

Nowcasting Satellite Application Facility: software and products

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NWC SAF Project Manager

USER Forum in Africa

30 September 2021

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 v2018

- **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 v2018

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

Current NWC SAF Products for Geostationary Satellites

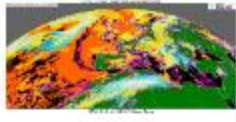
- **Cloud products:** CMA, CT, CTTH, CMIC (cloud phase, cloud optical thickness, liquid water path, ice water path, effective radius)
- **Precipitation Products:** Probability of Precipitation (PC and PC-Ph) and Convective Rainfall Rate (CRR and CRR-Ph)
- **Stability Product:** iSHAI (stability indices, 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 Products

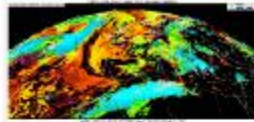
Cloud Products



CMA: Cloud Mask



CT: Cloud Type

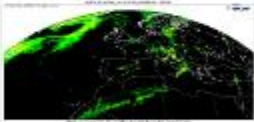


CTTH: Cloud Top
Temperature and Height



CMIC: Cloud
Microphysics

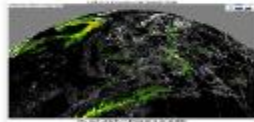
Precipitation Products



PC: Precipitating Clouds



CRR: Convective Rainfall
Rate



PC-Ph: Precipitating
Clouds based on Cloud
Physical Properties



CRR-Ph: Convective
Rainfall Rate based on
Cloud Physical
Properties

Convection Products

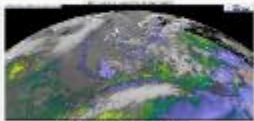


RDT: Rapid Developing
Thunderstorms

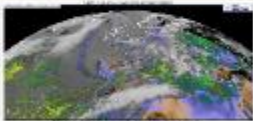


CI: Convection Initiation

Satellite Humidity and Instability Products



ISHAI: Total Precipitable
Water



ISHAI: Layer Precipitable
Water

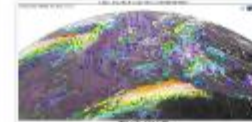


ISHAI: Stability Analysis
Imagery

Winds Products



HRW: High Resolution
Winds - AMV levels



HRW: High Resolution
Winds - AMV speed

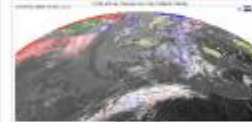


HRW: High Resolution
Winds - Trajectories 1
hour

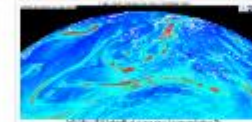


HRW: High Resolution
Winds - Trajectories 3
hour

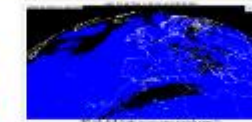
Conceptual Model Products



ASII: Automatic Satellite
Image Interpretation

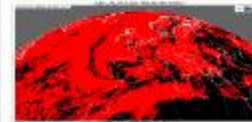


ASII-TF: Automatic
Satellite Image
Interpretation -
Tropopause Folding
detection



ASII-GW: Automatic
Satellite Image
Interpretation - Gravity
Wave pattern detection

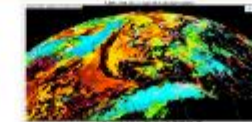
Extrapolated Imagery Products



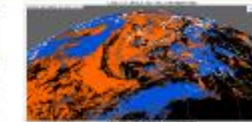
EXIM: Cloud Mask



EXIM: Cloud Type



EXIM: Cloud Top
Temperature and Height

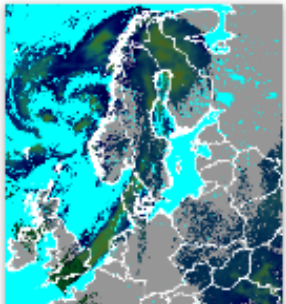


EXIM: Cloud Phase

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

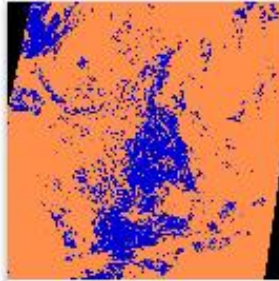
NWC SAF PPS Products

Precipitation Products

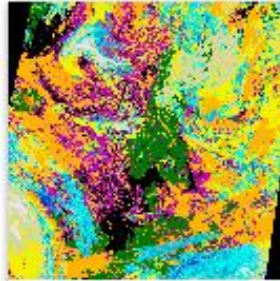


PC:
Precipitating
Clouds

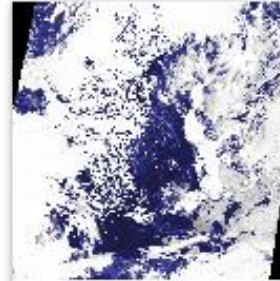
Cloud Products



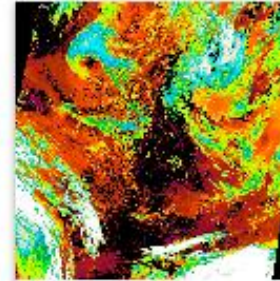
**CMA: Cloud
Mask**



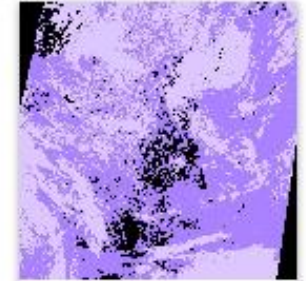
**CT: Cloud
Type**



**CMA-prob: Cloud
Probability**



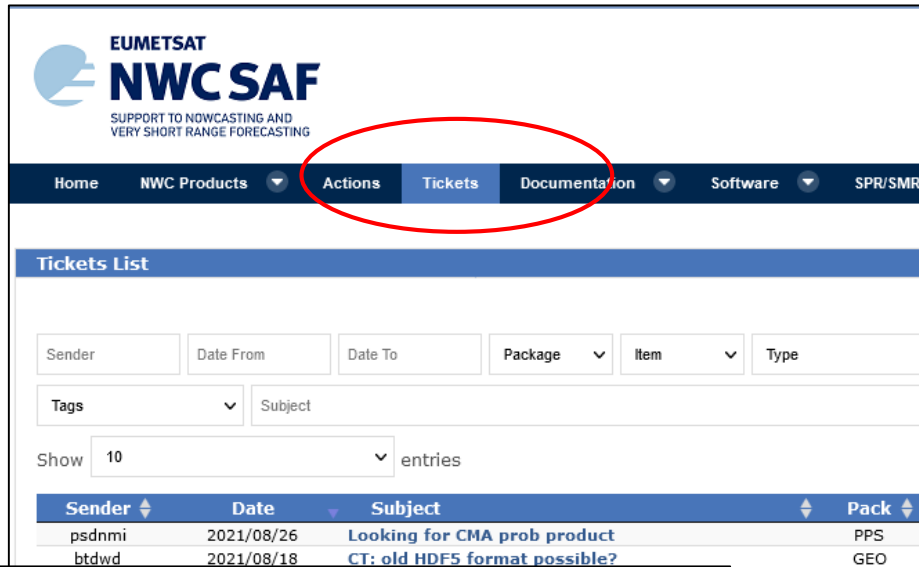
**CTTH: Cloud
Top
Temperature
and Height**



**CPP: Cloud
Physical
Properties**

Available in NRT in nwc-saf.eumetsat.int

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



EUMETSAT NWCSAF
SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

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

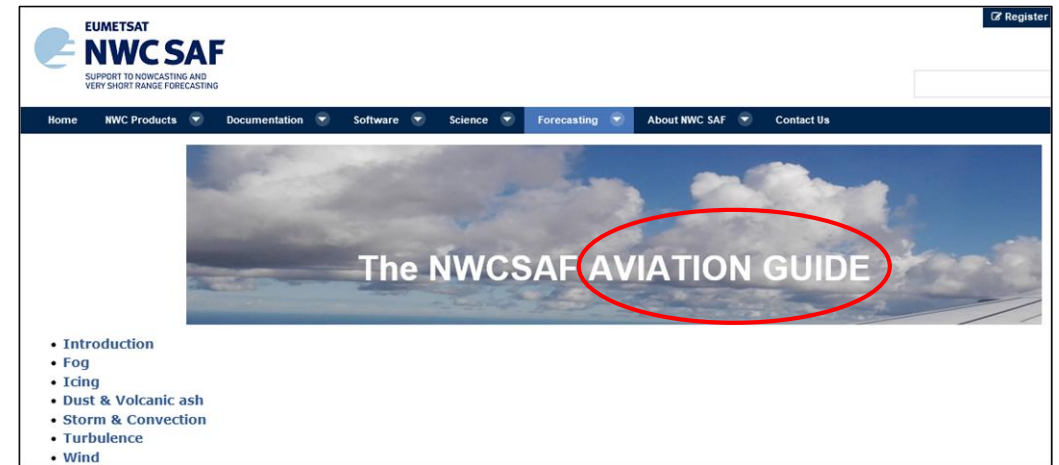
Tickets List

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
			GEO

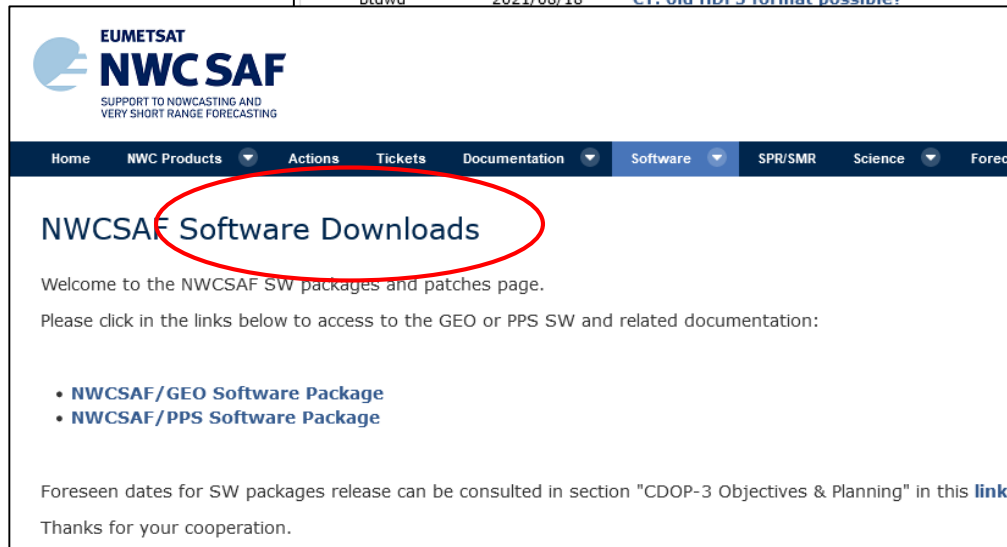


EUMETSAT NWCSAF
SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

Home NWC Products Documentation Software Science **Forecasting** About NWC SAF Contact Us

The NWCSAF AVIATION GUIDE

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



EUMETSAT NWCSAF
SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

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

NWCSAF Software Downloads

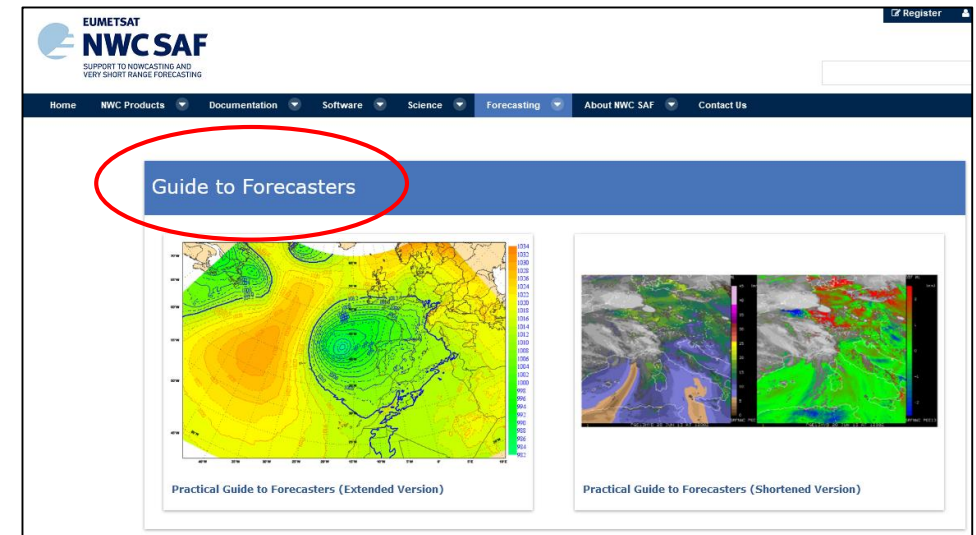
Welcome to the NWCSAF SW packages and patches page.

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 NWCSAF
SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

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Guide to Forecasters

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

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

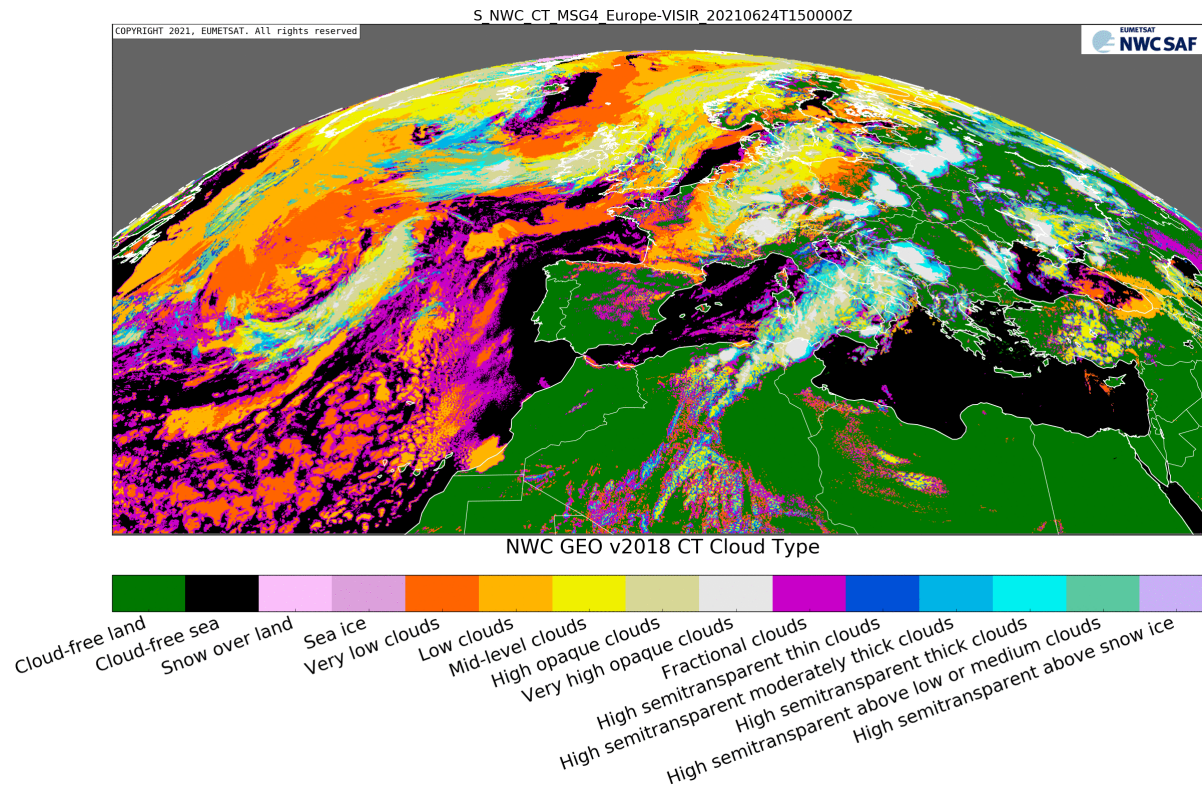
How to run NWC SAF GEO SW at your site

- 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)

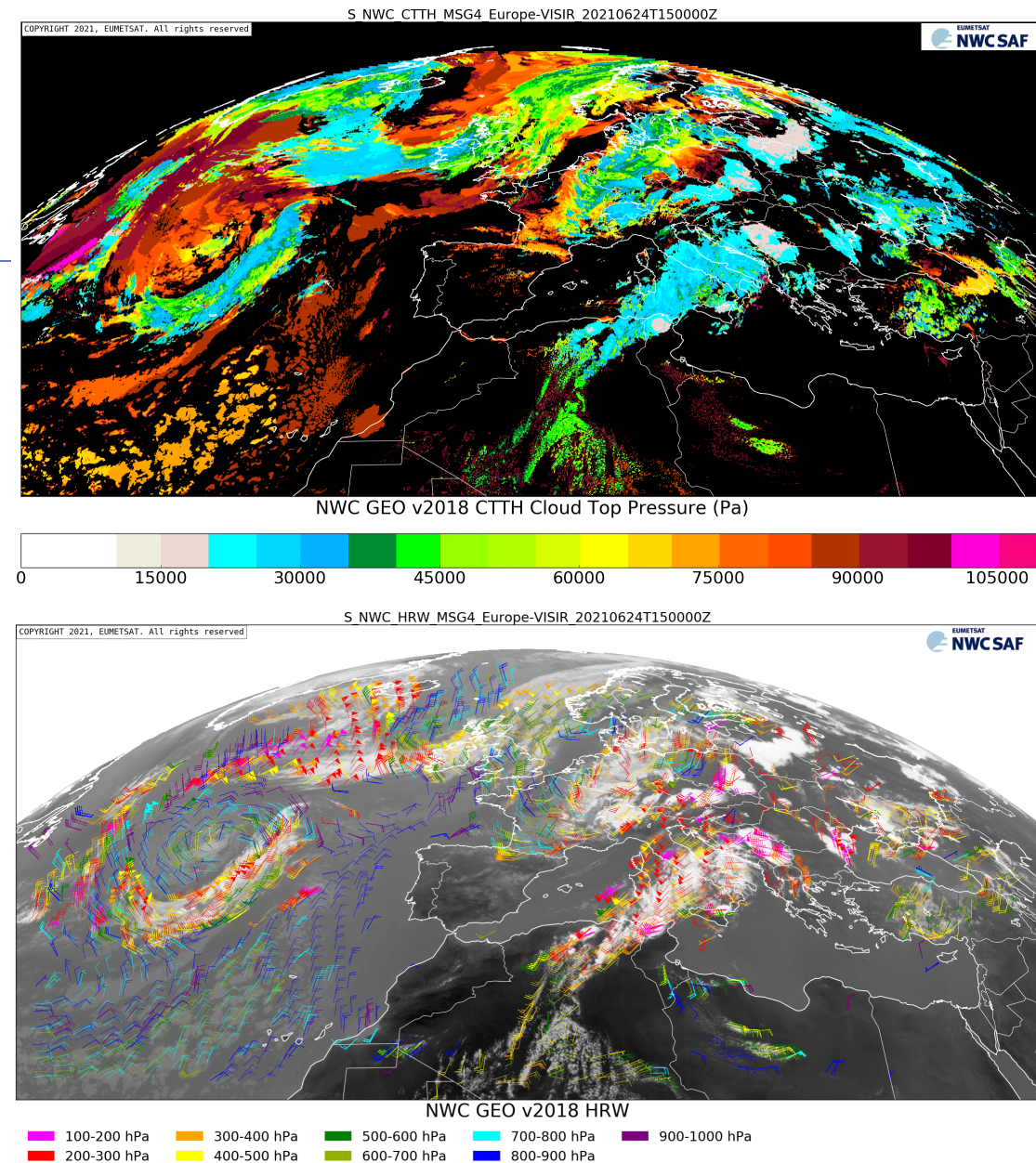
The NWC SAF Team offers support if you encounter any problem

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

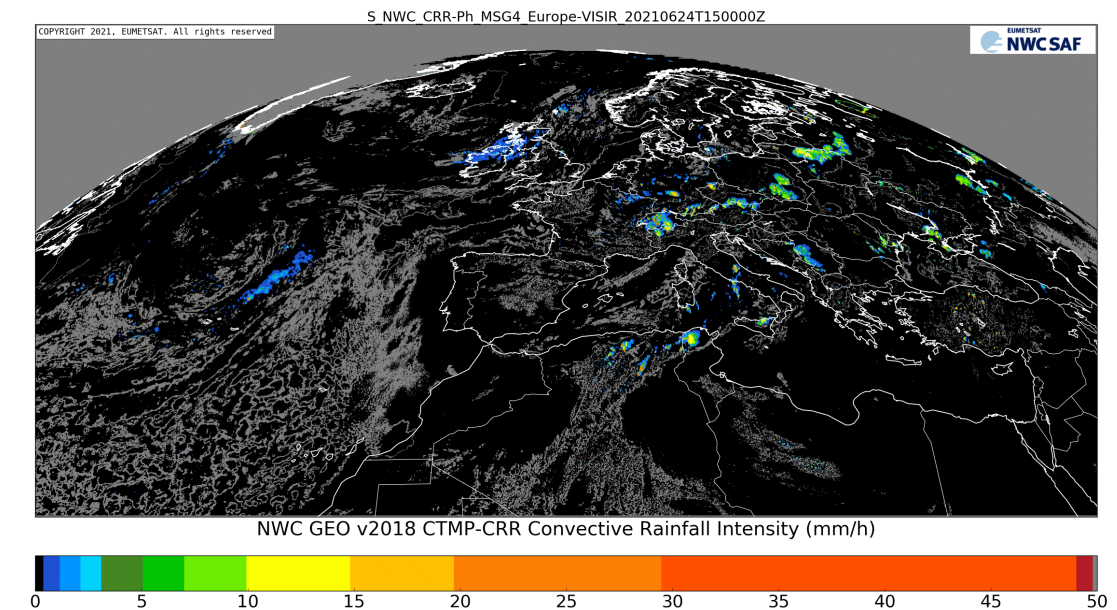
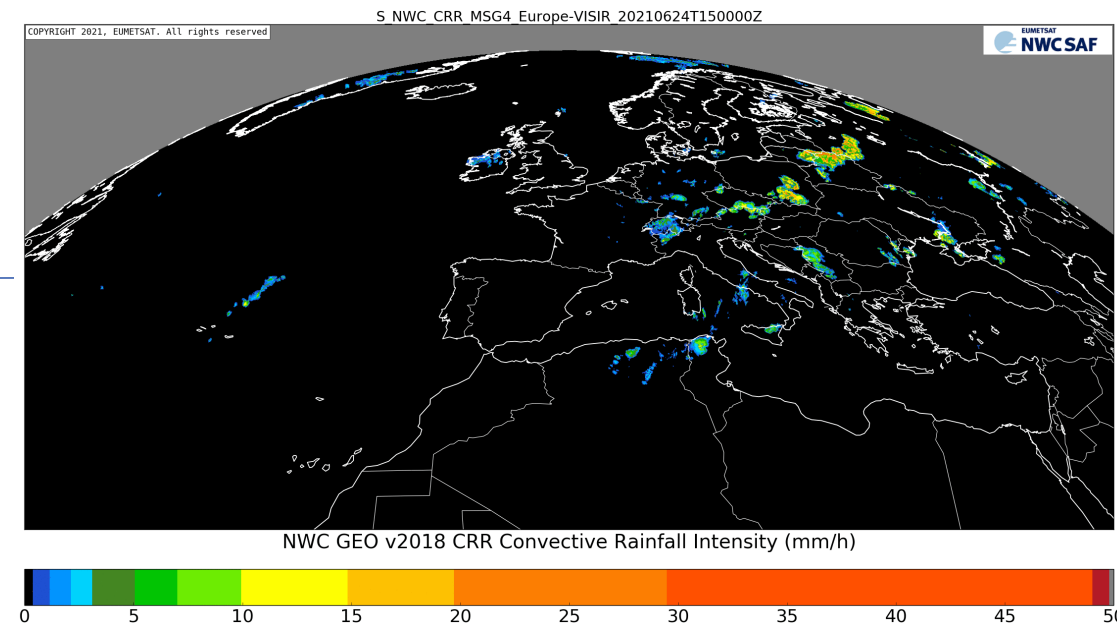
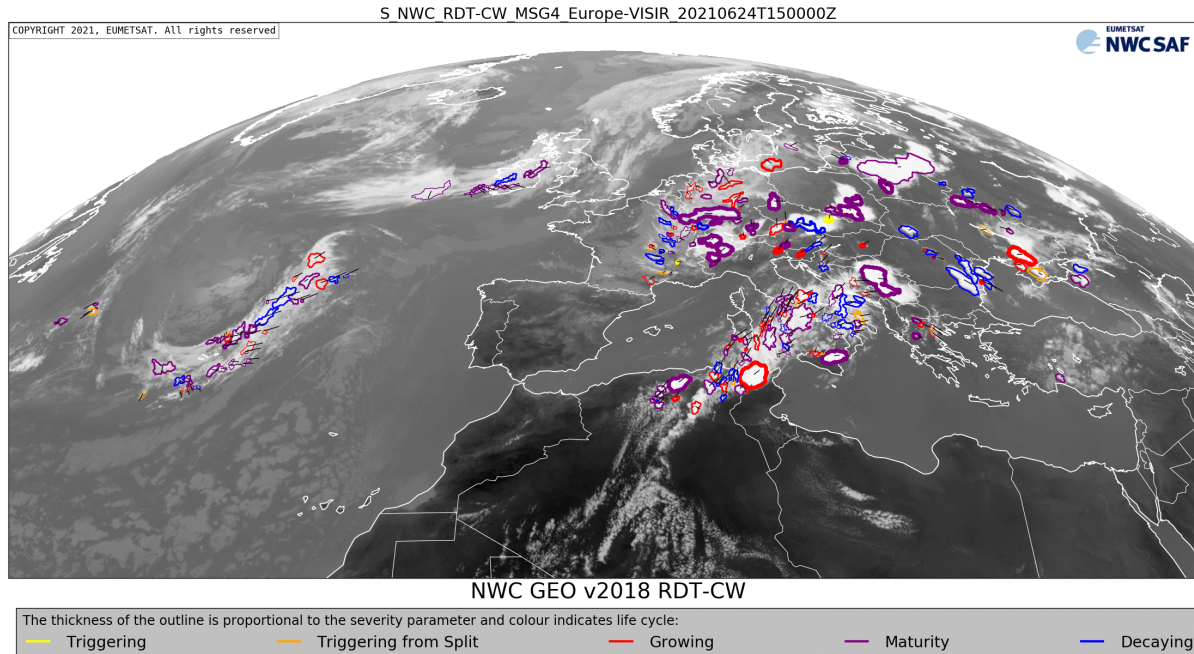
Example 24 June 2021 15:00



CT, CTTH and HRW



Example 24 June 2021 15:00

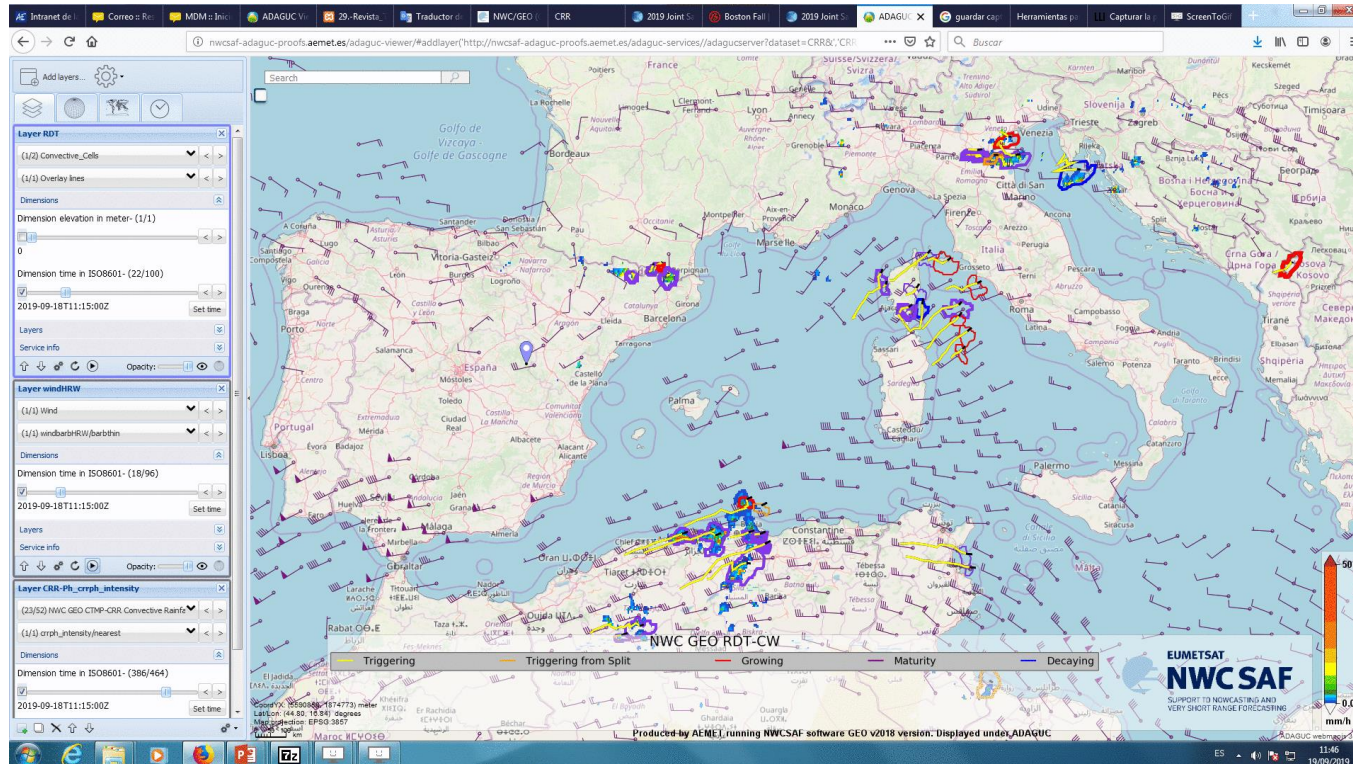


RDT-CW (left), CRR(top right) and CRRPh (bottom right)

Visualization of the products

We provide:

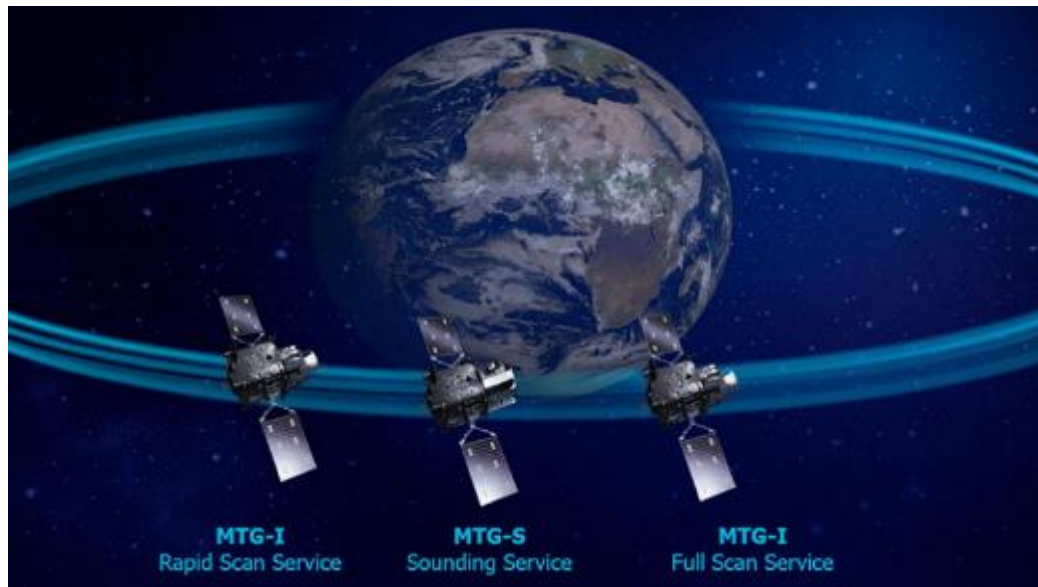
- Python script (nwcpy) to generate images from the NetCDF output file
- A software suite that makes possible the connection between NWCSAF and ADAGUC. We can provide support to install it.



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

EUMETCast Africa

NWC SAF

Some NWC SAF products are generated at EUMETSAT HQ and distributed through EUMETCast Africa:

- CMA, CT, CTTH
- CRR, RDT-CW

If you have limitations to generate the products at your site, you can access these products through EUMETCast Africa.

H SAF

A precipitation product from the H SAF is available in EUMETCast Africa

- H03B (currently the only H SAF operational algorithm enabling precipitation rate estimates with the time resolution required for nowcasting)

Thank you very much for your attention!

More information in www.nwcsaf.org

You can contact as at

pripodasa@aemet.es

safnwchd@aemet.es