

Nowcasting Satellite Application Facility: software and products

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SUMMARY

1. Nowcasting SAF Products
2. Past experiences in Africa
3. Prospects for the Future

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Meet the SAFs



AC SAF

Atmospheric Composition Monitoring

The AC SAF processes satellite data on ozone, other trace gases, aerosols and ultraviolet data.

[Learn more about AC SAF](#)



CM SAF

Climate Monitoring

The CM SAF generates and archives high-quality climate datasets.

[Learn more about CM SAF](#)



LSA SAF

Land Surface Analysis

The LSA SAF exploits remotely-sensed data on land, land-atmosphere interactions and biosphere applications.

[Learn more about LSA SAF](#)



OSI SAF

Ocean and Sea Ice

The OSI SAF provides comprehensive information on the ocean-atmosphere interface.

[Learn more about OSI SAF](#)



NWP SAF

Numerical Weather Prediction

The NWP SAF supports the interface between satellite data and European activities in NWP.

[Learn more about NWP SAF](#)



ROM SAF

Radio Occultation Meteorology

The ROM SAF generates and archives high-quality GNSS Radio Occultation (RO) data for NWP.

[Learn more about ROM SAF](#)



NWC SAF

Nowcasting and Very Short Range Forecasting

Nowcasting is a weather forecast for the next few hours, based on current information.

[Learn more about NWC SAF](#)



H SAF

Operational Hydrology and Water Management

The H SAF generates and archives datasets and products for operational hydrological applications.

[Learn more about H SAF](#)

EUMETSAT SAF Network

The eight EUMETSAT SAFs provide users with operational data and software products, each one for a dedicated user community and application area.

The SAFs are located within the National Meteorological Services (NMS) of EUMETSAT Member States, or other agreed entities linked to a user community.

<https://www.eumetsat.int/about-us/satellite-application-facilities-safs>

NWC SAF concept

- ✓ To ensure the optimum use of meteorological satellite data in Nowcasting and Very Short Range Forecasting
- ✓ The NWC SAF develops and maintains SW Packages (for GEOstationary and POLAR Satellites) freely distributed to registered users to generate satellite derived products with a direct application in Nowcasting
- ✓ User support
- ✓ Training

NWC SAF SW packages

Geostationary satellites

NWC SAF GEO v2021

- **MSG primary satellite**
- **MSG Rapid Scan Service** (Latitudes **15° N** - 70° N)
- **MSG IODC**
- Other satellites (Himawari 8, GOES-N and GOES-16)

Polar satellites

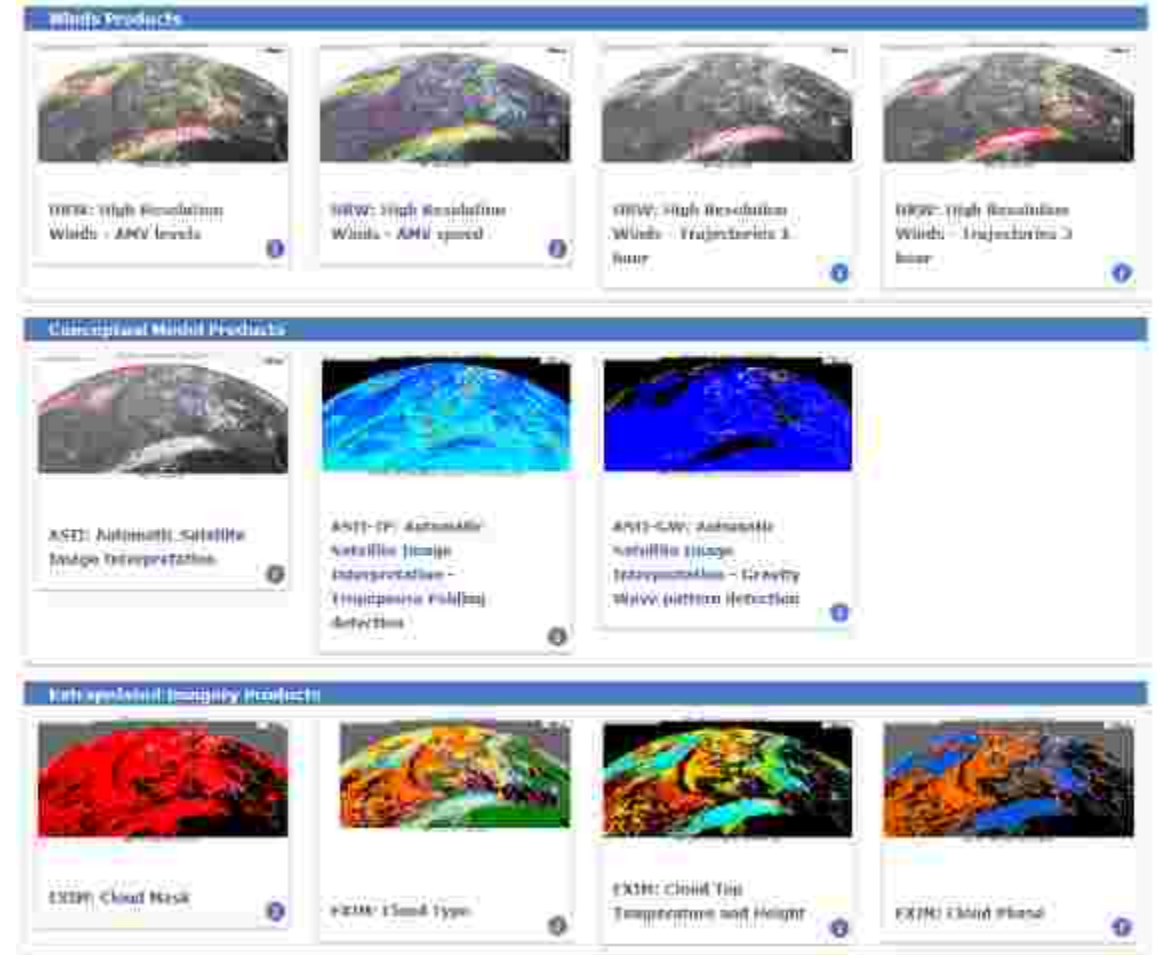
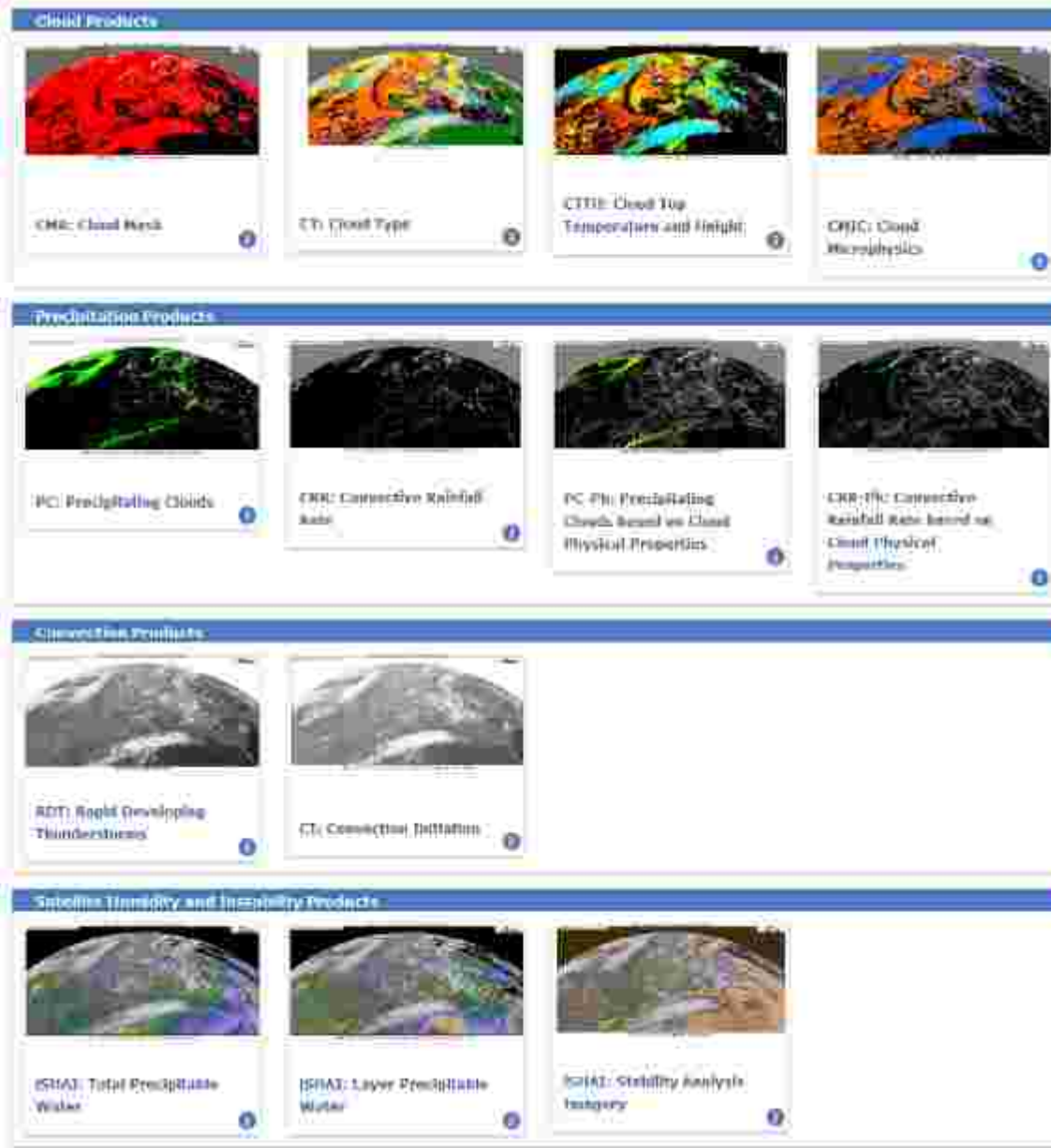
NWC SAF PPS v2021

- Metop
- NOAA
- NPP
- JPSS
- EOS
- FY-3D

Current NWC SAF Products for Geostationary Satellites

- **Cloud products:** CMA, CT, CTTH, CMIC (cloud phase, cloud optical thickness, liquid water path, ice water path, effective radius)
- **Precipitation Products:** Probability of Precipitation (PC and PC-Ph) and Convective Rainfall Rate (CRR and CRR-Ph)
- **Stability Product:** iSHAI (stability indices, Precipitable water in low, mid and high Layers, skin temperature, total ozone, differences with NWP)
- **Convection Products:** CI (probability of a cloud to become a convective cell) and RDT-CW (identification, characterization and tracking of convective cells)
- **Winds:** HRW (high resolution winds at various levels, trajectories)
- **Image Extrapolation:** EXIM (extrapolation of satellite images and NWCSAF products)
- **Automatic Image Interpretation:** ASII, ASII-TF (probability of presence of tropopause folding), ASII-GW (probability of presence of gravity waves)

NWC SAF GEO



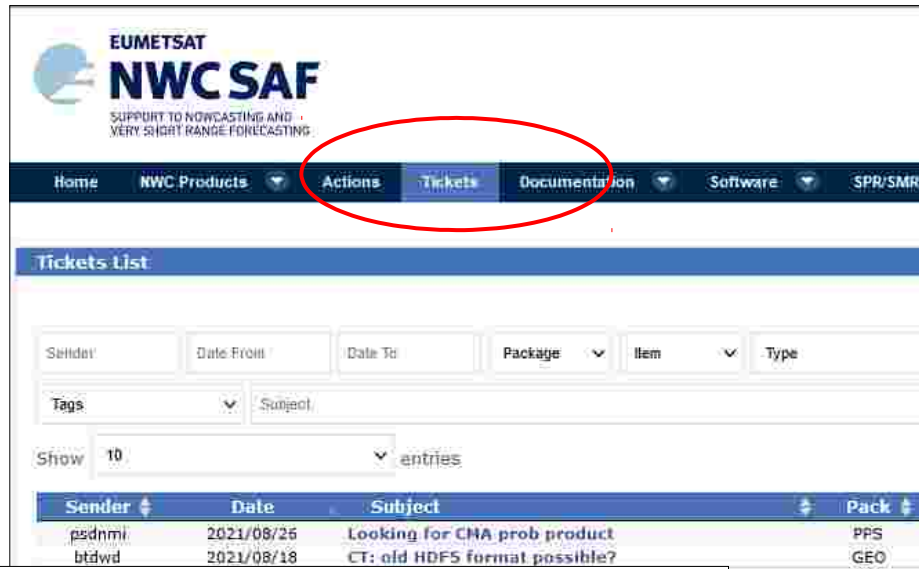
Available in NRT in nwc-saf.eumetsat.int
A two years rolling archive

NWC SAF PPS Products



Available in NRT in nwc-saf.eumetsat.int

NWC SAF services. (nwc-saf.eumetsat.int)



EUMETSAT NWC SAF
SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

Home NWC Products Actions **Tickets** Documentation Software SPR/SMR

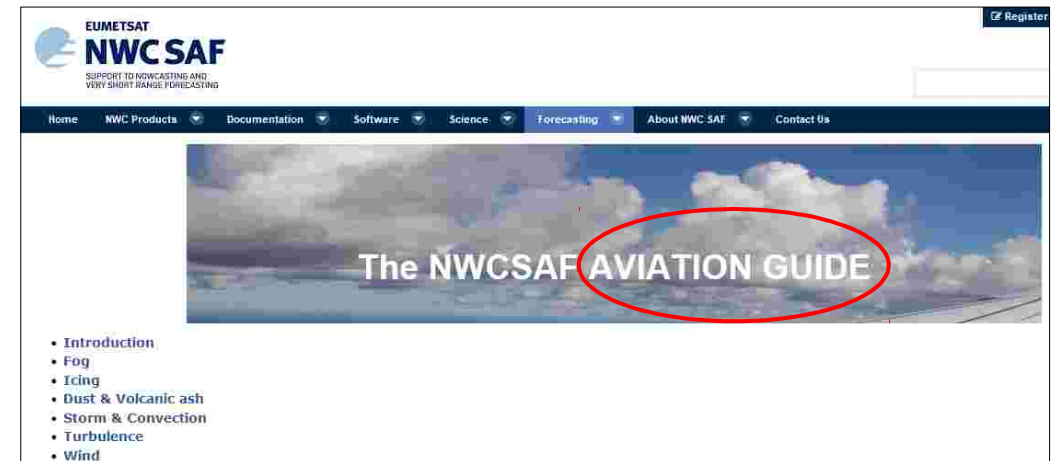
Tickets List

Sender: Date From: Date To: Package: Item: Type:

Tags: Subject:

Show 10 entries

Sender	Date	Subject	Pack
psdnmi	2021/08/26	Looking for CMA prob product	PPS
btdwd	2021/08/18	CT: old HDF5 format possible?	GEO
			GEO
			GEO
			GEO
			PPS
			GEO
			GEO
			GEO



EUMETSAT NWC SAF
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The NWCSAF AVIATION GUIDE

- Introduction
- Fog
- Icing
- Dust & Volcanic ash
- Storm & Convection
- Turbulence
- Wind



EUMETSAT NWC SAF
SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

Home NWC Products Actions Tickets Documentation Software **SPR/SMR** Science Forecasting

NWCSAF Software Downloads

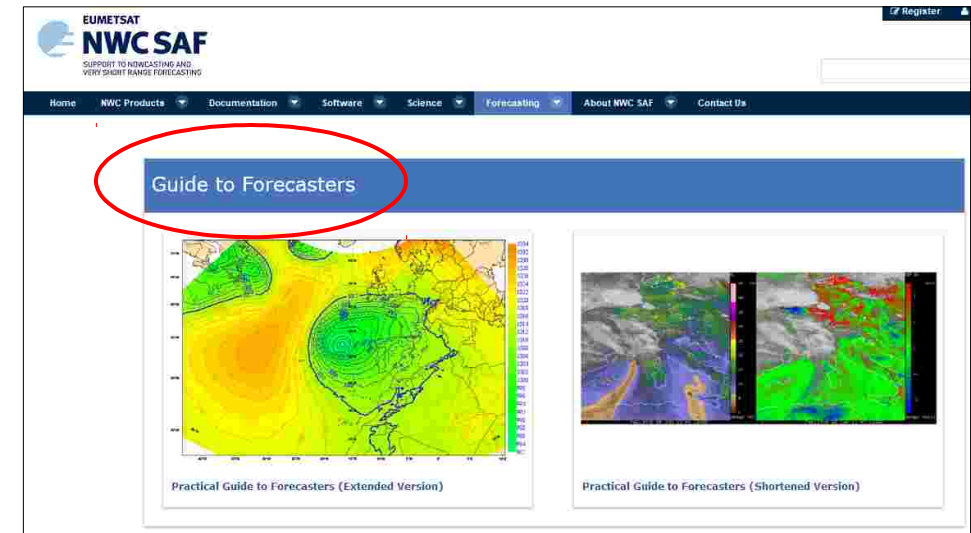
Welcome to the NWCSAF SW packages and patches page!

Please click in the links below to access to the GEO or PPS SW and related documentation:

- [NWCSAF/GEO Software Package](#)
- [NWCSAF/PPS Software Package](#)

Foreseen dates for SW packages release can be consulted in section "CDOP-3 Objectives & Planning" in this [link](#).

Thanks for your cooperation.



EUMETSAT NWC SAF
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Guide to Forecasters

[Practical Guide to Forecasters \(Extended Version\)](#)

[Practical Guide to Forecasters \(Shortened Version\)](#)

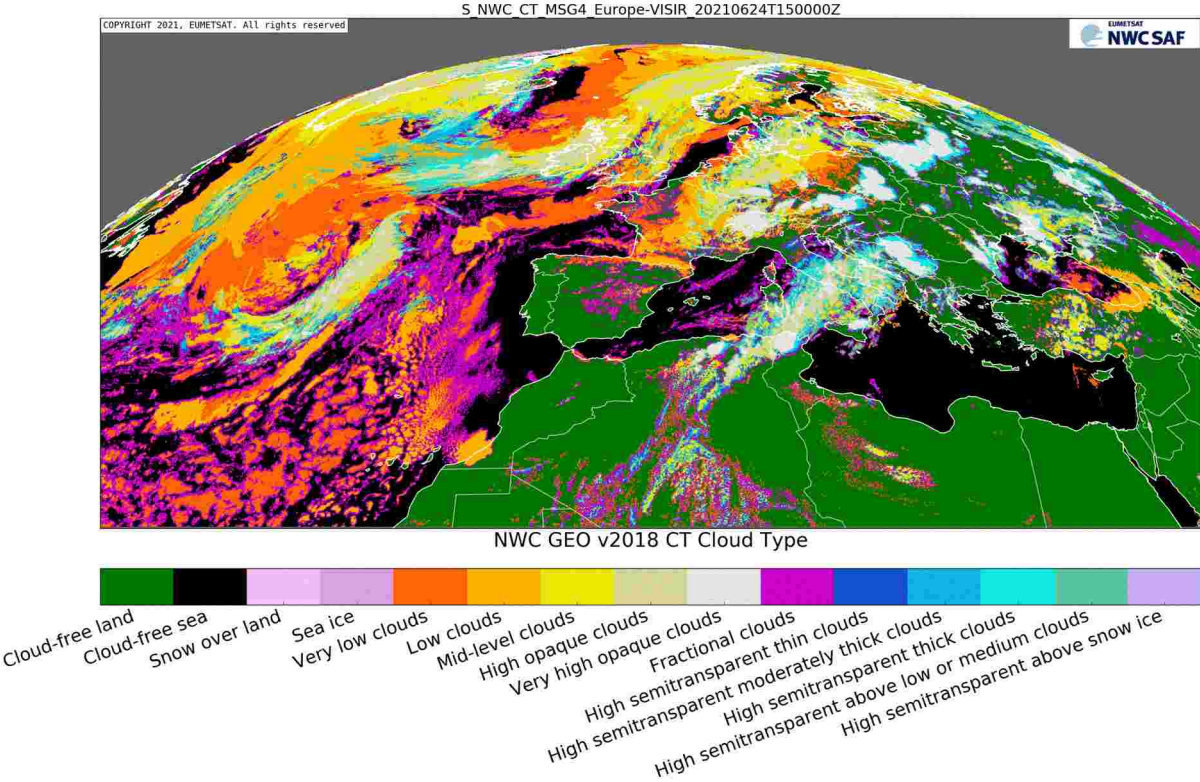
How to run NWC SAF GEO SW at your site

- **Register** as a user (it is free and can be done online)
- **Download** the software from the web site (nwc-saf.eumetsat.int)
- **Install** the software
- **Set the configuration** of your interest
 - Satellite to be used
 - Products to be generated
 - Geographical area where to generate the products
- **Input** data needed
 - Satellite data (HRIT MSG files)
 - A numerical model (ECMWF or GFS for example)

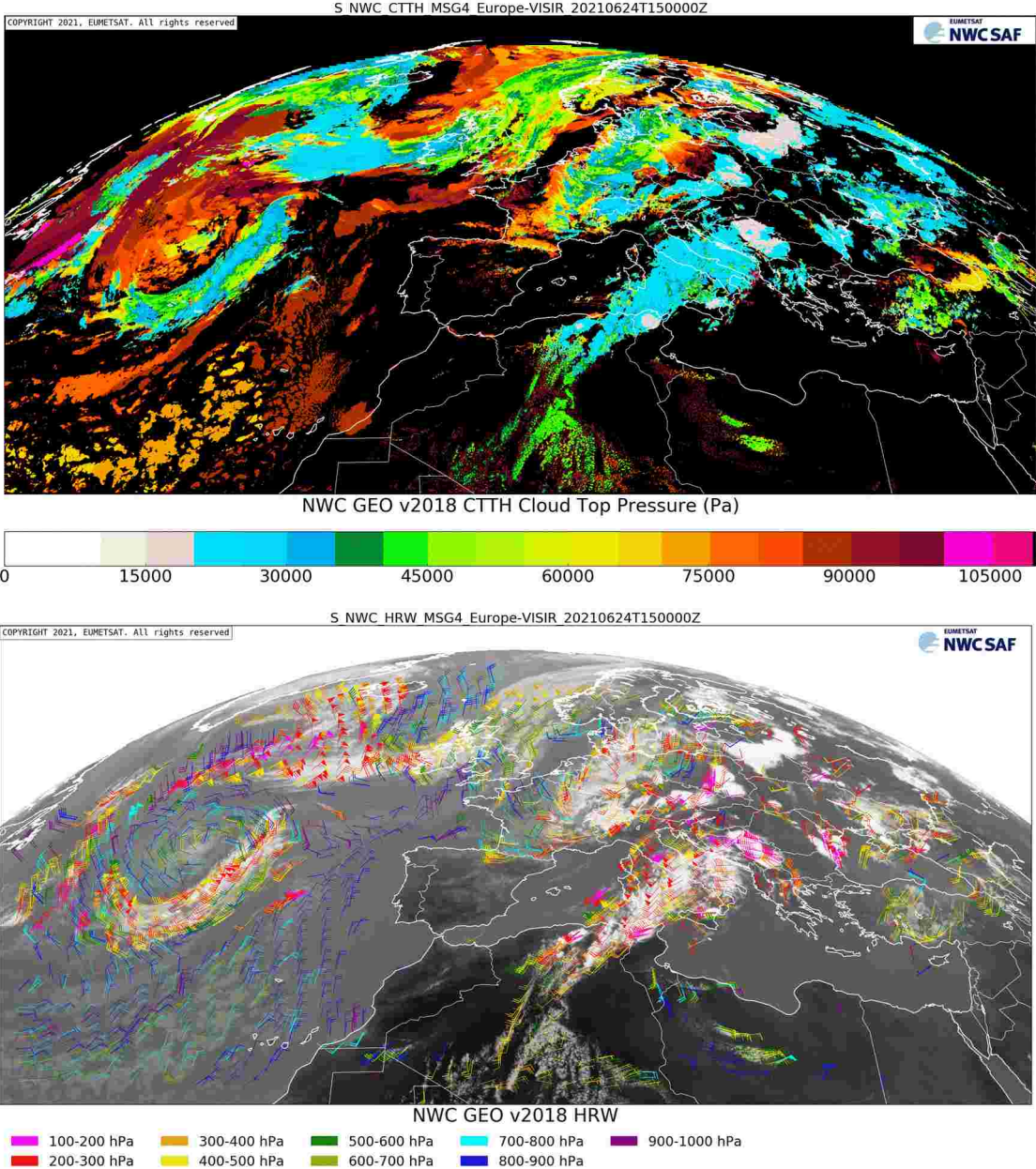
The NWC SAF Team **offers support** if you encounter any problem

The software is meant to be run in **NRT operationally** but also allows the generation of products in **offline mode**.

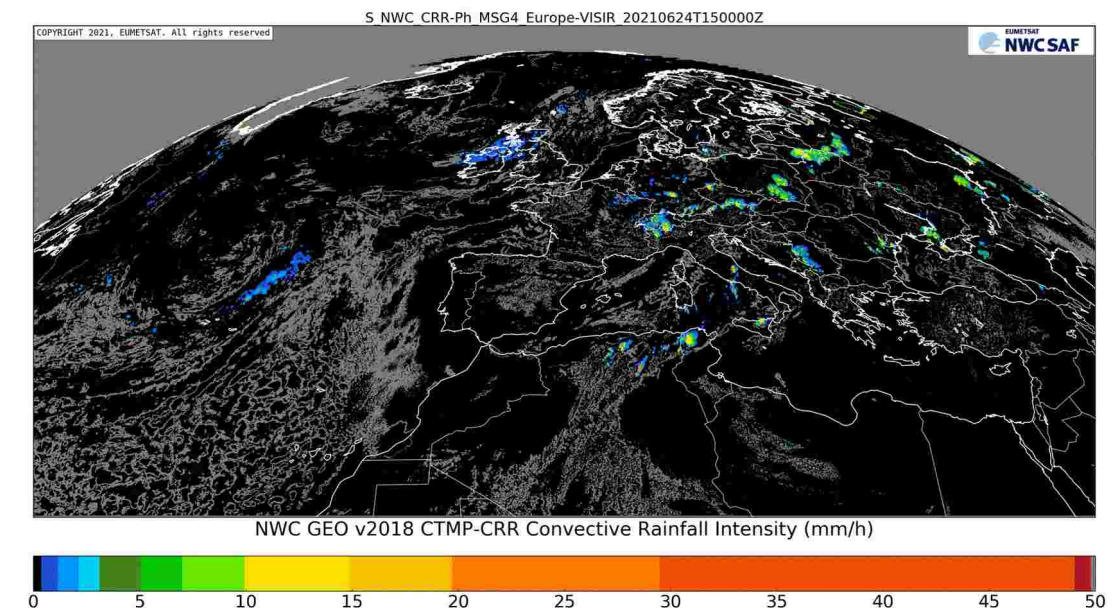
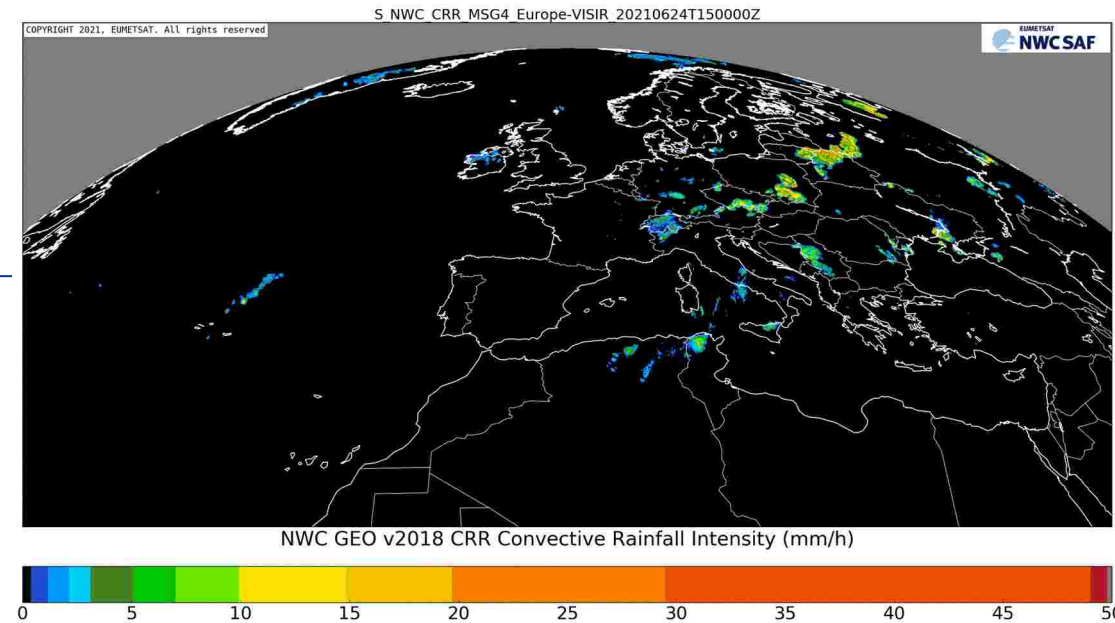
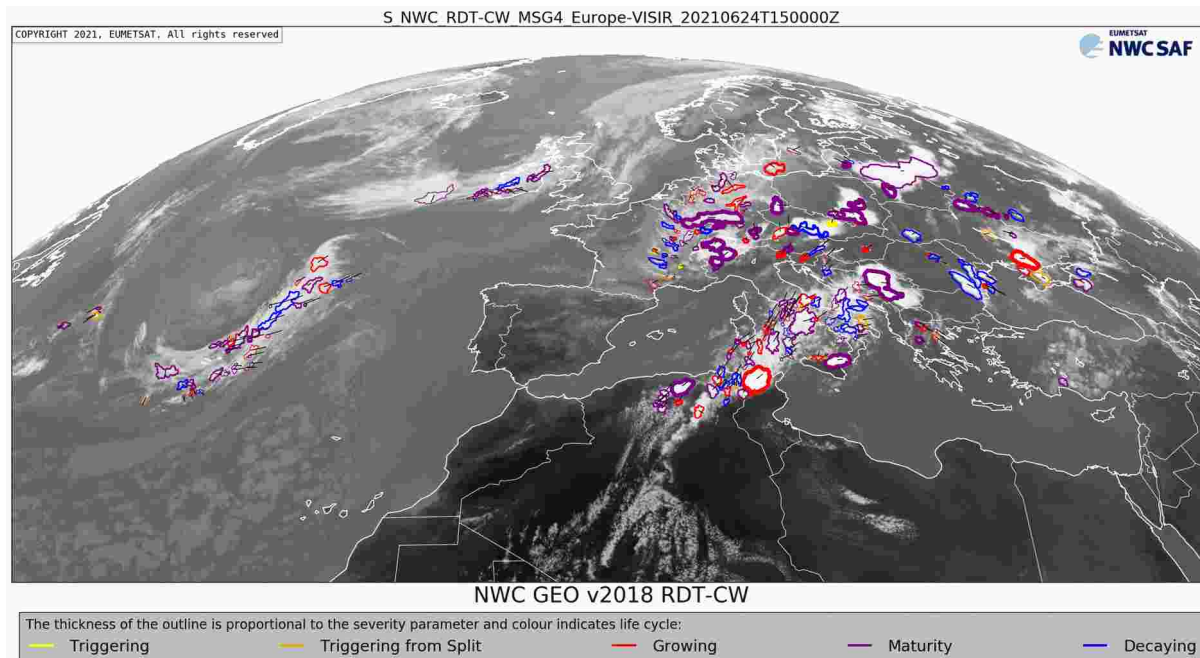
Example 24 Jun 2021 15:00



CT, CTTH and HRW



Example 24 June 2021 15:00

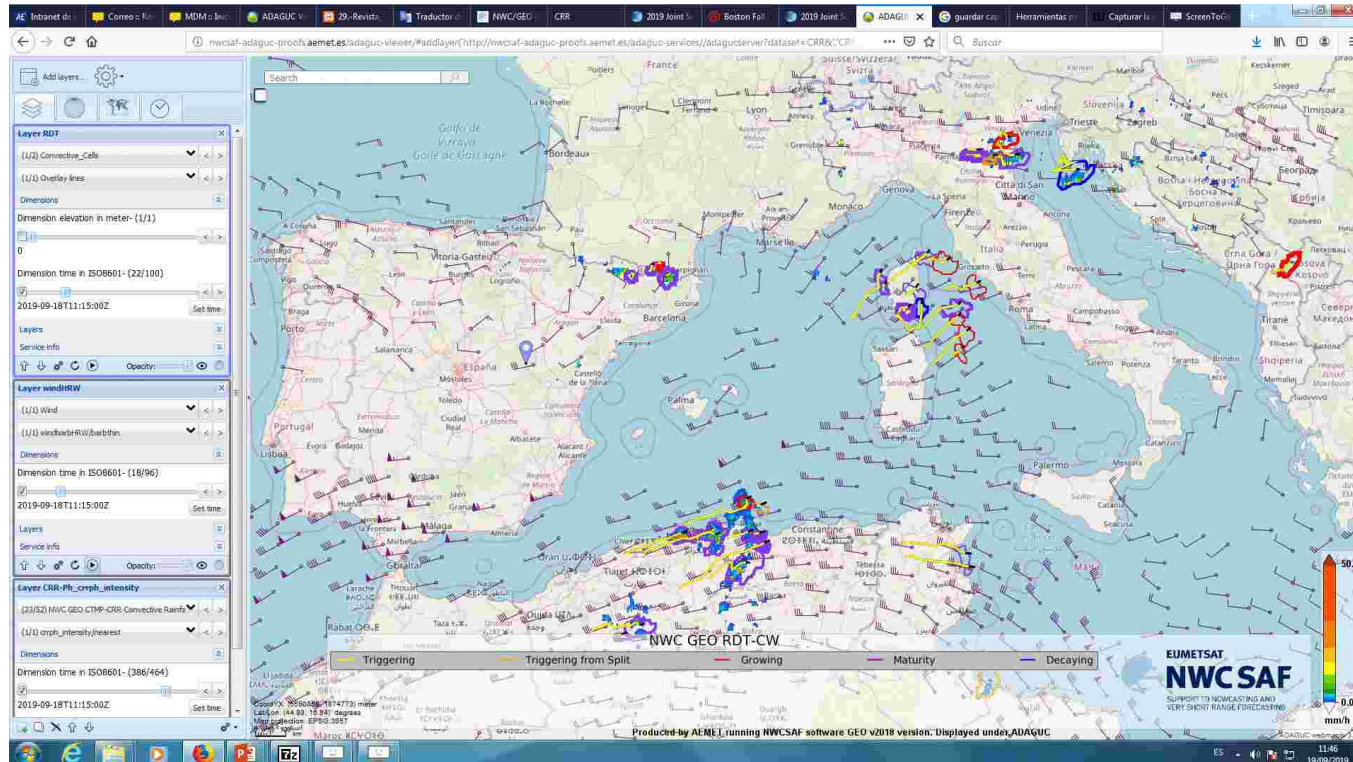


RDT-CW (left), CRR(top right) and CRRPh (bottom right)

Visualization of the products

We provide:

- Python script (nwcpy) to generate images from the NetCDF output file
- A software suite that makes possible the connection between NWCSAF and ADAGUC. We can provide support to install it.



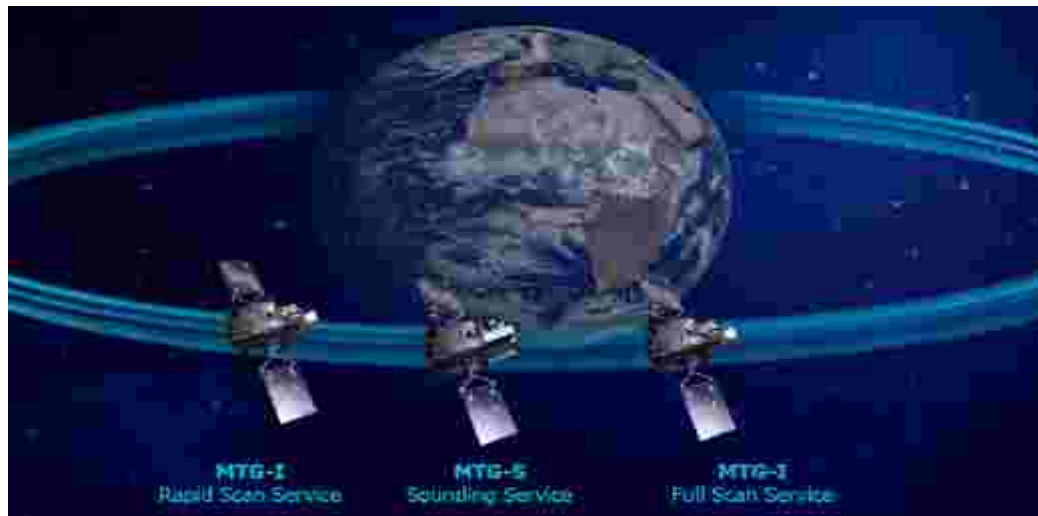
See it in action:

<http://nwcsaf-adaguc-proofs.aemet.es/adaguc-viewer/>

ADAGUC example of NWCSAF software outputs: geolocalized, zoomable, several products simultaneously (CRR, RDT, HRW), data picker.

Future Plans

- Adapt the products to the new era EUMETSAT Satellites (MTG-I, MTG-S, EPS-SG A, EPS-SG B) ensuring continuity
- Full exploitation of the capabilities of the new satellites:
 - improve current products
 - new products (ASII-ICE, MTG LI products, MTG IRS products, EPS SW MW products)



MTG-I and MTG-S Satellites, EUMETSAT



EPS-SG A and EPS SG B Satellites, EUMETSAT

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Current Situation

- NWC SAF products for MSG can be generated **locally**, receiving satellite data via
 - EUMETCast Africa **Satellite**
 - EUMETCast **Terrestrial**

Issues with the NWC SAF Installation

- Very specific user support has been given to two African countries → Learned what **problems users usually face**
- **Results** are varied
- While **software** is relatively **easy** to install, the **data feeds** (both Satellite and NWP) are **difficult** for many users
- Users need a good **understanding of Linux basics** to overcome these problems
- As a consequence → In the NWC SAF we will try to make a more comprehensive and **easy to install** not only of the **software**, but also of the **data feeds**

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Future MTG Satellite

- NWC SAF products can be generated **locally**, receiving satellite data via
 - Due to the MTG data volume increases, **EUMETCast Africa Satellite** will **not** provide all radiance channels → It will **not be possible to generate** NWC SAF products with EUMETCast Africa Satellite
 - EUMETCast **Terrestrial** will be the way to obtain MTG radiance data to **generate NWC SAF products** locally

The most fundamental NWC SAF products **will be distributed** via **EUMETCast Satellite**: **CTTH** (Cloud Top Temperature and height), **CRRPh** (Convective Rainfall Rate), **RDT-CW** (Convective Cell Tracking) and also rain estimates from the H SAF (**H03B**).

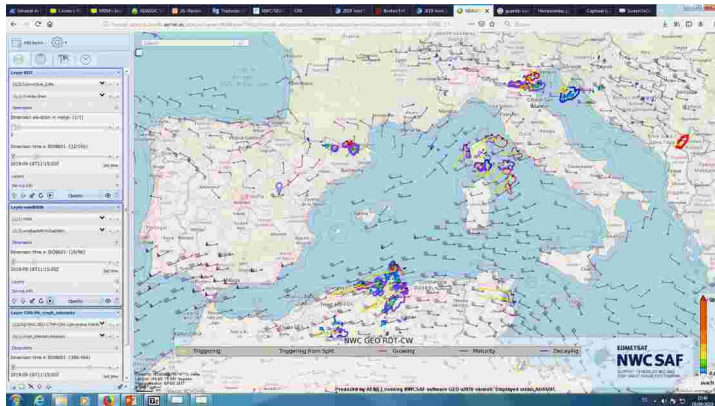
And **possibly**: **iSHAI** (humidity and stability from imager) **CMA** (Cloud Mask), **CT** (Cloud Type) and **PCPh** (Probability of Precipitation)

Nowcasting in the MTG era

- Nowcasting in Africa needs to be **well designed** for the MTG era:
 - How are the final users going to be **notified** of extreme events? Web page? Mobile phone? Others?
 - Will **warnings** be issued automatically, semi-automatically or manually?

Nowcasting in the MTG era

- Will there be **web servers** serving Nowcasting data? Where and how?
 - **ADAGUC** is a possible free software solution
 - Developed by KNMI (Netherlands)
 - Scripts to ingest data developed by AEMET (Spain)



See it in action:
[http://nwcsaf-adaguc-proofs.aemet.es/
adaguc-viewer/](http://nwcsaf-adaguc-proofs.aemet.es/adaguc-viewer/)

Nowcasting in the MTG era: NWC EWC

- Platform to develop and test Nowcasting tools has started under the European Weather Cloud (EWC) called **NWC EWC**
- The goal is to have, in a mid term, a **Nowcasting platform software** that can run anywhere but tested in the EWC
- It will process **several types of data**: Satellite, Radar, Commercial Microwave Links (CMLs), surface stations, etc.
- **Feel free to join** the mailing list
 - **Subscribe** writing to Xavier Calbet xcalbeta@aemet.es or Vesa Nietosvaara <Vesa.Nietosvaara@eumetsat.int>
- **Current state**
 - ➔ NWC SAF software installed
 - ➔ Instance of ADAGUC installed
- **Inminent:**
 - ➔ Installation of convective environment detection
 - ➔ Installation of retrievals of WV using future FCI 0.9 micron channel

Conclusion

Asante! Thank you very much for your attention!

- More information in www.nwcsaf.org
- We can continue discussion here or
- You can contact us at

xcalbeta@aemet.es, pripodasa@aemet.es or safnwchd@aemet.es