

Earth Observation Products for Wildfires Monitoring and Forecast 2022

The Fire Group experience on ARISTOTLE-eENHSP

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19/10/2022

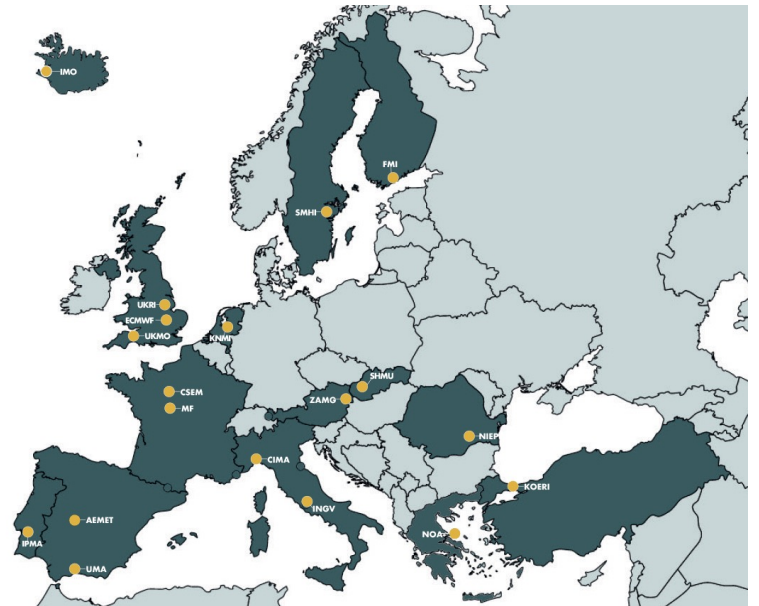
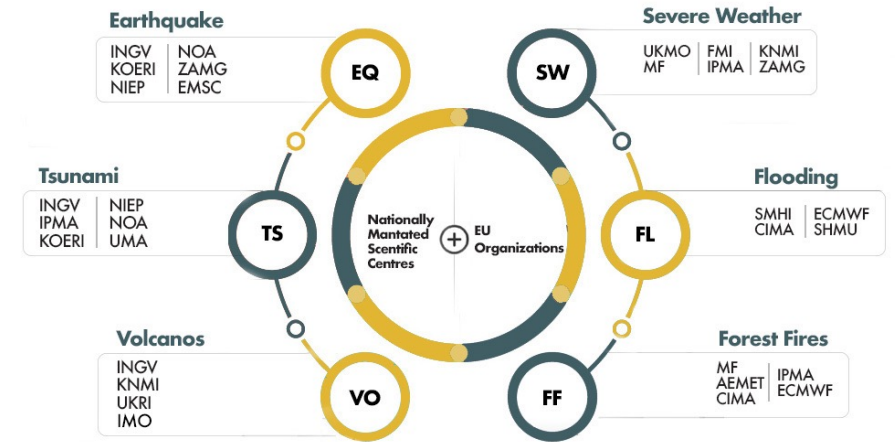
The ARISTOTLE-eENHSP Project

- **ARISTOTLE-eENHSP** “*enhanced European Natural Hazard Scientific Partnership*”, raised from the collective experience gained during the previous **ARISTOTLE-eENHSP** and the **initial pilot ARISTOTLE project**.
- **ARISTOTLE-eENHSP** is a long-term operational, research, and cooperation project financed by the **Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO)**.
- ARISTOTLE-eENHSP aims to continue strengthening the monitoring and analysis functions of the **Emergency Response Coordination Centre (ERCC)** and its **Situational Awareness Sector (SAS)** by delivering unique multi-hazard advice service at global level and on a 24/7 operational basis.

The ARISTOTLE-eENHSP Project

ARISTOTLE-eENHSP Consortium is currently providing advice in a multi-hazard fashion for disaster risk at national level with **extended global 24/7 monitoring and analytical capacity** for the following inter-related hazards:

- Earthquakes,
- Tsunamis,
- Volcanic eruptions,
- Severe Weather events,
- Flooding events and
- Wildfires/Forest fires.



Forest Fire Hazard

Forest Fire Hazard Service Team

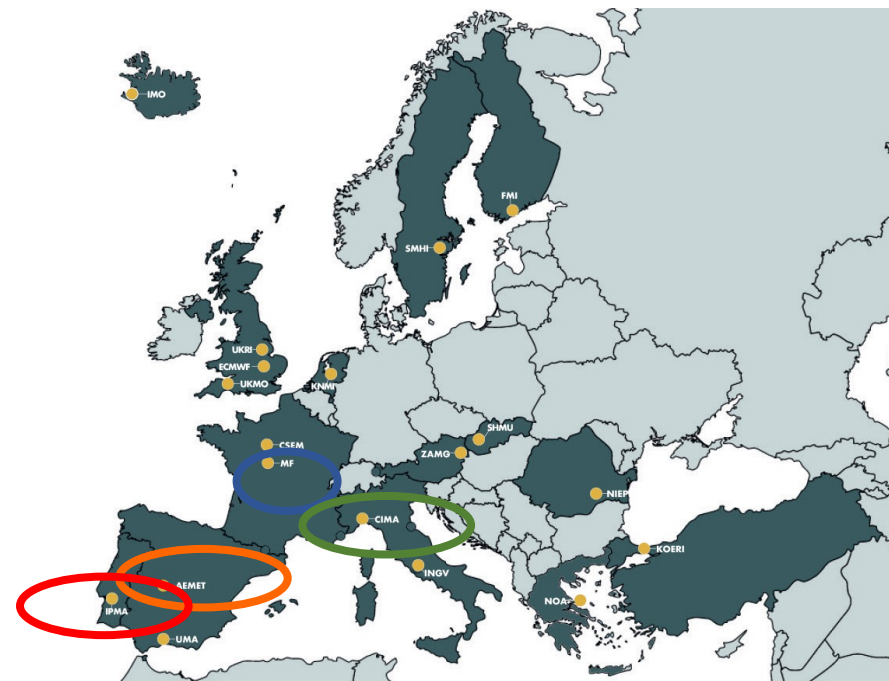
AEMET, CIMA, IPMA and Météo-France

⇒ FF expertise, national experience, fire danger assessment

⇒ FF Aristotle on-duty: rota 1-week basis

ECMWF

⇒ FF expertise, support and data provider (Fire Danger Indices computation)



Forest Fires



Forest Fire Risk Overview

Forest Fire Hazard Service

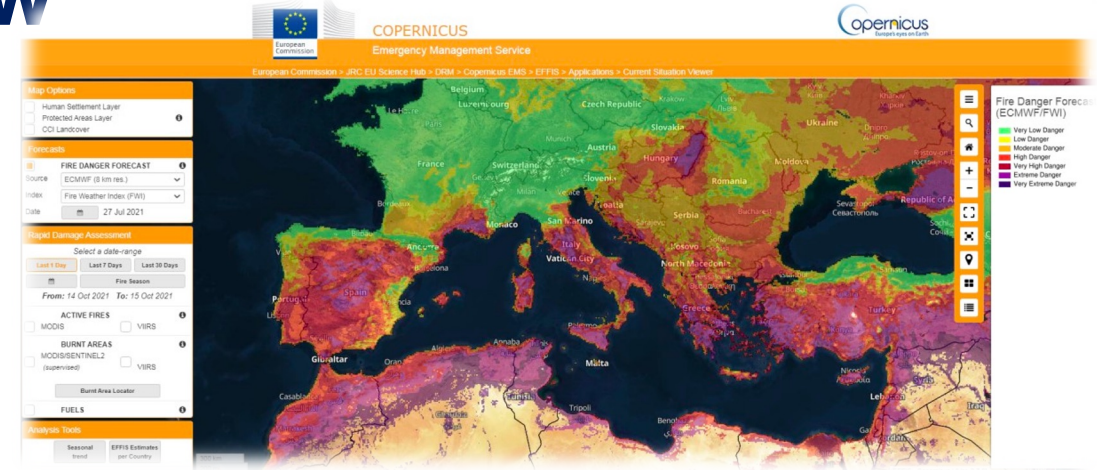
- Routine Operational Mode
 - ⇒ 3/weekly FF contributions in MHOB report:
Fire Weather Danger Forecast for 2/3 days
 - ⇒ Monitoring main ongoing fire events
- Emergency Activations

Global Coverage

Forest Fire Risk Overview

Forest Fire Hazard Service

- FF Add Value



⇒ Expert assessment/advice complementary to EFFIS/GWIS platforms allowing to highlight the areas with highest fire danger

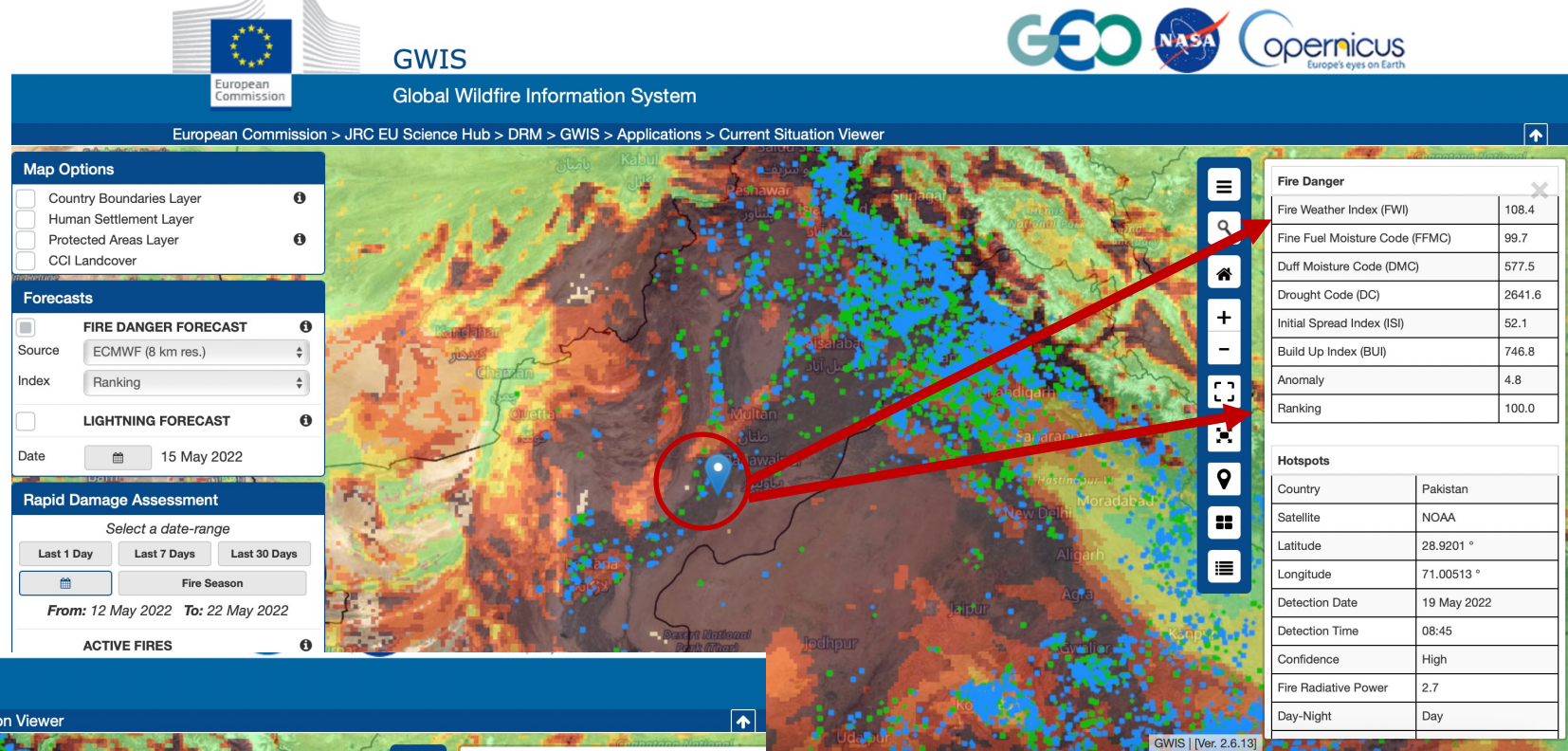
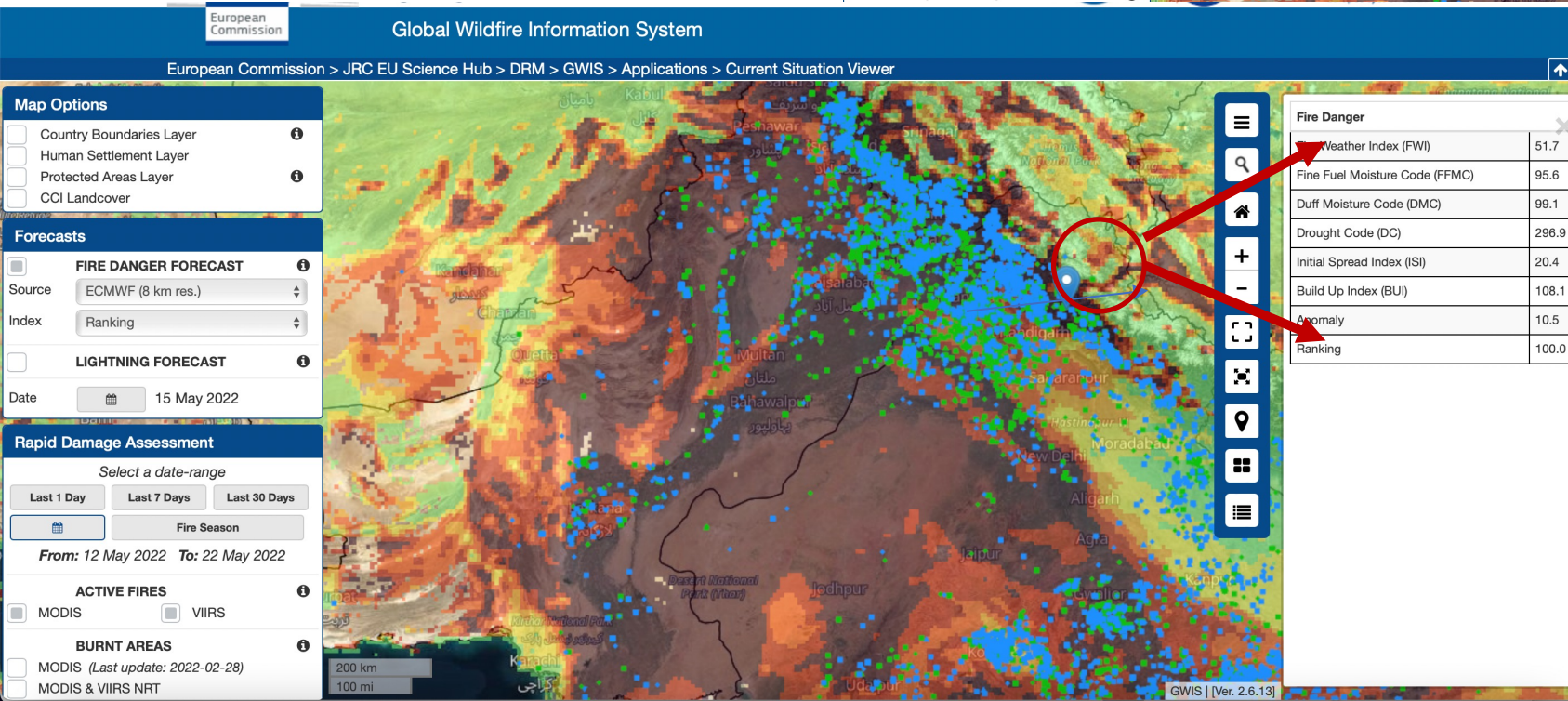
⇒ FF assessment limited to the 3 severest fire danger classes: High, Very High and Extreme

⇒ FF assessment on demand over requested areas (by ERCC)



Fire Activity

ARISTOTLE Fire Danger Assessment



Active Fires (AF)

Derived from the thermal anomalies produced by fires.

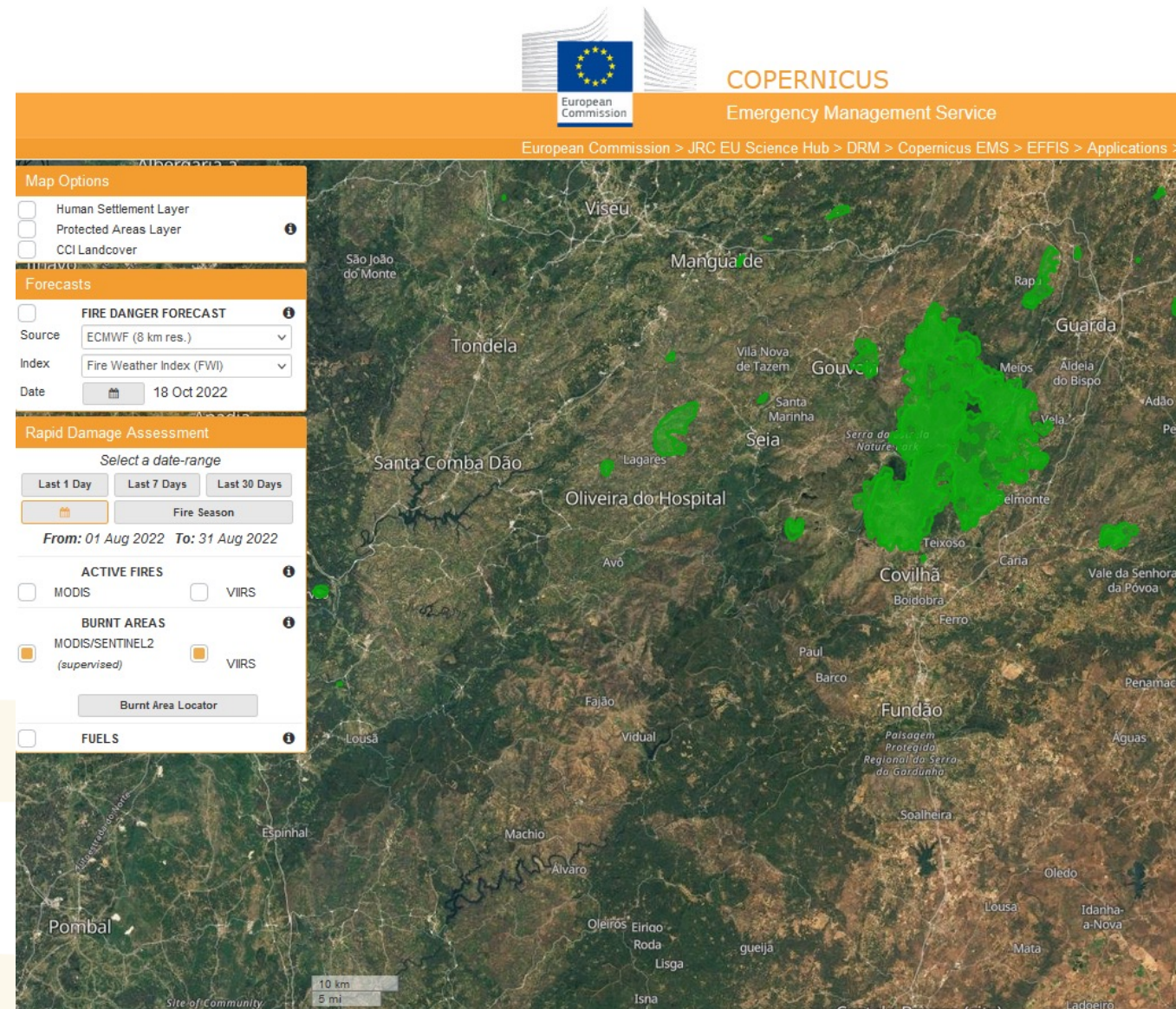
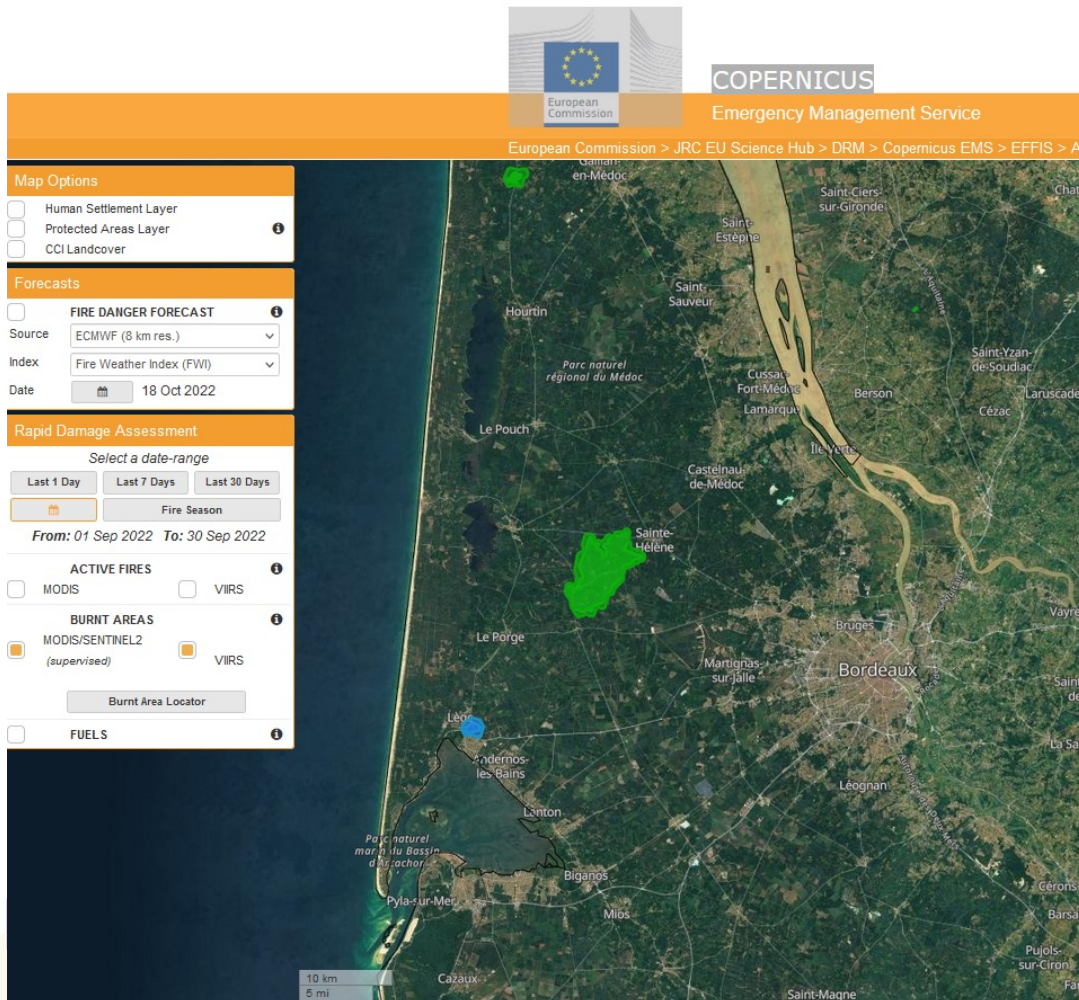
EFFIS/GWIS platforms disseminate data from Moderate Resolution Imaging Spectroradiometer (**MODIS**) and Visible Infrared Imaging Radiometer Suite (**VIIRS**).

Data from NASA's Fire Information for Resource Management System (FIRMS) at Near Real-Time (NRT) within 3 hours of the satellite overpass.



Burned Areas

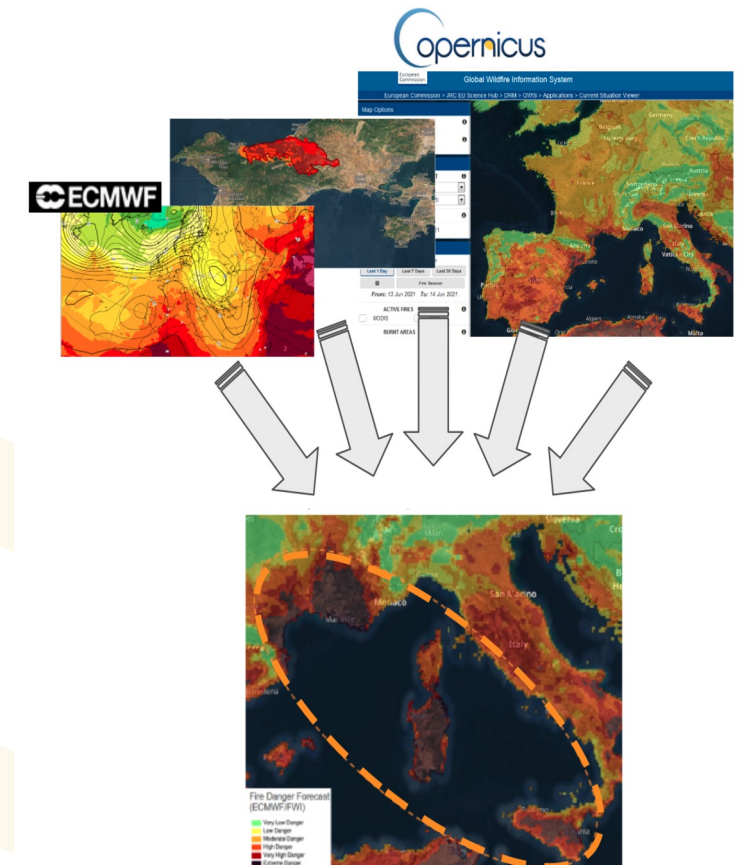
ARISTOTLE Fire Danger Assessment



Fire Danger Forecast

- FWI thresholds, traps, situations, ..
- Fire Danger : peak, stable, morning, afternoon (from hourly conditions), night recovery
- Strong link with wind
- Strong link with humidity
- Fire Danger History (FWI Ranking)
- Fire Activity (FRP)

Fire Danger Forecast (ECMWF/FWI)



Fire Alert Level Matrix

Likelihood of Impact	High	Monitor (4)	Prepare (7)	Act (9)
	Medium	Nil (2)	Monitor (5)	Prepare (8)
	Low	Nil (1)	Nil (3)	Monitor (6)
Decision Matrix		Sub-national resources	National resources	International Resources
		Estimated resources		

Hazard Assessment: Fire danger hazard based on forecasted data available on EFFIS/GWIS platforms, namely the canadian Fire weather indices and meteorological variables provided by ECMWF. The ranking position of the forecasted FWI is considered.

Active Fires: The number and intensity (fire radiative power) of active fires in the considered regions, highlighting the severity of the event.

Vegetation/Fuel Types: Regions covered by dense forest or shrubland are more prone to severe fire events, than areas with sparse vegetation.

Socio-economic interfaces: proximity to natural reserves, touristic areas and urban areas.

MHB Assessment: Other hazardous events in the impact region that may contribute to Risk.

Take into account known **past events** in the region.

Examine whether **Risk > Country Lack of Coping Capacity**.

Evaluate **required resources** and assign an alert level in the Decision Matrix. The **level 9 (Act)** is selected only in the case of ongoing fire spreading with critical fire weather conditions, which is having/could have very strong impacts.

FF Assessments in Aristotle - ROM

- MHOB report: 29/07/2022
 - Integrated in MH Report
 - Headlines / World map
 - Specified when forecasted wildfires

HEADLINES

- Very High Fire Danger over Southern France
- Very High Fire Danger over Albania, Greece, Western Turkey and Cyprus
- Very High Fire Danger Iberian Peninsula
- Very High Fire Danger over Tunisia, Sardinia and Sicily
- On going fire - Germany and Czechia border
- On going fire - Italy and Slovenian border

SUMMARY



Likelihood	High	Monitor	Prepare	Act
	Medium	Nil	Monitor	Prepare
	Low	Nil	Nil	Monitor
Decision Matrix	Sub-national	National Resources	International Resources	
	Estimated Resources			

Based on the Decision Matrix, the 24 events in this report are grouped as follows:

0 "Act" (red) - 8 "Prepare" (orange)
9 "Monitor" (yellow) - 7 "Nil" (green)

FF Assessments in Aristotle - ROM

- MHOB report: 29/07/2022

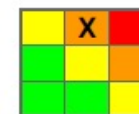
DISCUSSION

1: Very High Fire Danger - Southern France

Description

Very High Fire Danger for today, becoming extreme from tomorrow onwards. FWI values ranging from 70 to 80, becoming greater locally. Very high to extreme fire spread conditions ($20 < ISI < 30$) and very high fuels moisture codes ($FFMC > 96$).

Maximum daily temperatures varying between 30°C and 34°C for the next two days. Minimum temperatures range from 22-24°C. Daily relative humidity values for today varying between 50-30%, with significant recovery tonight. Very low relative humidity values expected from tomorrow: 30-20%, without night recovery. Moderate to strong wind gusts are expected (20 - 40 km/h) gusting up to 50-60 km/h during the next two afternoons.



Likelihood vs Impact

Ardeche:

Max Temp 25°C - 30°C, Min Temp 18°C - 21°C for the next two days.

Relative humidity values Min - Max: 45% - 70% (Friday), 25% - 50% (Saturday), 25% - 40% (Sunday).

Wind: 25-30km/h Friday, becoming 45-55 km/h overnight into Saturday/Sunday.

Precipitation: Some thunderstorms by day 0-2mm Friday, turning clear weekend.

Impacts

Fine and deep fuel moistures remain critically low ($FFMC > 96$ and $700 < DC < 900$), that combined with dry and hot weather and strong winds are linked to high fire danger values, close to the historical maxima, that could result in strong fire behavior in case of ignition.

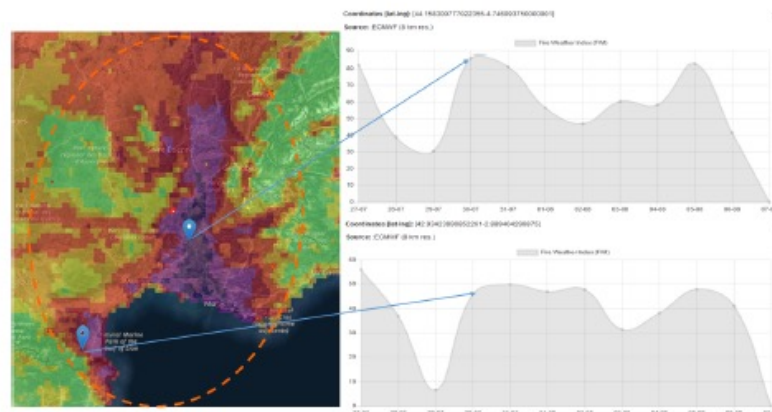


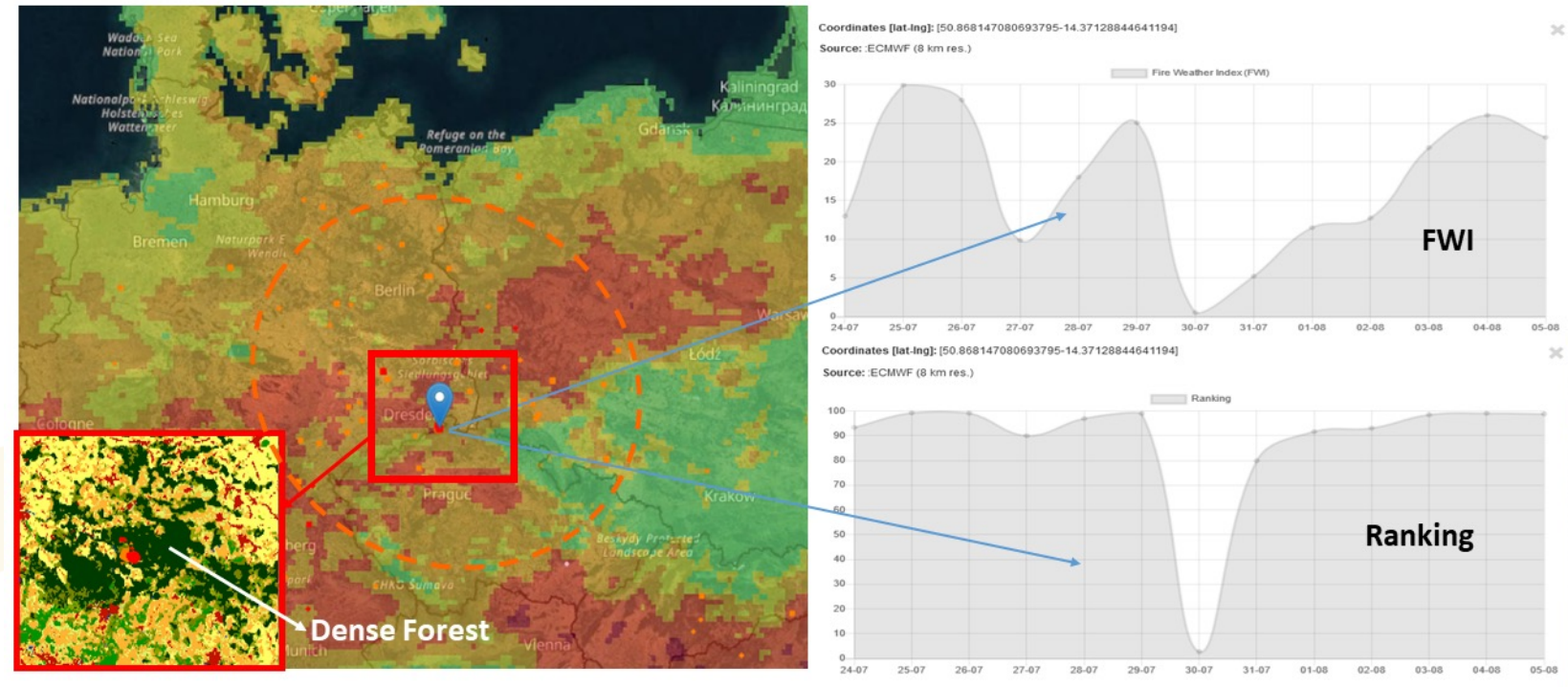
Image 1
FWI map and
temporal evolution
for Southern France
and Ardeche
30 July 2022 (EFFIS)

FF Assessment in Aristotle - ROM

- MHOB report: 27/07/2022

Request from ERCC

FWI, Ranking
Active Fires,
Burned Areas
Vegetation Types



FF Assessment in Aristotle 2022

15th May – 15th September

1st January – 14th May / 16th
September – 15th October

Total: 148 Events



Worldwide: 10



Europe: 138

Total: 33 Events



Worldwide: 20



Europe: 13

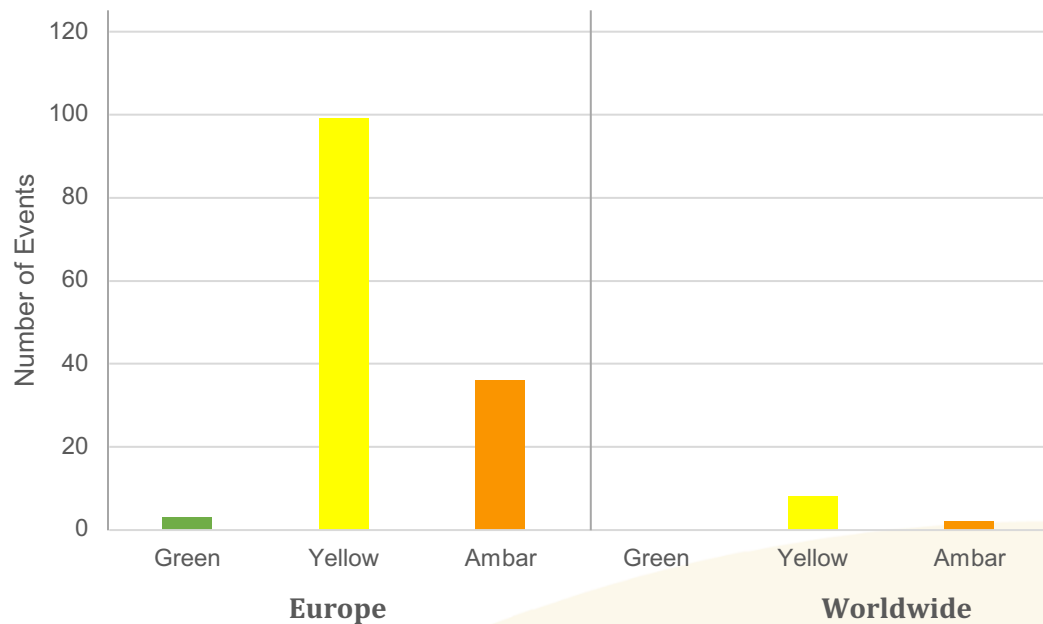


Requests: 43

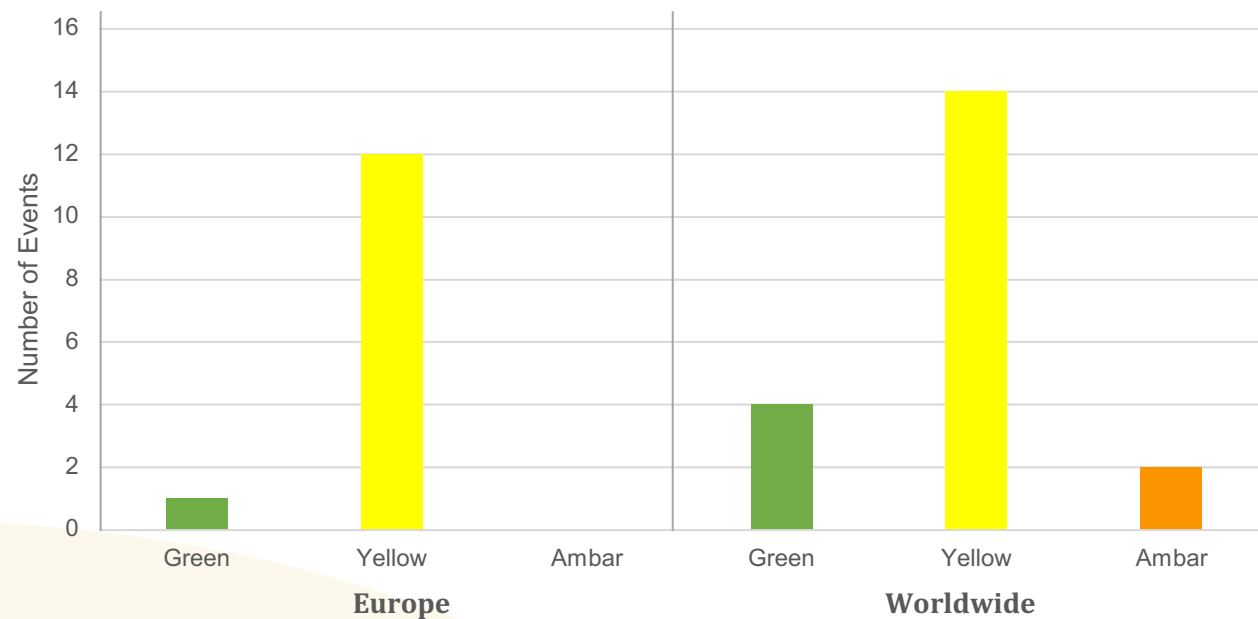


Calls: 3

15th May – 15th September



1st January – 14th May 16th September – 15th October



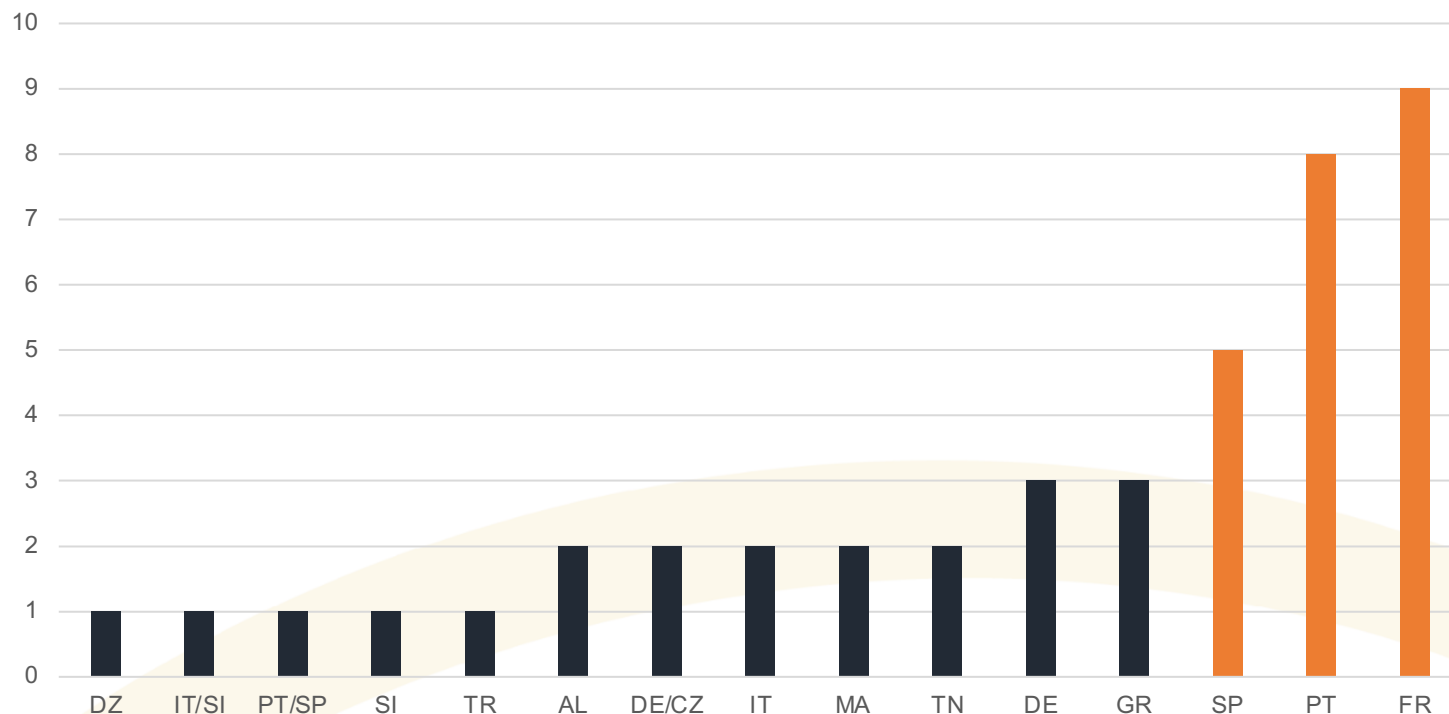


ERCC Requests: 43



Calls: 3

Number of ERCC requests per country



AL – Albania
CZ - Czech Republic
DE - Germany
DZ – Algeria
FR - France
GR – Greece
IT - Italy
MA – Morocco
PT - Portugal
SI – Slovenia
SP - Spain
TN – Tunisia
TR - Turkey

Thank You

Questions ?

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