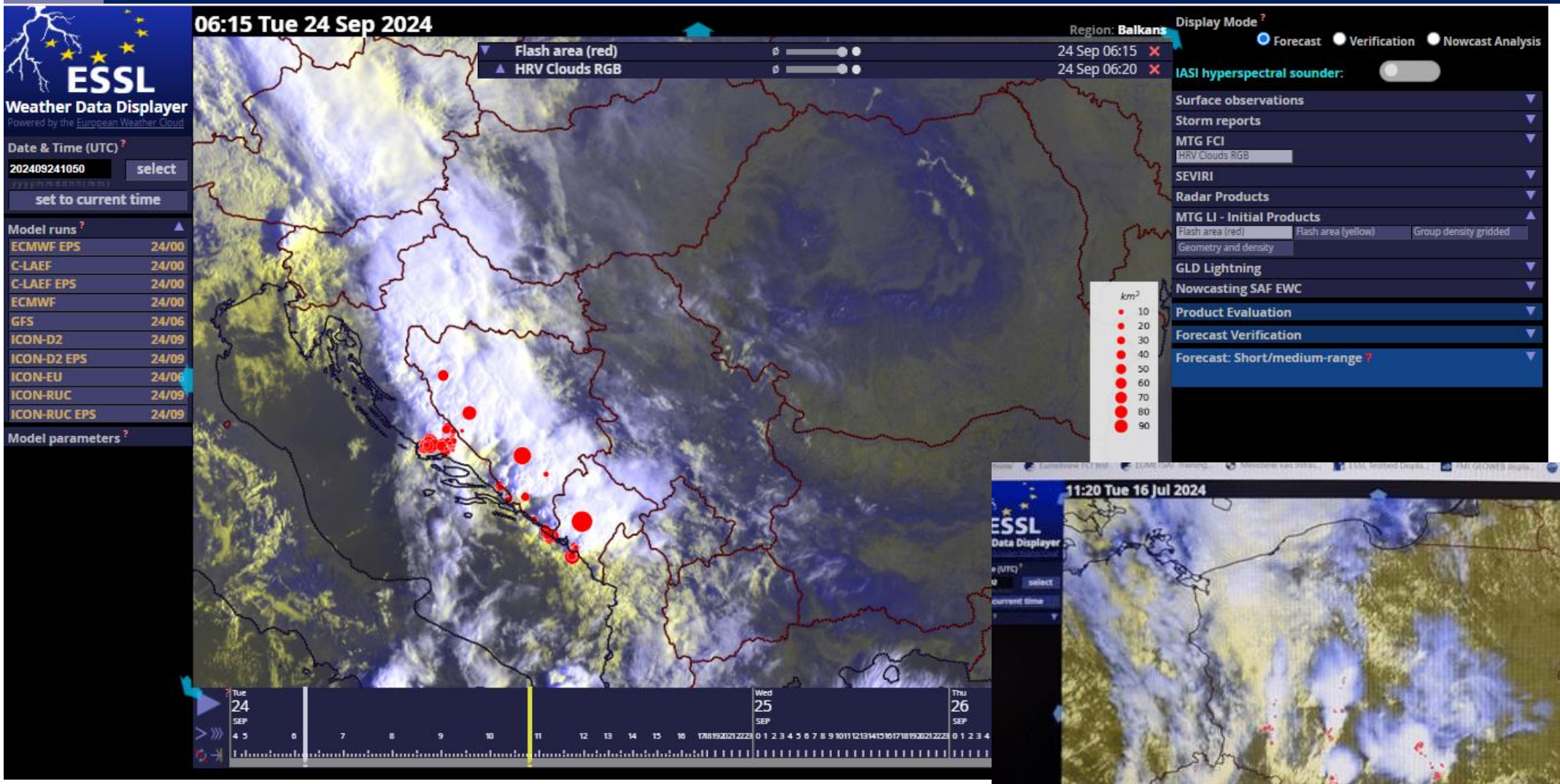
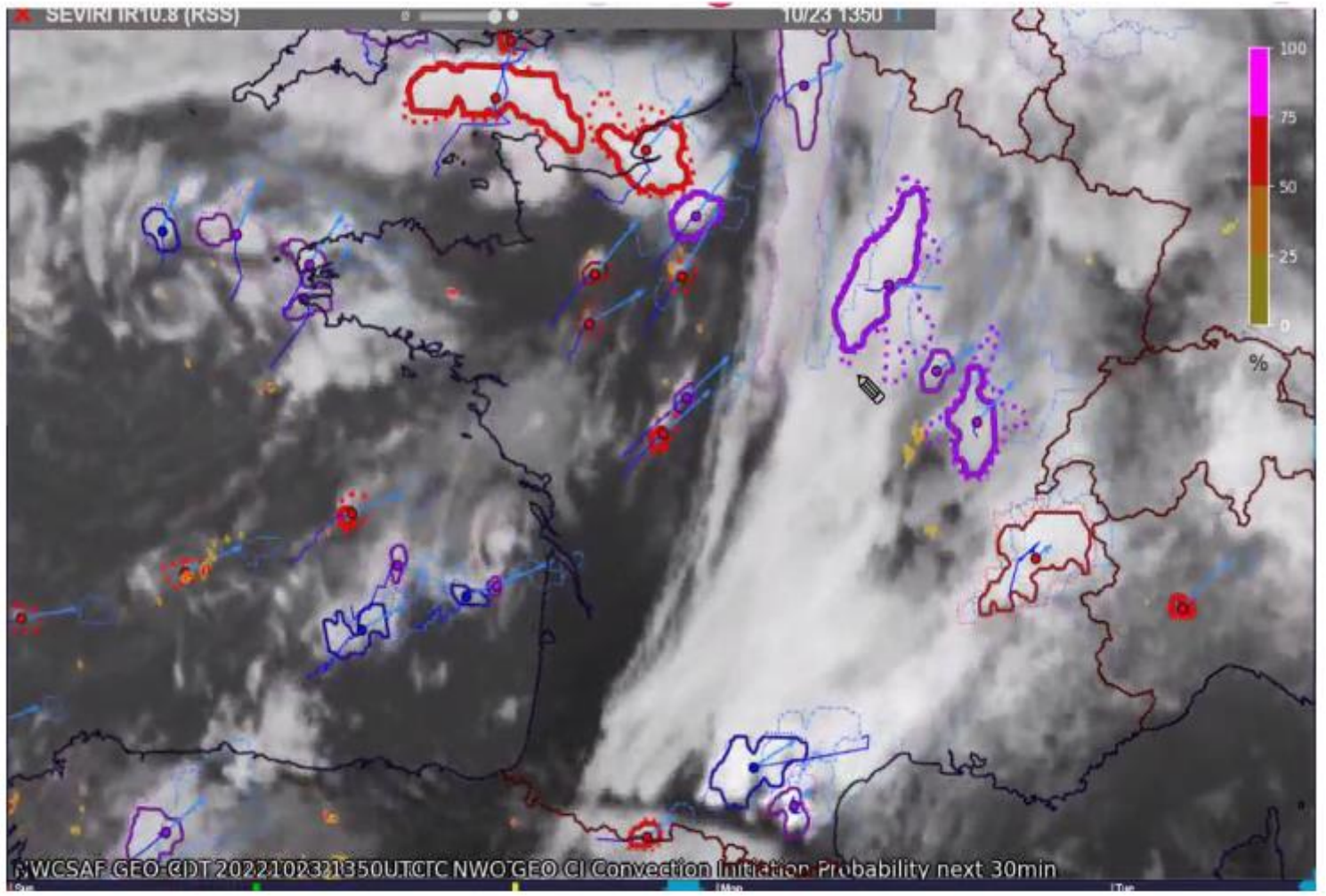


# Severe Convective Storms Testbed



# Severe Convective Storms Testbed

- Out of the available NWC-SAF products,CI (convective initiation30 min),CRR Rate, CRRPh Rate, accumulated CRR, and accumulated CRRPh were selected for the forecaster testbeds.




*Testbed display overlay of CI and RDT-CW products for the case of 23 October 2022 at 13:50 UTC*

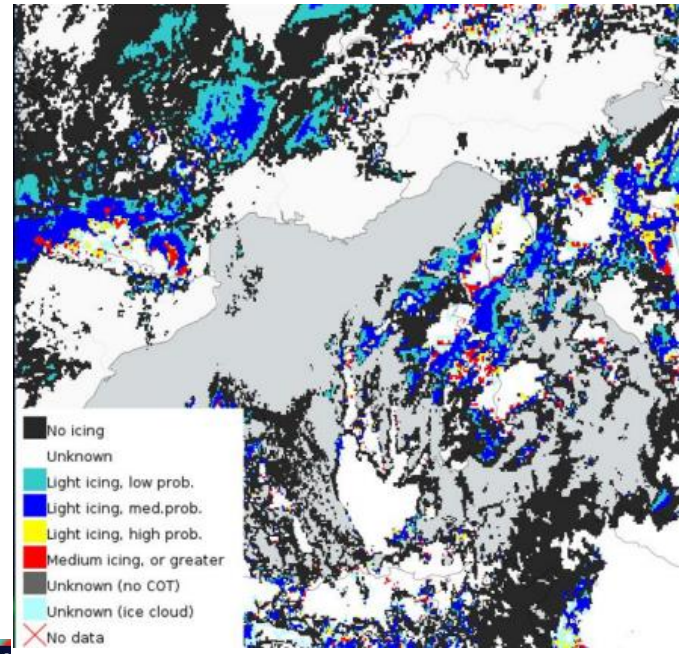
# Aviation Testbed

**Aviation meteorology -** application area that could benefit greatly from the next-generation satellite data

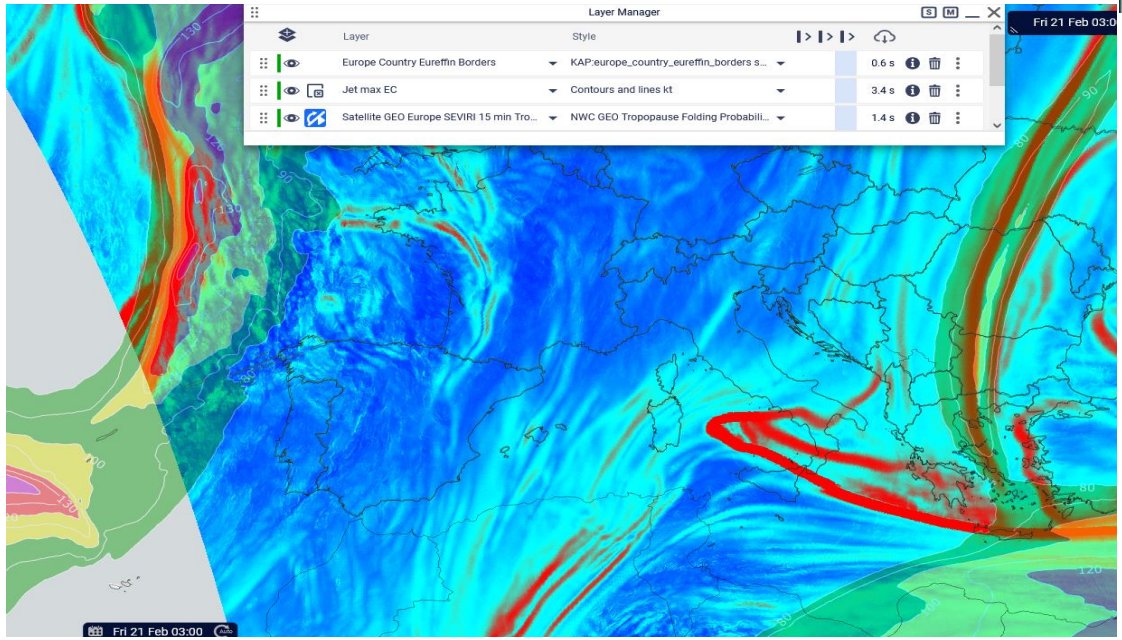
**Training partnership between EUMETSAT and FMI**

- Testbeds tailored for **aviation forecasters** and other **operational staff dealing with air-traffic**, on the ground and in the air

- Expert workshops
- Testbed for forecasters
- Workshop for customers

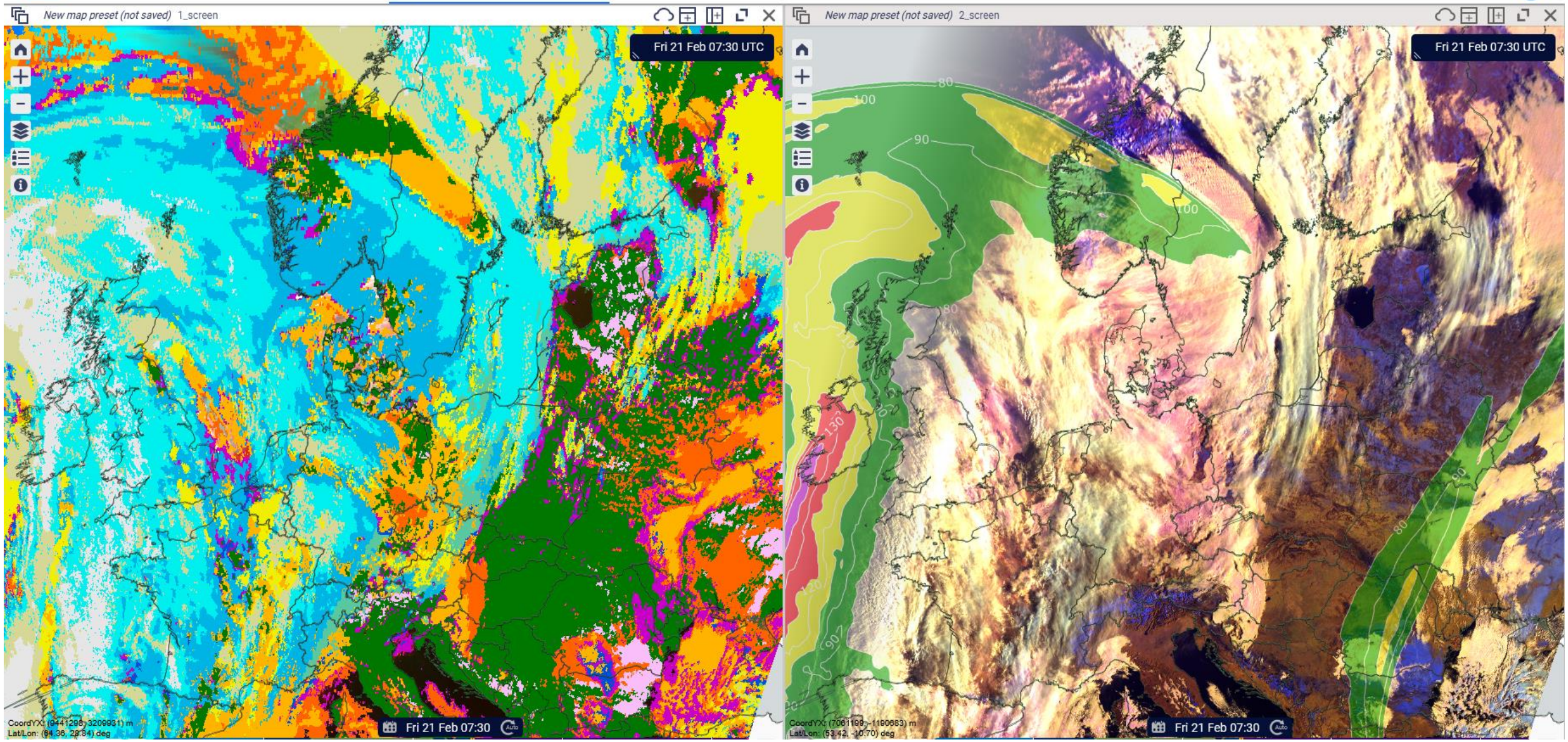



NWCSAF ASII-ICE
Supercooled water droplet




NWCSAF GEO
Tropopause folding probability

# NWC Data in Aviation Testbed UI (GeoWeb)



# Outside Europe … Nowcasting in Africa

Abdoulahat Diop (ANACIM)
Alex Roberts (University of Leeds, UK)
Andre Kamga Foamhouhoue (ACMAD)
Beth Woodhams (University of Leeds, UK)
Douglas Parker (University of Leeds, UK)
Jennifer Fletcher (University of Leeds, UK)
Jos de Laat (KNMI)
Lee-Ann Simpson (SAWS)
Mark Higgins (EUMETSAT)
Morne Gijben (SAWS)
Natasa Strelec Mahovic (EUMETSAT)
Pilar Ripodas (AeMET)
Ralph Petersen (University of Wisconsin-Madison)
Sarah Kimani (Chair of RAIDEG)
Stephan Bojinski (EUMETSAT)
Steven Goodman (NOAA)
Vesa Nietosvaara (EUMETSAT)
Vincent Gabaglio (EUMETSAT)
Xavier Calbet (AeMET)

- Robust, operational nowcasting services limited (excluding aviation)
- Limited use of specialist nowcasting tools or procedures
- Limited communication of nowcasts to other users and the wider public.
- Projects:
  - High-Impact Weather Lake System (HIGHWAY) project (2017–2021) implemented storm warnings on Lake Victoria
  - African SWIFT programme

# GCRF African Swift

GCRF African Swift Nowcasting Catalogue

Latest Nowcasts | Charts and data | Guides | About

You are viewing the latest images with forward extrapolations. You can view the latest images, but forward extrapolations may not be available.

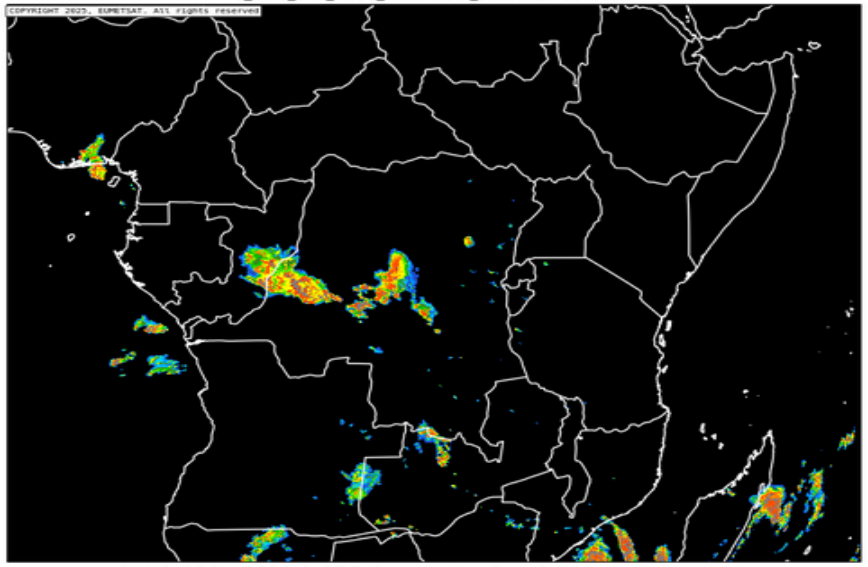
Use the dropdown menus above each image to select which nowcasting products to view.

Greyscale images indicate that there is no forecast or observation for the selected time.

Displaying images for 20250225T104500Z

Convective rainfall intensity (CRR)

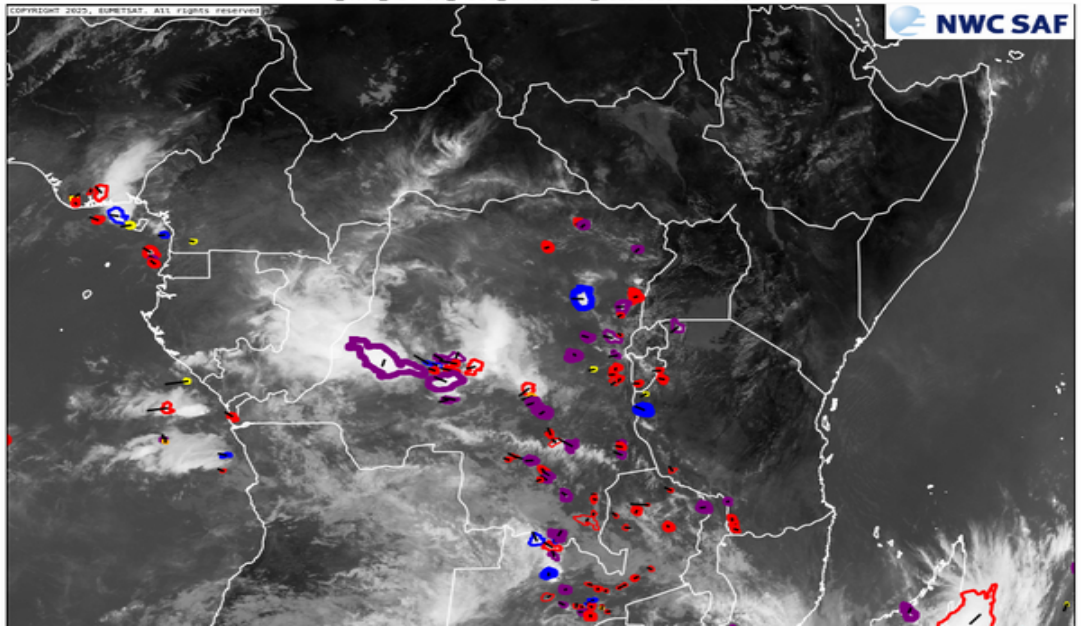
S_NWC_CRR_MSG3_Africa-VISIR_20250225T104500Z



NWC GEO v2021.3 CRR Convective Rainfall Intensity (mm/h)

Rapidly developing thunderstorms (RDT)

S_NWC_RDT-CW_MSG3_Africa-VISIR_20250225T104500Z

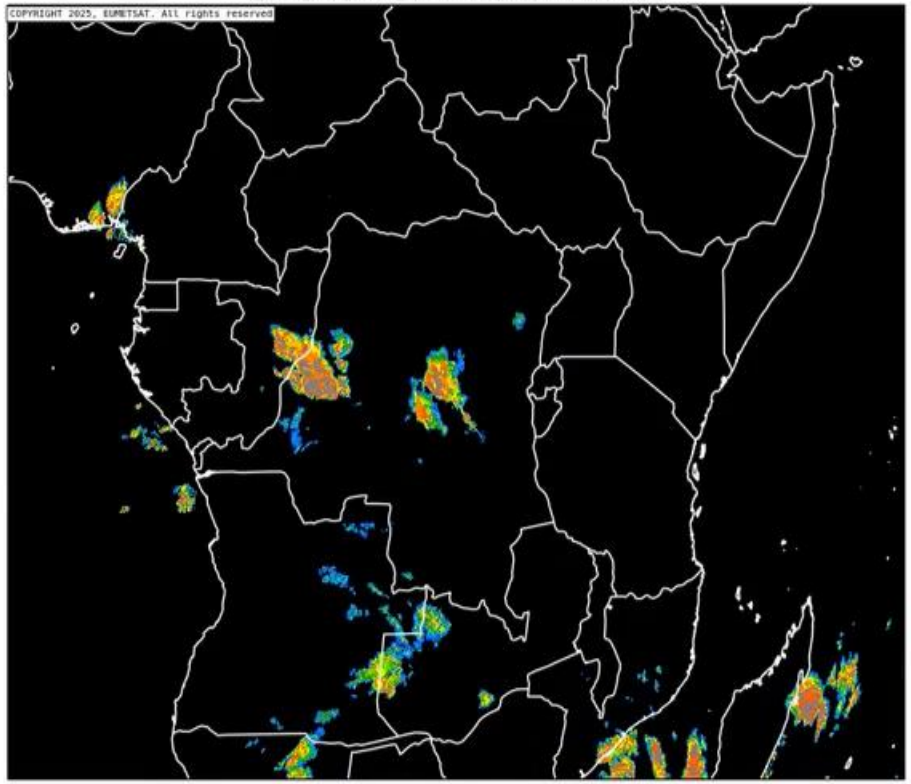


# GCRF African Swift

Displaying images for 20250225T073000Z

Convective rainfall intensity (CRR)

S_NWC_CRR_MSG3_Africa-VISIR_20250225T073000Z




Rapidly developing thunderstorms (RDT)

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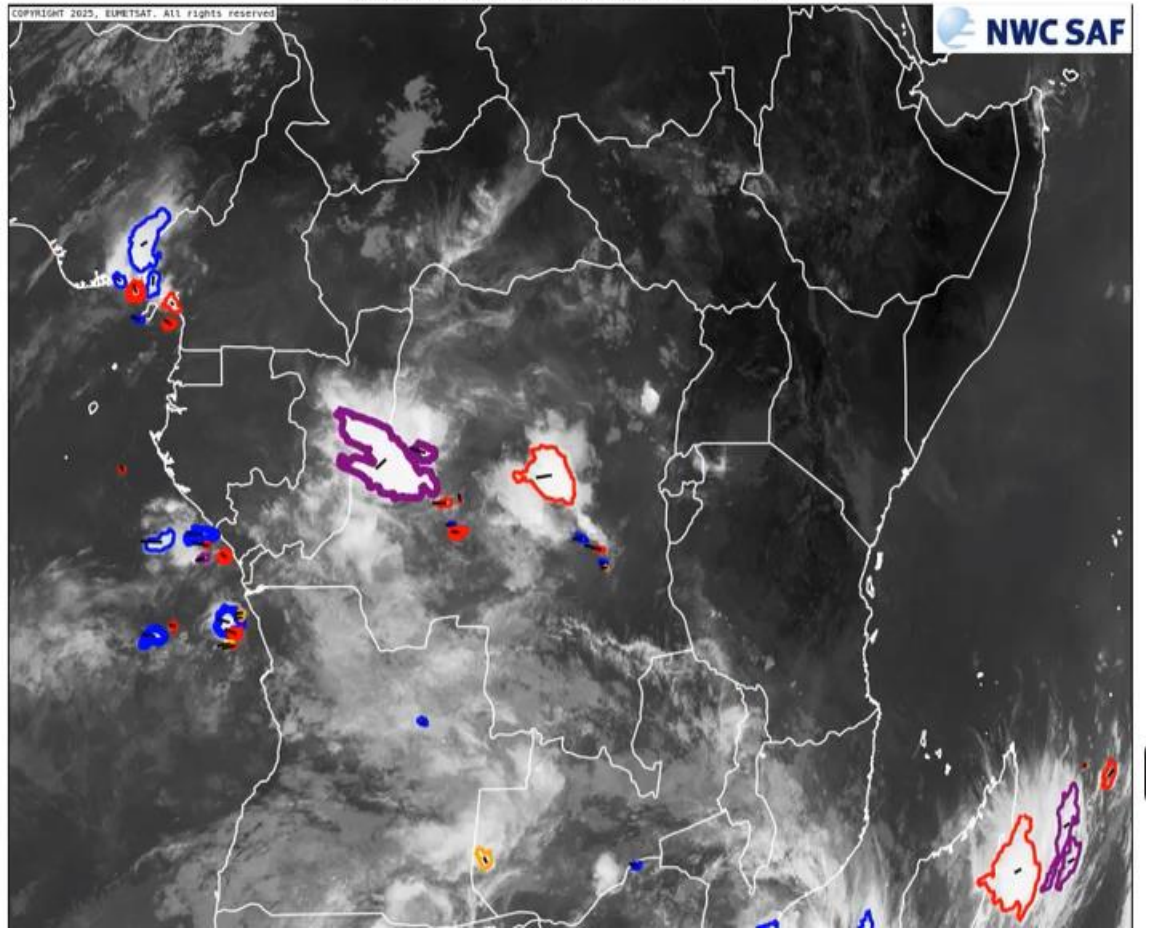
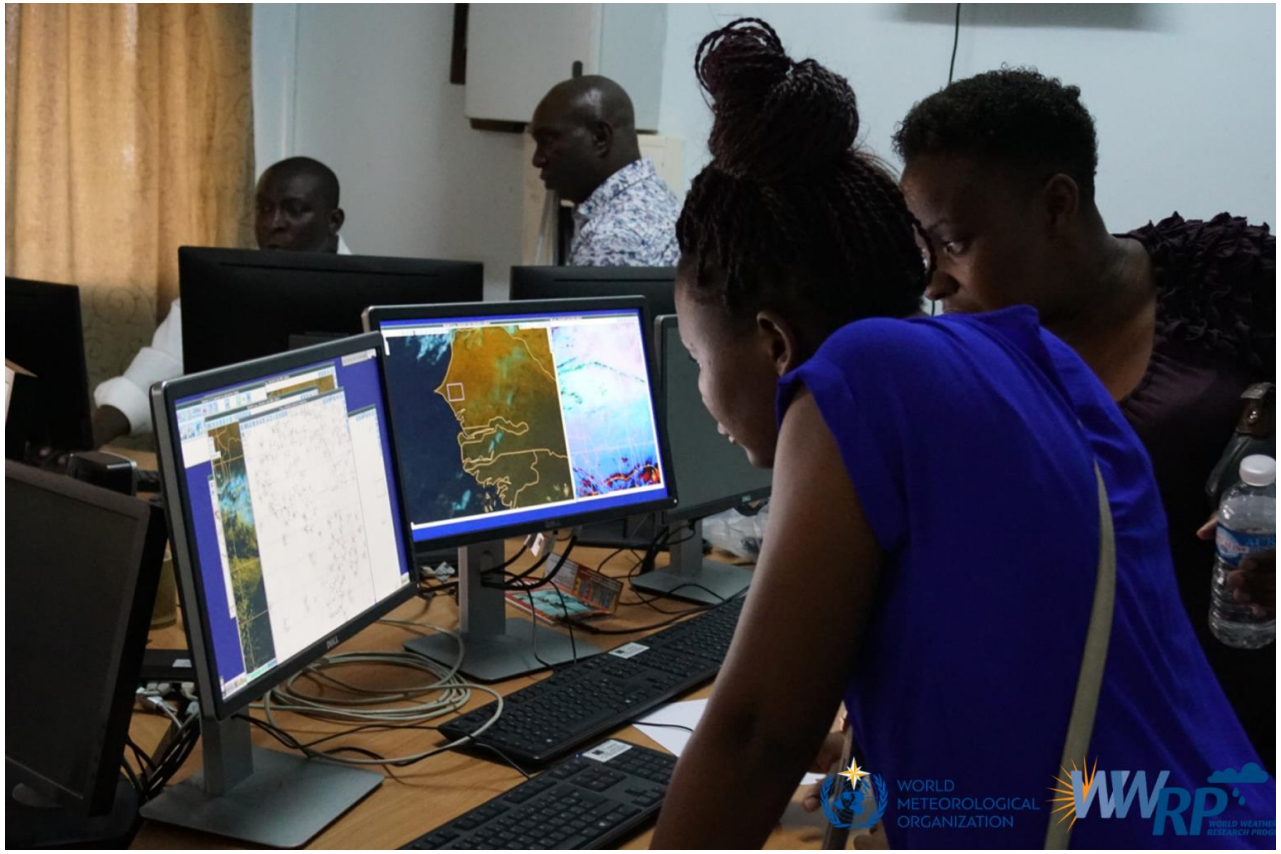


# WISER-EWSA project (ongoing)




- Access to early weather warning systems for urban communities in South Africa, Zambia and Mozambique.
- Capacity development and training events
- Testbeds in Zambia and Mozambique
- Links to communities and disaster risk managers
- Co-design and co-

# Space for Early Warnings in Africa (SEWA)

- The European Commission's Directorate-General for International Partnerships (DG INTPA) has launched an initiative to enhance the strategic Africa-EU partnership in the field of Space.
- Aims to strengthen Early Warning Systems of hazardous weather and climate-related events over Africa.
- Implementation partners ECMWF, EUMETSAT and African Union.The Action started in January 2025, with an implementation period until end December 2028.
- Ultimate goal is to strengthen the nowcasting capabilities in African centres.
- EUMETSAT supports the establishment of regional capacities to generate satellite-based products for nowcasting and further applications.

# Current EUMETSAT Training in Africa and Middle East

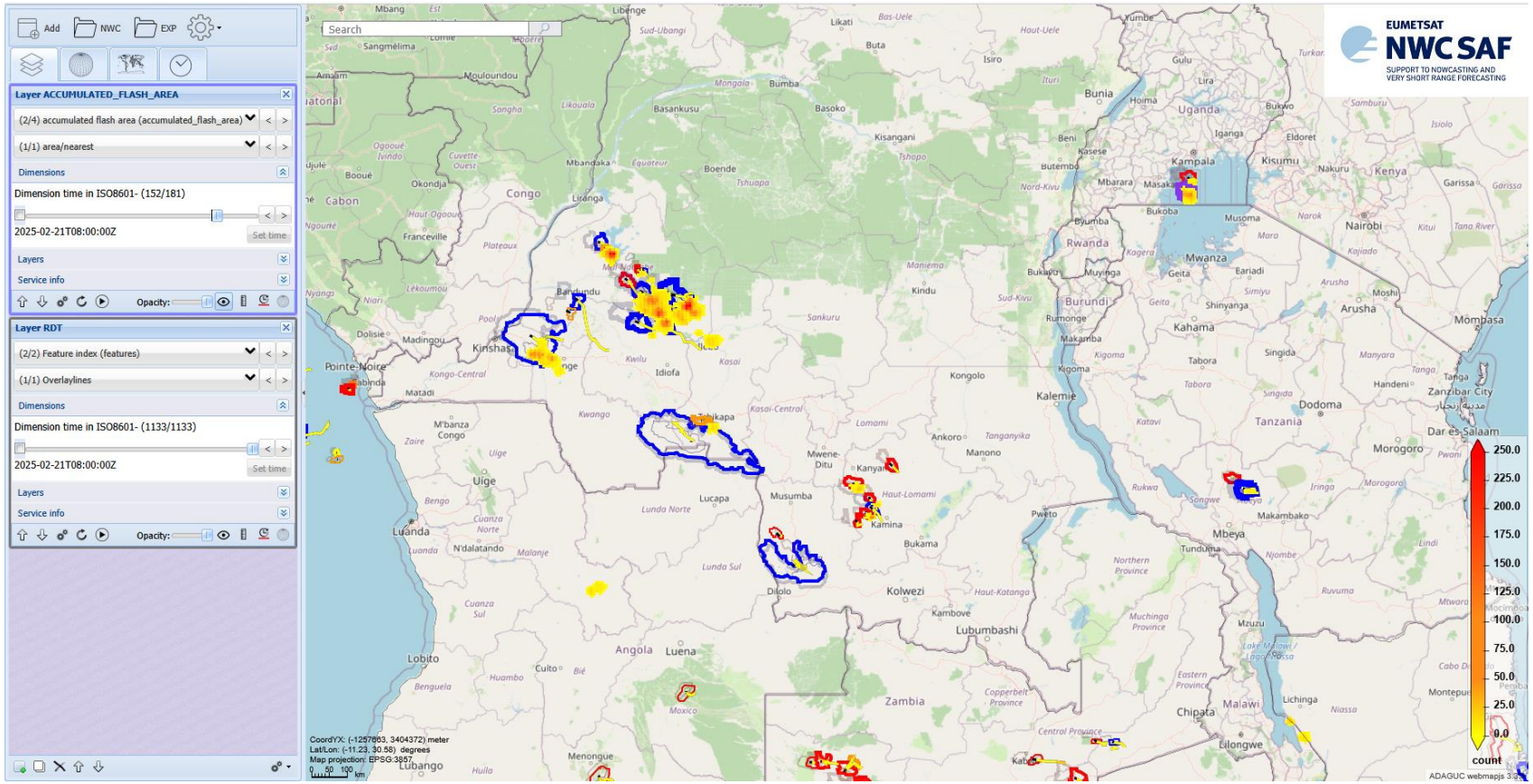
In **Africa** Training is planned and delivered **in partnership with the WMO VLab Centres of Excellence** (Morocco, Niger, Kenya, South Africa)

- training resources are developed together with ASMET trainer group
- **Satellite Applications Courses** for African forecasters are delivered in English and French - online (basic) and in classroom (advanced)

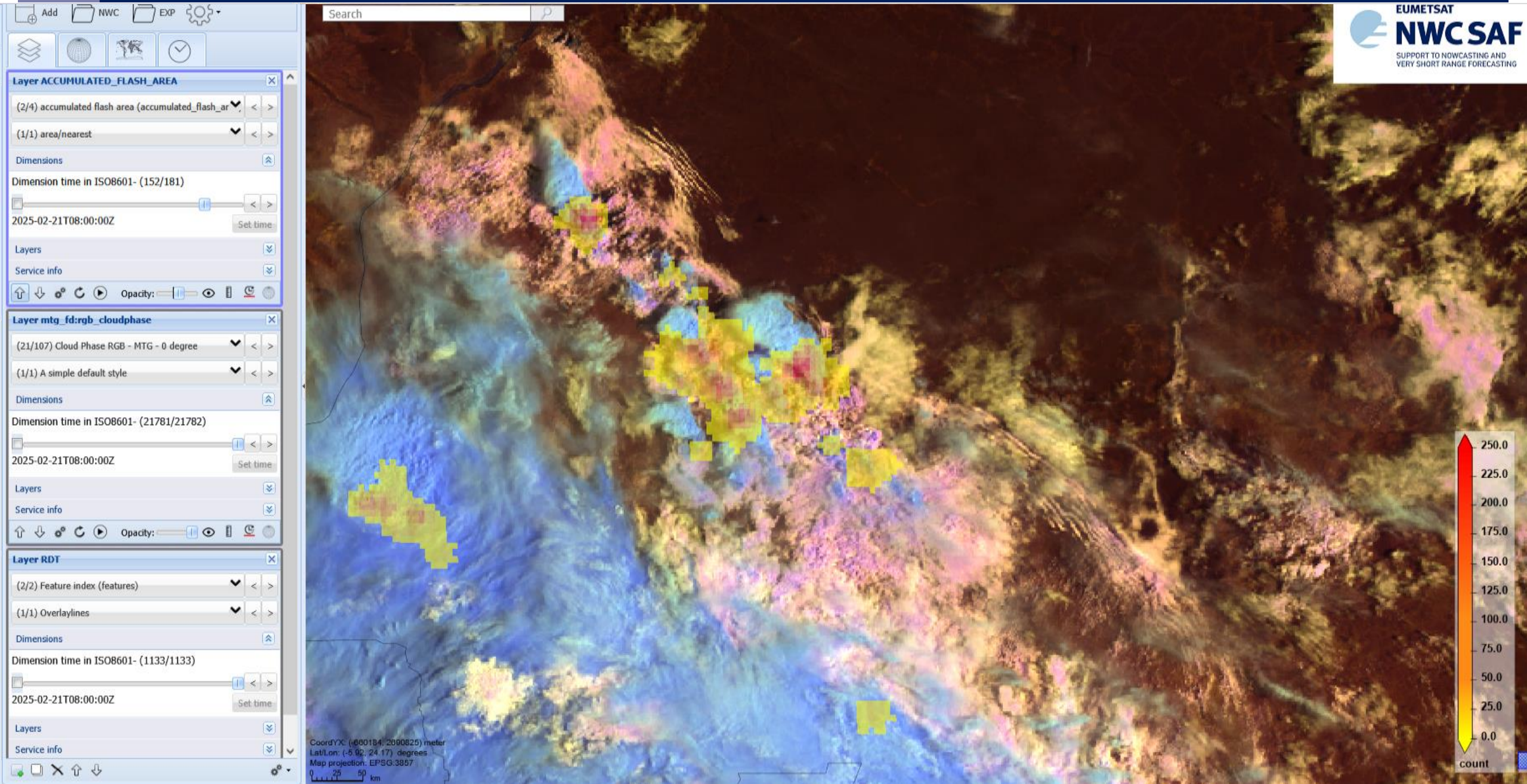
In the **Middle East** training courses offered for the forecasters are coordinated by **Center of Excellence** in **Oman**. Courses are delivered in English and Arabic.

# NWC SAF in African trainings

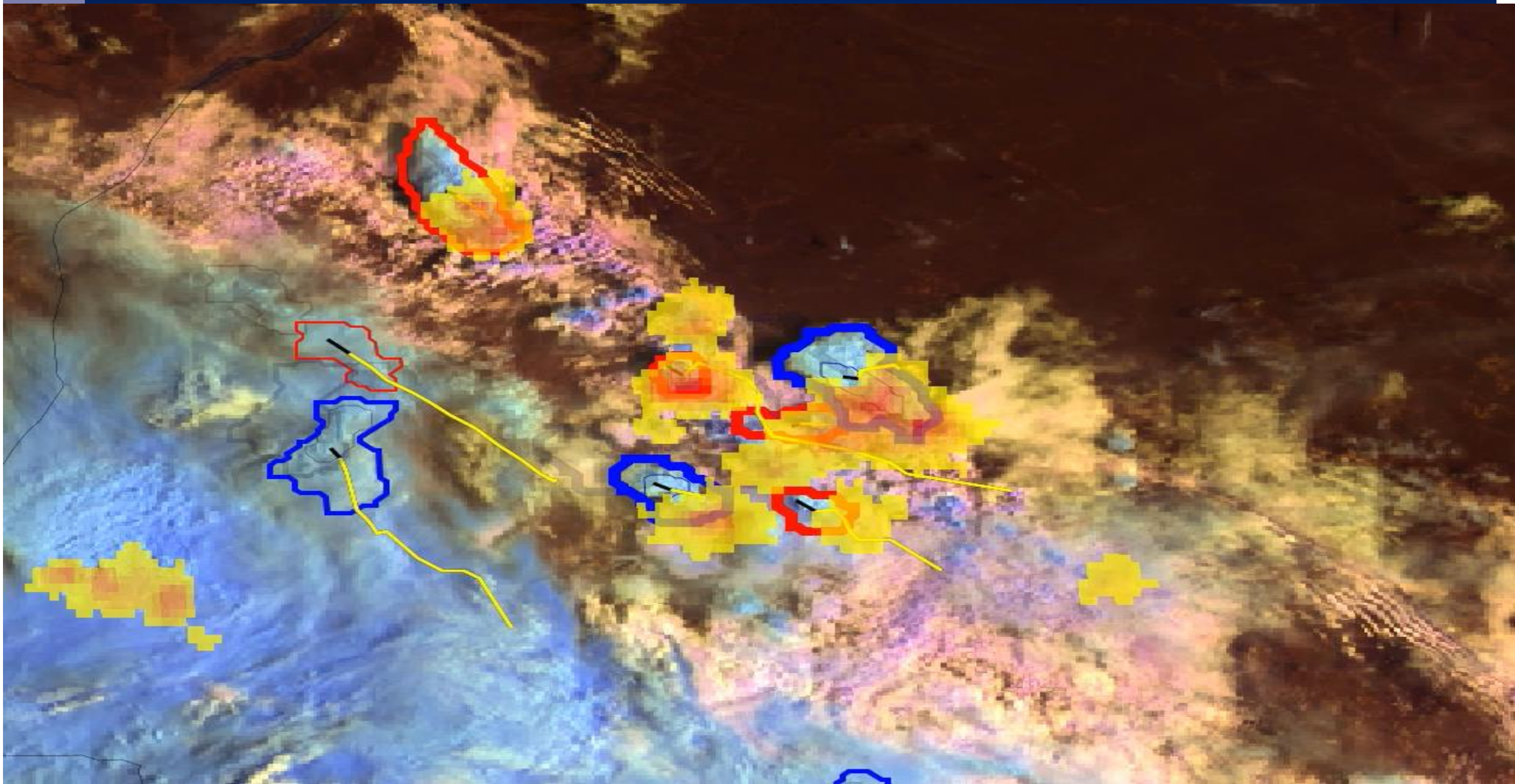
- NWC SAF products via ADAGUC server effective at African courses
- Users can use the interface for working on real time weather exercises



# Adding other information is easy through WMS

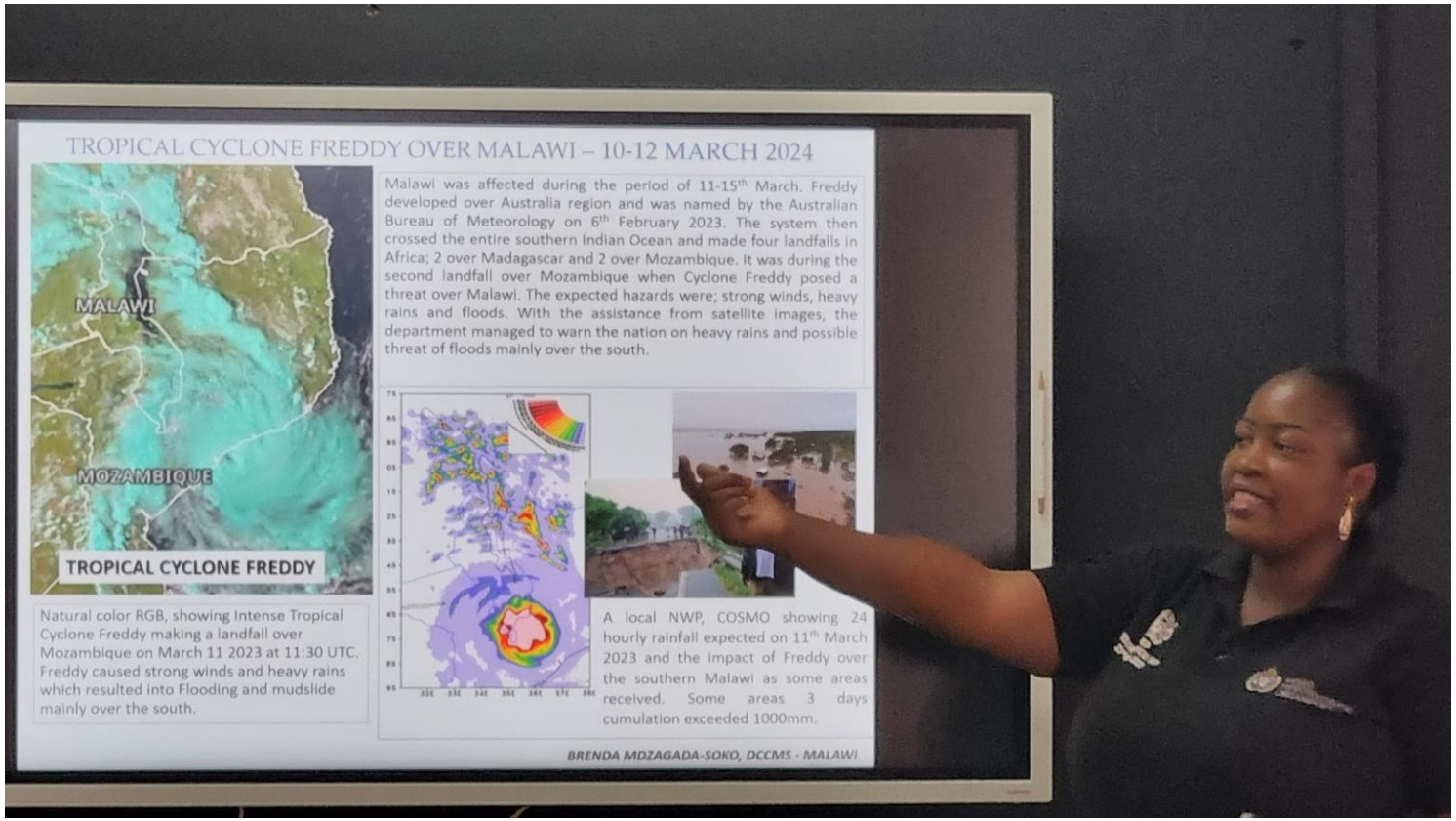


# Developing a satellite nowcasting environment



# User feedback very positive

- It makes a difference to have an interface to work with actual data
- Overlaying data gives a deeper understanding of the products
- Access to archived data would be



Thank you!

training@eumetsat.int