

# Rapid Mapping at I-Cube SERTIT



**Dr Hervé Yésou,**

<http://sertit.unistra.fr/>

**French Lebanese summer school on Remote Sensing  
Beirut May 30<sup>th</sup> to June 3<sup>rd</sup> , 2022**

# Copernicus services



<https://www.copernicus.eu/fr/services/urgences>

# EMERGENCY SERVICE



## Emergency Management Service



Mapping



**Rapid Mapping  
(RM)**



**Risk & Recovery Mapping  
(RRM)**



Early Warning System



Floods

EFAS  
GloFAS



Fires

EFFIS



Droughts

EDO  
GDO



# European Flood Awareness System



# EMS early warning components

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The of the Copernicus EMS consists of three different systems:

- The European Flood Awareness System (EFAS), which provides overviews on ongoing and forecasted floods in Europe up to 10 days in advance.
- The European Forest Fire Information System (EFFIS), which provides near real-time and historical information on forest fires and forest fire regimes in the European, Middle Eastern and North African regions.
- The European Drought Observatory (EDO), which provides drought-relevant information and early-warnings for Europe.

**Global Flood Awareness System (GloFAS), Global Wildfire Information System (GWIS) and Global Drought Observatory (GDO)** complete the previous three above systems at global level.

# European Forest Fire Information System EFFIS



# European Forest Fire Information System -

EFFIS supports the services in charge of the protection of forests against fires in the EU and neighbor countries and provides the European Commission services and the European Parliament with updated and reliable information on wildland fires in Europe.

Since 1998, : network of experts from the countries in what is called the Expert Group on Forest Fires

Experts from 43 countries in European, Middle East and North African countries.

In 2015, EFFIS became one of the components of the Emergency Management Services in the EU Copernicus program.



# Forest fire forecasting

Fire Danger Forecast (ECMWF/FWI)

- Very Low Danger
- Low Danger
- Moderate Danger
- High Danger
- Very High Danger
- Extreme Danger
- Very Extreme Danger

**Map Options**

- Human Settlement Layer
- Protected Areas Layer
- CCI Landcover

**Forecasts**

**FIRE DANGER FORECAST**

Source: Meteo France (10 km res.)

Index: Fire Weather Index (FWI)

Date: 19 May 2022

**Rapid Damage Assessment**

Select a date-range

Last 1 Day | Last 7 Days | Last 30 Days

From: 01 Jan 2022 To: 22 May 2022

**ACTIVE FIRES**

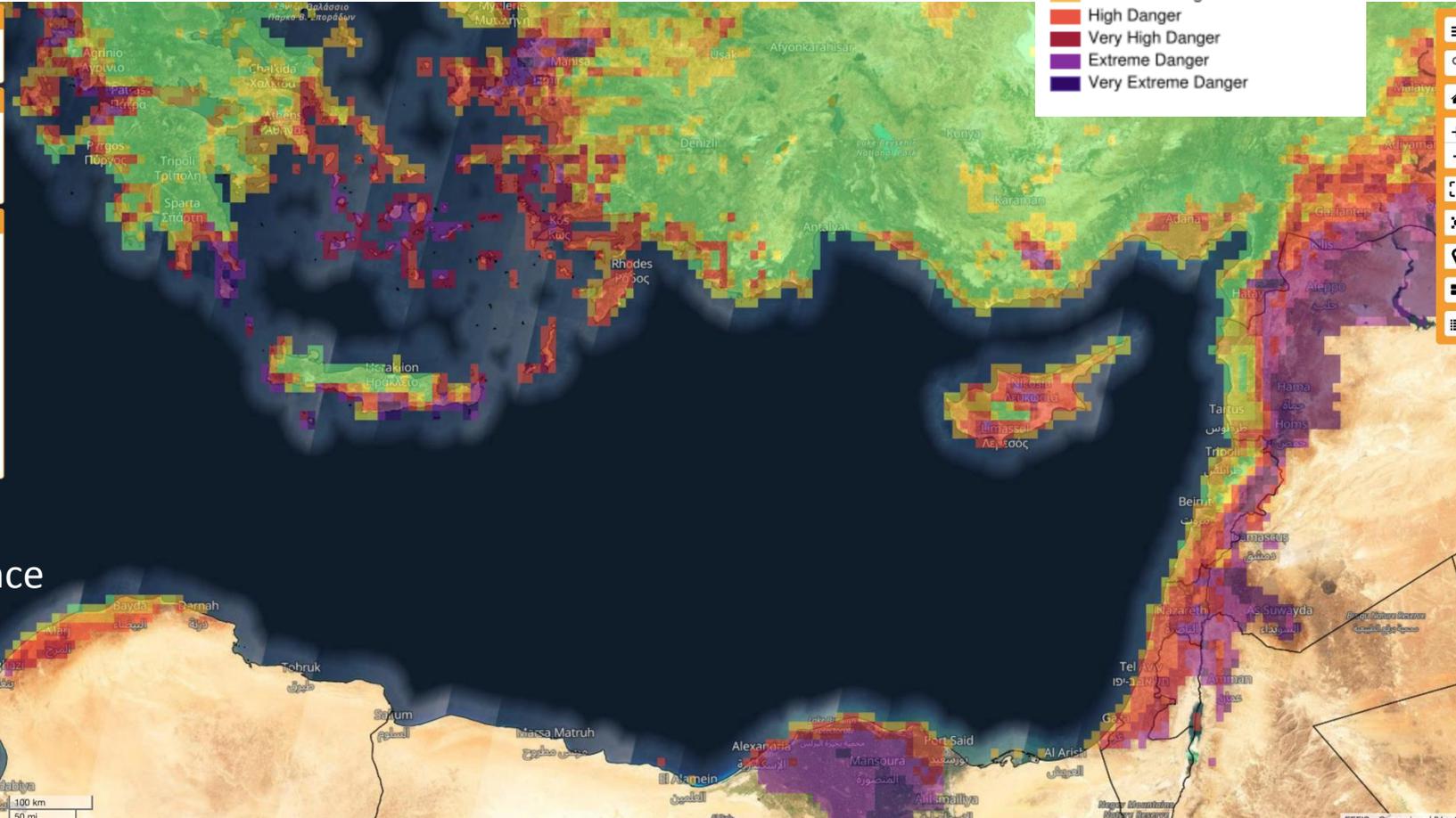
MODIS  VIIRS

**BURNT AREAS**

MODIS/SENTINEL2 (supervised)  VIIRS

Burnt Area Locator

**FUELS**



Meteo France  
10km<sup>2</sup>

Based on two models for various indicators: Fire Weather Index FWI

Fire Weather Index (FWI)

Initial Spread Index (ISI)

Build Up Index (BUI)

Fine Fuel Moisture Code (FFMC)

Duff Moisture Code (DMC)

Drought Code (DC)

Anomaly

Ranking

KBDI

Keetch-Byram Drought Index (KBDI)

MARK-5

✓ Drought Factor (DF)

Rate of Spread (ROS)

Fire Danger Index (FDI)

NFDRS

NFDRS Rate of Spread (NFDRS ROS)

NFDRS Spread Component (NFDRS SC)

NFDRS Energy Release Component (NFDRS ERC)

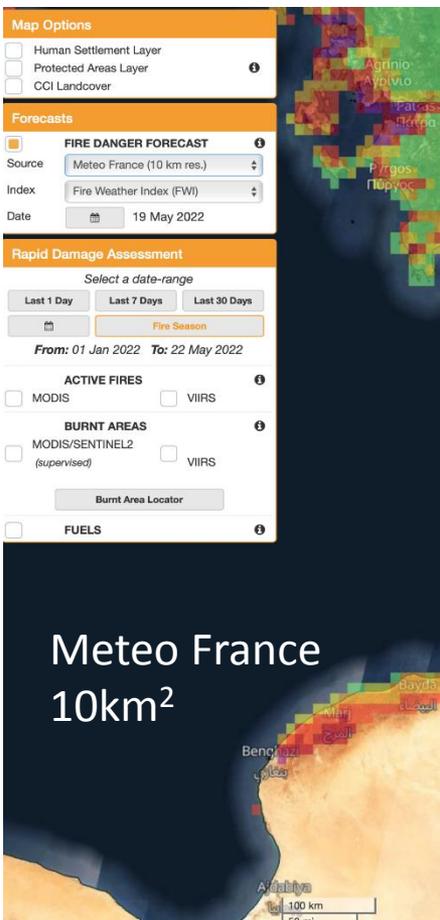
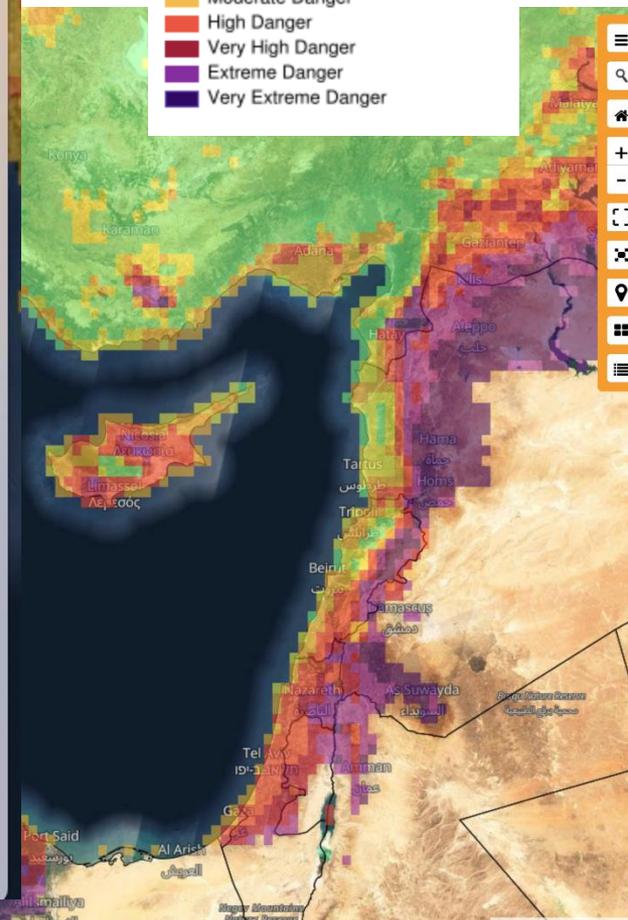
NFDRS Burning Index (NFDRS BI)

NFDRS Ignition Probability (NFDRS IC)

ng

Fire Danger Forecast (ECMWF/FWI)

- Very Low Danger
- Low Danger
- Moderate Danger
- High Danger
- Very High Danger
- Extreme Danger
- Very Extreme Danger



Meteo France  
10km<sup>2</sup>

Based on two models for various indicators: Fire Weather Index FWI

# Forest fire forecasting

Fire Danger Forecast (ECMWF/FWI)

- Very Low Danger
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**Map Options**

- Human Settlement Layer
- Protected Areas Layer
- CCI Landcover

**Forecasts**

**FIRE DANGER FORECAST**

Source: ECMWF (8 km res.)

Index: Fire Weather Index (FWI)

Date: 19 May 2022

**Rapid Damage Assessment**

Select a date-range

Last 1 Day | Last 7 Days | Last 30 Days

From: 01 Jan 2022 To: 22 May 2022

**ACTIVE FIRES**

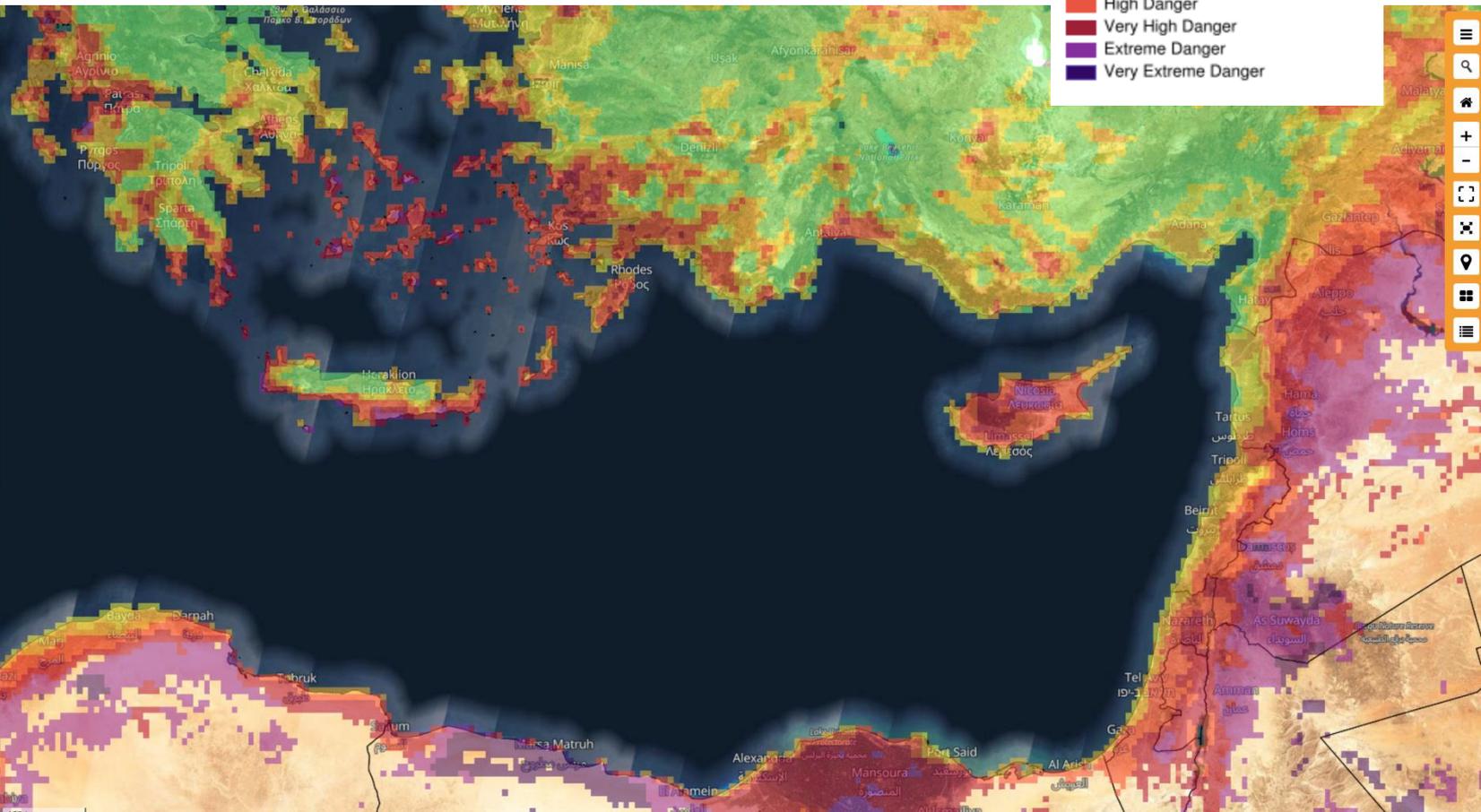
MODIS  VIIRS

**BURNT AREAS**

MODIS/SENTINEL2 (supervised)  VIIRS

Burnt Area Locator

**FUELS**



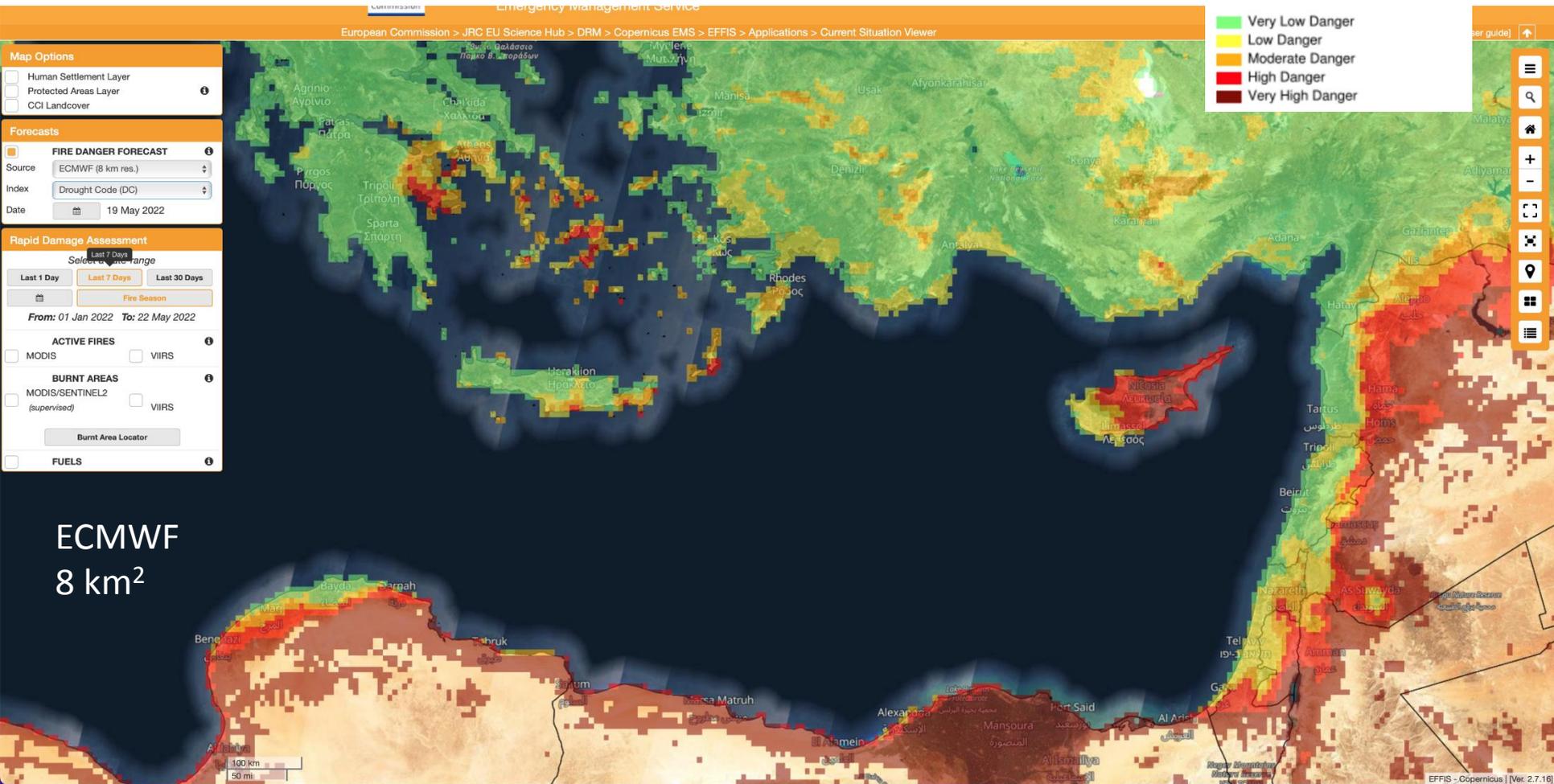
ECMWF

Based on two models for various indicators: Fire Weather Index FWI



# Forest fire forecasting

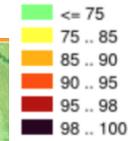
## Fire Danger Forecast (ECMWF/DC)



Based on two models for various indicators: Drought Code

# Forest fire forecasting

Fire Danger Forecast  
(ECMWF/Ranking)



**Map Options**

- Human Settlement Layer
- Protected Areas Layer
- CCI Landcover

**Forecasts**

FIRE DANGER FORECAST

Source: ECMWF (8 km res.)

Index: Ranking

Date: 19 May 2022

**Rapid Damage Assessment**

Select a date-range

Last 1 Day | Last 7 Days | Last 30 Days

Fire Season

From: 01 Jan 2022 To: 22 May 2022

**ACTIVE FIRES**

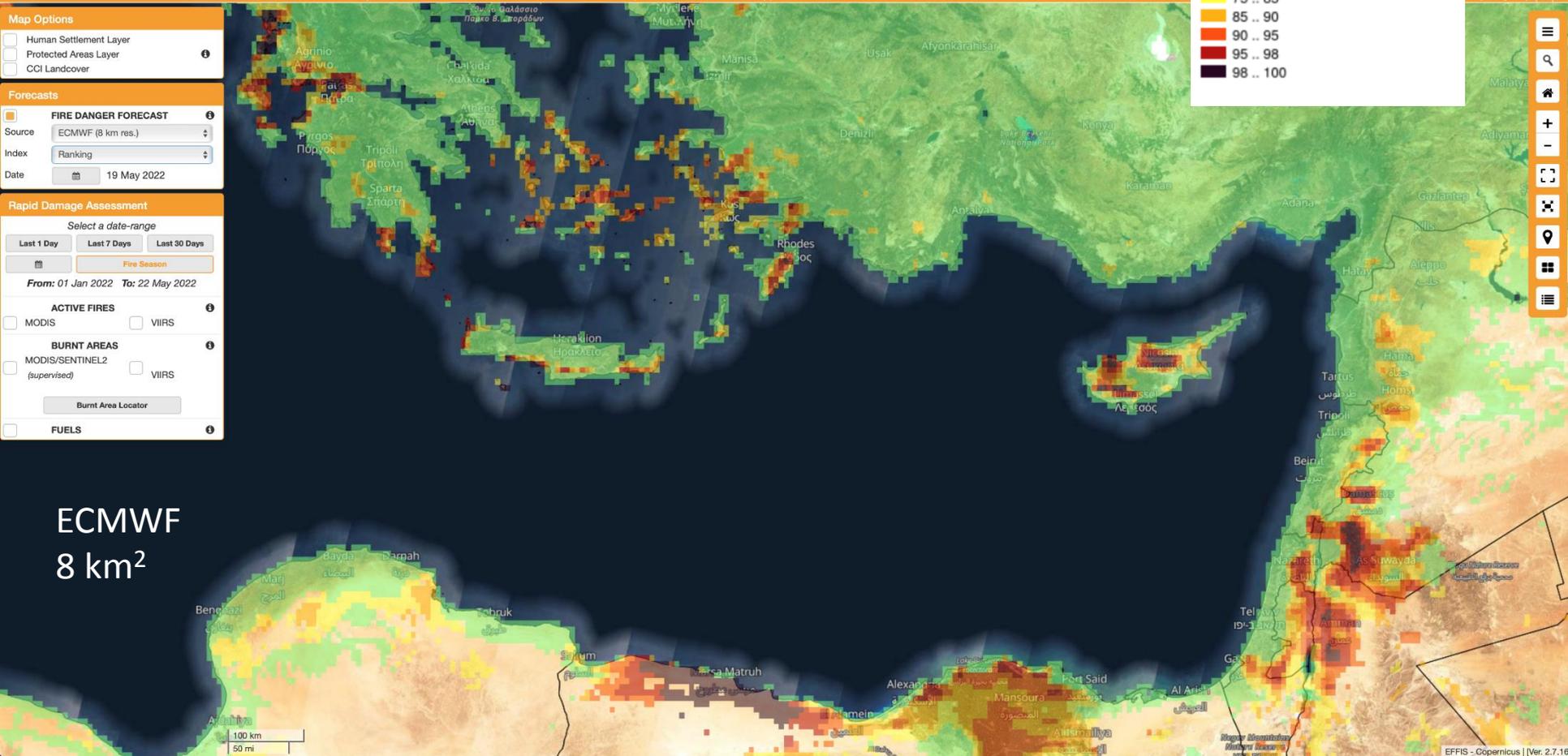
MODIS  VIIRS

**BURNT AREAS**

MODIS/SENTINEL2 (supervised)  VIIRS

Burnt Area Locator

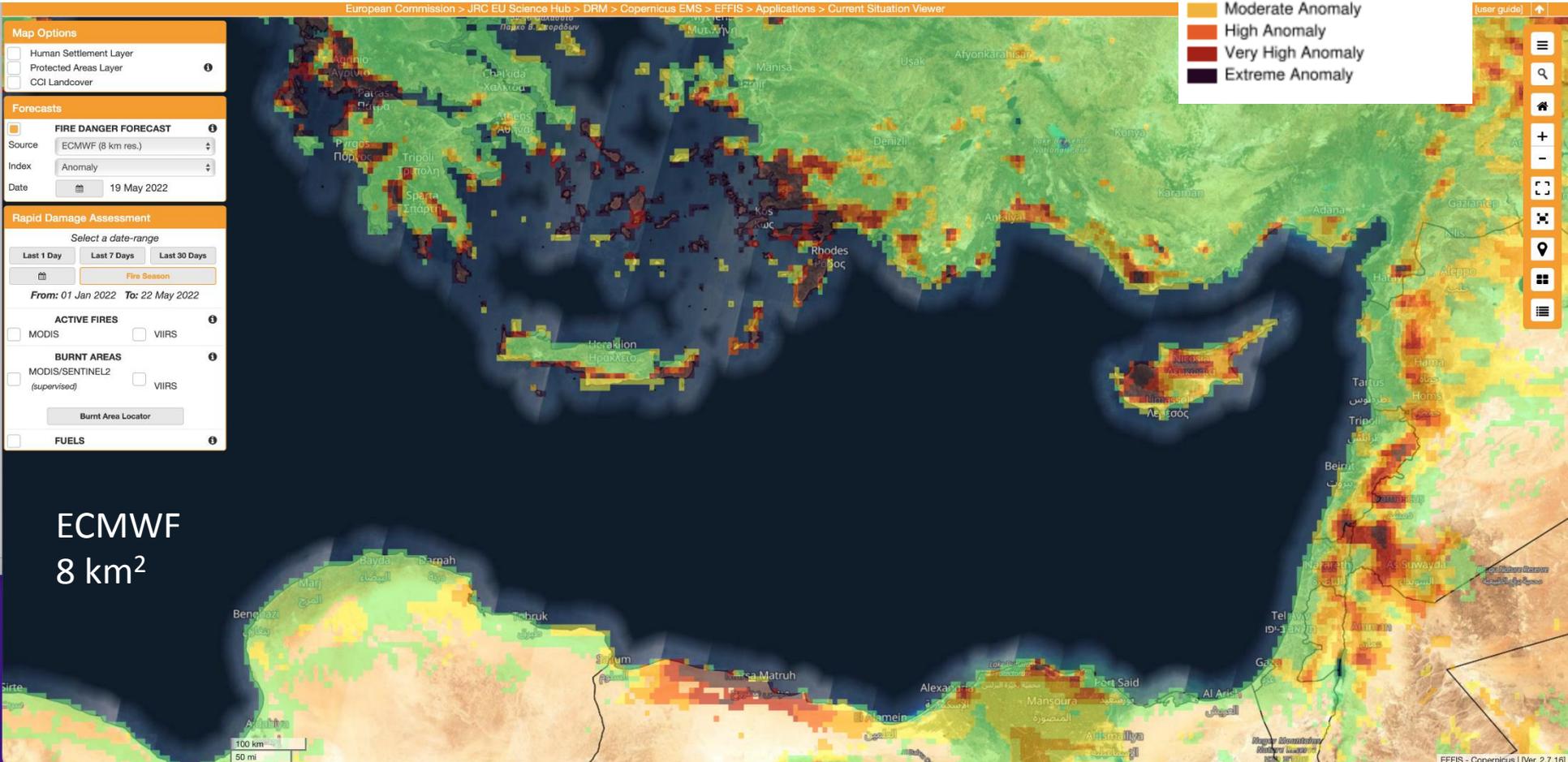
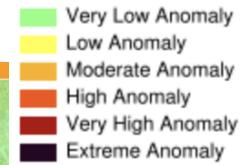
**FUELS**



Based on two models for various indicators: Ranking

# Forest fire forecasting

## Fire Danger Forecast (ECMWF/Anomaly)



Based on two models for various indicators: Anomaly

# Current situation: different time scales



## Rapid damage assessment

# Current situation: different time scales

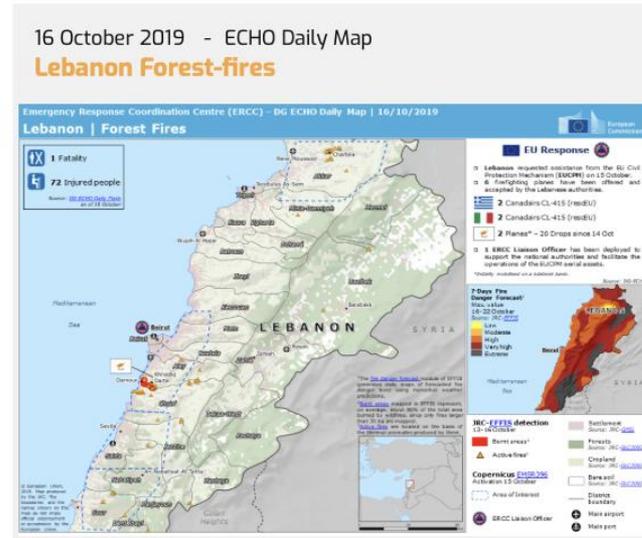
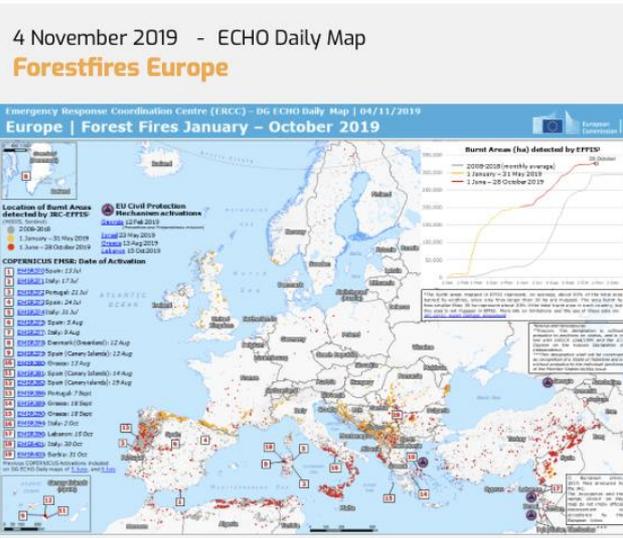
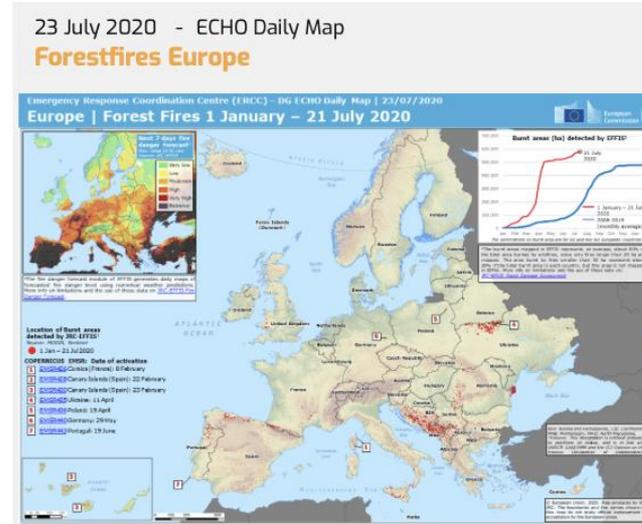
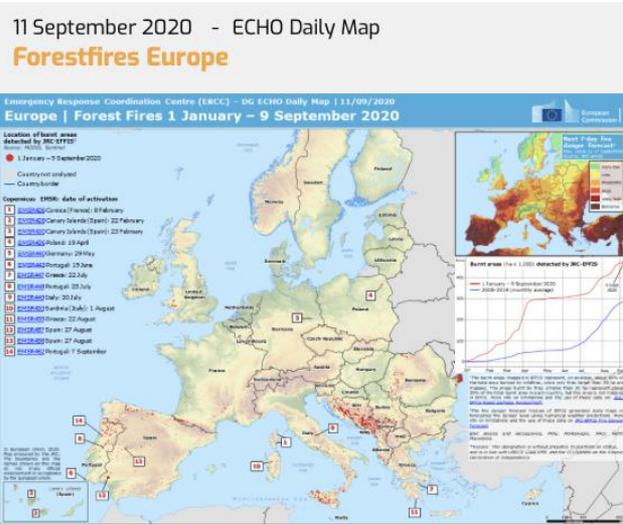


One fire season

Rapid damage assessment

# Country/Regional Wildfire Maps

## In relations with EMSR activity



Country/Regional Wildfire Maps

# Country/Regional Wildfire Maps

## In relations with EMSR activity

11 September 2020 - ECHO Daily Map

23 July 2020 - ECHO Daily Map

Emergency Response Coordination Centre (ERCC) – DG ECHO Daily Map | 11/09/2020

### Europe | Forest Fires 1 January – 9 September 2020



#### Location of burnt areas detected by JRC-EFFIS<sup>1</sup>

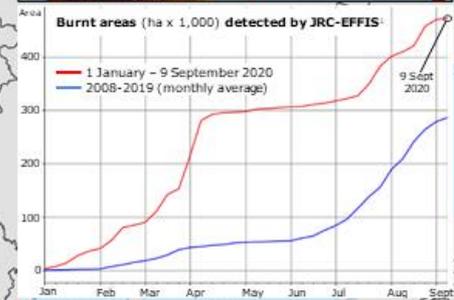
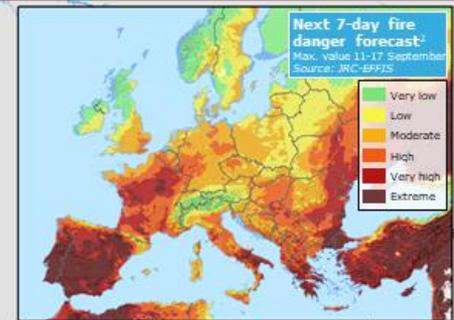
Source: MODIS, Sentinel

● 1 January – 9 September 2020

□ Country not analysed  
— Country border

#### Copernicus EMSR: date of activation

- 1 EMSR426 Corsica (France): 8 February
- 2 EMSR428 Canary Islands (Spain): 22 February
- 3 EMSR430 Canary Islands (Spain): 23 February
- 4 EMSR436 Poland: 19 April
- 5 EMSR440 Germany: 29 May
- 6 EMSR443 Portugal: 19 June
- 7 EMSR447 Greece: 22 July
- 8 EMSR448 Portugal: 25 July
- 9 EMSR449 Italy: 30 July
- 10 EMSR453 Sardinia (Italy): 1 August
- 11 EMSR455 Greece: 22 August
- 12 EMSR457 Spain: 27 August
- 13 EMSR458 Spain: 27 August
- 14 EMSR462 Portugal: 7 September



<sup>1</sup>The burnt areas mapped in EFFIS represent, on average, about 90% of the total area burned by wildfires, since only fires larger than 30 ha are mapped. The areas burnt by fires smaller than 30 ha represent about 20% of the total burnt area in each country, but this area is not mapped in EFFIS. More info on limitations and the use of these data on: [JRC-EFFIS Rapid Damage Assessment](#).

<sup>2</sup>The fire danger forecast module of EFFIS generates daily maps of forecasted fire danger level using numerical weather predictions. More info on limitations and the use of these data on: [JRC-EFFIS Fire Danger Forecast](#).

BIH: Bosnia and Herzegovina, MNE: Montenegro, MKD: North Macedonia.

\*Kosovo: This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.

© European Union, 2020.  
Map produced by the JRC.  
The boundaries and the names shown on this map do not imply official endorsement or acceptance by the European Union.

# Country/Regional Wildfire Maps

## In relations with EMSR activity

Emergency Response Coordination Centre (ERCC) – DG ECHO Daily Map | 16/10/2019

### Lebanon | Forest Fires



1 Fatality

72 Injured people

Source: [DG ECHO Daily Flash](#) as of 16 October



The [fire danger forecast](#) module of EFFIS generates daily maps of forecasted fire danger level using numerical weather predictions.

[Burnt areas](#) mapped in EFFIS represent, on average, about 80% of the total area burned by wildfires, since only fires larger than 30 ha are mapped.

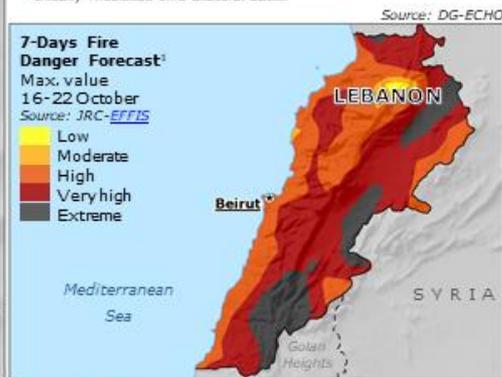
[Active fires](#) are located on the basis of the thermal anomalies produced by them.



### EU Response

- Lebanon requested assistance from the EU Civil Protection Mechanism (EUCPM) on 15 October.
- 6 firefighting planes have been offered and accepted by the Lebanese authorities.
- 2 Canadairs CL-415 (rescEU)
- 2 Canadairs CL-415 (rescEU)
- 2 Planes\* – 20 Drops since 14 Oct
- 1 ERCC Liaison Officer has been deployed to support the national authorities and facilitate the operations of the EUCPM aerial assets.

\*Initially mobilised on a bilateral basis.



### JRC-EFFIS detection 13-16 October

- Burnt areas<sup>2</sup>
- Active fires<sup>3</sup>

- Settlement  
Source: JRC-[GHSL](#)
- Forests  
Source: JRC-[GLC2000](#)
- Cropland  
Source: JRC-[GLC2000](#)
- Bare soil  
Source: JRC-[GLC2000](#)

### Copernicus EMSR396 Activation 15 October

- Area of Interest
- ERCC Liaison Officer
- Main airport
- Main port

© European Union, 2019. Map produced by the JRC. The boundaries and the names shown on this map do not imply official endorsement or acceptance by the European Union.

## Country/Regional Wildfire Maps

# Fire news

## Firenews

Fire news is an application that collects, geo-locates and stores in a database fire news published in the internet in all the EU and other languages, allowing the user to filter the news on the basis of geographical scope, keywords, e

The screenshot displays the Firenews application interface. On the left, there is a search filter panel with the following fields: 'From' (01/01/2012), 'To' (31/12/2012), 'Country' (All countries), and a 'Search' button. Below the filter is a list of news items, each with a date range and a country code, such as '2012-01-19 - 2012-01-19 [GR] - Greece / Attica/Sifnos'. On the right, a satellite map of Europe shows several blue location markers indicating fire news events across the continent. The top of the interface features the Copernicus logo and navigation links: 'Home', 'Parameters', 'Help', 'Partners', and 'Contact'.

# Fire news



[About](#) [Publications](#) [Apps](#) [Partners](#) [Contacts](#)



**From**

**To**

**Country**

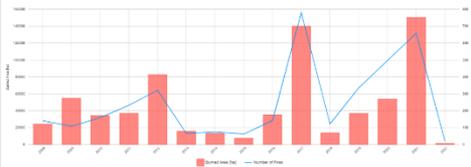
**Search**

2022-05-19 - 2022-05-19 [GR] - Greece / Amoni, Sofiko	0 ha
2022-05-19 - 2022-05-19 [GR] - Greece / Vonitsa	0 ha
2022-05-18 - 2022-05-18 [FR] - France / Opoul	8 ha
2022-05-18 - 2022-05-18 [IT] - Italy / Vesuvius	0 ha
2022-05-18 - 2022-05-18 [IT] - Italy / Marina di Modica/Maganuco	0 ha
2022-05-18 - 2022-05-18 [FR] - France / Opoul-Périllos	10 ha
2022-05-18 - 2022-05-18 [GR] - Greece / Kamatero, Attica	0 ha
2022-05-18 - 2022-05-18 [UA] - Ukraine / Chernobyl	0 ha
2022-05-16 - 2022-05-16 [FR] - France / Thorigné-Fouillard/Liffré, Rennes	25 ha
2022-05-16 - 2022-05-16 [SE] - Sweden / Härnösand/Timrå	0 ha

# EFFIS Statistics Portal

## EFFIS Estimates

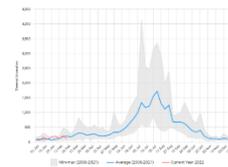
of Burned Areas and Number of Fires



[Open](#)

## Seasonal Trend

of Burned Areas, Number of Fires and Thermal Anomalies



[Open](#)

# Information available for

## EU Countries

### Overview

-  AUT - Austria
-  BEL - Belgium
-  BGR - Bulgaria
-  HRV - Croatia
-  CYP - Cyprus
-  CZE - Czechia
-  DNK - Denmark
-  EST - Estonia
-  FIN - Finland
-  FRA - France
-  DEU - Germany
-  GRC - Greece
-  HUN - Hungary
-  IRL - Ireland

## European non EU Cou...

### Overview

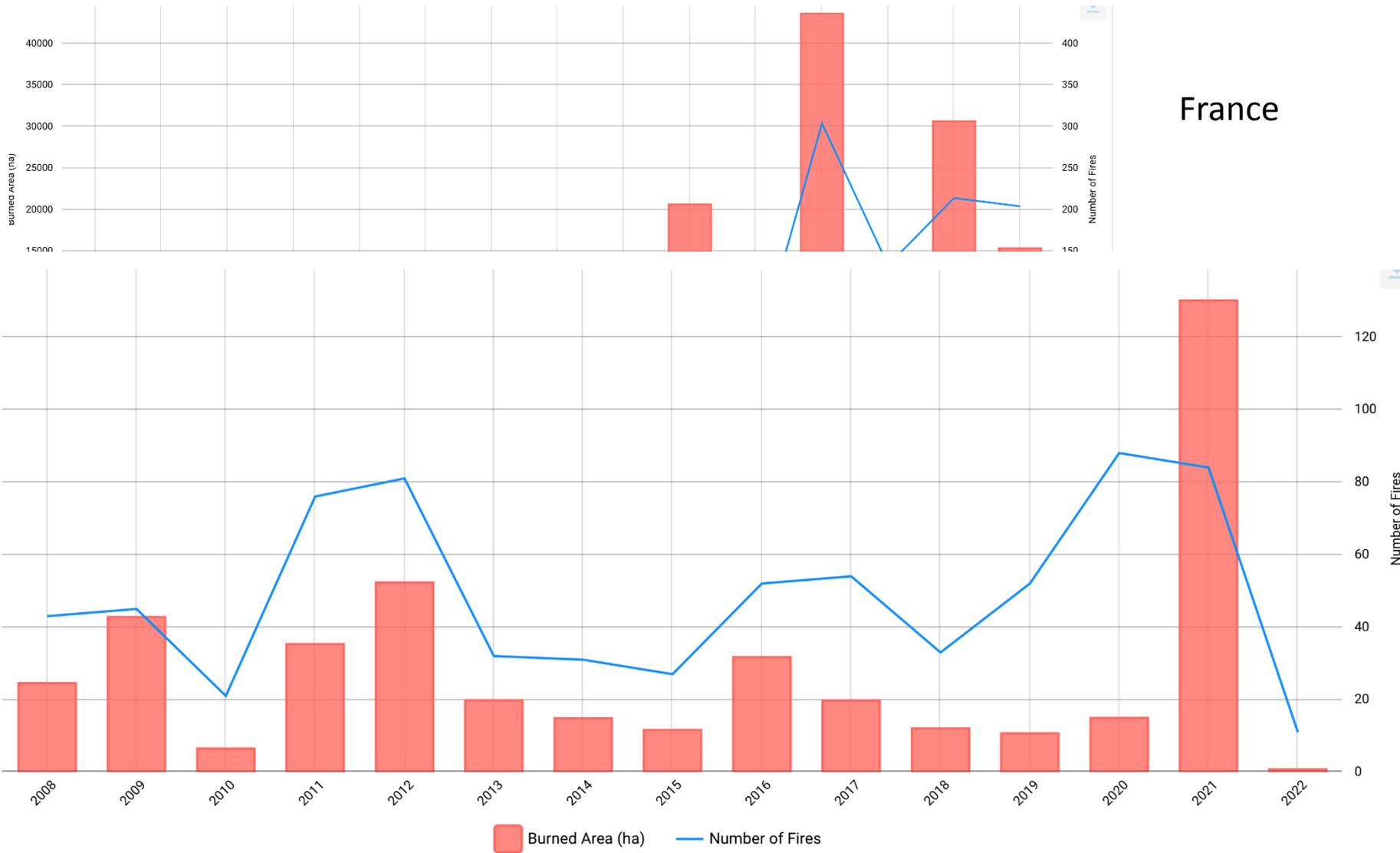
-  ALB - Albania
-  BIH - Bosnia and Herzegovina
-  GEO - Georgia
-  MNE - Montenegro
-  MKD - North Macedonia
-  NOR - Norway
-  SRB - Serbia
-  CHE - Switzerland
-  TUR - Turkey
-  UKR - Ukraine
-  GBR - United Kingdom

## MENA Countries

### Overview

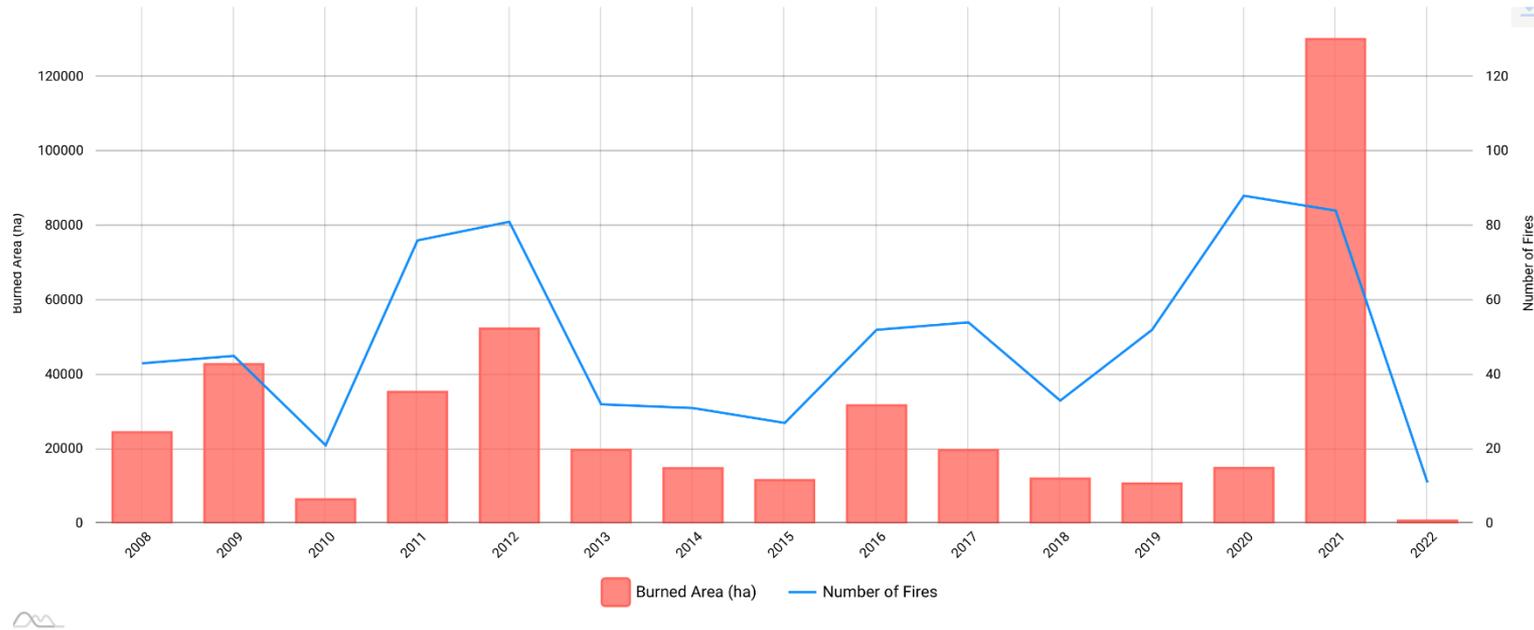
-  DZA - Algeria
-  ISR - Israel
-  LBN - Lebanon
-  LBY - Libya
-  MAR - Morocco
-  PSE - State of Palestine
-  SYR - Syrian Arab Republic
-  TUN - Tunisia

# EFFIS Statistics Portal



# EFFIS Statistics Portal

Greece

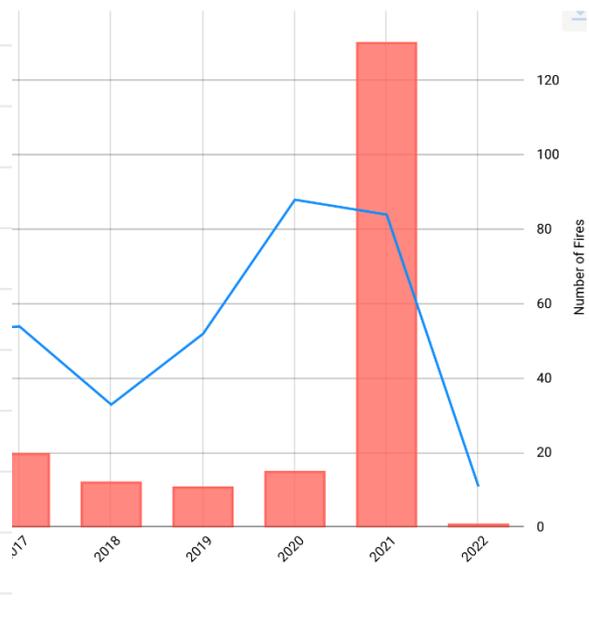


# EFFIS Statistics Portal



Year	Burned Area (ha)	Number of Fires
2008	24502	43
2009	42757	45
2010	6472	21
2011	35305	76
2012	52269	81
2013	19762	32
2014	14815	31
2015	11613	27
2016	31707	52
2017	19682	54
2018	12037	33
2019	10689	52
2020	14915	88
2021	130058	84
2022	756	11

Burned Area (ha)



Greece

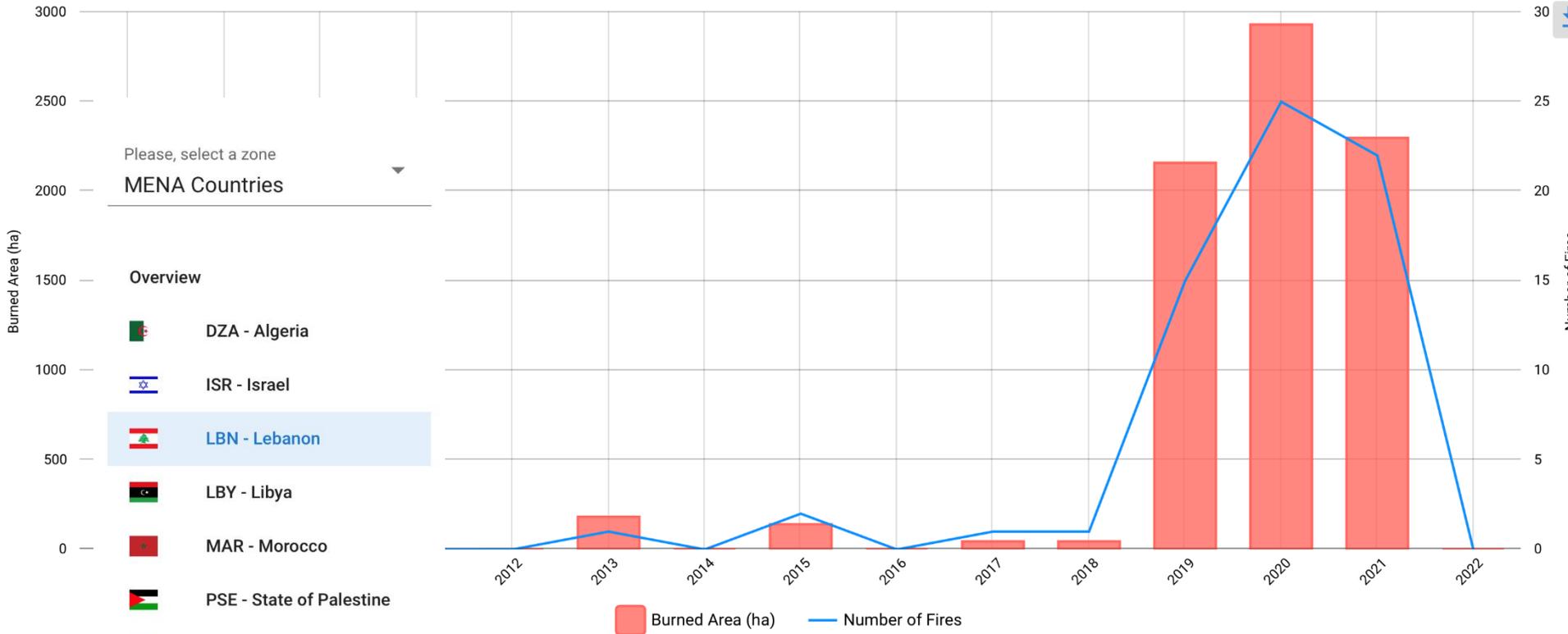
2020-2021 same amount of fires  
But in terms of surface \*10 in 2021

# EFFIS Statistics Portal

## EFFIS Annual Statistics for Lebanon

[Country Profile](#)

[Copy URL](#)



# GWIS



GWIS : a joint initiative of the [GEO](#) and the [Copernicus](#) Work Programs.

GWIS : Bring together existing information sources at regional and national level in order to provide a comprehensive view and evaluation of fire regimes and fire effects at global level and to provide tools to support operational wildfire management from national to global scales.

GWIS builds on the ongoing activities of the European Forest Fire Information System ([EFFIS](#)), the Global Terrestrial Observing System (GTOS) Global Observation of Forest Cover- Global Observation of Land Dynamics (GOFC-GOLD) Fire Implementation Team ([GOFC Fire IT](#)), and the associated Regional Networks,



# GWIS



## Current Situation Viewer

Provides fire danger forecast up to 10 days in advance, 1-day lightning forecast and near-real time information on active fires...

[Read more >](#)



## Current Statistics Portal

Statistics are provided at national level and for regions of interest, such as the "Brazilian Legal Amazon" and the Arctic Monitoring and Assessment Program (AMAP).

[Read more >](#)



## Country Profile

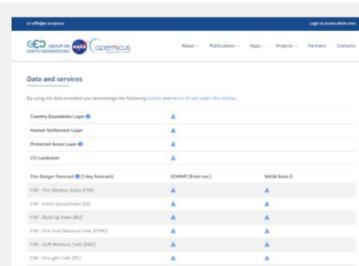
Provides historical overviews of fire regimes at country and sub-country level for the period 2002-2019.

[Read more >](#)



## Long-term fire weather forecast

Monthly and seasonal forecast of temperature and rainfall anomalies that are expected to prevail over the world. [Read more >](#)



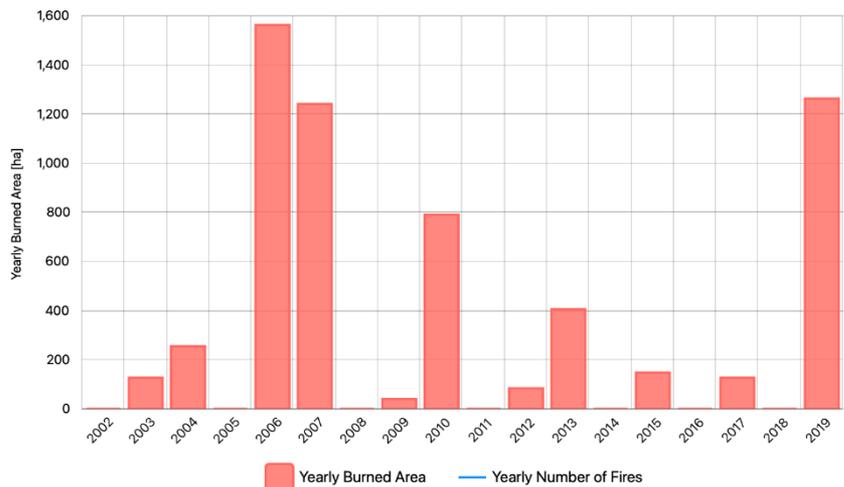
## Data & Services

Provides access to the data used in the GWIS applications. Data from the Current Situation Viewer are provided from the WMS.

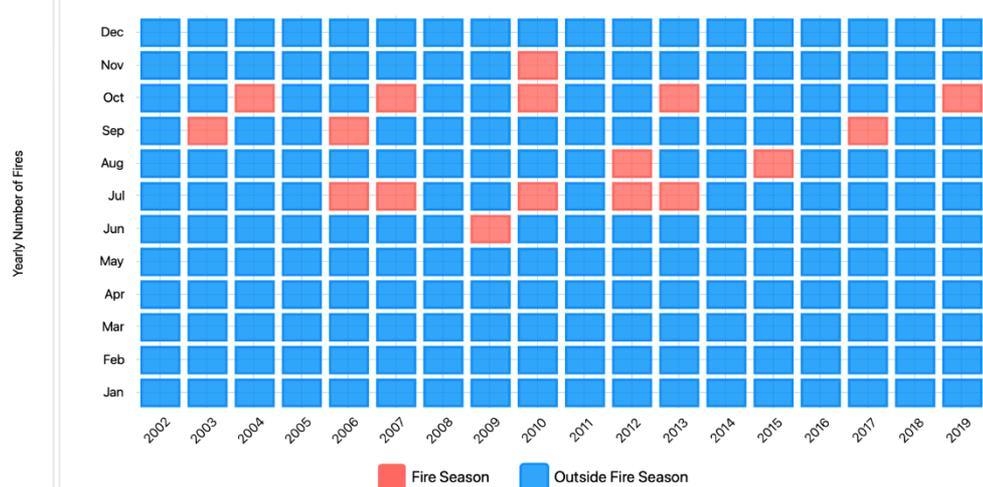
[Read more >](#)

# GWIS : Country profile

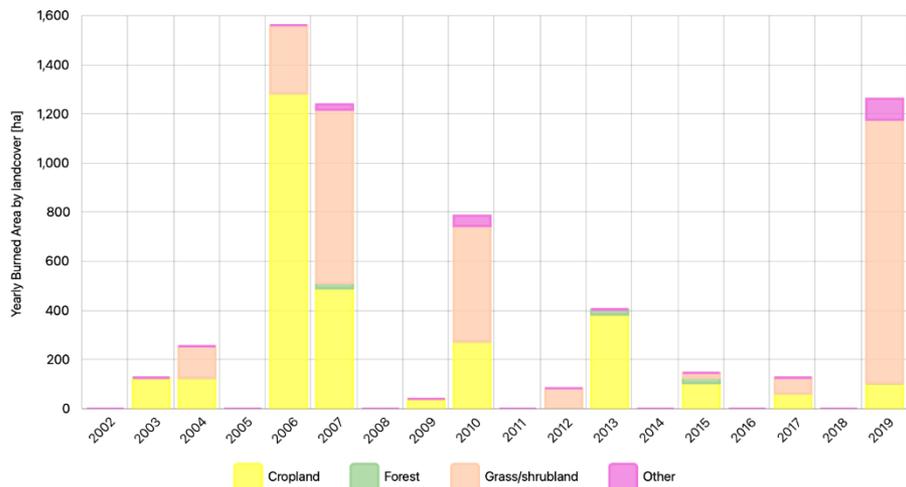
Yearly Burned Area & Number of Fires - [2002-2019]



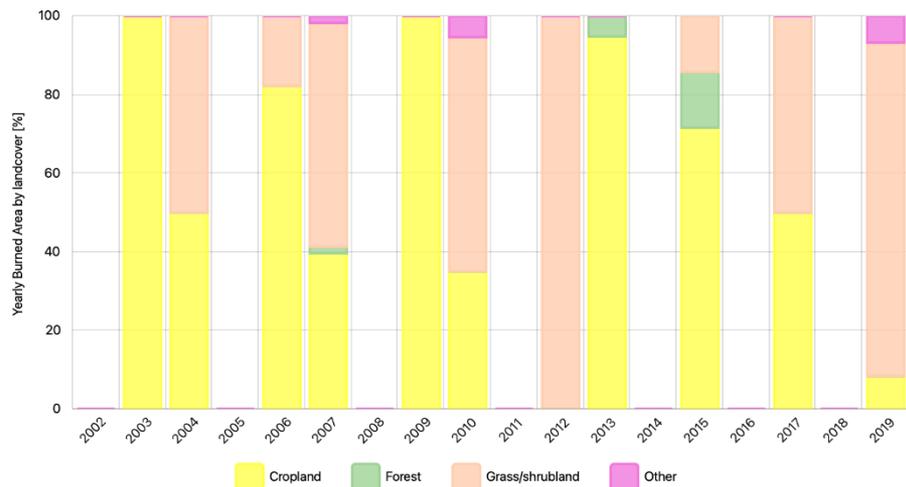
Yearly Burned Area Seasonality - [2002-2019]



Yearly Burned Area by Landcover - [2002-2019]

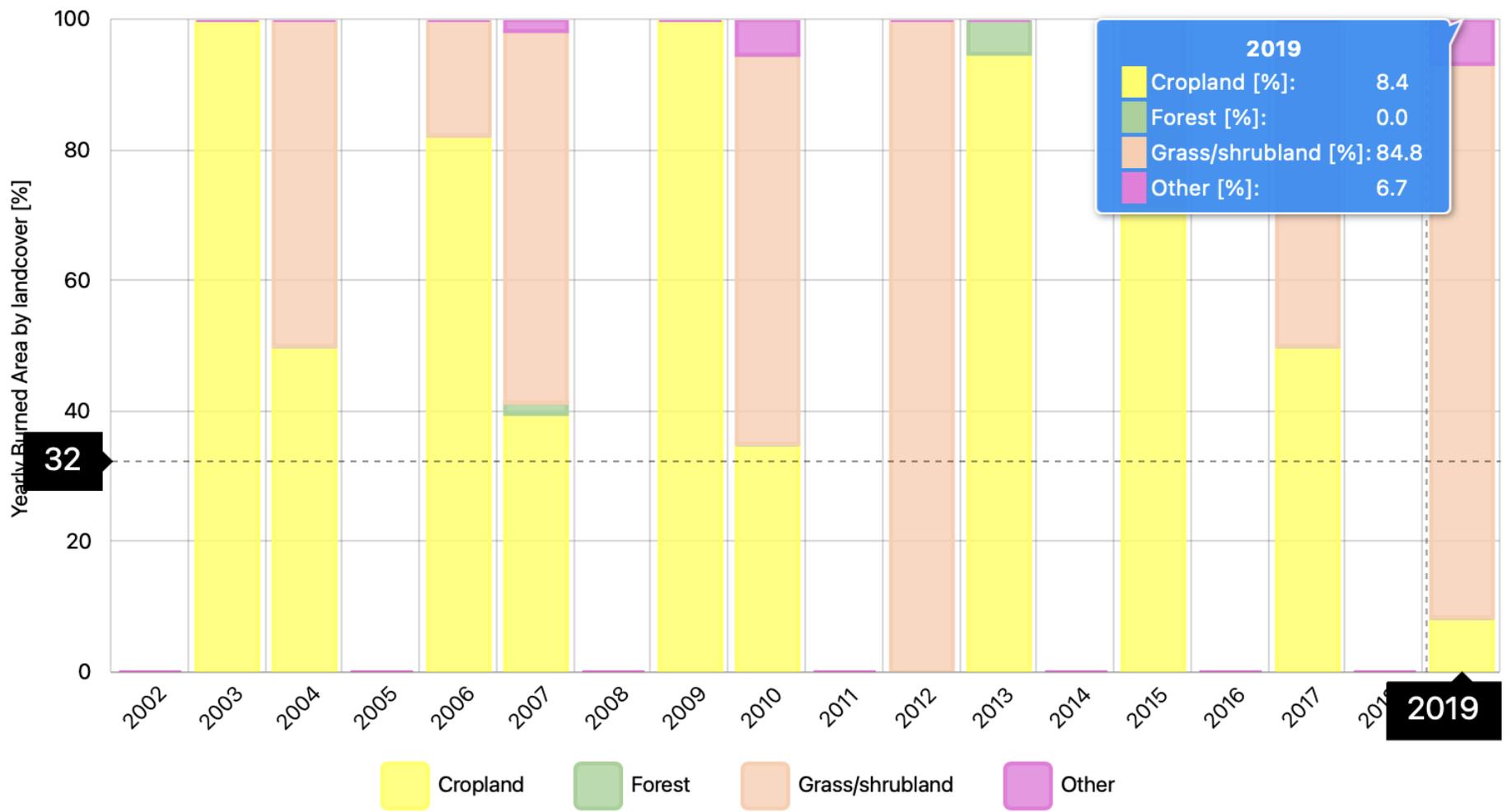


Yearly Burned Area by Landcover (100%) - [2002-2019]



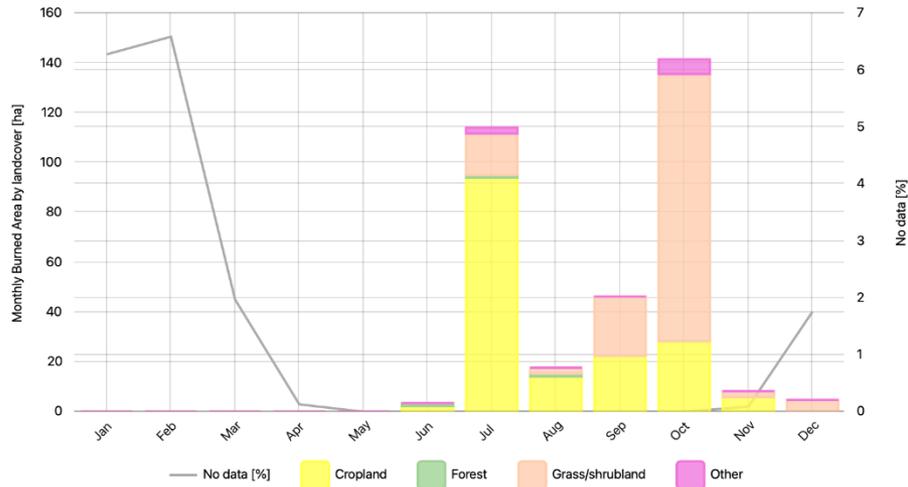
# GWIS : Country profile

Yearly Burned Area by Landcover (100%) - [2002-2019]

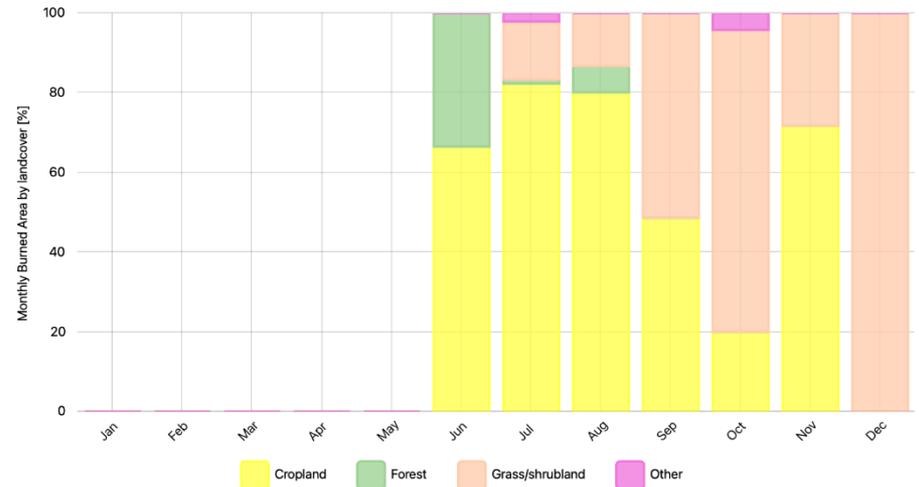


# GWIS

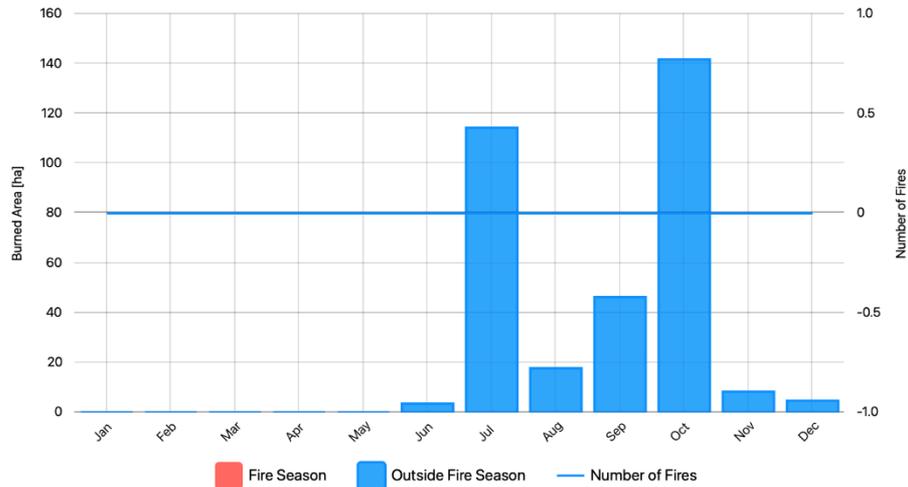
Average Monthly Burned Area by Landcover & No Data - [2002-2019]



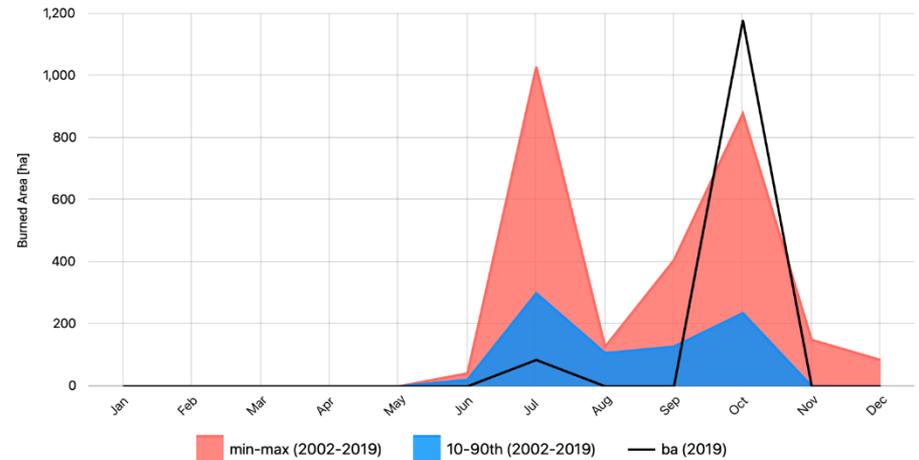
Average Monthly Burned Area by Landcover (100%) - [2002-2019]



Average Monthly Burned Area Seasonality & Number of Fires - [2002-2019]



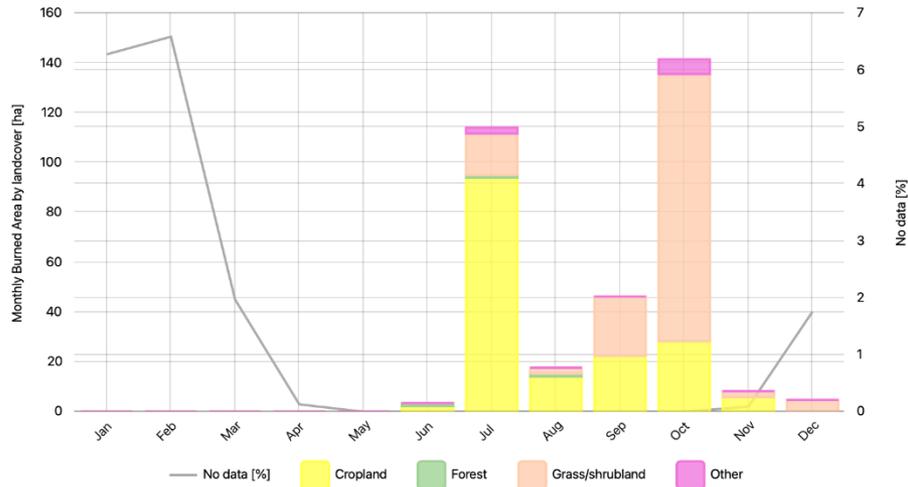
[2002-2019] → 2019 Monthly Burned Area vs Historical



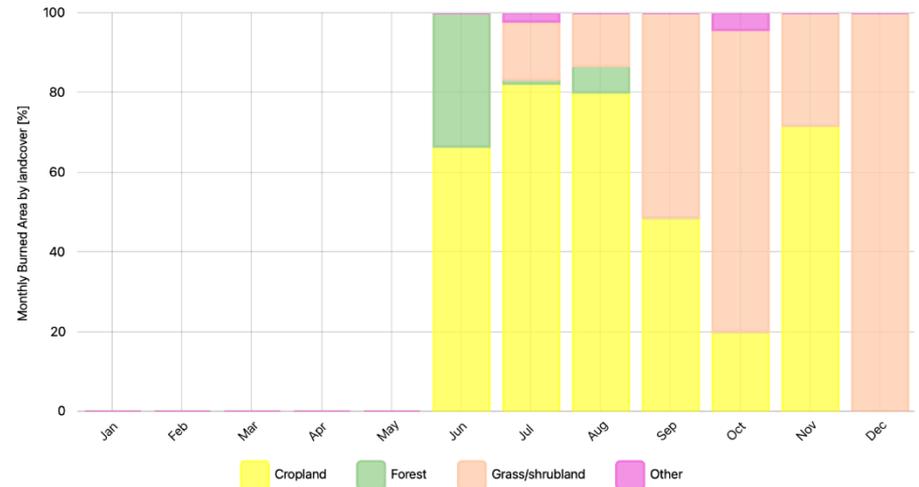
NOTE: computation for the selected period DOES NOT include the year 2019

# GWIS

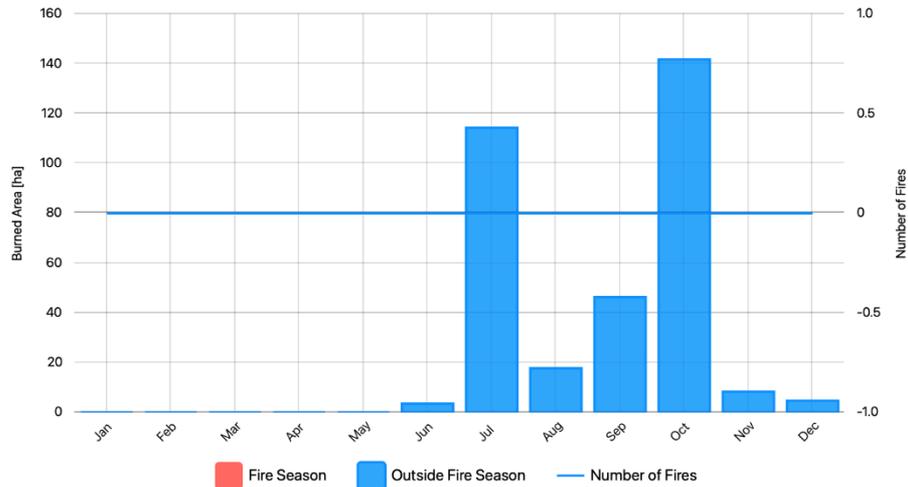
Average Monthly Burned Area by Landcover & No Data - [2002-2019]



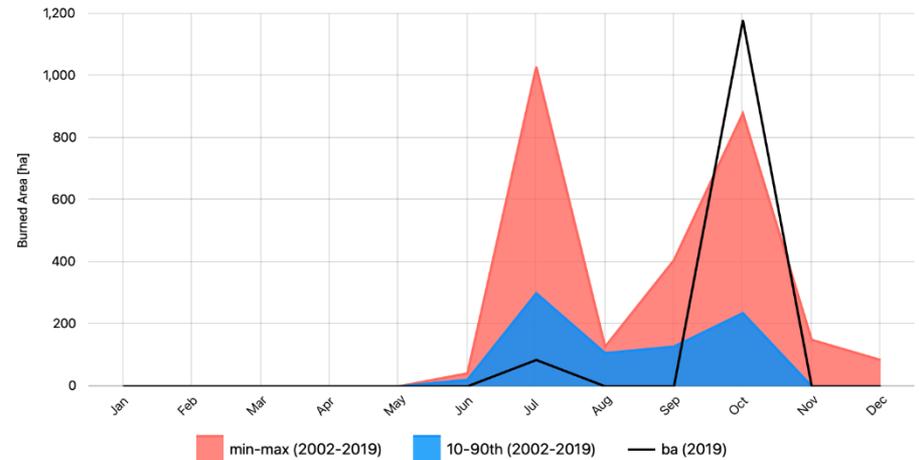
Average Monthly Burned Area by Landcover (100%) - [2002-2019]



Average Monthly Burned Area Seasonality & Number of Fires - [2002-2019]



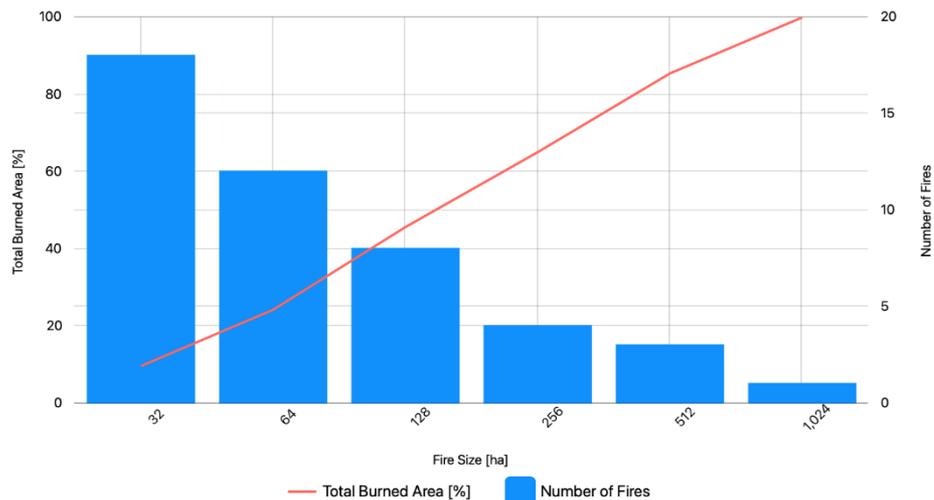
[2002-2019] → 2019 Monthly Burned Area vs Historical



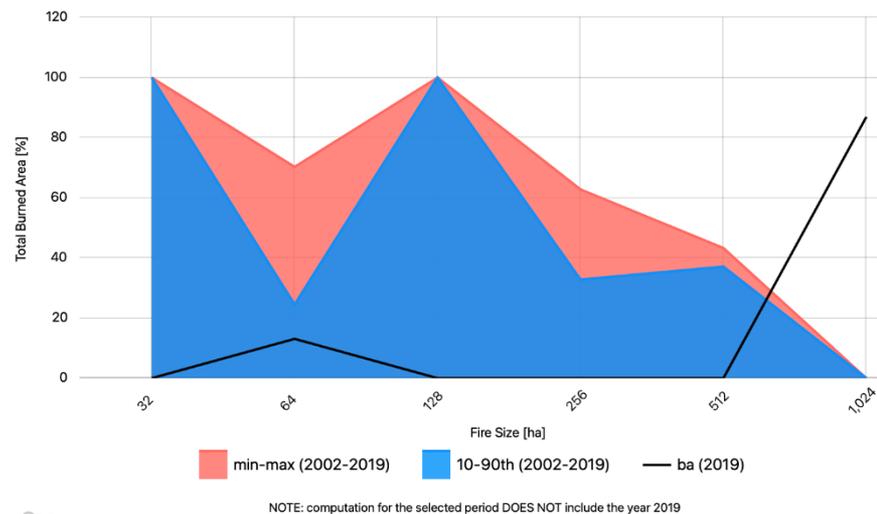
NOTE: computation for the selected period DOES NOT include the year 2019

# GWIS

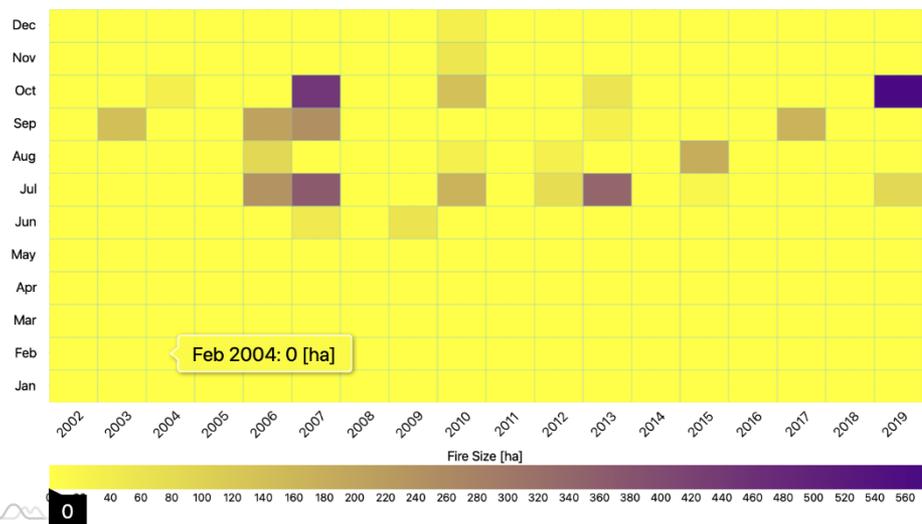
Fire Size Distribution and % Contribution to Total Burned Area - [2002-2019]



[2002-2019] → 2019 Average Monthly Fire Size Distribution vs Historical



Average Monthly Fire Size per Year - [2002-2019]



# EFAS



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## European Flood Awareness System

The aim of the European Flood Awareness System (EFAS) is to support preparatory measures before major flood events strike, particularly in the large trans-national river basins and throughout Europe in general

# EFAS



[Home](#) [About](#) [Products](#) [Data access](#) [Collaborate](#) [News and events](#) [Resources](#) [Training](#) [EFAS Wiki](#)

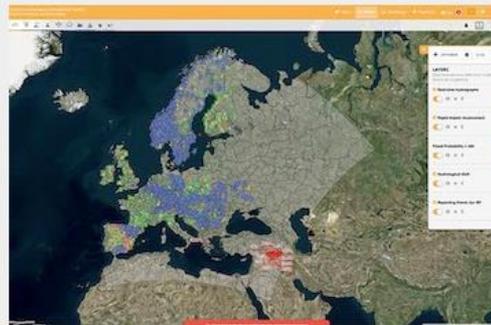
## European Flood Awareness System

### Latest events



CEMS MDCC integrated NWP data of DWD's ICON model to cover data gaps in the Ukraine during the war

### Access the map viewer



Live map

### Latest news



Southern and Central Spain flooding, early May 2022

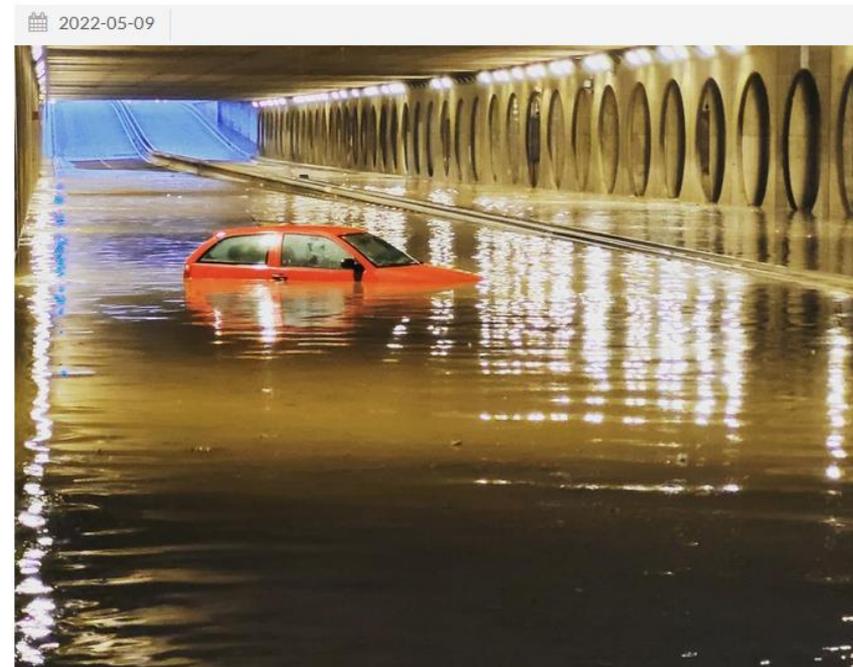
# EFAS latest News

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## Southern and Central Spain flooding, early May 2022



Flooded tunnel in Valencia, 03 May 2022. Credit: Policia Local Valencia

Record rainfall fell in the metropolitan area of Valencia, Spain on 03 May 2022, causing flooding across the city and surrounding areas

Agencia Estatal de Meteorología (AEMET) reported a total of 232.4 l/m<sup>2</sup> of rain in Valencia in 24 hours, which is a record amount for the month of May and one of the highest totals on record for the city.

Figures from Associació Valenciana de Meteorologia (AVAMET) show the weather station at Camins al Grau in the city recording 260.9 l/m<sup>2</sup>.

AEMET added that in the 2-month period from 03 March to 03 May, the city of Valencia accumulated 488.6 l/m<sup>2</sup>, an amount higher than the normal value for an entire year (474.9 l/m<sup>2</sup>).

Firefighters rescued several occupants of vehicles trapped in floodwaters in Paterna municipality to the north of the city, and in Carlet municipality to the south.

In total firefighters carried out over 50 interventions, including clearing flooded roads and removing downed trees. Local police said their officers responded to 94 rain-related interventions in 2 hours late on 03 May. At least four road tunnels in the city were flooded at one point. Some schools were closed and rail services were interrupted or suspended.

A city official pointed out that investment in the Cano de la Molinera pumping station and clearing of drainage systems, together with natural drainage systems in the city such as the Turia riverbed, helped control the flooding at times of greatest intensity.

Other areas of the country also saw severe weather around this time. On 02 May, hail and heavy rain caused flooding and damage in parts of the Murcia Region. Murcia emergency services (112 Murcia) said around 30 mm of rain fell in 1 hour on 02 May 2022, causing floods in Caravaca de la Cruz. Emergency crews responded to 48 weather-related incidents, including 6 rescues. An intense hailstorm caused damage in Bullas, Mula, and Yecla.

Hail and heavy rain also affected areas further north, including parts of the capital, Madrid. Madrid 112 reported 29 incidents, including 16 interventions for flood water clearance, mostly in Leganés and Móstoles.

### Social Media

<https://twitter.com/BombersValencia/status/1521648587280683008>

[https://twitter.com/AEMET\\_CValencia/status/1521757771544375297](https://twitter.com/AEMET_CValencia/status/1521757771544375297)

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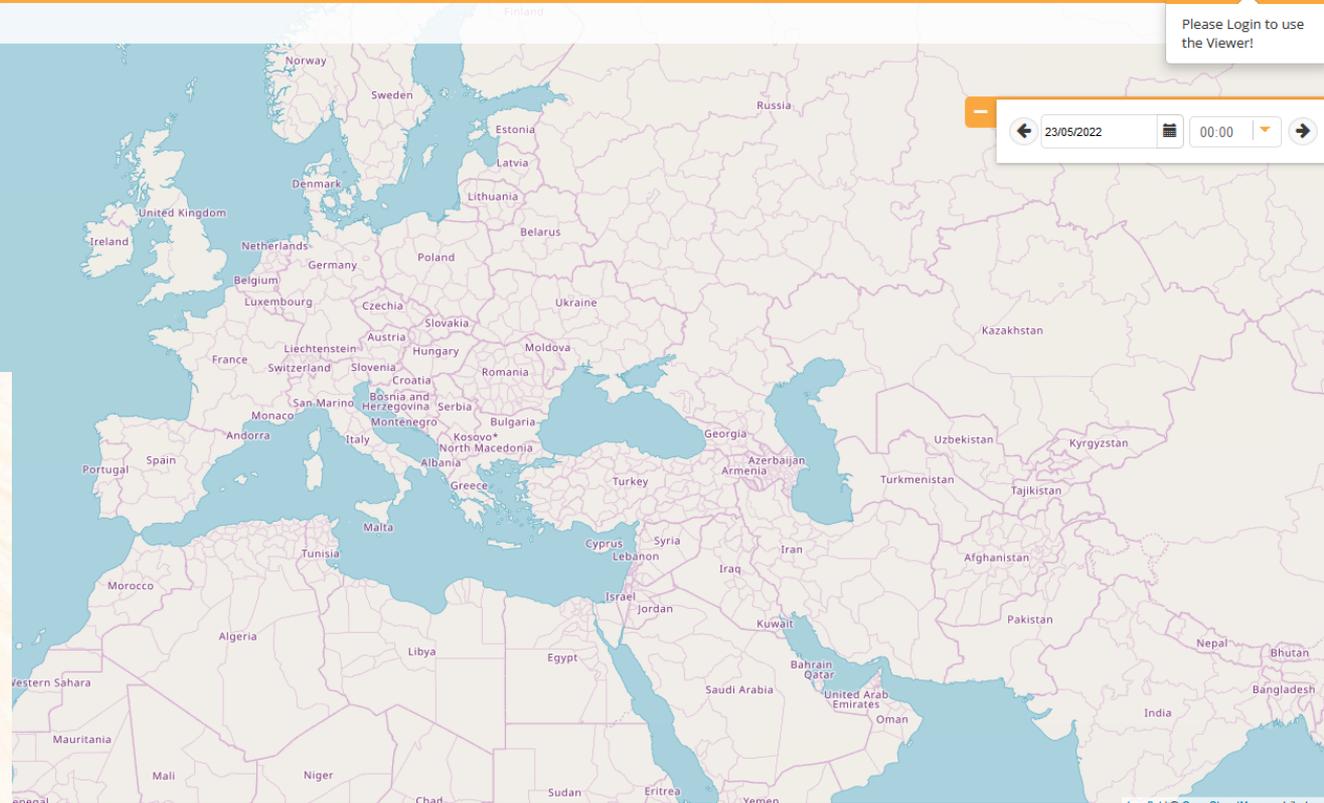
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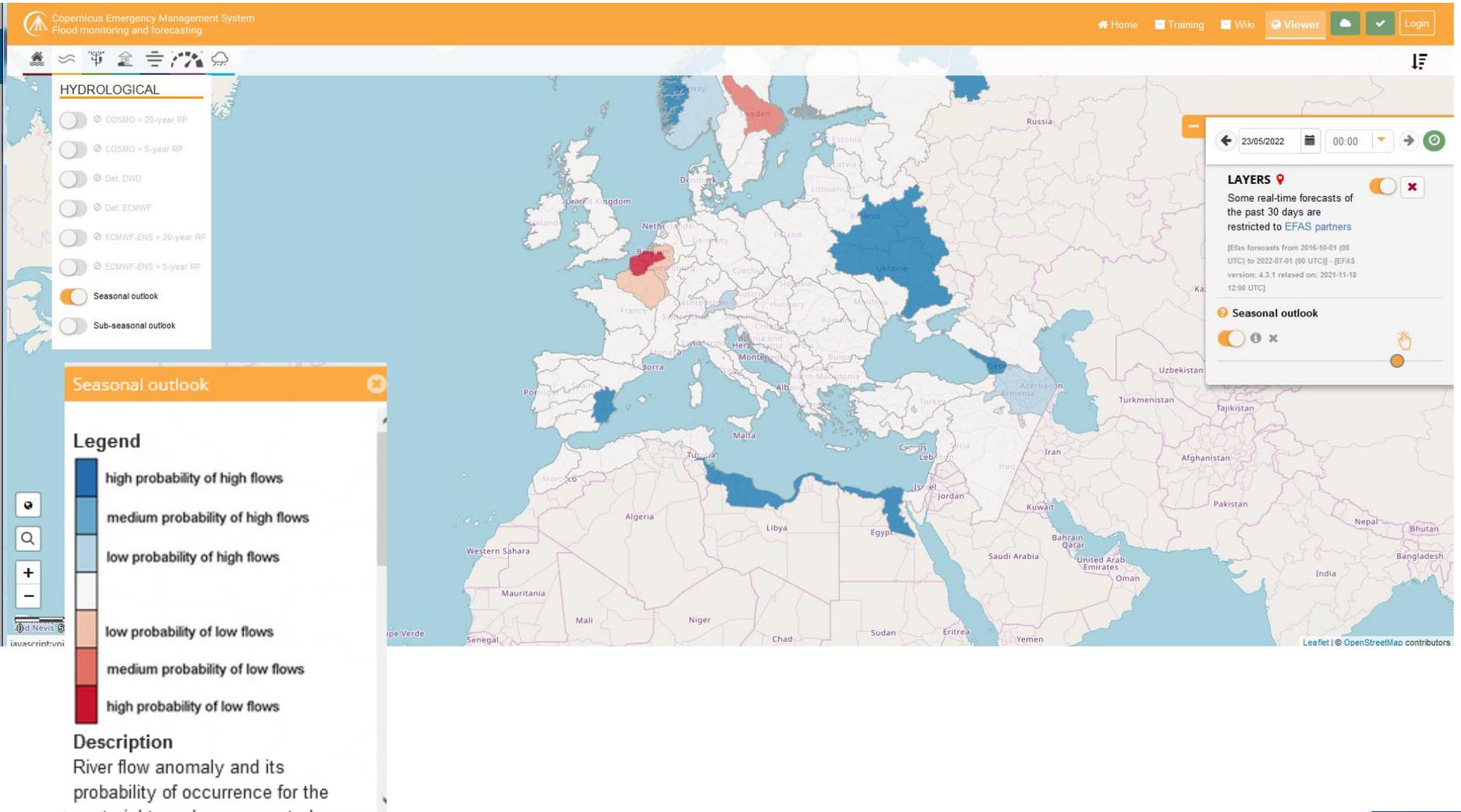
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