Recent developments in the
Global Wildfire Information System (GWIS)

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European Commission - Joint Research Centre
GWIS concept:
follows the EFFIS (European Forest Fire Information System) fire cycle:

Current EFFIS Network of 43 Countries
Extension to MENA countries in collaboration with FAO
Copernicus Emergency Management Service (Copernicus EMS) provides information for emergency response in relation to different types of disasters, including meteorological hazards, geophysical hazards, deliberate and accidental man-made disasters and other humanitarian disasters as well as prevention, preparedness, response and recovery activities. The Copernicus EMS is composed of an on-demand mapping component providing rapid maps for emergency response and risk & recovery maps for prevention and planning and of the early warning and monitoring component which includes systems for floods, droughts and forest fires:
GWIS Timeline

1998 - Creation of Forest Fire Experts Group in EC
2000 - EFFIS becomes operational in 2000
2001 - GOFC-Fire holds a joint workshop with the CEOS LPV on Fire Product Validation in Lisbon
2004 - Effis Fire Database was established
2007 - Rapid damage assessment was introduced to EFFIS; quasi-real time maps of burned areas in southern Europe.
2010 - 2016 - GOFC-GOLD Fire Implementation Team Meetings to promote joint developments of global fire monitoring and EEFIS
2013 - Copernicus and GEO support development of GWIS as an extension of EFFIS
2018 - NASA supports 3 GWIS Teams
2020 - GWIS Operational

Courtesy of Vince Ambrosia
Global Wildfire Information System (GWIS)

The Global Wildfire Information System is a joint initiative of the GEO and the Copernicus Work Programs. The Global Wildfire Information System (GWIS) aims at bringing 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.

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 (GOF-C GOLD), Fire Implementation Team (GOFC Fire IT), and the associated Regional Networks, complementing existing activities that are on-going around the world with respect to wildfire information gathering. The development of GWIS is supported by the partner organisations and space agencies. Support to GWIS was just launched by NASA through its ROSES program.

Access to worldwide information on wildfires is available through the GWIS viewer at http://gwis.jrc.ec.europa.eu/ar/earth/earth_current_situation/public/index.html
News about the Global Wildfire Information System (GWIS):

- **GEO GWIS Work program 2020-2022** progressing well, despite COVID restrictions, except for e.g. annual meetings.


- **New EU project on support to wildfire management** in the Latin-America and Caribbean, under the TEI Amazon initiative (2021-2027).

- **Other activities:** (1) GWIS contribution to UN-SPIDER/ZFL Virtual Expert Meeting for Southern Africa, 13-15 July 2021, (2) Contribution to NASA ARSET Webinars (example of Zambia).

https://gwis.jrc.ec.europa.eu
GWIS applications – fire danger forecast
GWIS applications – active fire and burnt area mapping
Most affected areas in 2020
Seasonal Trends - Brazil
Weekly evolution of: damage to protected areas, burnt areas, active fires, land cover damage, fire danger, fire emissions
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https://gwis.jrc.ec.europa.eu
NASA GEO-GWIS Selections

A.50 GEO Work Programme
3.8 Global Wildfire Information System (GWIS)

- Robert Field (Columbia University)
  - “Enhancements to the Global Wildfire Fire Information System: Fire Danger Rating and Applications in Indonesia”

- Wilfrid Schroeder / Louis Giglio (/ NOAA / UmD)
  - “Development of a Harmonized Multi-Sensor Global Active Fire Data Set”

- Luigi Boschetti / David Roy (U. of Idaho & MI. State Univ.)
  - “Using the NASA polar orbiting fire product record to enhance and expand the Global Wildfire Information System (GWIS)”

Courtesy of Vince Ambrosia
Use of MODIS BA product record to enhance GWIS

Fire Analysis Portal
Ex; South Sudan 2017

This user selected region and analysis year; page spawned as a separate window (a user can spawn many windows e.g. several different years for the same region, e.g. several different regions for the same, e.g. for different regions and years).

User can interactively point & click to select country of interest (country outline shown on map)

User can interactively select three options; (note, these 3 options graphics should show real results for the selected region and year)

2017 statistics
Multi-year statistics
Maps

Courtesy of Vince Ambrosia
Harmonized Multi-Sensor Global Active Fire Data Set

Active Fire Counts Per 1 Degree Grid Cell – Importance of Persistent Source Removal

Top Left: All GOES-16 ABI FDC classes and all MSG SEVIRI FRP-PIXEL fire confidence (1-100%) were used;

Bottom Left: High Confidence GOES-16 ABI FDC classes (10,11,13,30,31,33) and MSG SEVIRI FRP-PIXEL fire confidence (51-100%) were used;

Bottom Right: Filtered fires including removal of non-vegetation persistent fire sources.

Augment existing GWIS fire mapping capabilities with the delivery of a harmonized global multi-sensor fire data set

Courtesy of Vince Ambrosia
GWIS Fire Danger Rating Enhancements

Goals:

• Enhance the NASA Global Fire Weather Database (GFWED) with short-term fire weather forecasts;
• Contribute selected GFWED data to GWIS;
• Improve the Indonesian Fire Danger Rating System using NASA Global Precipitation Measurement mission precipitation estimates to enhance fire management decision aids.

Preliminary Fire Weather Index Map calculated for July 25, 2018

Courtesy of Vince Ambrosia
GWIS Country Profiles (launched in 2021)

GWIS – Country Profiles:
- Burnt area extent
- Fire frequency
- Seasonality
- Landcover damage
- Damage to protected areas
- Etc…
Current data used in GWIS country profiles

MCD64 A1 – Burnt Areas (NASA GEO GWIS project)

Globfire – Number of fires, fire size, fire size distribution

GFED4s – Emissions

FAOSTAT Emissions (forthcoming)
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https://gwis.jrc.ec.europa.eu
EU-LAC Dialogue on wildfire management project (2021-2027):

(Launched by JRC under the EU Green Deal strategy, supported by the EU Team Europe Initiative on the Amazon)

• (1) Reduce the impact of wildfires in the Amazon region and neighboring countries through cooperation with LAC countries and regional organizations (ACTO, Leticia Pact, UNEP, FAO, UNDRR, etc.) by providing evidence for policies.

• (2) Share the experience of the EC on the establishment of the Expert Group on Forest Fires (EGFF)¹ and the development of wildfire early warning and monitoring systems in the pan-European region (i.e. European Forest Fire Information System)²

• (3) Establish cooperation with fire management services in the countries and organizations operating in the region, e.g. ACTO, Leticia Pact, FAO, UNEP, etc.

¹ Group made of fire managers from Ministries of Environment, Agriculture or Civil Protection from 43 countries in Europe, Middle East and North Africa
² European Forest Fire Information System (EFFIS), developed by JRC and currently operating under the EU Copernicus Regulation
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https://gwis.jrc.ec.europa.eu
https://www.earthobservations.org/article.php?id=467

https://youtu.be/JnYJ2AFMKQo
What can GWIS provide for wildfire monitoring at global scale?

- Analysis of fire regimes and changes in different regions of the world
- Harmonized and up to date comparable data across the globe to assess wildfire effects
  - wildfire regime profiles, fire seasonality, impact, trends
- Methods for reliable analysis of fire damages and economic impacts, including near real-time information on critical events
- Implementation of information systems reachable at national/regional/global scale
- Web information services reaching citizens (education/awareness)
- Development of tools supporting fire prevention/preparedness
- Repository for relevant global datasets for users
- Training and capacity building...
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)

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