

→ MED 2018

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European Space Agency

# WILDFIRE MONITORING IN THE MEDITERRANEAN REGION

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Wildfire monitoring in the Mediterranean region

## Outline:

1. The European Forest Fire Information System (EFFIS)– data harmonization
2. EFFIS current situation
  - Fire Danger Assessment
  - Active fire and burnt area mapping
3. Temporal/Spatial pattern of burnt areas
4. Fire size vs Burnt Area
5. Wildfires and climate change
6. Global wildfire monitoring - GWIS
7. New developments and challenges

## Fire danger exchange 1998... => the need for harmonization



- **Definition and scope of EFFIS**

- System established by the Joint Research Centre (JRC) and DG Environment (ENV) as focal point for information on forest fires in Europe (1998)
- Provides EU level assessments during both pre-fire and post-fire phases, thus supporting fire prevention, preparedness, fire fighting and post-fire operations
- Complements national fire information systems through the provision of harmonised data, methods and standards

- **Users**

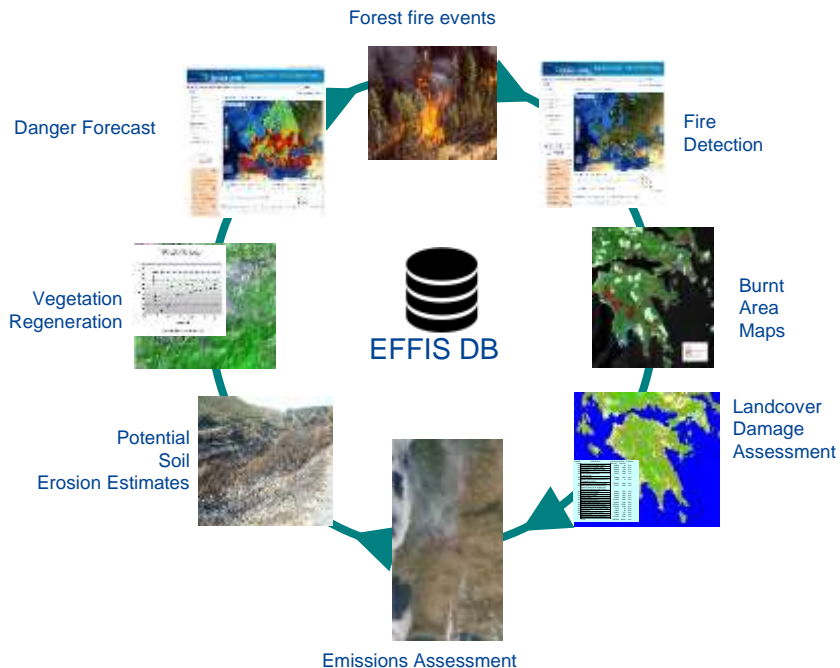
- EC Services, European Parliament, national/regional forest fires and civil protection services of EU and non-EU countries
- FAO, United Nations Economic Commission for Europe, FAO *Silva Mediterranea*

- **Operation and development**

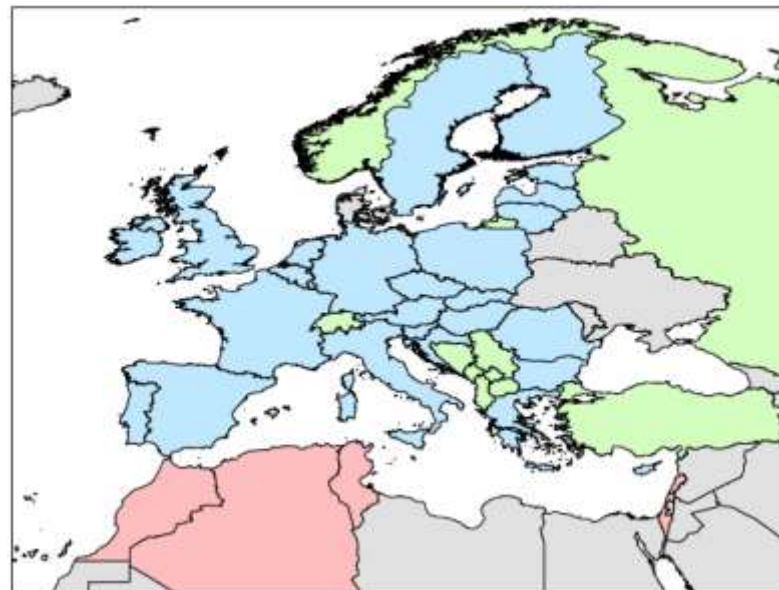
- Development by the JRC
- Operation supported by the EC Directorate Generals GROW (Copernicus Program), ECHO, ENV, JRC
- End of 2015 – EFFIS joined the Copernicus Emergency Management Services






# EFFIS fire monitoring cycle



EFFIS Network – 41 countries



Emergency Management Service

European Commission • The EU Space Hub • EFMD • Copernicus EMS • European Forest Fire Information System (EFFIS)

[About EFFIS](#) • [Reports and Publications](#) • [Applications](#) • [Partners](#)

## Welcome to EFFIS

The European Forest Fire Information System (EFFIS) monitors fires in the EU countries and provides it with updated and reliable information on wildland fires.

A number of specific applications are available:

- Since 1998, EFFIS is supported by a network of experts on forest fires, which is registered under the Secretariat General of the European Commission. Currently, this group consists of experts from 40 countries in Europe, Middle East and North African countries. In 2015, EFFIS became one of the components of the Emergency Management Services in the EU Copernicus program.
- The link to some of the most widely used applications is provided below. Additional applications such as the extension of EFFIS to the global level into a Global Wildfire Information System (GWIS) are available through the side "Applications" box.

**Current Situation Viewer**

- Long-term seasonal fire weather forecast
- Long-term monthly fire weather forecast
- Fire history
- Fire news
- Data and services
- Expert Group on Forest Fires

Hotspots of forest fires

European Parliament

**Visit the brand-new GWIS Current Situation Viewer**

**EFFIS Damage Assessment**

**EFFIS Burned Area Plot**

**Yearly EU28 Countrywise**

Request: 30/10/2015 (15:30 h Forest)

Submitted: 7/02/16, 07

**Yearly EFFIS Coverage**

Request: 10/06/2015

Submitted: 13/06/16, 07

(Updated daily)

More information and user instructions

**Applications**

- Current Situation Viewer
- Long-term seasonal fire weather forecast
- Long-term monthly fire weather forecast
- Fire history
- Fire news



**Current Situation**

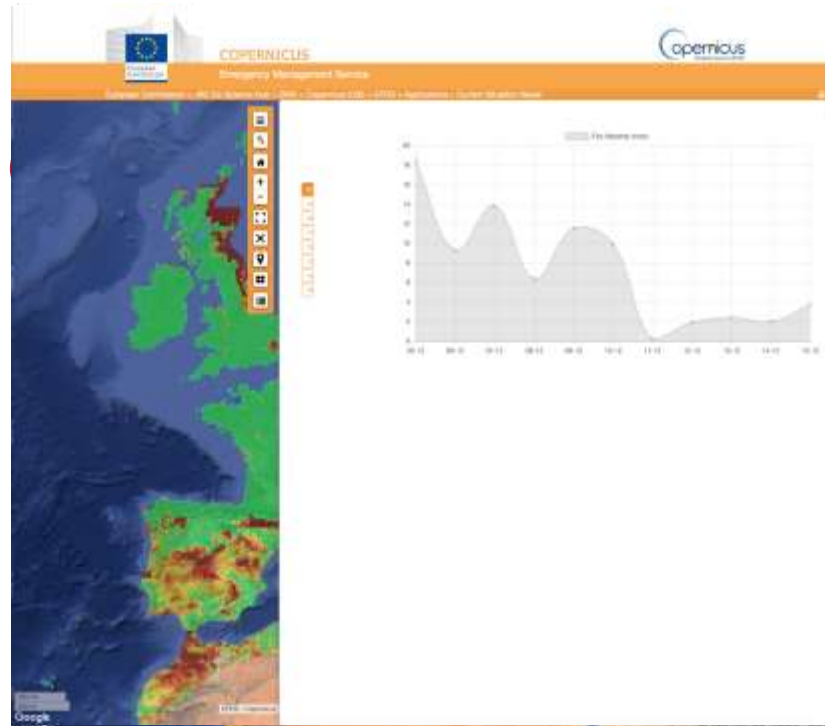
The most up-to-date information on the current fire season in Europe and in the Mediterranean area. This includes today meteorological fire danger maps and forecast up to 5 days, daily updated maps of hot spots and fire parameters.



**Fire News**

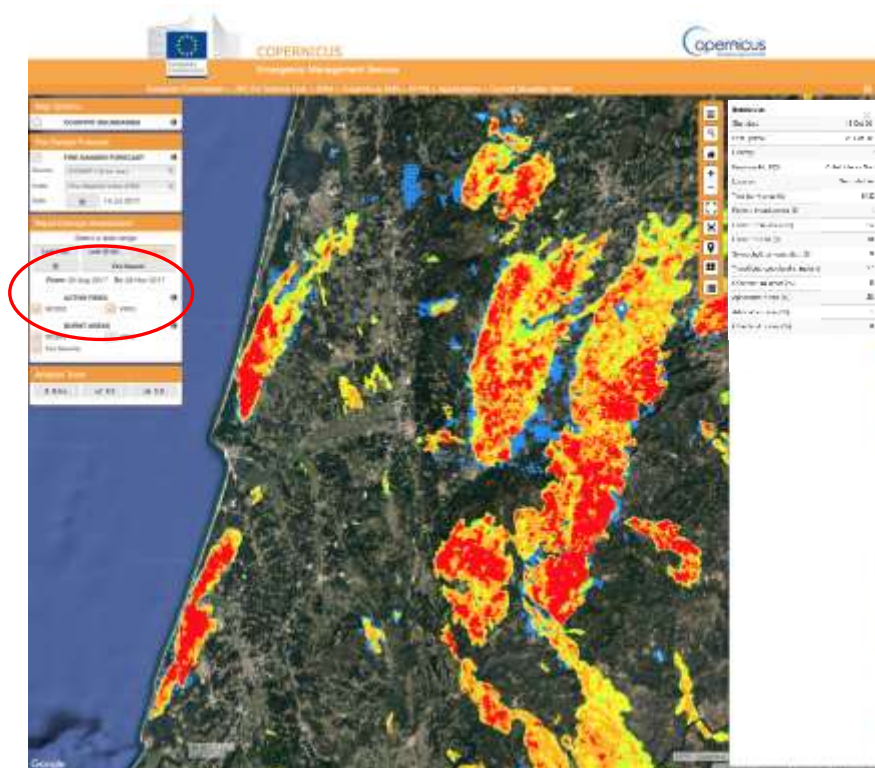
A selection of news from the press on wildland fires in Europe updated daily by the EFFIS team. News can be browsed for specific countries selected by the user from the news map.

# EFFIS - Fire Danger Forecast

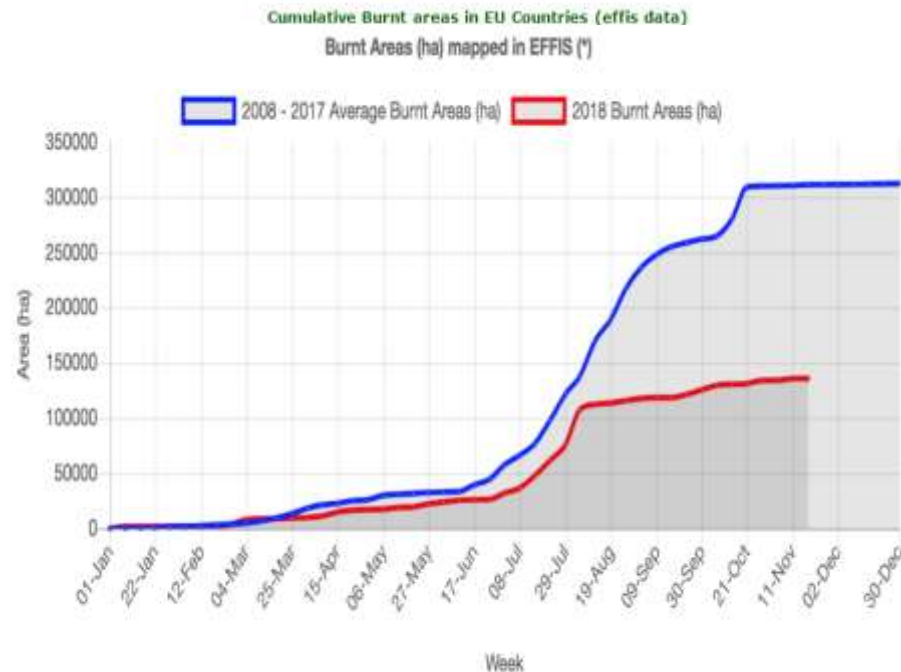
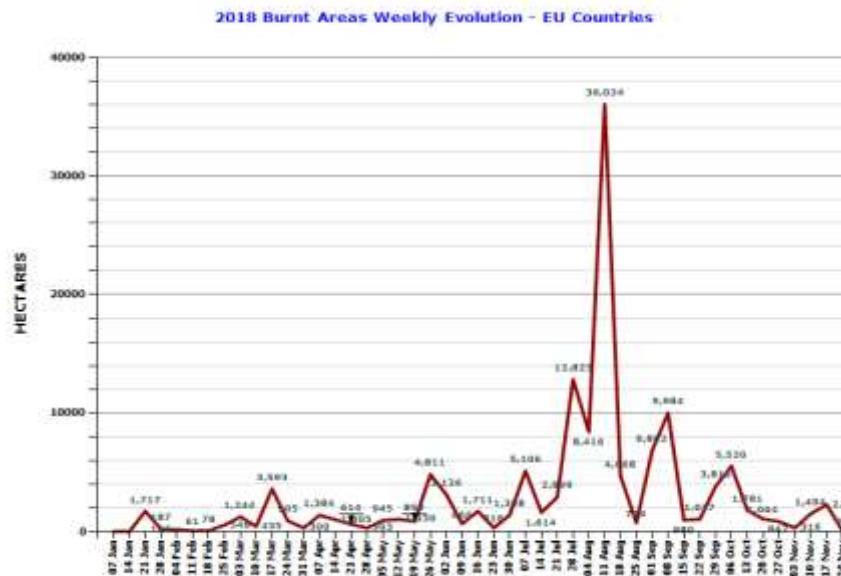




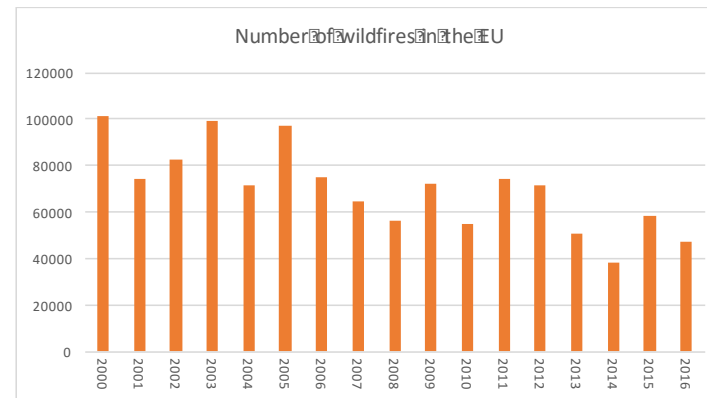
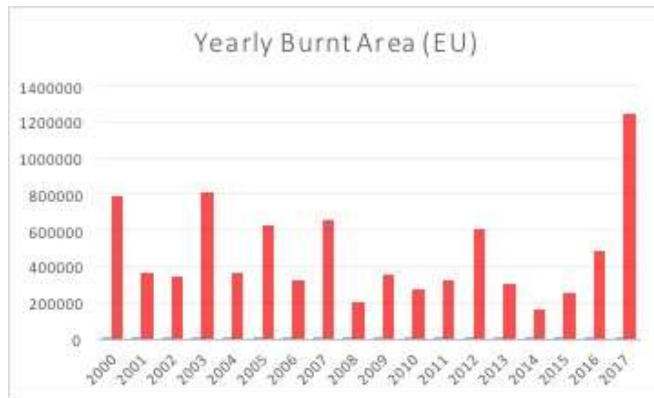
# Active fire and burnt area mapping



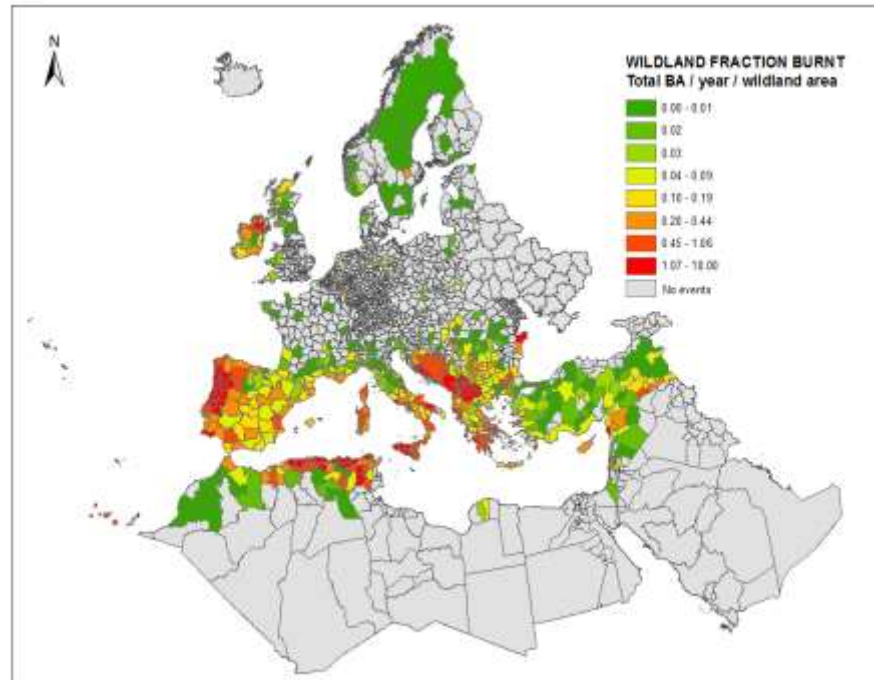
# Time evolution of burnt areas in the EU countries



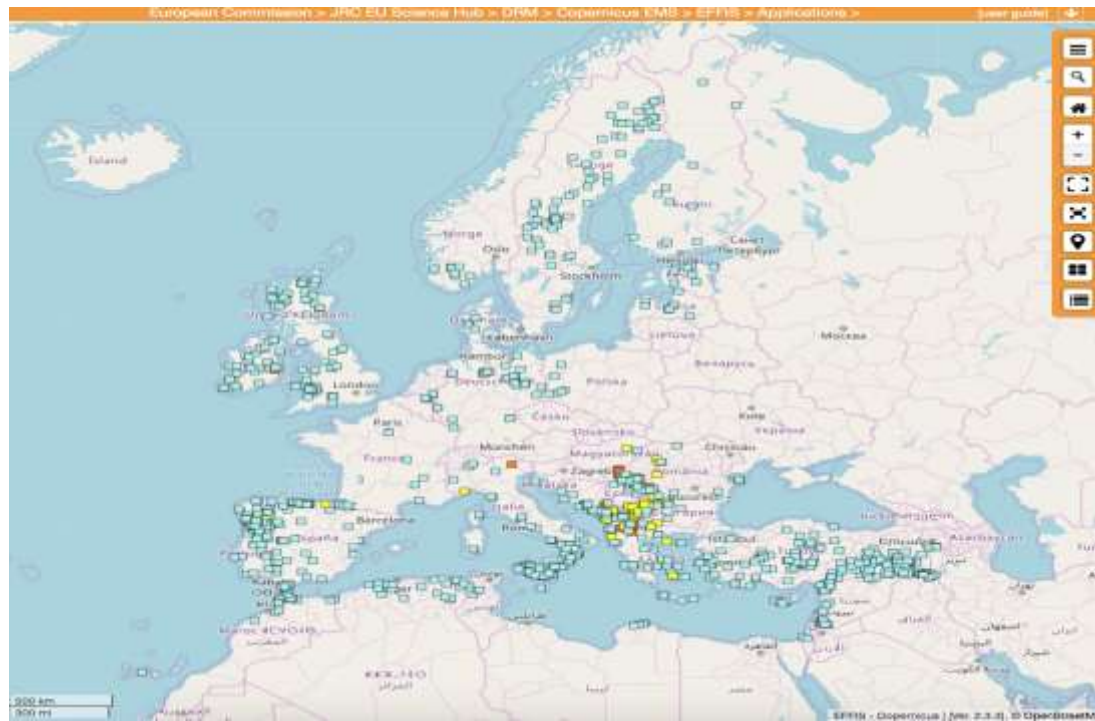
# Trends in burnt areas and number of fires



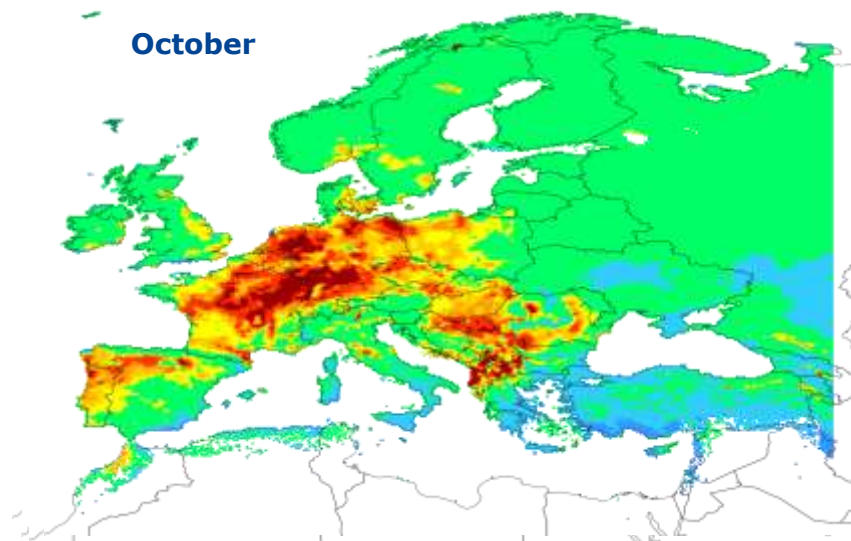
Approx. 480,000 hectares burned per year in EU



# 2017-2018 - Spatial distribution of large fires

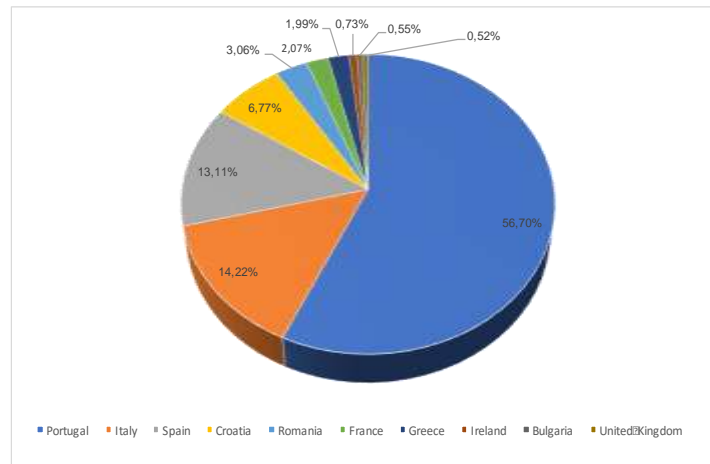






# Burned area by mapped in the EU countries - 2017

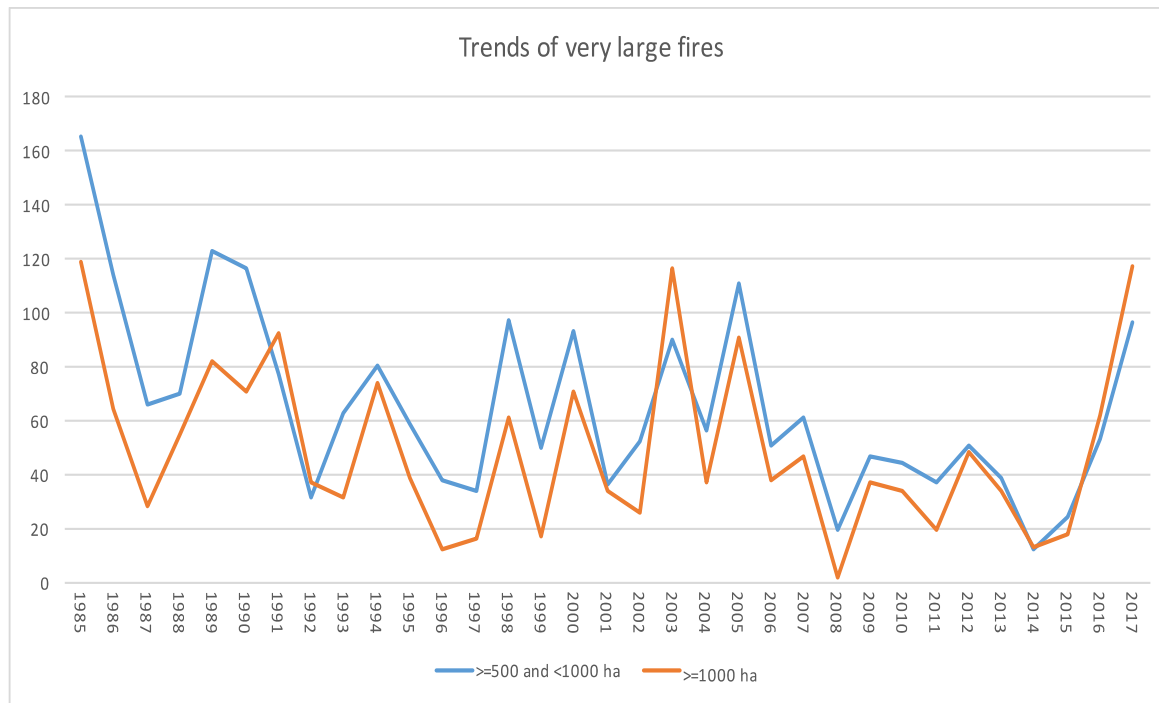
Country	Area (HA)	%	Number of fires (>30ha)
Portugal	563,790.30	56.70%	412
Italy	141,425.40	14.22%	788
Spain	130,389.30	13.11%	318
Croatia	67,362.80	6.77%	104
Romania	30,445.80	3.06%	65
France	20,623.70	2.07%	90
Greece	19,779.40	1.99%	57
Ireland	7,241.10	0.73%	18
Bulgaria	5,438.80	0.55%	18
United Kingdom	5,126.70	0.52%	19
Sweden	732.9	0.07%	8
Cyprus	672.4	0.07%	4
Hungary	458.3	0.05%	3
Finland	234	0.02%	4
Slovenia	187.7	0.02%	2
Czech Republic	144.9	0.01%	1
Denmark	130.4	0.01%	2
Estonia	57.5	0.01%	1
Germany	56.7	0.01%	1
Latvia	34.5	0.00%	1
Total:	994,332.60	100.00%	1,916.00



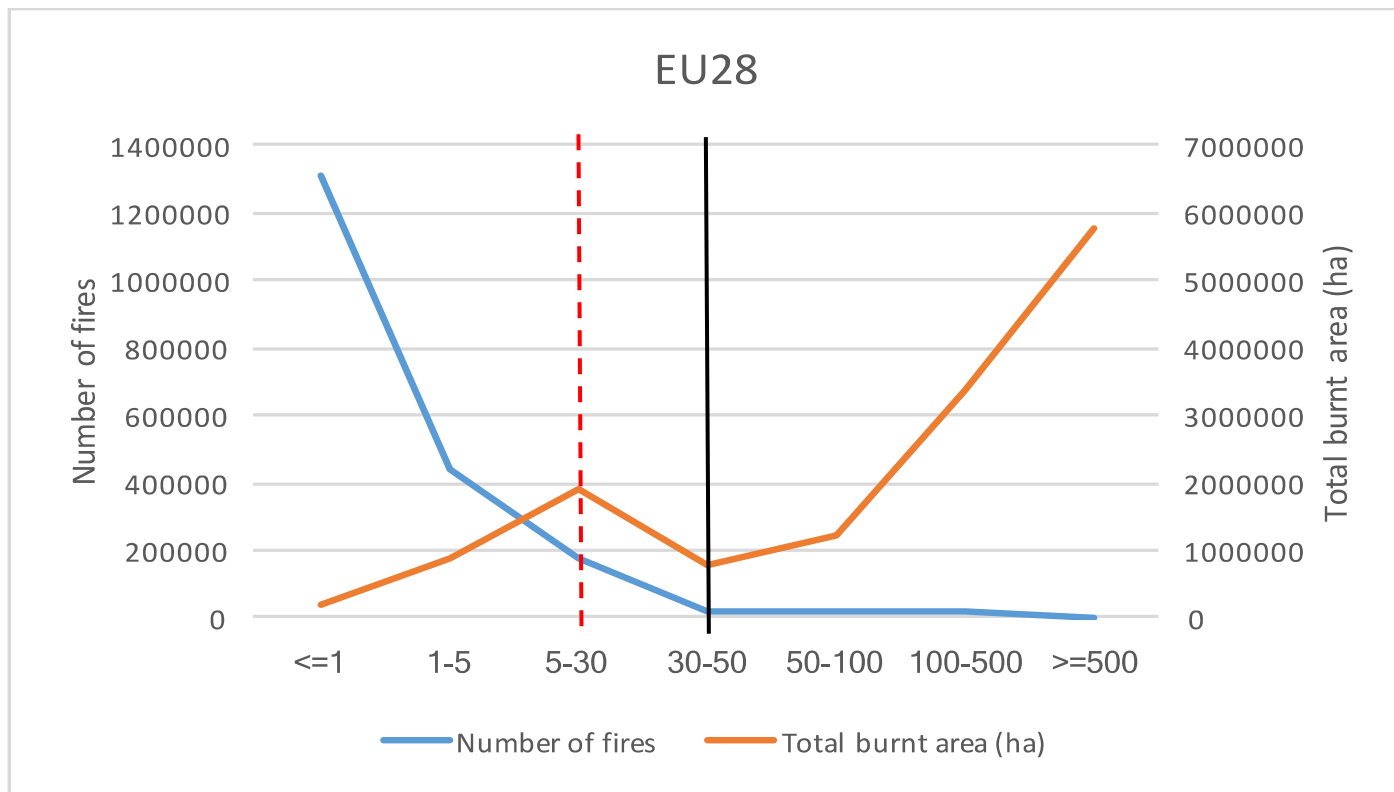
Country	Area (HA)	%	Number of fires
Albania	42,281.00	16.00%	224
Bosnia and Herzegovina	83,131.70	31.46%	145
Georgia	854	0.32%	1
Kosovo under UNSCR 1244	4,056.30	1.54%	34
Montenegro	51,661.20	19.55%	124
Norway	260.3	0.10%	2
Serbia	8,170.00	3.09%	37
The former Yugoslav Republic of	25,751.60	9.75%	88
Turkey	48,085.90	18.20%	157
	264252	100.00%	812

Middle East and North Africa			
Country	Area (HA)	%	Number of fires >30 ha
Algeria	91,468.8	75.4%	284
Lebanon	45.4	0.0%	1
Libya	234.0	0.2%	3
Morocco	4,771.9	3.9%	24
Syria	5,742.6	4.7%	18
Tunisia	19,065.0	15.7%	51
<b>Total:</b>	<b>121,327.6</b>	<b>100.0%</b>	<b>381</b>

# Trends in the number of fires (by size) in Europe



# Fire size vs burnt area





**95.3% of fires (of known cause) in the European Mediterranean region are caused by humans**

- **55.8 % fires deliberately caused**
- **39.5 % fires unintentionally caused**

**Lack of proper fuel management and landscape planning in fire prone areas is increasing the risk of critical fires**

- **Abandonment of rural areas**
- **Fuel accumulation – lack of forest management in low productivity forests**
- **Continuity of fuel layers due to lack of proper landscape planning and fuel reduction programs**
- **Increase of Wildland Urban Interfaces (WUI)**
  - **urban expansion**
  - **second residence homes**

## Impact of wildfires in the EU in the period 2000-2017

- Area burnt: **8.5 Million ha** (about the size of Austria), approx. 480000 ha/year
- Firefighters and civilians killed by wildfires: **611 people**, equiv. to nearly 34 people every year
- Economic losses: over **54 Billion Euro**, approx. 3000 Million per year

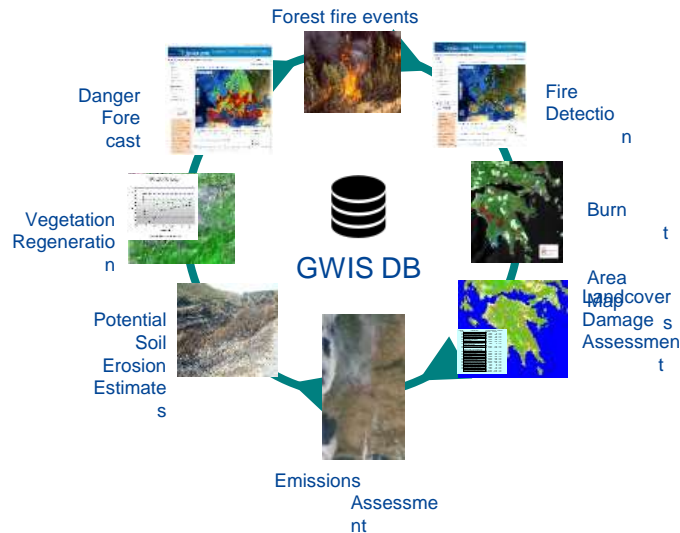
## Present

High emission (2070-2100)



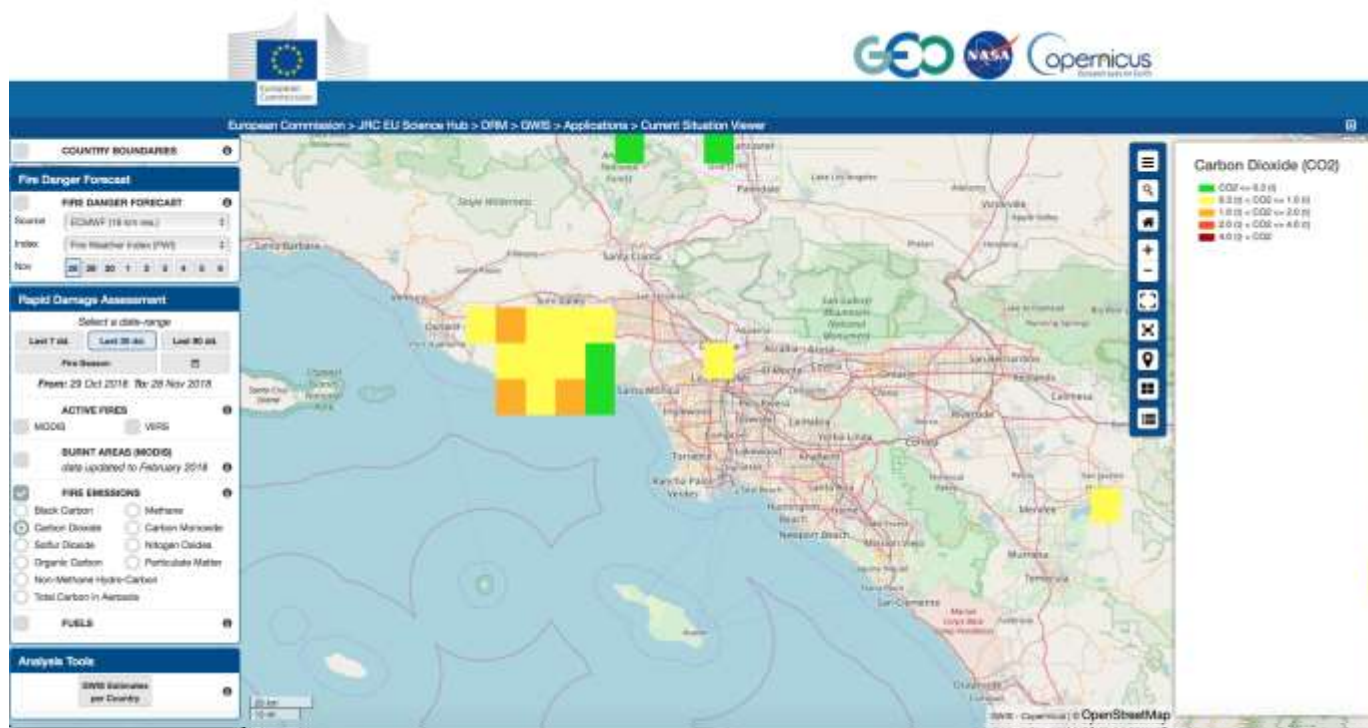
Special Use

## GWIS – Global Wildfire Information System

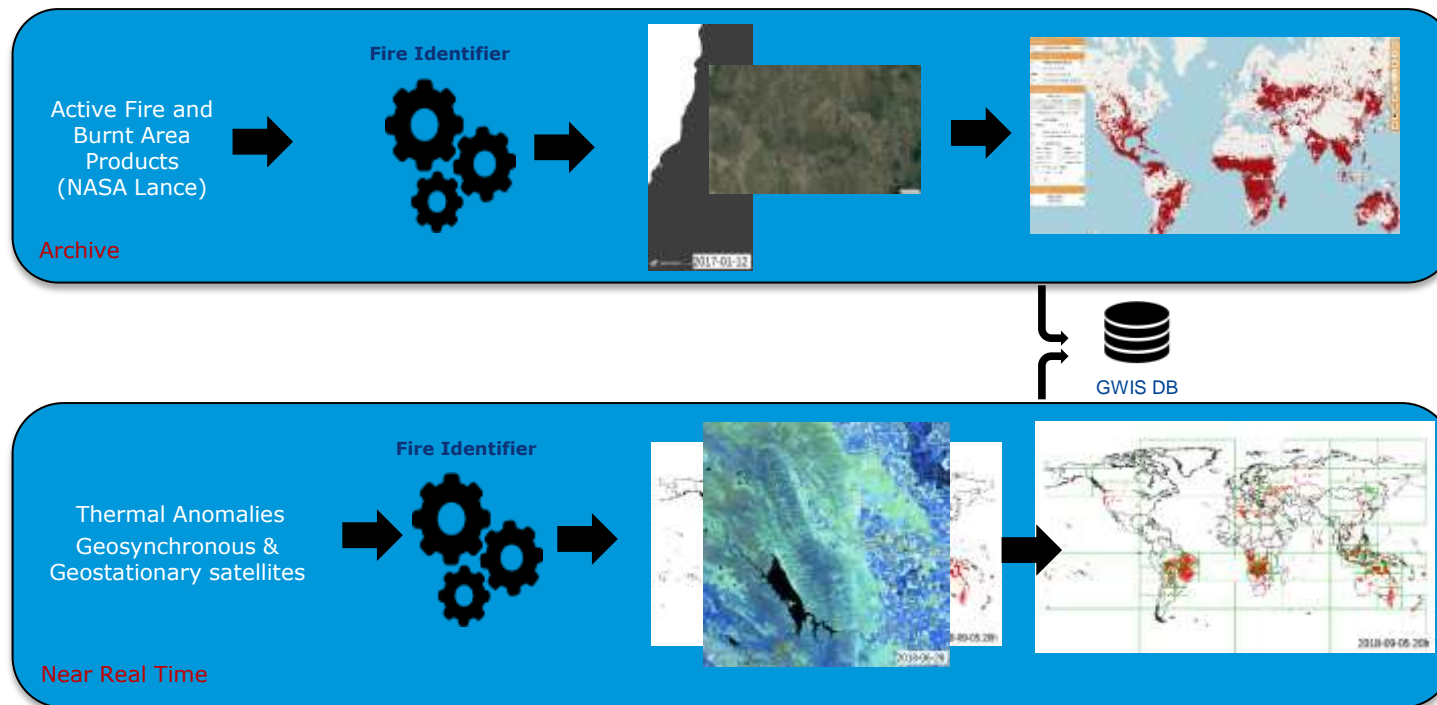


GEO - <https://www.earthobservations.org/activity.php?id=126>  
JRC - <http://gwis.jrc.ec.europa.eu>

# GWIS – current data availability









## New developments for wildfire monitoring in EFFIS/GWIS

- 2019
  - Outsourcing – Development/testing of ensemble and seasonal fire danger forecasting (w/ ECMWF)
  - Outsourcing - Testing the operation of active fire & burnt area mapping medium resolution (MODIS/VIIRS/S-3) (w/eGEOS consortium)
  - Outsourcing - Testing/validation of an 8-day high-spatial resolution burnt area layer (S-2, Landsat) (w/eGEOS consortium)
  - Testing of fire emissions & dispersion processing chain
- Testing of geo-stationary satellites for global wildfire monitoring (in coll. with NASA)
- Testing of near-real time monitoring on the basis of high-spatial resolution sat. sensors (in coll. with NOAA).

## Challenges/Discussion points

### Active fire detection

- Are geostationary sat/sensors the solution for near-real time monitoring?
- Real time monitoring of wildfires – High Altitude Sensor Systems?
- Night time monitoring – Will S-2 be available for this?
- Are S-3, MODIS, VIIRS, Feng-Yun, etc. plus high-spatial res. Sensors (S-2, Landsat, etc.) enough?

### Burnt area mapping

- Are S-3 type (MODIS, VIIRS, etc.) enough for wildfire monitoring?
- Is near-real time-wildfire monitoring at high spatial resolution (e.g. S-2, Landsat, etc.) feasible?
- Wildfire severity? Are S-2, Landsat, etc. enough? Do hyperspectral sensors add relevant information?
- Monitoring of wildfire emissions. Is P-5 the solution?
- Is the Med region a large enough market for services? Should applications be regional? Should they be global?

Wildfire science is at a loss for comprehensive data

*An international monitoring initiative is crucial for understanding wildfires and reducing their damage*

Nature (Bowman, July 2018)

# Thank you

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**<http://effis.jrc.ec.europa.eu>**

**<http://gwis.jrc.ec.europa.eu>**