



Situational Awareness and Early Warning Systems

22 January 2025

Situational Awareness Sector
DG ECHO – Civil Protection and Humanitarian Aid Operations



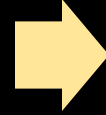
Mandate

- Ensuring situational awareness.
- Maintaining and further developing transnational early warning systems.
- Bridging the scientific and operational communities.
- Coordinating and drafting situational reports for MS on Ukraine and Gaza.

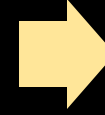
*“...developing the ERCC as the Commission’s cross-sectoral crisis hub for **joint situational awareness, early warning, anticipation, information exchange** and operational coordination, including between civilian and military stakeholders.”*

President of the European Commission, Ursula von der Leyen

Data input



ANALYTICAL TEAM



Operational advice

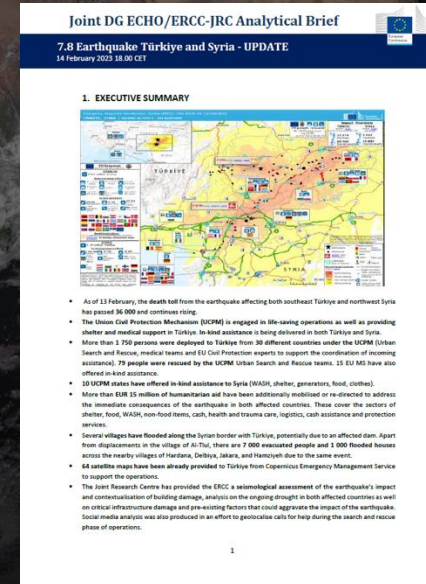
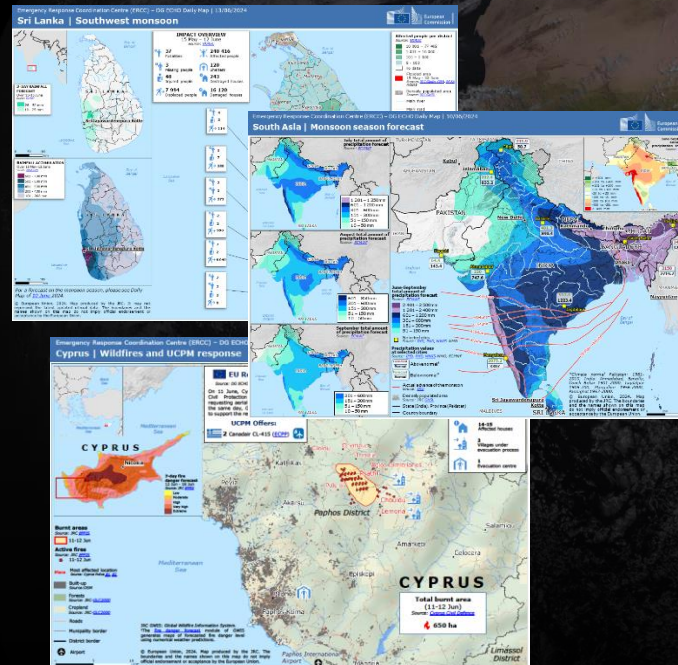
Processing, analysis, integration

- Early warning systems
- Scientific partnerships
- ECHO field
- ECHO partners
- EU DEL
- Satellite imagery
- Media

Mapping capacity
(situational maps, identification
of areas of interest for satellite
imagery)

Situational analysis
(analytical briefings, emergency
updates, monitoring)

- Mobilisation of response capacities
- Expert deployment
- Security
- Follow-up activities



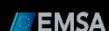
1. SCIENTIFIC PARTNERSHIPS



Natural hazards



Radiological and
Nuclear hazards



Maritime safety

ANALYTICAL SERVICES IN THE ERCC

3. EARLY WARNING AND MONITORING SERVICES

2. ON-DEMAND MAPPING SERVICES



Rapid Mapping
service



Risk and Recovery



External and
Security services



Droughts and heatwaves



Wildfires



Floods



Volcanic activity, earthquakes,
and tropical cyclones



EDO/GDO

European (EDO)
and Global (GDO)
Drought Observatory



EFFIS/GWIS

European Forest Fire (EFFIS)
and Global Wildfire (GWIS)
Information Systems



EFAS/GloFAS

European (EFAS)
and Global (GloFAS)
Flood Awareness Systems



GDACS

Global Disaster Alert and
Coordination System (GDACS)

Monitoring

Alert

A disaster just hit. How big? How bad?

Can we expect a request for assistance?



GDACS - Global Disaster Alert and Coordination System

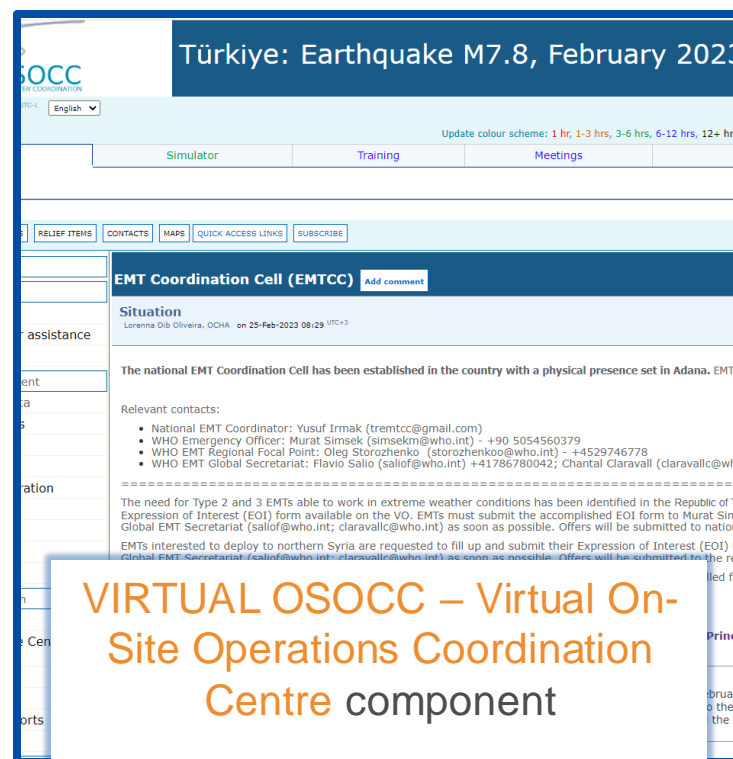


A cooperation framework between the **United Nations**, the **European Commission** to improve alerts, information exchange and coordination in the first phase after major disasters.



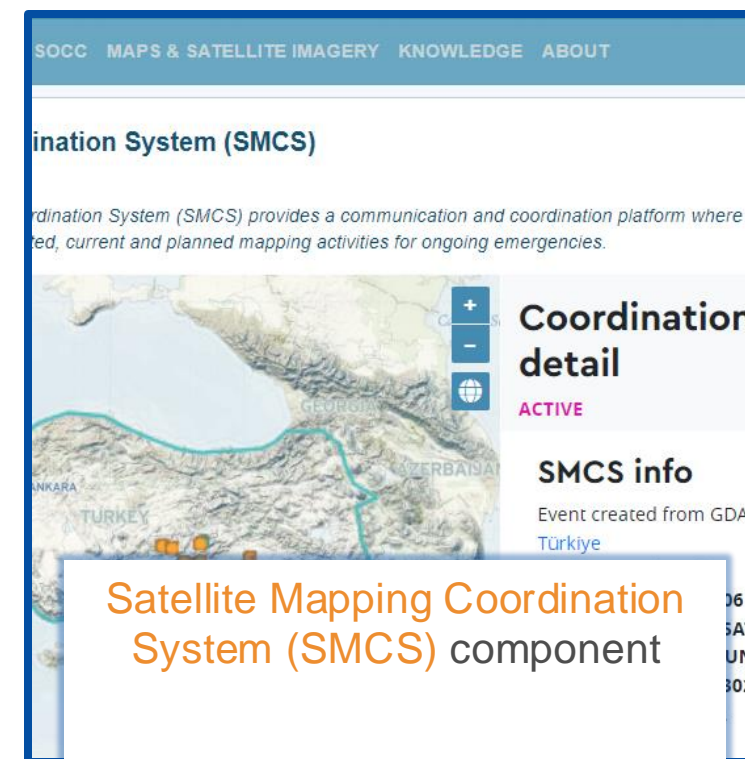
Multi Hazard Early Warning
System (MHEWS)
component

Resp. JRC



VIRTUAL OSOCC – Virtual On-
Site Operations Coordination
Centre component

Resp. UN OCHA



Satellite Mapping Coordination
System (SMCS) component

Resp. UNOSAT



Map of disaster alerts in the past 4 days. European Union, 2022. Map produced by EC-JRC. The designations employed and the presentation of material on the map do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The blurred events in the list below are the past events before last 4 days. For drought alerts, all the events listed in the homepage are ongoing events. In bold: i) new events; ii) events where a significant worsening has been detected (+ 0.5 GDACS score or increase in the Alert Level); iii) events where new information products are available (Global Drought Observatory Report). For Forest Fires alerts, the events are all the ongoing events of class Orange or Red plus the Green alerts with burned area exceeding 5k ha and population within 5 km exceeding 10k.

EARTHQUAKES	TROPICAL CYCLONES	FLOODS	VOLCANOES	DROUGHTS	FOREST FIRES
<div>  <div> <div>Russian Federation</div> <div>(M 5.7) - 24 Apr 01:35</div> </div> </div> <div>  <div> <div>Bosnia and Herzegovina</div> <div>(M 5.7) - 22 Apr 21:07</div> </div> </div> <div>  <div> <div>Nicaragua</div> <div>(M 6.7) - 21 Apr 2022</div> </div> </div> <div>  <div> <div>Philippines</div> <div>(M 6.0) - 20 Apr 2022</div> </div> </div>	<div>  <div> <div>JASMINE-22</div> <div>(102 km/h) - 26 Apr 06:00</div> </div> </div> <div>  <div> <div>MALAKAS-22</div> <div>(213 km/h) - 15 Apr 2022</div> </div> </div> <div>  <div> <div>MEGI-22</div> <div>(74 km/h) - 11 Apr 2022</div> </div> </div> <div>  <div> <div>FILI-22</div> <div>(102 km/h) - 08 Apr 2022</div> </div> </div>	<div>  <div> <div>Colombia</div> <div>- 24 Apr 01:00</div> </div> </div> <div>  <div> <div>South Africa</div> <div>- 22 Apr 2022</div> </div> </div> <div>  <div> <div>Uzbekistan</div> <div>- 22 Apr 2022</div> </div> </div> <div>  <div> <div>Jamaica</div> <div>- 20 Apr 2022</div> </div> </div>	<div>  <div> <div>Krakatau (Indonesia)</div> <div>- 25 Apr 2022</div> </div> </div> <div>  <div> <div>Manam (Papua New Guinea)</div> <div>- 20 Apr 2022</div> </div> </div> <div>  <div> <div>Ruiz, Nevado del (Colombia)</div> <div>- 04 Apr 2022</div> </div> </div> <div>  <div> <div>Taal (Philippines)</div> <div>- 28 Mar 2022</div> </div> </div>	<div>  <div> <div>Hungary-2022</div> <div>- 14 Weeks</div> </div> </div> <div>  <div> <div>Morocco Algeria Tunisia-2021</div> <div>- 70 Weeks</div> </div> </div> <div>  <div> <div>Central South America-2019</div> <div>- 122 Weeks</div> </div> </div> <div>  <div> <div>Madagascar-2020</div> <div>- 79 Weeks</div> </div> </div>	<div>  <div> <div>Sierra Leone</div> <div>(16682 ha) - 25 Apr 2022</div> </div> </div> <div>  <div> <div>Sierra Leone</div> <div>(15596 ha) - 25 Apr 2022</div> </div> </div> <div>  <div> <div>Nepal</div> <div>(33816 ha) - 24 Apr 2022</div> </div> </div> <div>  <div> <div>India</div> <div>(27067 ha) - 24 Apr 2022</div> </div> </div>

GDACS MHEWS

www.gdacs.org



- GDACS Disaster Alerts based on automatic estimates and risk analysis are issued and disseminated to some 40,000 subscribers following sudden-onset disasters.
- Alert level (green/orange/red) refers to likelihood that external assistance (e.g. humanitarian) may be needed.
- GDACS alerts are not in competition with official alerts from the local or national designated authorities, which always prevail.
- The site also acts as an information aggregator, gathering EC maps, reports and media analyses, weather forecasts...

GDACS for Earthquakes and Tsunami



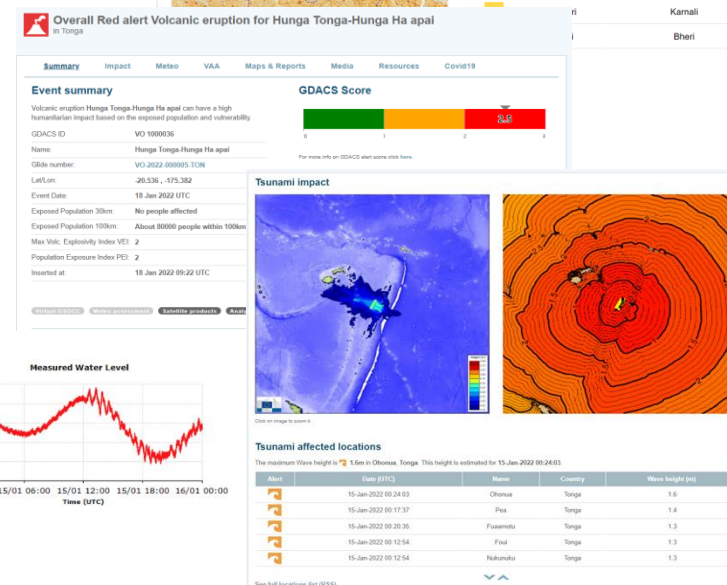
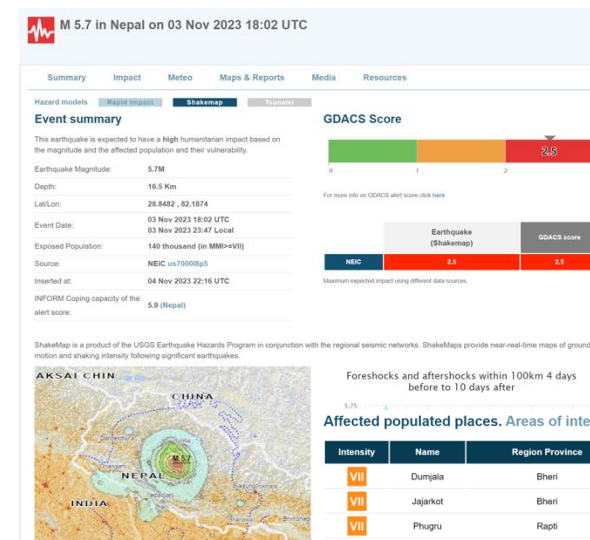
Earthquake:

- Automatic alerts based on population exposed to strong shaking intensity.
- Alerts issued within 30 min of the earthquake, updated if new USGS Shakemap is published.



Tsunami:

- Not accessible from main site, only for potentially tsunamigenic earthquakes and some volcanos.
- Automatic alerts based on simulated tsunami.
- Alerts issued within 30 min of the trigger, updated if sea-level observations reported higher than simulation.



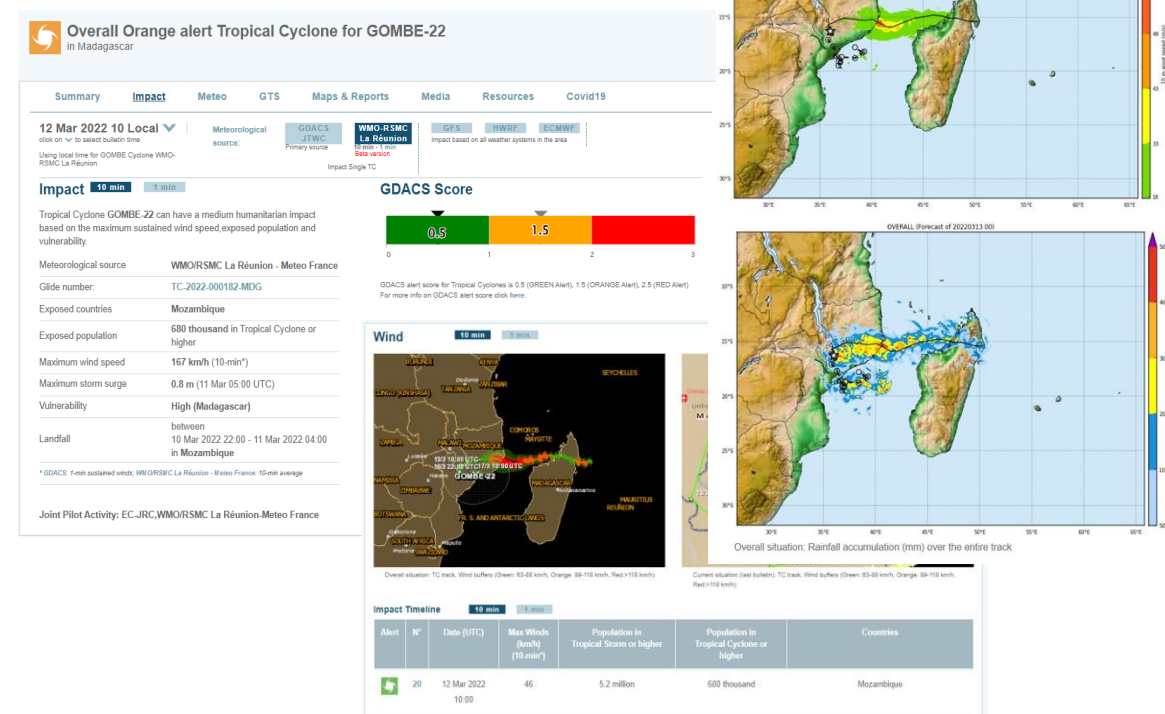
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GDACS for Tropical Cyclones and Volcanoes



Tropical Cyclones:

- Automatic alerts based on population exposure to wind (Saffir-Simpson scale).
- Alerts issued within 30 min of the source update, at 3-6 hour intervals
- Precipitation and (simulated) storm surge population exposure also evaluated.



Volcanos

- Manual alerts based on expert opinion.
- Automatic updating of Volcanic Ash Advisories.

Volcanic Ash Advisory issued on 2021-10-06 at 08:52 UTC.

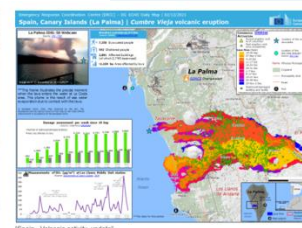
Key information extracted from original VAA message :

Aviation Colour Code : ●

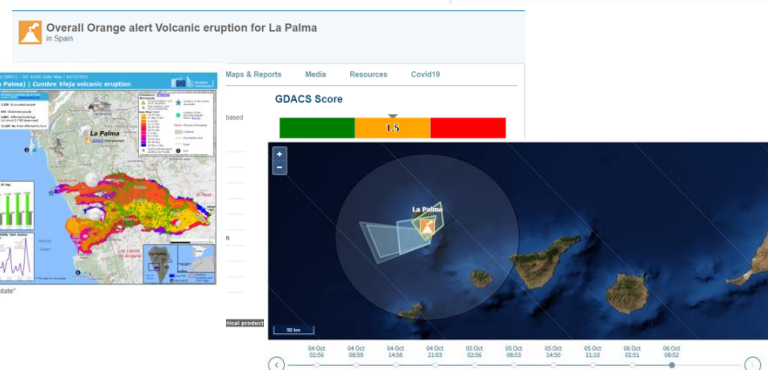
- Eruption at 2021-09-19 14:10 utc ongoing eruption.
- Ongoing ash emission reaching approx 3000m above sea level drifting westwards and later northeastwards.



Detailed event map: European Union, 2022. Map produced by EC-JRC.
The boundaries and the names shown on this map do not imply official endorsement or acceptance by the European Union.



*Spain - Volcanic activity: update

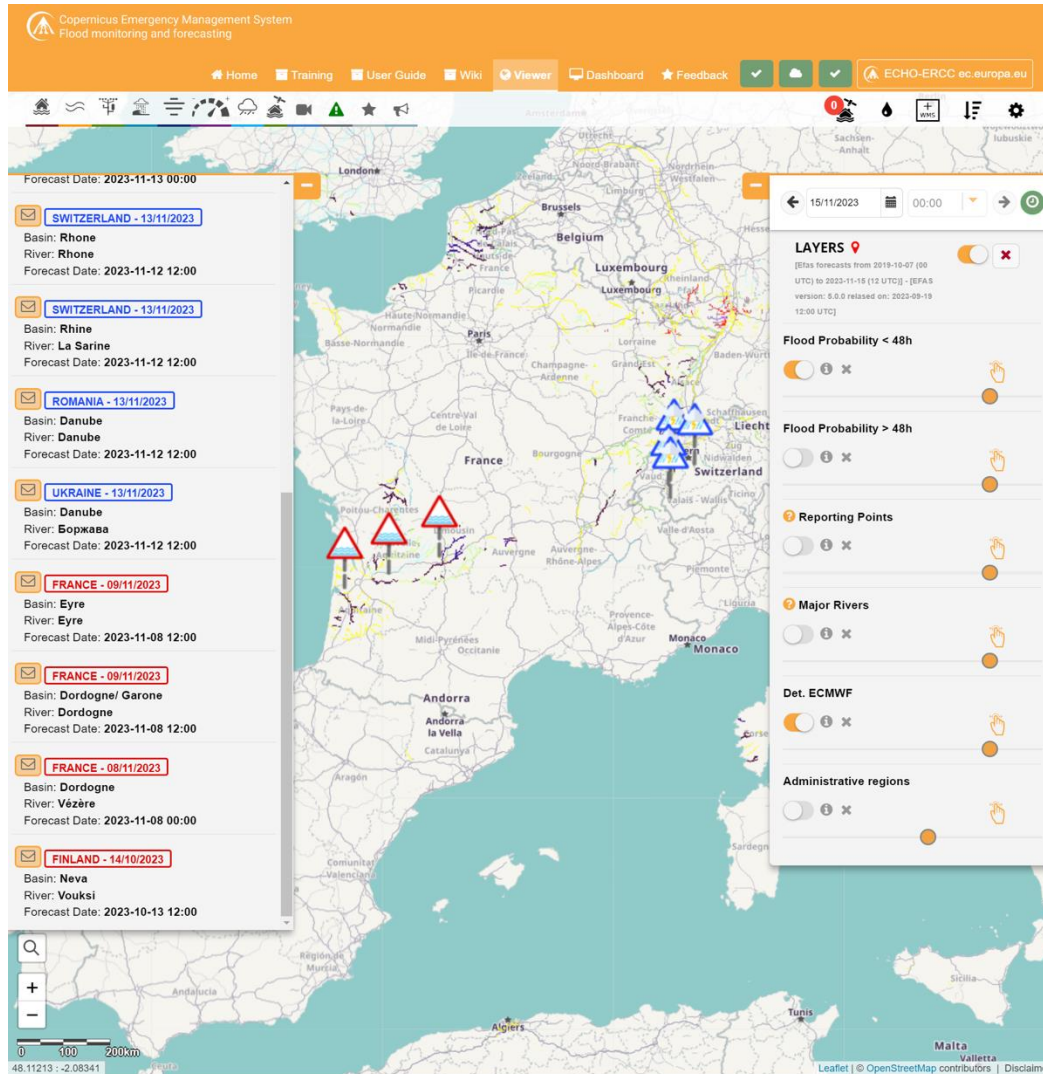


Copernicus EMS Monitoring Systems



EFAS – European Flood Awareness System

<https://european-flood.emergency.copernicus.eu/>



- EFAS provides flood forecasts **up to 10 days in advance** to the National/Regional Hydrological Services, to civil protection authorities that are **EFAS partners** and to the Emergency Response Coordination Centre (ERCC).
- The hydrological model LISFLOOD is used for medium- and seasonal-range forecasts, whilst conceptual hydrological algorithms are used for the flash flood indicators.



EFAS Formal
Flood Notification



EFAS Informal
Flood Notification



EFAS Flash Flood
Notification

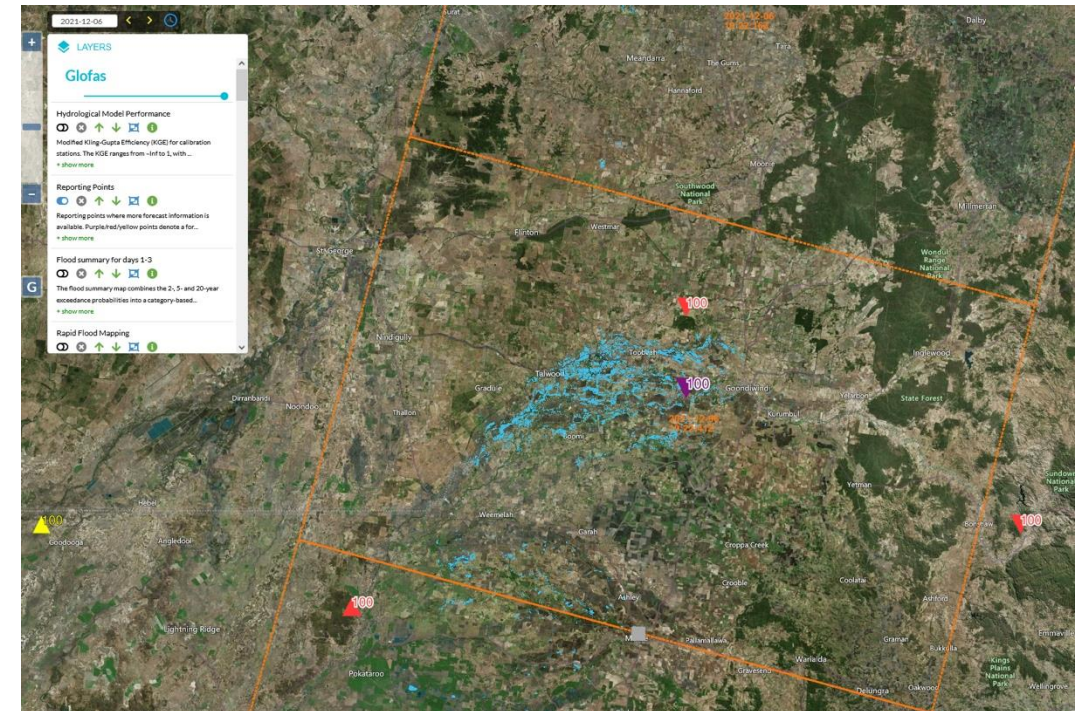
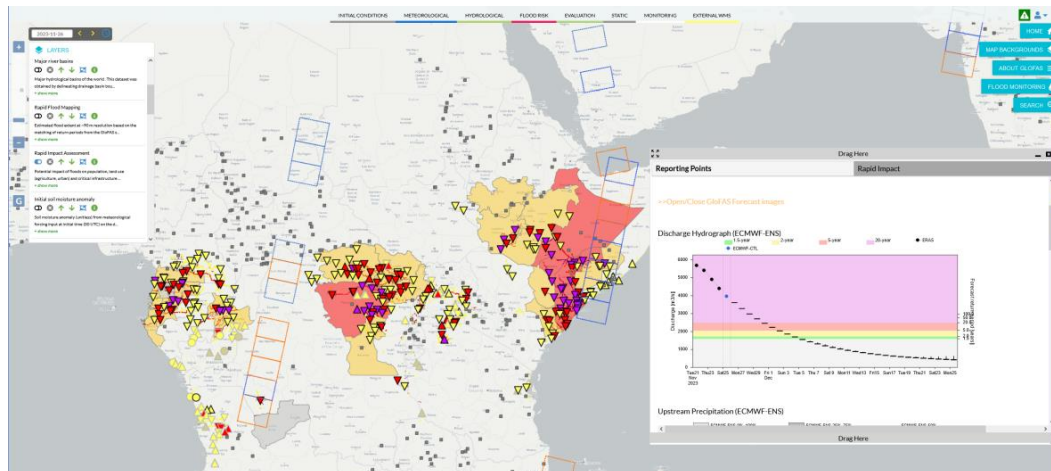


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GloFAS – Global Flood Awareness System

<https://global-flood.emergency.copernicus.eu/>

- GloFAS is a **global** hydrological forecast and monitoring system independent of administrative and political boundaries.
- Its continental scale set-up provides **downstream countries** with information on upstream river conditions as well as continental and global overviews.
- River-based hydrological model can forecast up to **30 days** in advance



Global Flood Monitoring (GFM): automated, global, satellite-based monitoring of floods in near real-time based on the automated processing of Copernicus Sentinel-1 Synthetic Aperture Radar (SAR) satellite data.

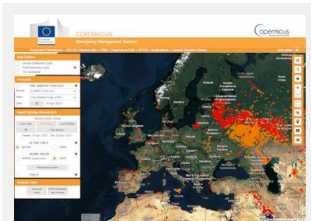


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EFFIS – European Forest Fire Info System

EFFIS applications

<https://forest-fire.emergency.copernicus.eu/>



Current Situation Viewer

The most up to date information on the current fire season in Europe and in the Mediterranean area.

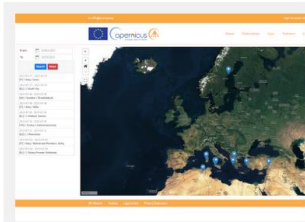
[Read more >](#)



Current Statistics Portal

Statistics are provided at national level and also for 3 groups of countries, EU, European non-EU countries, and Middle East and North Africa countries.

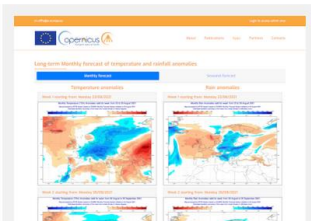
[Read more >](#)



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, etc.

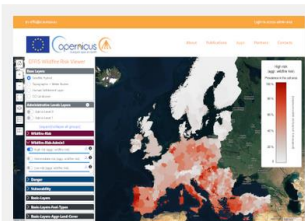
[Read more >](#)



Long-term fire weather forecast

Monthly and seasonal forecast of temperature and rainfall anomalies that are expected to prevail over European and Mediterranean areas.

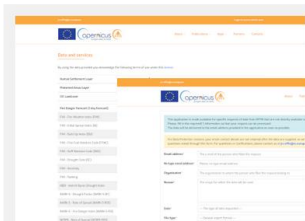
[Read more >](#)



Wildfire Risk Viewer

Wildfire Risk index for the pan-European Scale. This includes two main groups of components by considering the fire danger and the vulnerability on three categories: people, ecological, and economic values.

[Read more >](#)

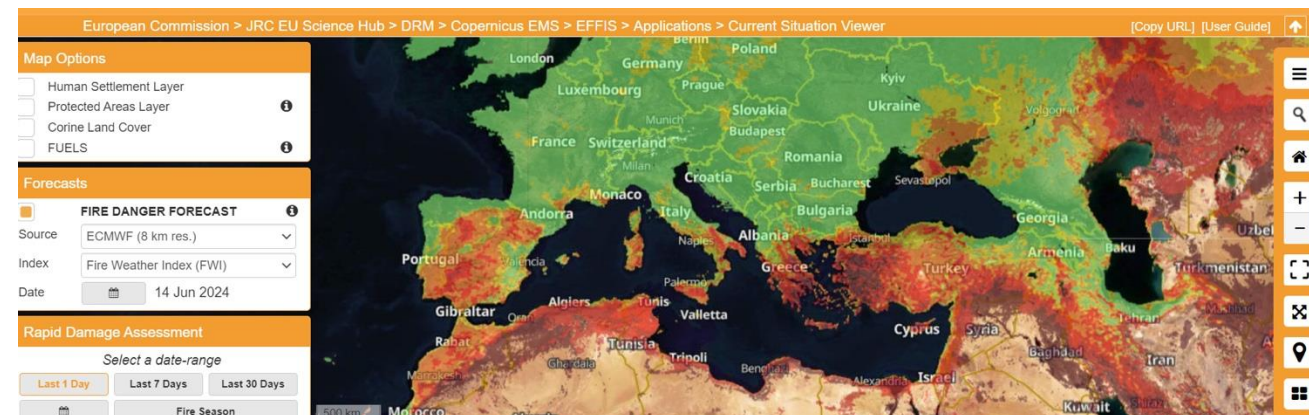


Data request

Request for country totals (burnt areas & number of fires) per year, as published in the Forest Fires in Europe, North Africa and Middle East reports, and more.

[Read more >](#)

- EFFIS supports the forest protection services in the EU and neighbour countries and provides the European Commission and Parliament with **updated and reliable information on wildland fires in Europe**.
- EFFIS is supported by a network of national experts called the **Expert Group on Forest Fires**. Currently, this group consists of experts from 43 countries in European, Middle East and North African countries.



GWIS – Global Wildfire Information System

<https://gwis.jrc.ec.europa.eu/>

- GWIS brings together existing information sources at regional and national levels in order to provide a comprehensive view and evaluation of **fire regimes** and **fire effects** at global level.
- GWIS builds on 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.
- The Global Wildfire Information System (GWIS) is a joint initiative of the GEO and the Copernicus Work Programs.

GWIS applications



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).

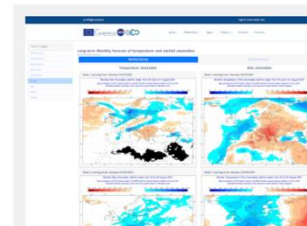
[Read more >](#)



Country Profile

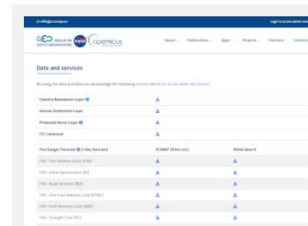
Provides historical overviews of fire regimes at country and sub-country level for the period 2002-2019.

[Read more >](#)



Long-term fire weather forecast

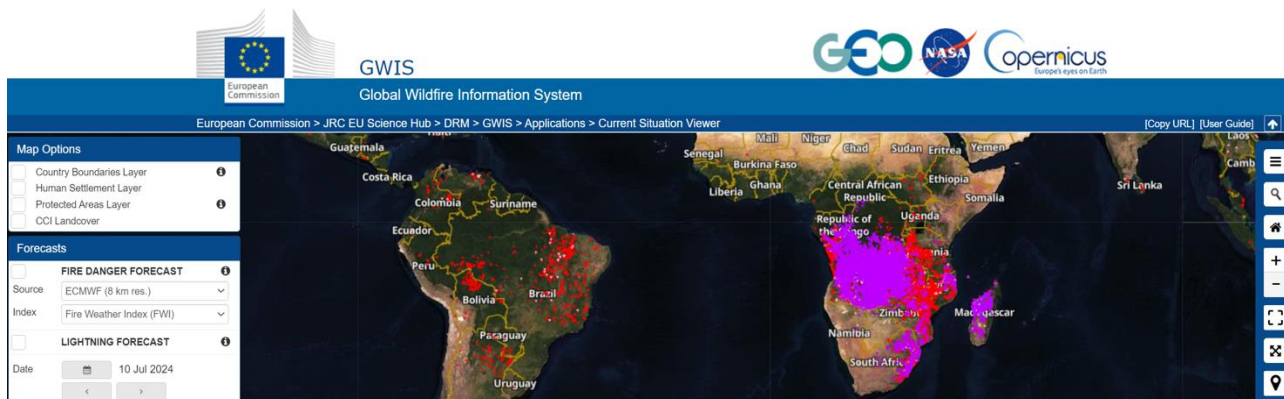
Monthly and seasonal forecast of temperature and rainfall anomalies that are expected to prevail over the world. [Read more >](#)



Data & Services

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

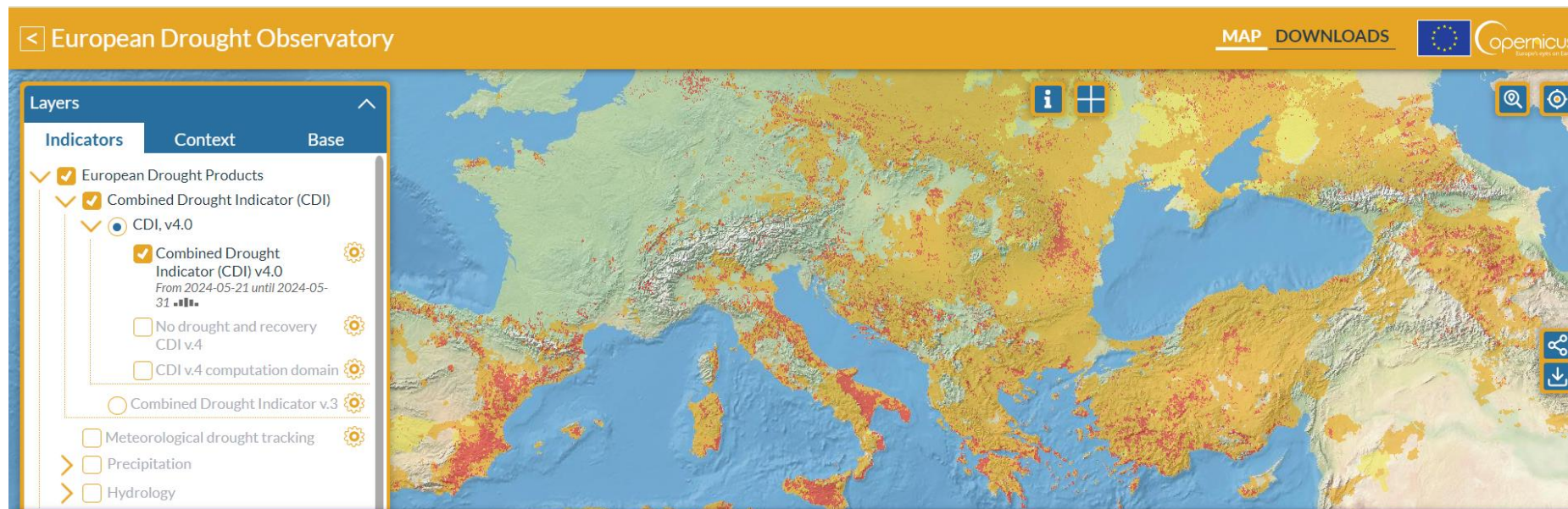
[Read more >](#)



EDO – European Drought Observatory

<https://drought.emergency.copernicus.eu/tumbo/edo/map/>

- EDO produces a suite of indicators that aims to provide a complete overview of ongoing and past drought in Europe.
- The system computes simple and combined indicators assessing anomalies affecting precipitation, temperature, soil moisture, vegetation condition, etc.
- It also offers a **drought tracking tool** based on SPI-3 (Standardized Precipitation Index, meteorological drought); seasonal predictions of unusually wet and dry areas.



GDO – Global Drought Observatory

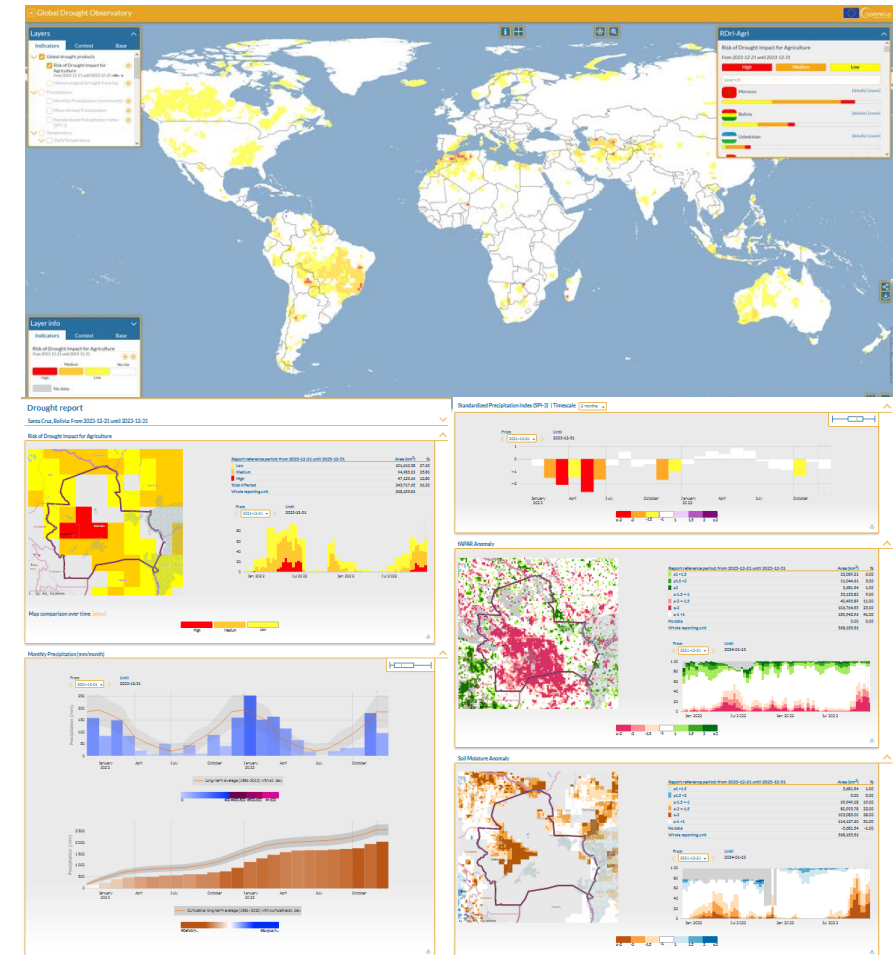
<https://drought.emergency.copernicus.eu/tumbo/gdo/map/>

GDO produces continuously updated drought indicators at global scale:

- Sector-specific risk of drought impact (RDRI for Agriculture)
- Meteorological drought based on precipitation (standardized precipitation index)
- Agricultural drought (soil moisture & vegetation greenness)
- Hydrological drought (low river flows, groundwater)
- Forecast of extreme precipitation

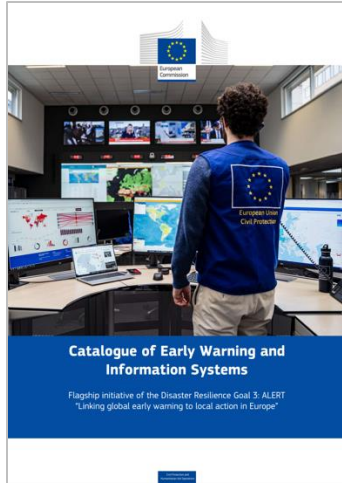
Plus other specialized tools and products:

- Interactive map-viewer to explore in space and time indicators for drought assessment.
- Analytical drought reports of relevant drought events.
- A global database of meteorological droughts (1950-2019) with more than 7000 events from country to global scale, based on SPI and SPEI. Each event is assigned duration, severity, intensity, and area.
- A tool for self-generating reports for an administrative region.



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Catalogue of Early Warning Systems and Services



- **What it is:** A catalogue of early warning and situational awareness systems and services that can be integrated in the civil protection and related activities of UPCM states
- **Goal:** The goal is to raise awareness about these services, so UPCM states can more easily benefit from the information
- **Policy context:** Deliverable of DRG 3 – “Alert”: Linking global early warning to local action in Europe



27 systems and services
identified and included
13 hazard types (plus multi-hazard)

All Hazards
INFORM Risk | INFORM Severity
CEMS On-demand Mapping*
*excluding Conflict

The Global Situation System

<https://gss-ecml.azurewebsites.net/>



- **What it is:** A data aggregation and visualization portal, providing access to Commission EWS and other datasets for situational awareness.
- **What it is not:** An EWS (GSS does not emit any kind of alerts, and the information is not real-time).
- **Policy context:** Deliverable of DRG 3 – “Alert”: Linking global early warning to local action in Europe

Thank you

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