



# GWIS new GEO and EU work programs

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European Commission Joint Research Centre

## Outline

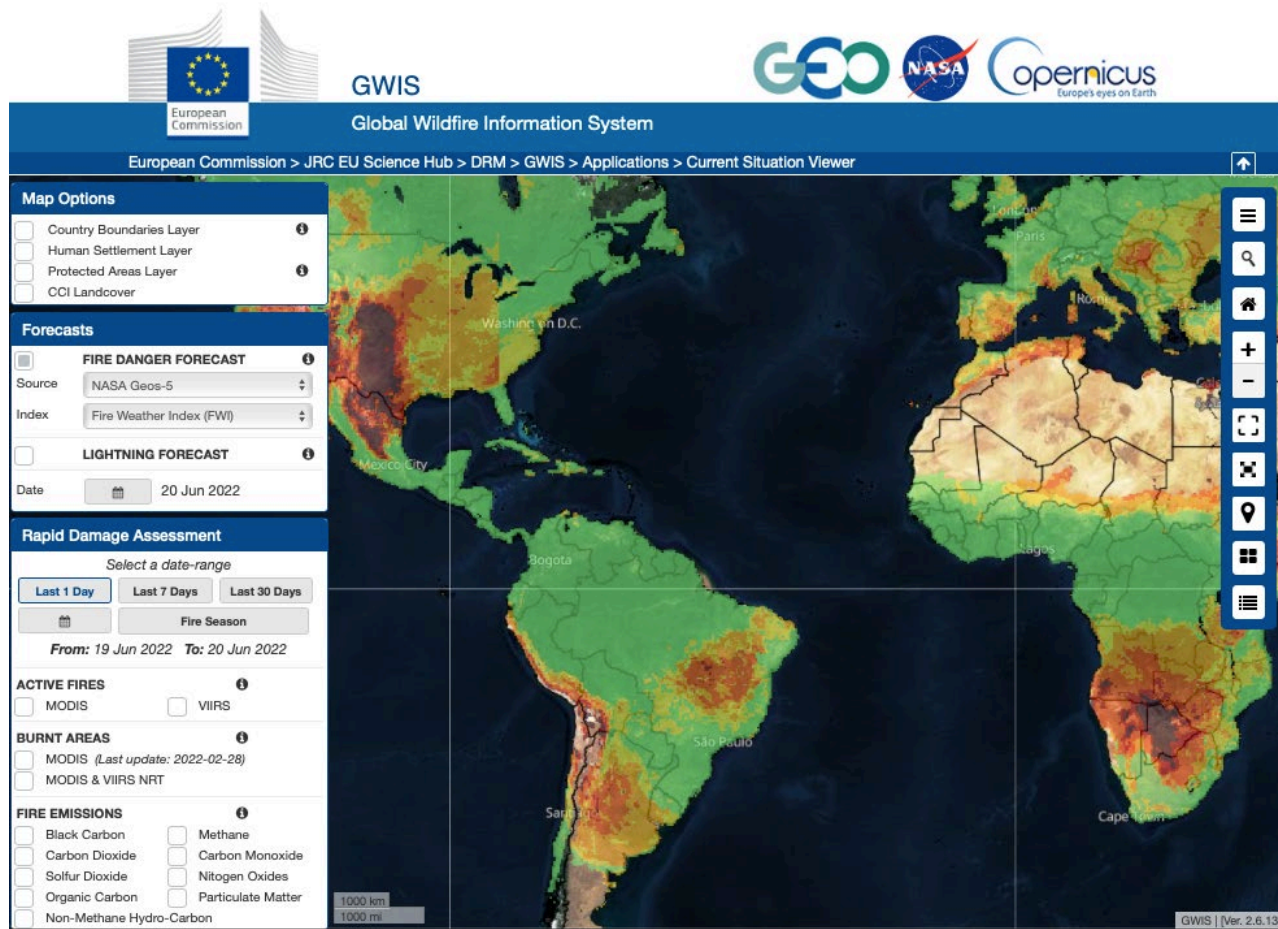
### 1. The GWIS GEO Work Program

- Implementation of the NASA projects
- Contribution to the Climate Change report / GEO Knowledge Hub / Climate Action
- Collaboration with NASA SERVIR

### 2. GWIS European Union (EU) program

- Copernicus Program
- Foreign Policy Instrument (FPI) EU Project on support to wildfire management in LAC
- EU Green Deal – Team Europe Initiative on the Amazon

- Fire danger assessment from NASA Geos-5 model (Field et al. 2021) & training with NASA ARSET

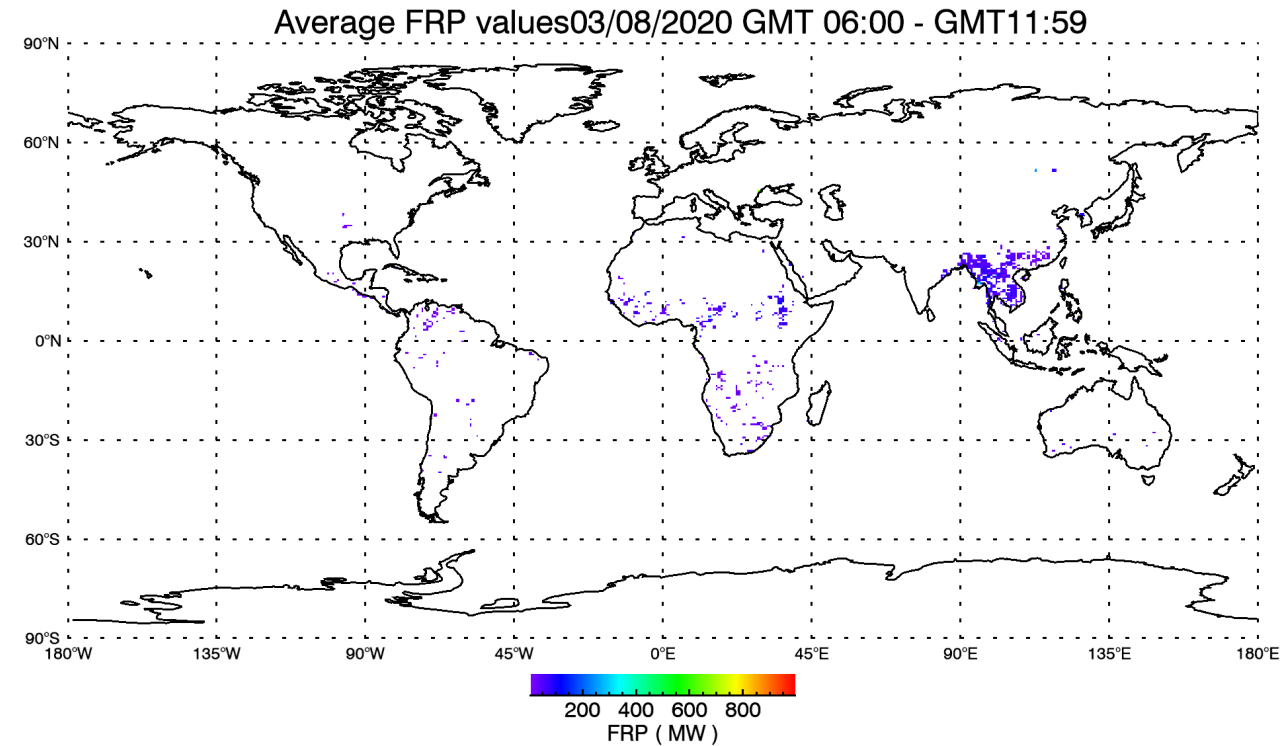
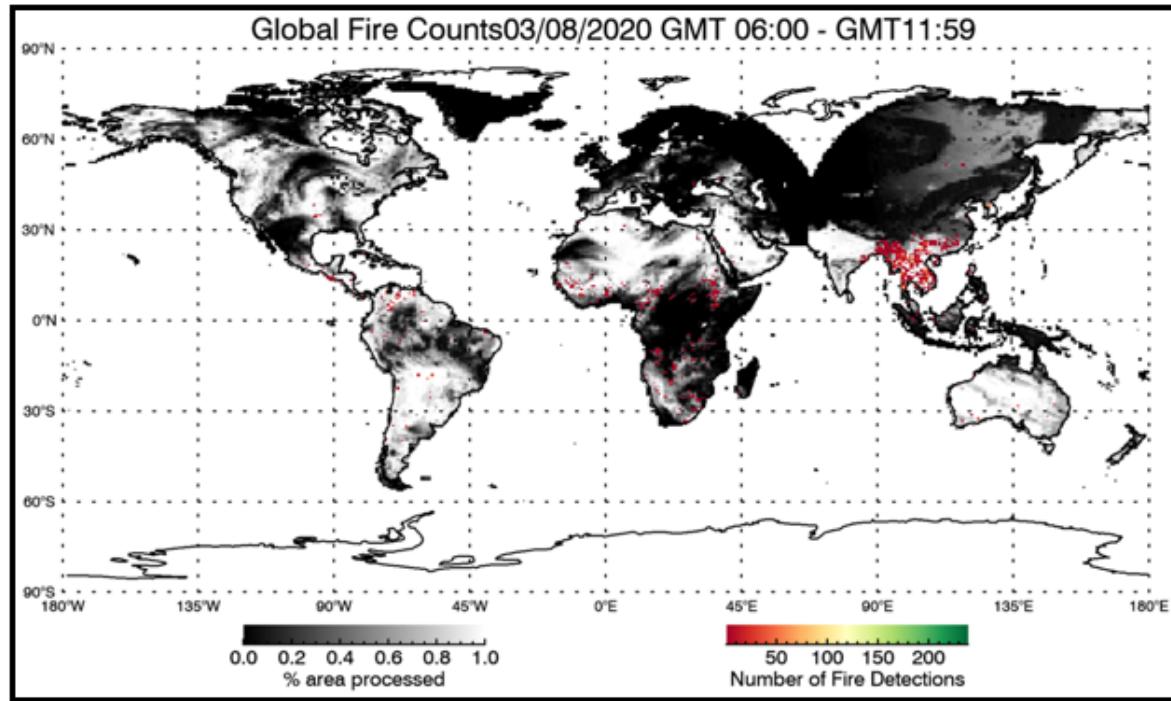


### Session 2 Agenda

- Part 3 (QGIS Fire Mapping Tool (FMT))
- Overview of the Group on Earth Observations
- Overview of the GWIS
- GWIS features and case-study applications
- GWIS tutorial

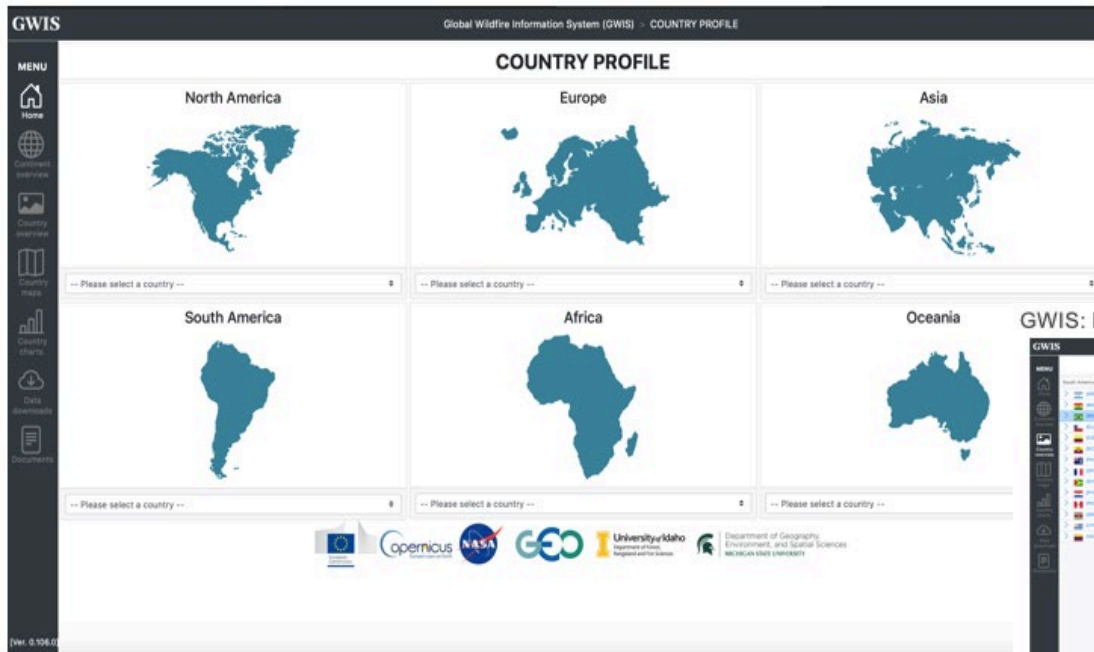
The video player shows a screenshot of the GWIS interface, similar to the one in the previous figure. The video title is "NASA ARSET: Overview of the Global Wildfire Information System (GWIS), Part 2/2". The video progress bar shows 2:47 / 58:38. The video player controls include play, pause, stop, full screen, and other standard video controls.

- Global Fire Counts – harmonized gridded products (L. Giglio et al. 2021)





- Burned area monthly stats from MCD64 A1 (Boschetti et al. 2021)



<https://gwis.jrc.ec.europa.eu/apps/country/profile/>

GWIS: Historical analysis of fire regimes, burnt areas, fire seasonality, protected areas, Landcover damage, etc. (e.g. Brazil)



- GEO contribution to the WMO State of Global Climate 2020: Wildfires – (San-Miguel et al. 2020)



#### CHALLENGE

Wildfires are a global hazard that contribute to huge environmental damage and economic losses. Every year, around half a million hectares of natural areas are burnt across the European Union. Climate change is expected to further exacerbate wildfire risks.

According to analysis by World Weather Attribution scientists, climate change has increased the chance of the "extreme fire weather" by at least 30 per cent.<sup>54</sup> Scientists estimate that if global temperatures were to rise by 2°C<sup>55</sup> the fire-weather conditions experienced in summer 2019–20 "would be at least four times more common as a result of human-caused climate change".<sup>56</sup>

#### APPROACH

The European Forest Fire Information System (EFFIS)<sup>57</sup> was created to collect standardized information on wildfires, supporting the wildfire management organizations in European countries, with harmonized reporting of wildfire information in support of the European Commission services and the European Parliament. In 2000, the EFFIS became one of the first regional information systems covering a large number of countries in Europe.

Since then, EFFIS has evolved to support wildfire information systems in 43 countries in Europe, the Middle East and North Africa. At a national level, EFFIS provides an ensemble of information including the prediction of wildfire danger in the coming days, seasonal fire weather monitoring, updated information on ongoing fires up to six times a day, analysis of wildfire severity, and assessment of wildfire damages.

The extension of EFFIS to the global level developed into a Global Wildfire Information System (GWIS),<sup>58</sup> a joint initiative of Copernicus and the Group on Earth Observations (GEO), using advanced methods on data processing for wildfire detection and monitoring, numerical weather prediction models and remote sensing to enable enhanced preparedness and effectiveness in wildfire management. GWIS is set to

be a unique resource supporting developing countries which may not have proper access to information on wildfires.

#### RESULT

The economic benefits of establishing the EFFIS have been quantified in different ways. The cost of setting up and operating the system, currently within the Copernicus Emergency Management Services (CEMS), is estimated at € 1.8 million a year. The estimated cost of replicating the tools of EFFIS at a national level would be of the order of € 775 million a year.

The benefits provided by EFFIS for preventing environmental damage and economic losses by the wood industry in Europe are between € 255 million and € 375 million a year.<sup>59</sup> This is based on the contribution of EFFIS to the reduction of burnt areas and how this reduction reverts to reduced environmental damage and reduced economic damage to the wood industry. Adding the savings in operating a regional wildfire early warning and information system to the benefits in saving environmental and economic losses, which is estimated to be an average of € 315 million, the total estimated benefits of EFFIS amount to around € 390.5 million a year in the European Union.

The direct benefits of international cooperation and enhancement of civil protection's capacity in developing countries through GWIS are harder to quantify but likely to be highly significant. A 10% reduction of environmental damage worldwide would avoid about € 13 trillion of economic losses.

The total estimated benefits of EFFIS amount to around € 390.5 million a year in the European Union.

#### PARTNERS

European Commission – Joint Research Centre, Group on Earth Observations.

<sup>54</sup> worldweatherattribution.org

<sup>55</sup> Studies based on IPCC data say there's a 95% chance we'll pass 2°C by the year 2100.

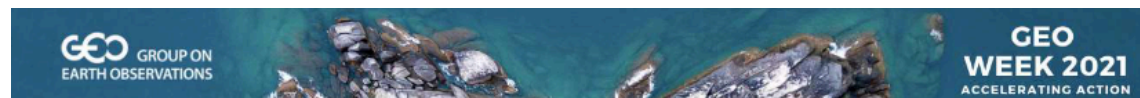
<sup>56</sup> Van Oosterbeek et al. Attribution of the Australian bushfire risk to anthropogenic climate change.

<sup>57</sup> EFFIS.

<sup>58</sup> GWIS.

<sup>59</sup> PwC, 2019. Analysis of benefits by the EU Copernicus services carried out by PwC for the European Commission.

- GlobFire Knowledge Hub package (Artes et al. 2022)



## GlobFire Knowledge Package



October 22, 2021 | Version 1.0

### A global wildfire dataset for the analysis of fire regimes and fire behaviour

Tomas, J. A. V. (1), J. A. V. (2), J. A. V. (3), J. A. V. (4), J. A. V. (5)

DOI:

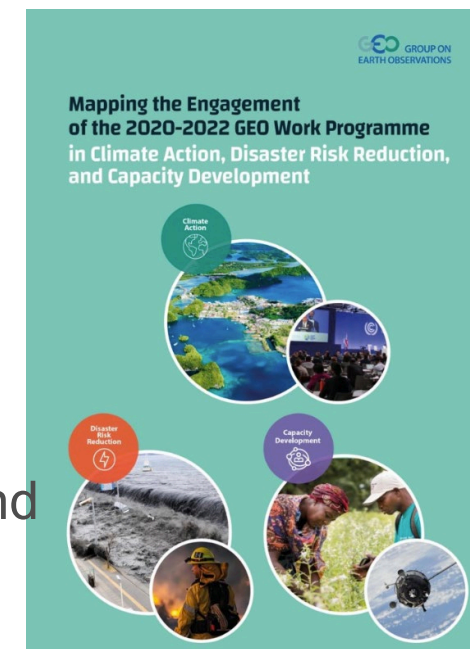
<https://doi.org/10.1016/j.glofire.2021.1000000>

Global fire monitoring systems are crucial to study fire behaviour, fire regimes and their impact at the global scale. Although global fire products based on the use of Earth Observation satellites exist, most remote sensing products only partially cover the requirements for these analyses. These data do not provide information like the size, the spread speed, how fires may evolve and pass into single event, or the number of fire events for a given area. This high level of abstraction is very valuable: it makes it possible to characterize fires by types (either size, spread, behaviour, etc.), here, we present and test a data mining work flow to create a global database of single fires that allows for the characterization of fire types and fire regimes worldwide. This work describes the data produced by a data mining process using MODIS burnt area product Collection 6 (MCD64A3). The entire product has been computed until the present and is available under the umbrella of the Global Wildfire Information System (GWIS).

GlobFire can be used to create statistics which are not commonly found in burnt area products. For instance, the average monthly fire size for country. It can be useful to see the behaviour of the fire season, spatial differences of fire frequency or trends of the maximum daily fire spread. It is interesting to see how there are some regions where the number of fires increased but the total burnt area correlation trend is strongly negative. That fact could point out to successful fuel management techniques in prescribed fires, but the opposite can happen too, an increasing linear trend of burnt area and number of fires as in many regions of the Arctic or southeastern western Australia. Fire causes and fire spread behaviour are defined by a large set of different factors like socio-economic factors, weather conditions, fire fighting means, policies, etc. Then, it is hard to point out the reasons of the results obtained from the dataset. However, the GlobFire could help to detect those areas where fire statistics are worsening potentially by climate change and/or direct anthropogenic factors. Finally, it could help, combined with other datasets, to see in which regions fuel management is working or do research to improve the danger and risk indexes. See more in Applications section of the manual (GlobFire Manual Method Application).

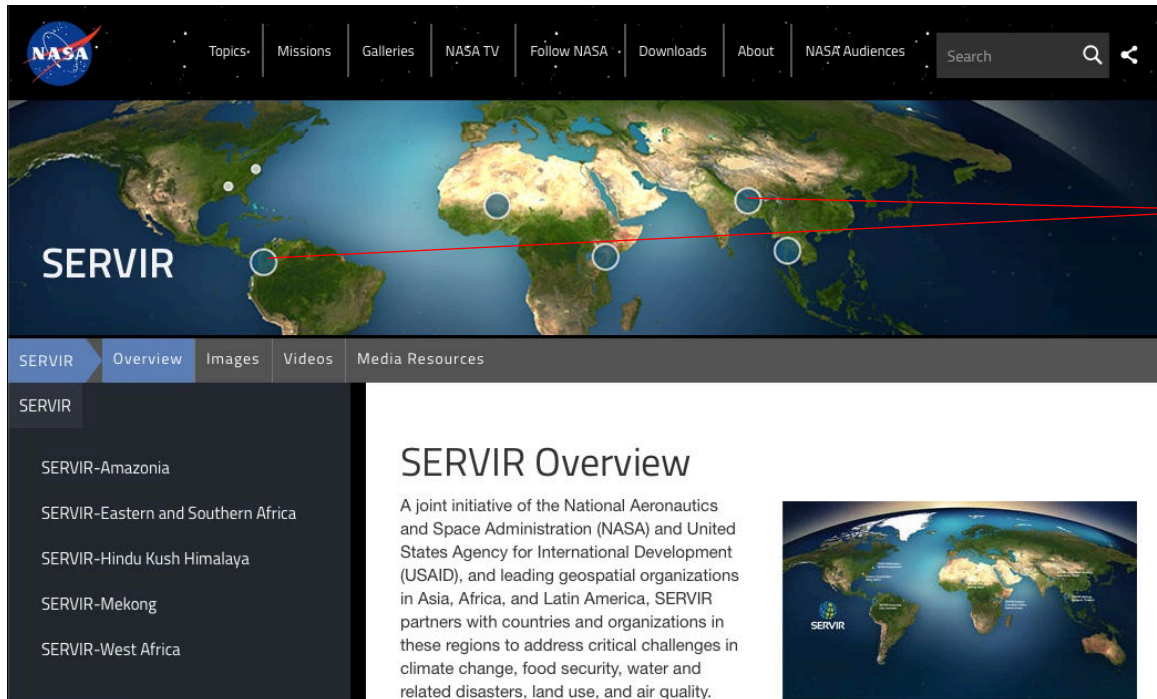
- Share GlobFire publication.
- Share GlobFire dataset.
- Share the method to build/replicate GlobFire.
- Share the software used for GlobFire.
- Share how to use it and what can be done.
- GKH is Knowledge meeting point and a platform to share!

- Engagement of GEO in Climate action, DRR and capacity development (Venturini et al. 2022)





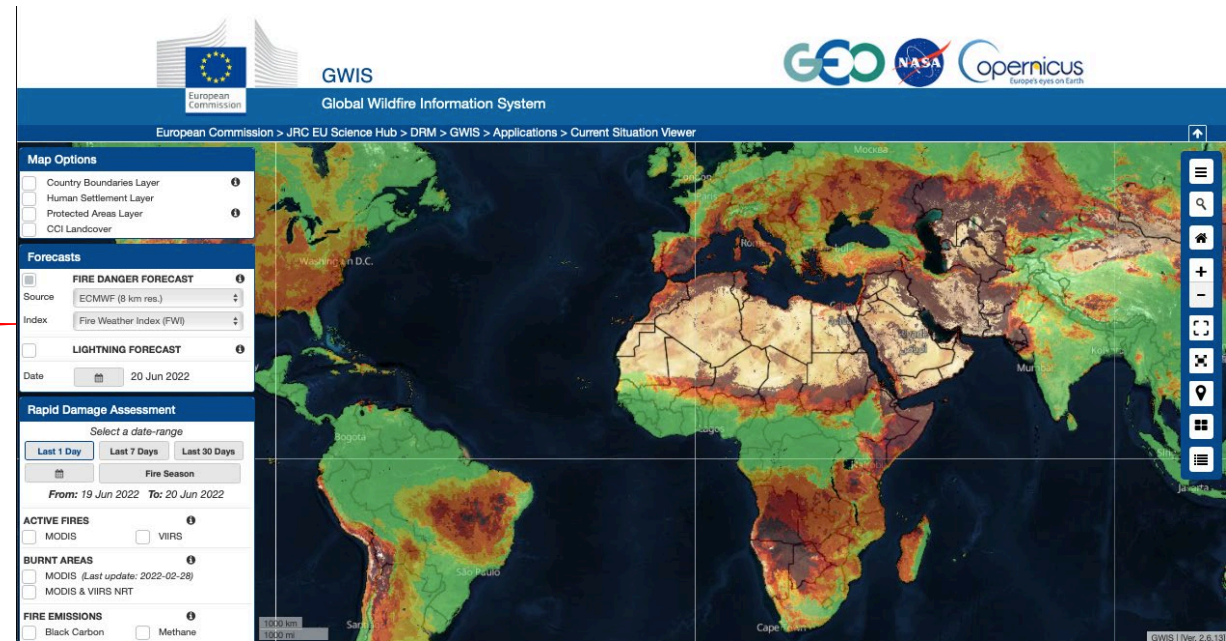
- GWIS collaboration with NASA SERVIR – SERVIR Amazonia & SERVIR-Hindu Kush Himalaya



**SERVIR Overview**

A joint initiative of the National Aeronautics and Space Administration (NASA) and United States Agency for International Development (USAID), and leading geospatial organizations in Asia, Africa, and Latin America, SERVIR partners with countries and organizations in these regions to address critical challenges in climate change, food security, water and related disasters, land use, and air quality.

- SERVIR-Amazonia
- SERVIR-Eastern and Southern Africa
- SERVIR-Hindu Kush Himalaya
- SERVIR-Mekong
- SERVIR-West Africa



- GEO Work Program 2023– 2025 submitted



Report generated on **2022-06-05 17:09:09 - UTC**

Report generated by **Jesus San Miguel-Ayanz**

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## **WP23\_25: Global Wildfire Information System**

v00.01

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### **Basic Information**

Full title of the Initiative

*Global Wildfire Information System*

Short Title or Acronym

*GWIS*

Current category in the 2020-2022 GWP

*GEO Initiative*

Proposed category in the 2023-2025 GWP

*GEO Initiative*



# GWIS EU programs - Copernicus



The screenshot shows the top of the EFFIS website. At the top left is the European Union flag and the Copernicus logo with the tagline 'Europe's eyes on Earth'. To the right is a navigation menu with links: 'About', 'Publications', 'Apps', 'Partners', and 'Contacts'. Below this is a large banner image of a forest fire with the text 'European Forest Fire Information System' and 'EFFIS' in white. The main content area has a heading 'Welcome to EFFIS' followed by a paragraph about the system's purpose. Below this is a section 'EFFIS applications' with three thumbnails: 'Current Situation Viewer', 'Current Statistics Portal', and 'Firenews'. To the right of the main text are two sidebars. The first sidebar, titled 'New features', contains links to 'Current Statistics Portal' and 'Data Request Form'. The second sidebar, titled 'Visit our', contains a link to 'Global Wildfire Information System Viewer'. At the bottom right, there is a section titled 'EFFIS Damage Assessment' showing 'EFFIS Burned Area (ha)' and 'Total EU Countries'.

**Welcome to EFFIS**

EFFIS - European Forest Fire Information System - 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, EFFIS is supported by a network of experts from the countries in what is called the [Expert Group on Forest Fires](#), which is registered under the Secretariat General of the European Commission. Currently, this group consists on 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. A number of specific applications are available through EFFIS:

**EFFIS applications**

[Current Situation Viewer](#) [Current Statistics Portal](#) [Firenews](#)

**New features**

Get up-to-date countries statistics by the new [Current Statistics Portal](#)

Make your specific requests of data by the new [Data Request Form](#)

**Visit our**

[Global Wildfire Information System Viewer](#)

**EFFIS Damage Assessment**

EFFIS Burned Area (ha)

Total EU Countries

## EU Copernicus Program (2022 – 2027) EFFIS & GWIS

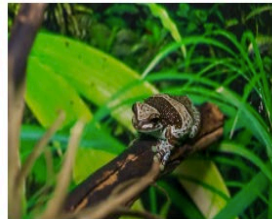
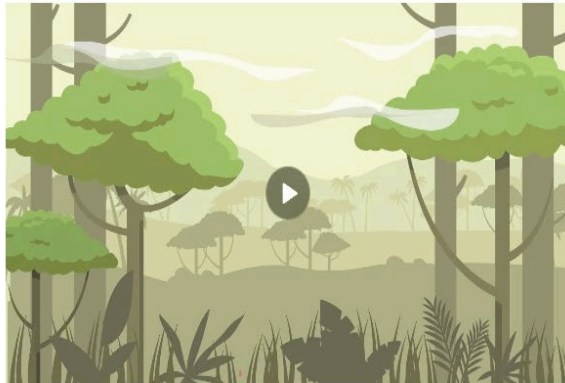
- Annual budget for operations
- Pan-European Expert Group on Forest Fires (EGFF)
- Organization of annual meetings
- Further developments
- Outsourcing of modules:
  - ECMWF fire danger
  - IGN + active fire & burnt area mapping

# GWIS EU programs – Foreign Policy Instrument

## Support to Wildfire Management in LAC

The European Union (EU) and Latin America and the Caribbean (LAC) have a longstanding relationship based on common values and established on a legal framework with most of the 33 countries through association and trade agreements, and political and cooperation dialogues.

Both regions collaborate in numerous international fora to tackle global challenges, such as the United Nations (UN) in the context of the 2030 Agenda for Sustainable Development cooperation, or the fight against climate change through the Paris Agreement.



<a href="#">Overview</a>	<a href="#">Regional</a>	<a href="#">Stakeholders</a>	<a href="#">Media</a>	<a href="#">Repository</a>	<a href="#">EGFF LAC</a>
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### Collaboration on wildfire management between the EU and Latin America and the Caribbean region

Wildfires constitute a major threat in many LAC countries, as they cause large environmental and economic losses every year. The urge to address this global

## EU Foreign Policy Instrument (2020 – 2023) “Support to wildfire management in LAC”

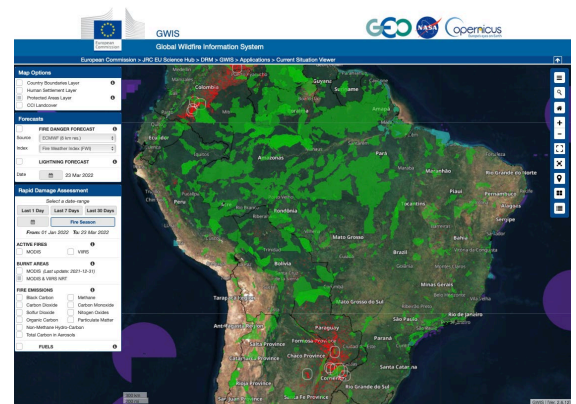
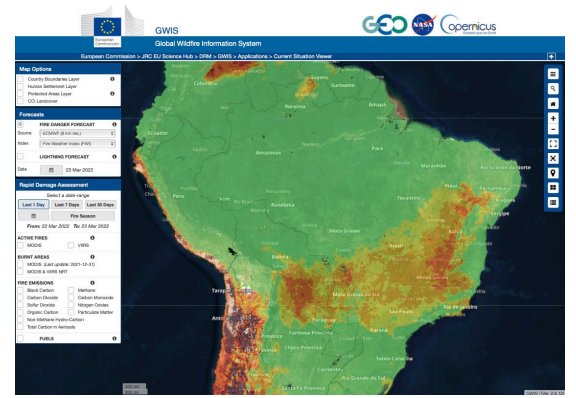
- Minimize the impact of wildfires in the LAC region
- Establish an Expert Group on Forest Fires in LAC
- Bilateral meetings w/ fire management services in LAC
- Reports on “Fire information systems in South America” & “Forest fires in South America 2021”
- Next physical meeting org. with FAO/ACTO/UNEP & CONAF in Chile, July 2022

<https://gwis.jrc.ec.europa.eu/projects/support-wildfire-management-lac>





# Fire regimes- Brazil: Weekly report on active fires, burnt areas, thermal anomalies (hot spots – VIIRS)



## JRC TECHNICAL REPORT

Weekly analysis of wildfires in the Amazon region and South America: March 7 - March 13, 2022



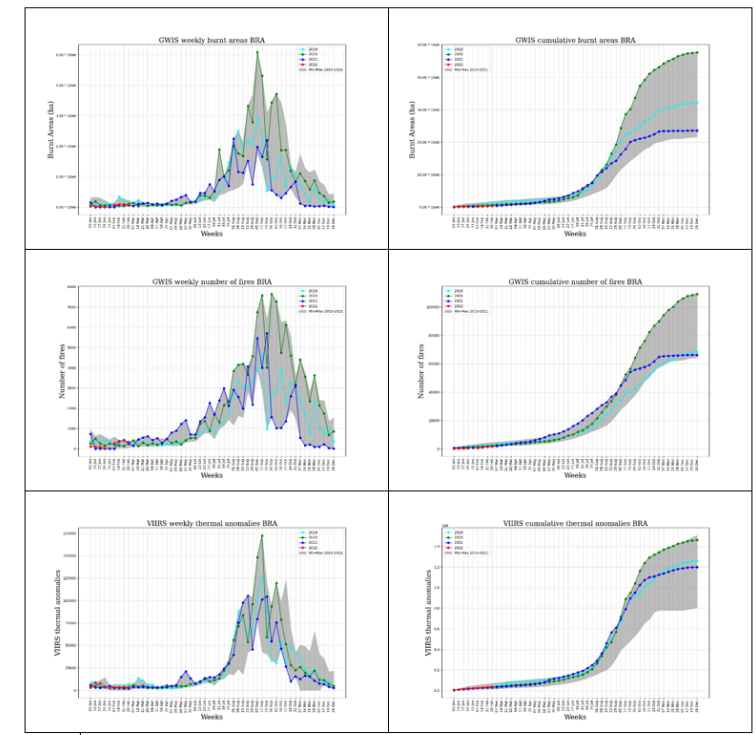
2022

JRC127248

Joint Research Centre

## 2 Wildfires in Brazil

Figure 3 shows the trends on the extent of burnt areas and the number of fires since January 1, 2022 produced by the Near-Real Time (NRT) fire analysis in GWIS. The last row shows the evolution of active hot spots (thermal anomalies) detected by the satellite sensor VIIRS. A total of 384,023 ha burnt in Brazil since January 1 until March 6, 2022, with a total 63,096 ha burnt in the last week. The total burnt area in the country remains similar to the values of the previous 7 years. The number of fires recorded in GWIS in the last week was 309, decreasing from the last week. The number of thermal anomalies until March 6, 2022 (36,606) shows a typical trend in the region. 2,895 thermal anomalies were registered last week.





GWIS: Near-real time analysis of fire regimes, burnt areas, emissions, protected areas, Landcover damage, etc. (e.g. Brazil)

AboutPublicationsAppsProjectsPartnersContacts

GWIS Statistics Portal

### EFFIS Estimates

of Burned Areas and Number of Fires

Open

### Seasonal Trend

of Burned Areas, Number of Fires and Thermal Anomalies

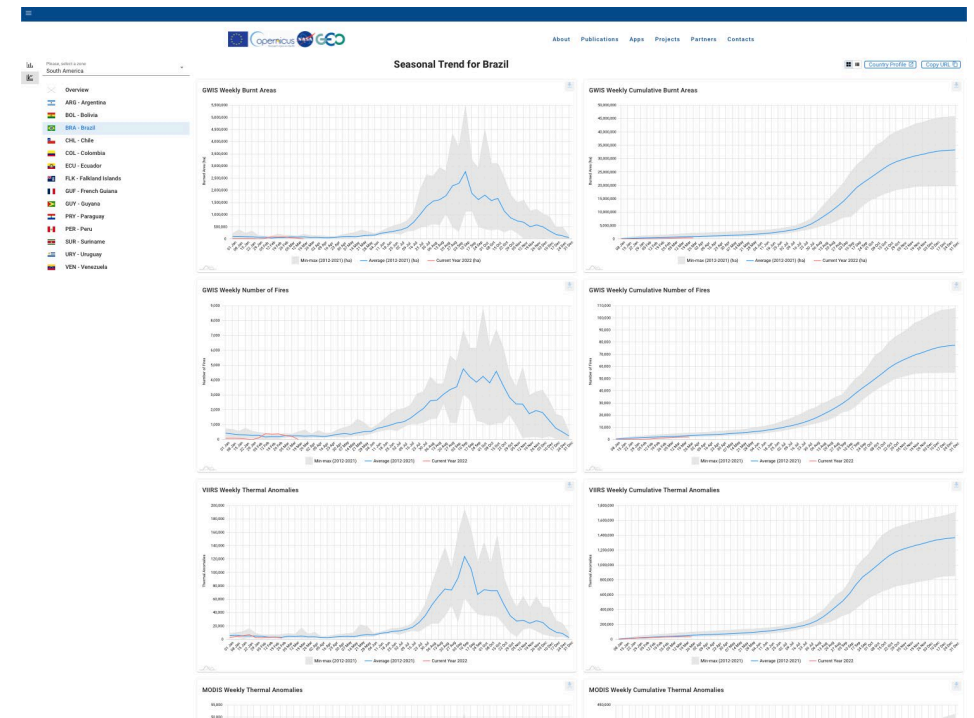
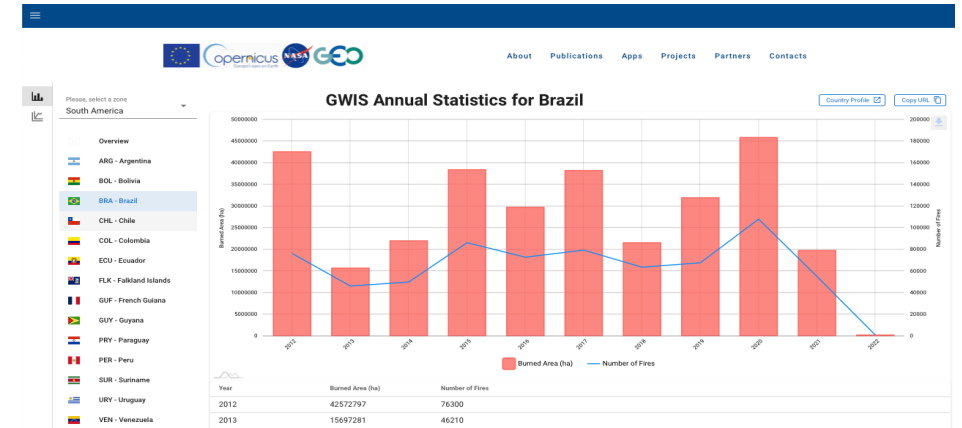
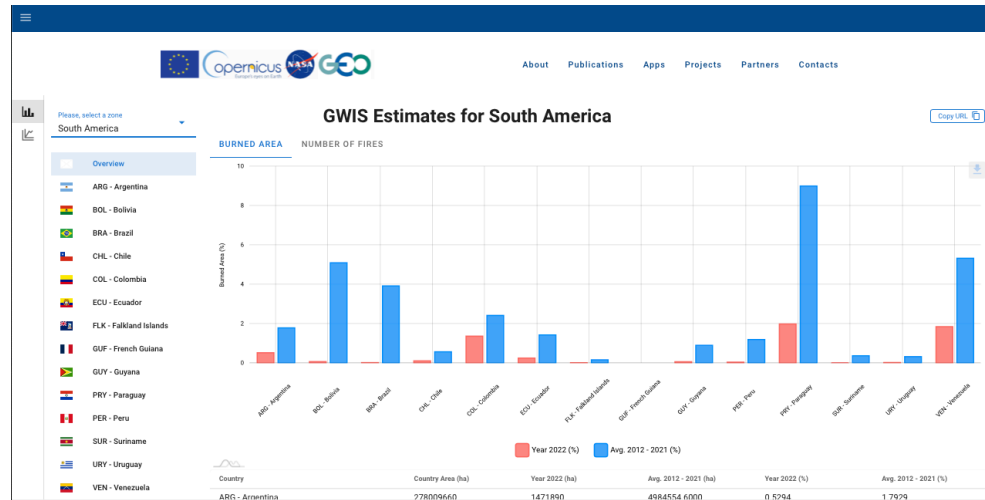
Open

JRC MissionCookiesLegal noticePrivacy Statement

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



# GWIS: Near-real time analysis of fire regimes, burnt áreas, emissions, protected áreas, Landcover damage, etc. (e.g. Brazil)



# GWIS EU programs – Green Deal

1. Deforestation  
and forest  
degradation

2. Wildfires

3. Environmental  
governance &  
indigenous  
peoples

4. Sustainable  
forest goods and  
services

## Regional component

### Implementation:

- Member State Organisations
- JRC

Managed by: DG INTPA

## Team Europe Initiative on the Amazon (2022 – 2028)

- Expert Group on Forest Fires in LAC
- Annual report of wildfires in the region
- Bilateral meetings w/ fire management services in LAC
- Training & capacity building on fire information systems
- Support to fire data harmonization in the LAC region



## Data and services

### Data and services

By using the data provided you acknowledge the following terms of use under this [license](#).

Country Boundaries Layer ⓘ	<a href="#">Download</a>	
Human Settlement Layer	<a href="#">Download</a>	
Protected Areas Layer ⓘ	<a href="#">Download</a>	
CCI Landcover	<a href="#">Download</a>	
Fire Danger Forecast ⓘ (1 day forecast)	ECMWF (8 km res.)	NASA Geos-5
FWI - Fire Weather Index (FWI)	<a href="#">Download</a>	<a href="#">Download</a>
FWI - Initial Spread Index (ISI)	<a href="#">Download</a>	<a href="#">Download</a>
FWI - Build Up Index (BUI)	<a href="#">Download</a>	<a href="#">Download</a>
FWI - Fine Fuel Moisture Code (FFMC)	<a href="#">Download</a>	<a href="#">Download</a>
FWI - Duff Moisture Code (DMC)	<a href="#">Download</a>	<a href="#">Download</a>
FWI - Drought Code (DC)	<a href="#">Download</a>	<a href="#">Download</a>
FWI - Anomaly	<a href="#">Download</a>	-
FWI - Ranking	<a href="#">Download</a>	-
KBDI - Keetch-Byron Drought Index	<a href="#">Download</a>	-
MARK-5 - Drought Factor (MARK-5 DF)	<a href="#">Download</a>	-
MARK-5 - Rate of Spread (MARK-5 ROS)	<a href="#">Download</a>	-
MARK-5 - Fire Danger Index (MARK-5 FDI)	<a href="#">Download</a>	-



# Additional information:

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

<https://gwis.jrc.ec.europa.eu/projects/support-wildfire-management-lac>

# Thank you

[jrc-effis@ec.europa.eu](mailto:jrc-effis@ec.europa.eu)