Enhancing the European Forest Fire Information System (EFFIS) with Open Source Software

Cristiano Giovando

JRC EUROPEAN COMMISSION

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Joint Research Centre
Insitute for Environment and Sustainability
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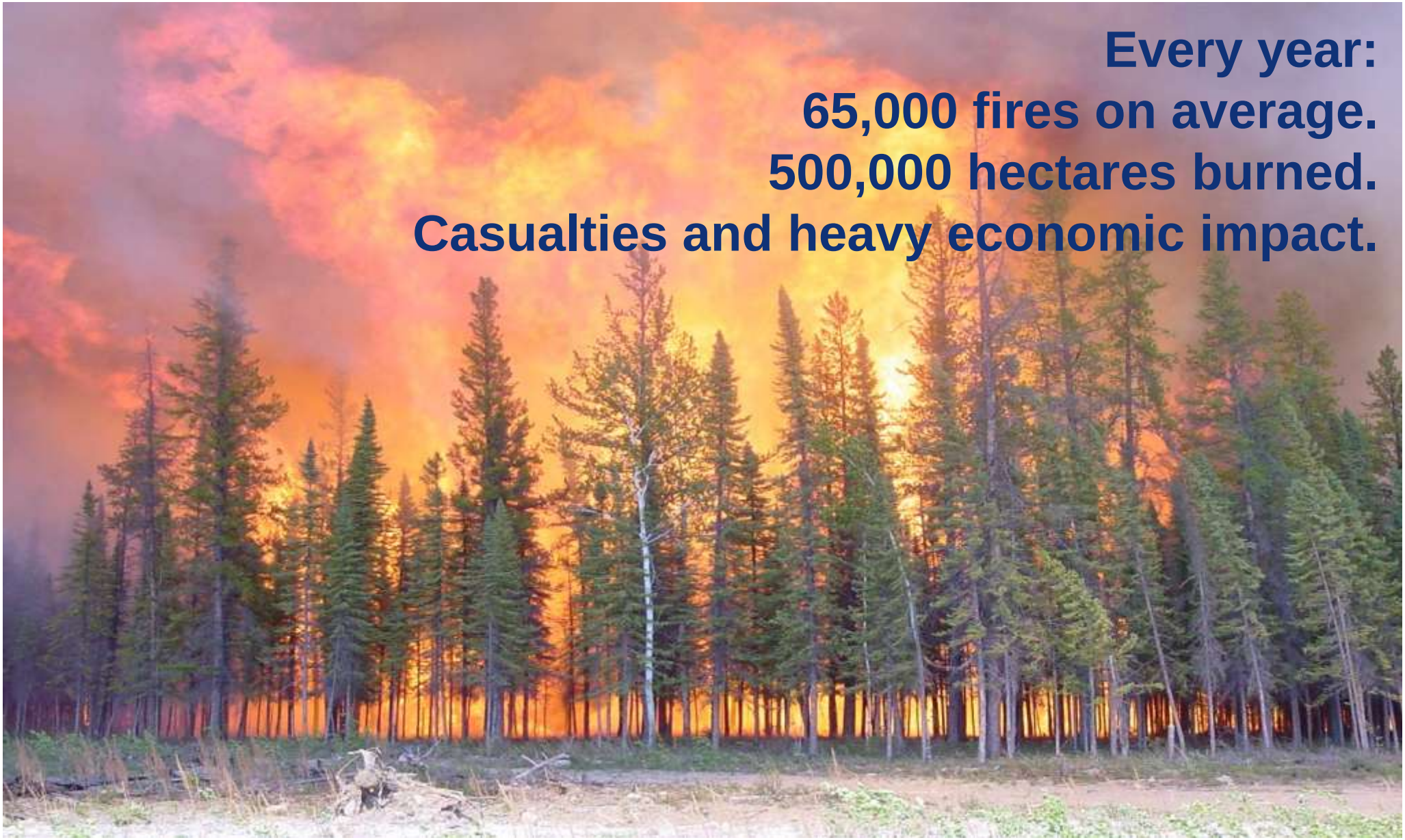
- 6 Sites
- 7 Institutes
- 2750 People
- ~400M€ Budget

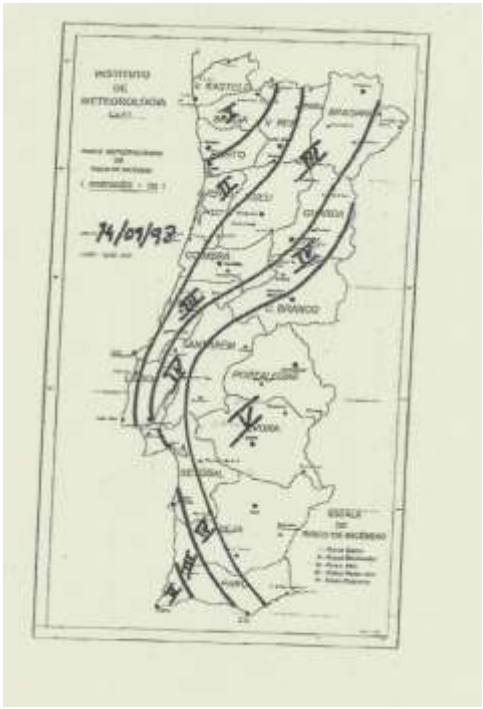
Visit us at www.**jrc**.ec.europa.eu

- **What is EFFIS:**
  - System established by the Joint Research Centre (JRC) and DG Environment (ENV) of the European Commission providing reliable and up-to-date information on forest fires in Europe
  - EU level assessments during both pre-fire and post-fire phases, supporting fire prevention, preparedness, fire fighting and post-fire evaluations
  - Complements national activities by the development and operation of harmonised methods and standards
- **Who are the users:**
  - EC Services, European Parliament, EU-Member States (fire protection services)
  - FAO UN-ECE, FAO *Silva Mediterranea*
- **What is behind:**
  - Continuous research on forestry and forest fires and development of methodologies in support of operational activities (since 1998)


Every year:
65,000 fires on average.
500,000 hectares burned.
Casualties and heavy economic impact.

MINISTRY OF INTERIOR
PUBLIC ADMINISTRATION AND DECENTRALISATION
GENERAL SECRETARIAT FOR CIVIL PROTECTION
Nomination on the level of risks of Forest Fires in Greece

DEPARTEMENT DE LA PROTECTION CIVILE D'ITALIE
C.O.A.U.
Centre Opérationnel Aerien Unifié
PREVISION DU NIVEAU DE RISQUE D'INCENDIE
PREVISION POUR
ZONES
aujourd'hui
demain
A
B
C
D
E
F
G
H
1: Faible, 2 Sévère, 3 Très Sévère, 4 Exceptionnel
prévision realisée le:
14/09/98


14/09/98

RIESGO DE INCENDIO FORESTAL
Dia 14 de Septiembre de 1.998
M
A
E
Bajo
Moderado
Alto
Extremo
D.G.C.N.

Risques de feux de forêts pour la journée du 11septembret 1998 et les suivantes

European Commission
Joint Research Centre
Institute for Environment and Sustainability
European Forest Fire Information Sy
European Commission > Joint Research Centre > IES > Land Management & Natural Hazards > Forest > EFFIS > Map Viewer
EFFIS Modules
Fire Danger Forecast
Indicator
FWI Danger Classes
Weather Input
Deutscher Wet. 0.36 deg
Day:
Today
2010-02-04
Period:
2010-01-26
2010-02-04
Function:
Average
Draw
Damage Assessment
Rapid Damage Assessment
EU Fire Database (by province)
Atmospheric Emissions
Soil Erosion
THEMES
Adm.Boundaries
Countries
Country Names
SRTM DEM
Land Cover:
Corine-2000 Lev1
Fuel Map
Forest Mask
Spatial Pattern:
Corine-90
CCM River Network
NASA:
Landsat7 Global Mosaic
Modis Terra (Mosaic)
WIFS-IRS:
2000
MAP
Sweden
Finland
Estonia
Denmark
United Kingdom
Ireland
Lithuania
Germany
Poland
Slovakia
France
Slovenia
Romania
Bulgaria
Italy
Portugal
Greece
Malta
Cyprus
0
600
1200 km
EFFIS - Open Web Services
X:
35.07785888
Y:
73.276155717
LEGEND
QUERY
Eu Administrative Bounda
Countries
FWI Danger Classes [Dwa
Very Low Risk
Low Risk
Moderate Risk
High Risk
Very High Risk
Contact Information in case of problems or any question: Mr. Giorgio Liberta'
Last Modified:

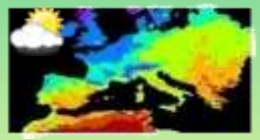
Provides information before fire (danger forecast)

during fire (fire detection, burned area rapid mapping)

after fire (land cover damage assessment, forest fire emissions, potential soil erosion)

Input

Remote sensing

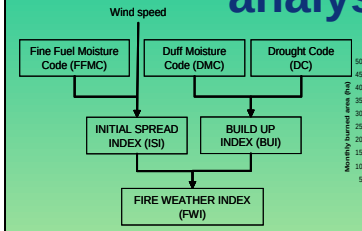


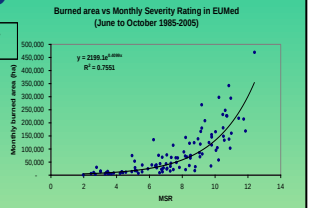
Weather forecast

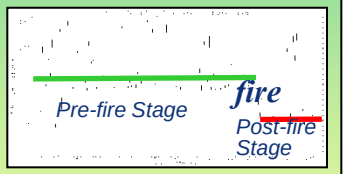
Geo-datasets

Databases

Models, data integration, analysis







A_v burned area (m^2)

B_v biomass ($g\ m^{-2}$)

C burning efficiency ($g\ g^{-1}$)

E_v emission coefficient for CO_2

$$CO_2 = \sum_v A_v \times B_v \times C \times E_v$$

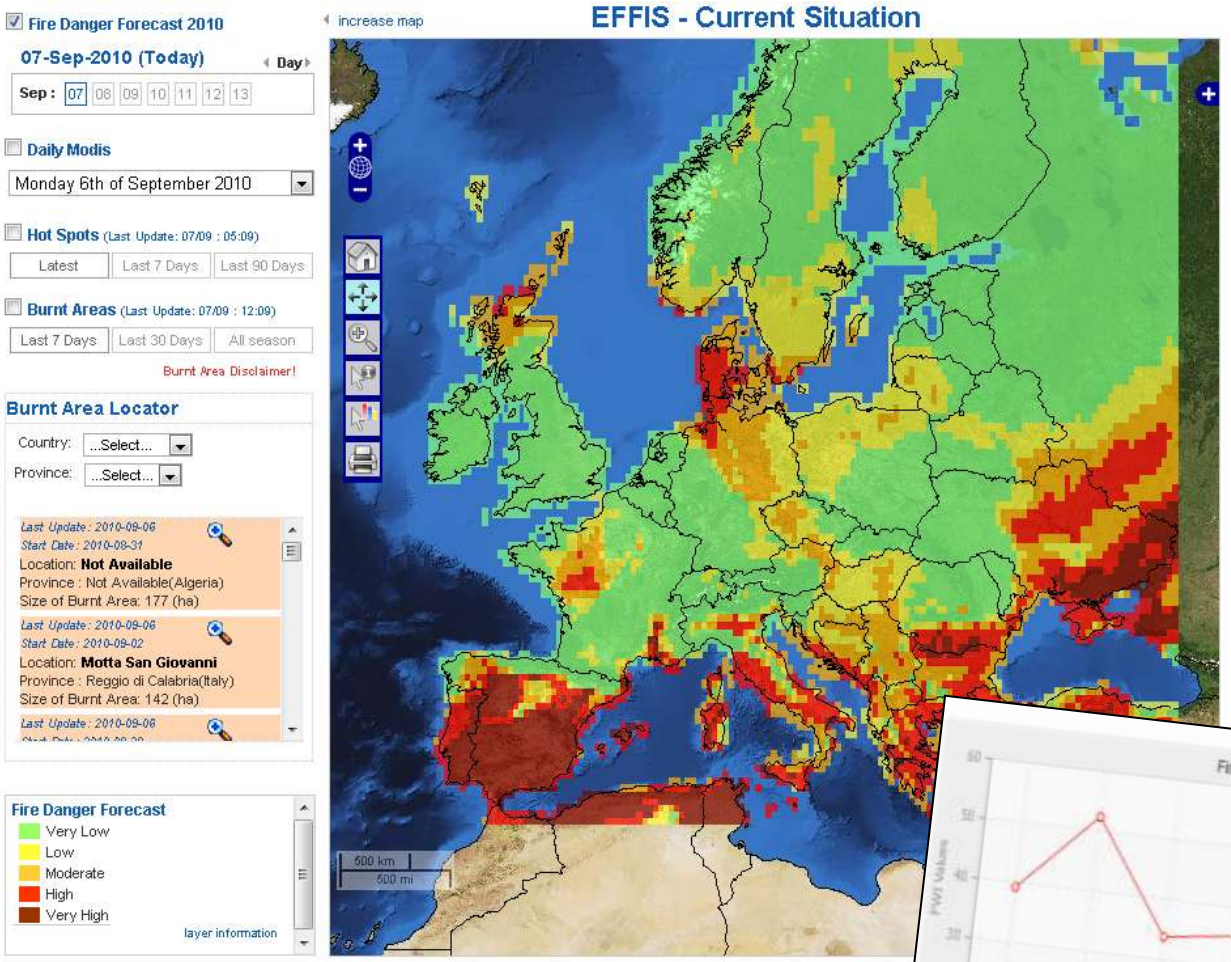
Regional estimates of CO_2 emissions

Output

- Fire Danger Forecast
- Active Fire Detection
- Fire Monitoring
- Damage Assessment
- Fire Emissions
- Post-fire Soil Erosion
- Fire News

WEB interface at (http://effis.jrc.ec.europa.eu)

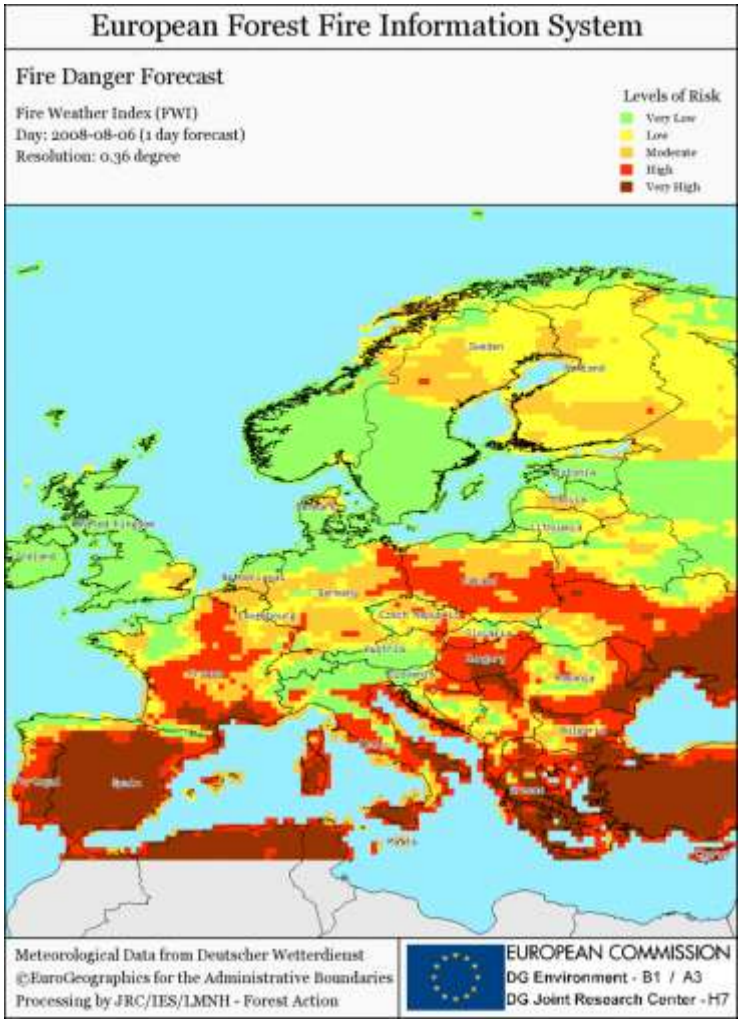
Fire Danger Forecast



- Forecast fire danger calculated daily up to 6 days in advance based on weather forecast data
- Used as common reference map in addition to local fire danger maps

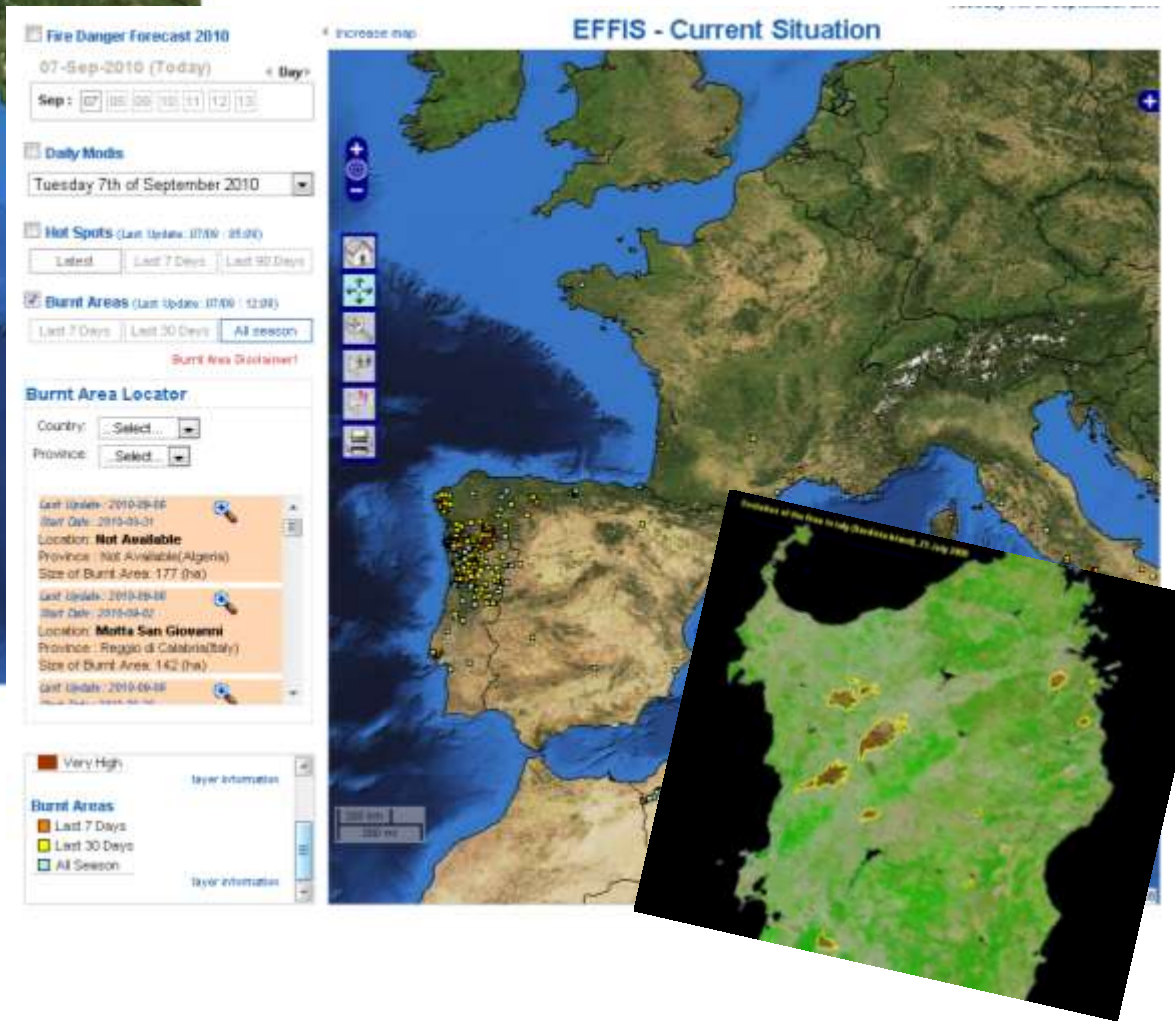
Fire Danger Forecast

- WHAT: Rating the most dynamic components of fire risk due to weather
- HOW: Daily assessment and EU-wide mapping of fire danger levels, based on meteorological forecasts
- WHY: Support preparedness and decision making about mutual assistance

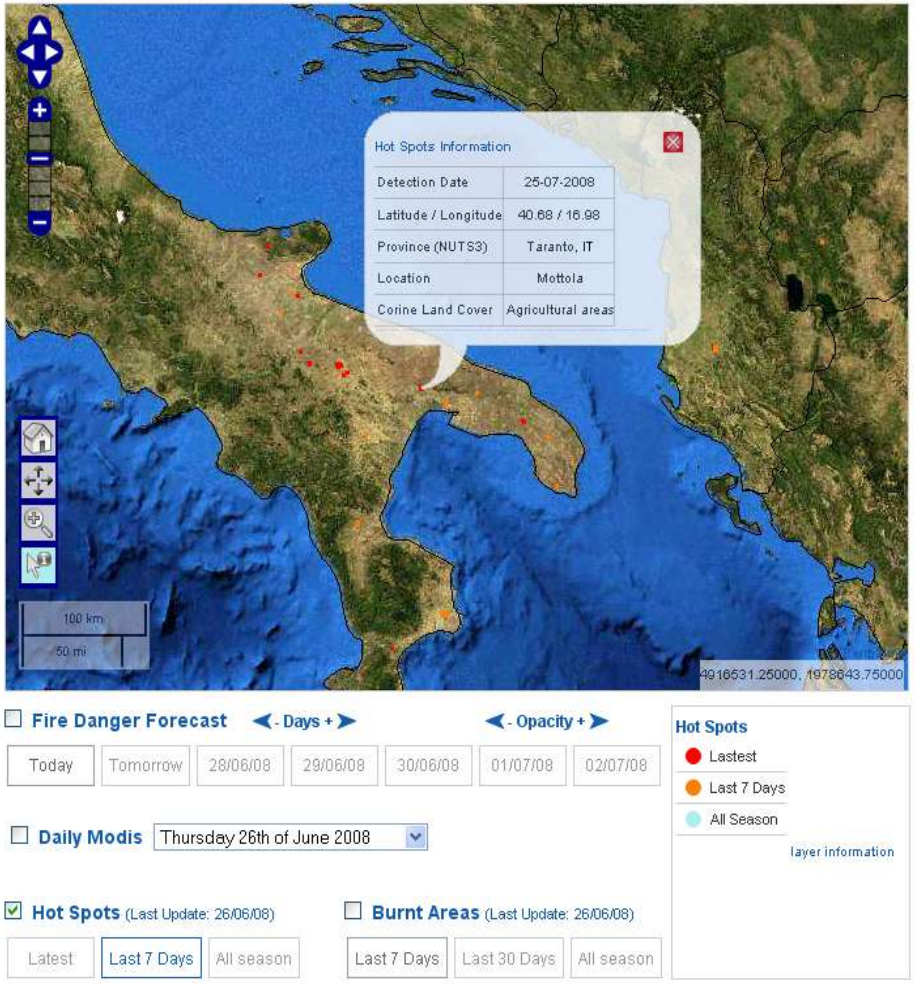


Hot spots

Burned area

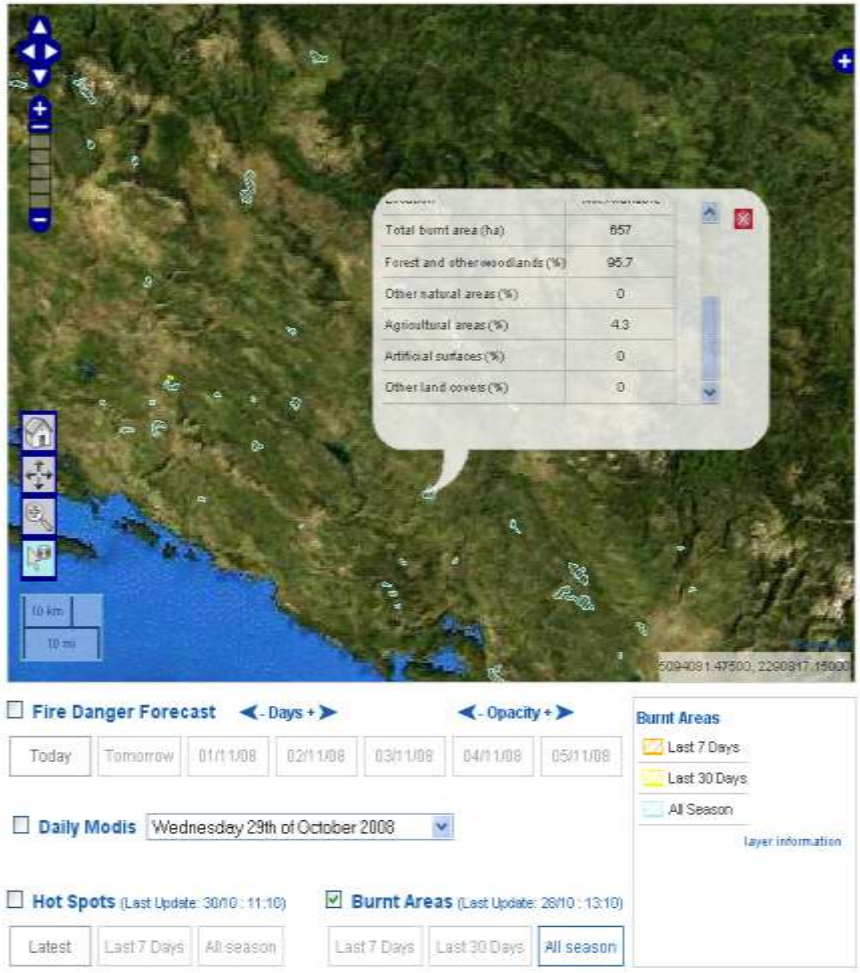


- WHAT: Identifying active fires on a daily basis EU-wide
- HOW: Satellite image processing to trace thermal anomalies (hot spots)
- WHY: Near-real time monitoring of the fire season, provide alerts and fire locations

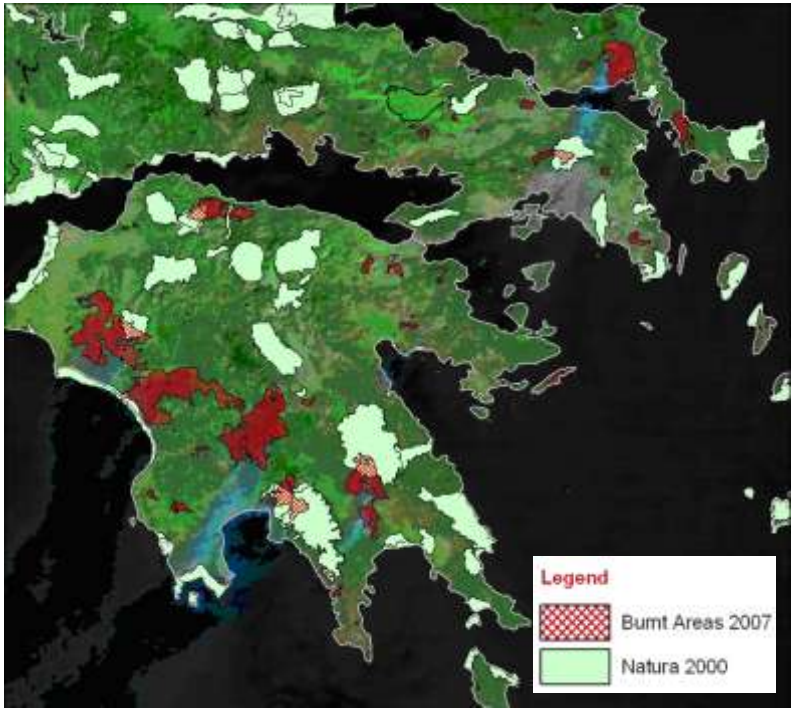


Rapid Damage Assessment

- WHAT: Daily mapping of burned areas of fires > 40 ha, and assess damage
- HOW: medium resolution satellite image processing and automatic classification, digitising fire perimeters, overlaying on land cover
- WHY: Monitor development of burned areas, locate critical situations



- WHAT: End of the season mapping and assessment of fires > 20 ha in Southern EU
- HOW: High resolution satellite image processing, digitising fire perimeters, cross analyses with other environmental datasets
- WHY: Yearly harmonised assessment of burned areas, land cover affected and impacts to Natura-2000 sites in EU

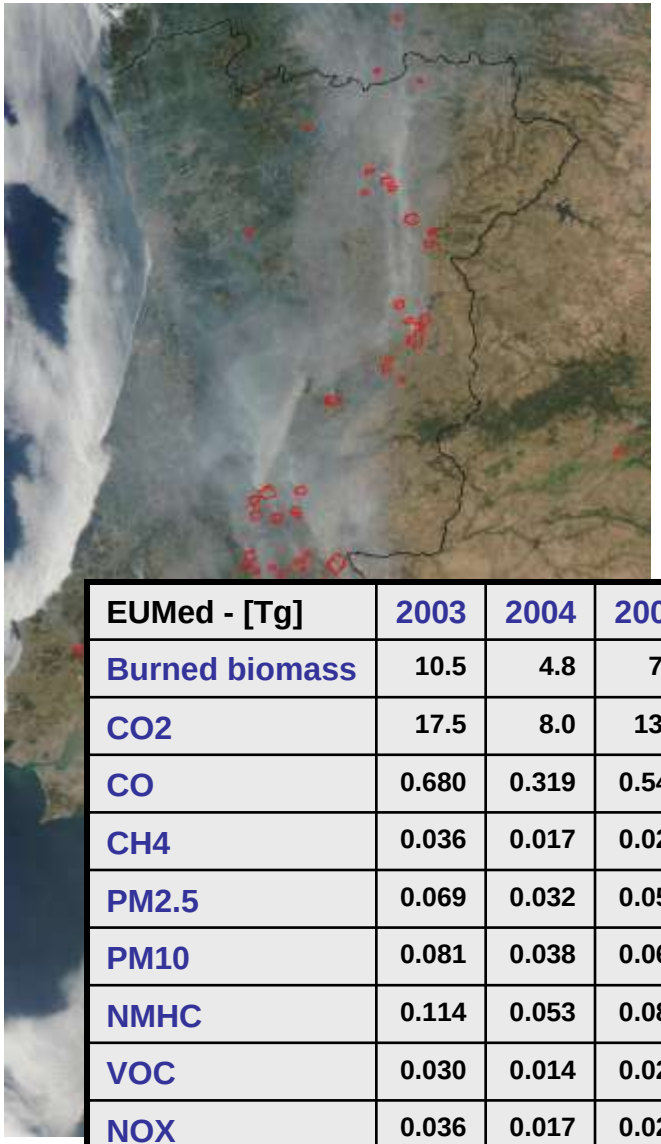


Burned areas and Natura2000 sites

Site Code	Site Name	Burned area (ha)
GR1250002	PIERIA ORI	1326.4
GR2330002	OROPEDIO FOLOIS	3555.6
GR2550006	OROS TAYGETOS	6501.8
GR3000001	OROS PARNITHA	2459.8
GR1340001	ETHNIKOS DRYMOS PRESPON	289.6
GR2130008	OROS MITSIKELI	387.6
…	…	…

Atmospheric emissions

- WHAT: Assessment of atmospheric emissions in EU due to biomass burning in forest fires
- HOW: Emission modelling (from burned areas, biomass, burning efficiency)
- WHY: Estimate the role of forest fires in greenhouse gas emissions and air quality

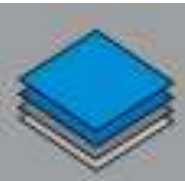


EUMed - [Tg]	2003	2004	2005	2006	2007
Burned biomass	10.5	4.8	7.9	4.2	5.6
CO2	17.5	8.0	13.2	7.0	9.4
CO	0.680	0.319	0.541	0.273	0.386
CH4	0.036	0.017	0.028	0.014	0.020
PM2.5	0.069	0.032	0.054	0.028	0.038
PM10	0.081	0.038	0.063	0.033	0.045
NMHC	0.114	0.053	0.089	0.012	0.016
VOC	0.030	0.014	0.023	0.014	0.020
NOX	0.036	0.017	0.028	0.019	0.027
OC	0.047	0.022	0.038	0.016	0.023

How does this all happen?

MapServer

open source web mapping



OpenLayers

redhat

Joomla!™

...because open source matters

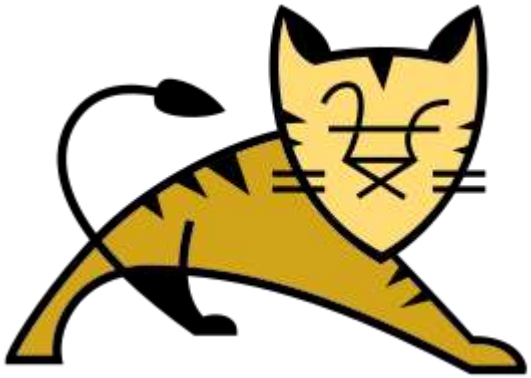
php MySQL™

GDAL

Apache

HTTP SERVER PROJECT

…and more!

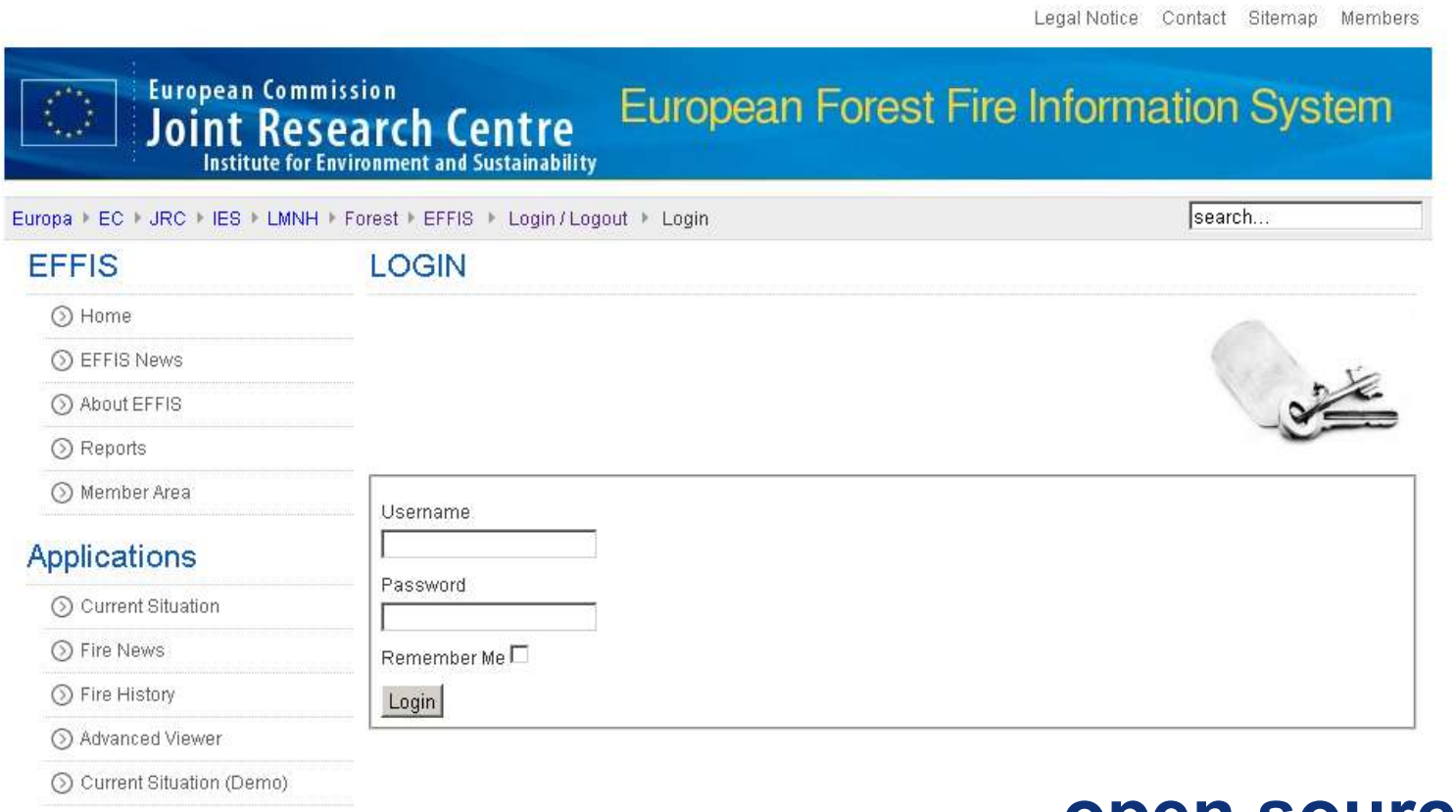


GeoServer

GeoWebCache

python™

- Provides solid and extendible framework
- Simple user management



…open source!

Data Processing: MODIS and FWI

- MODIS imagery received and processed twice a day.
- MODIS quicklooks and FWI grids are pre-tiled overnight for fast display.
- TileCache/GWC running on multi-core processing server.

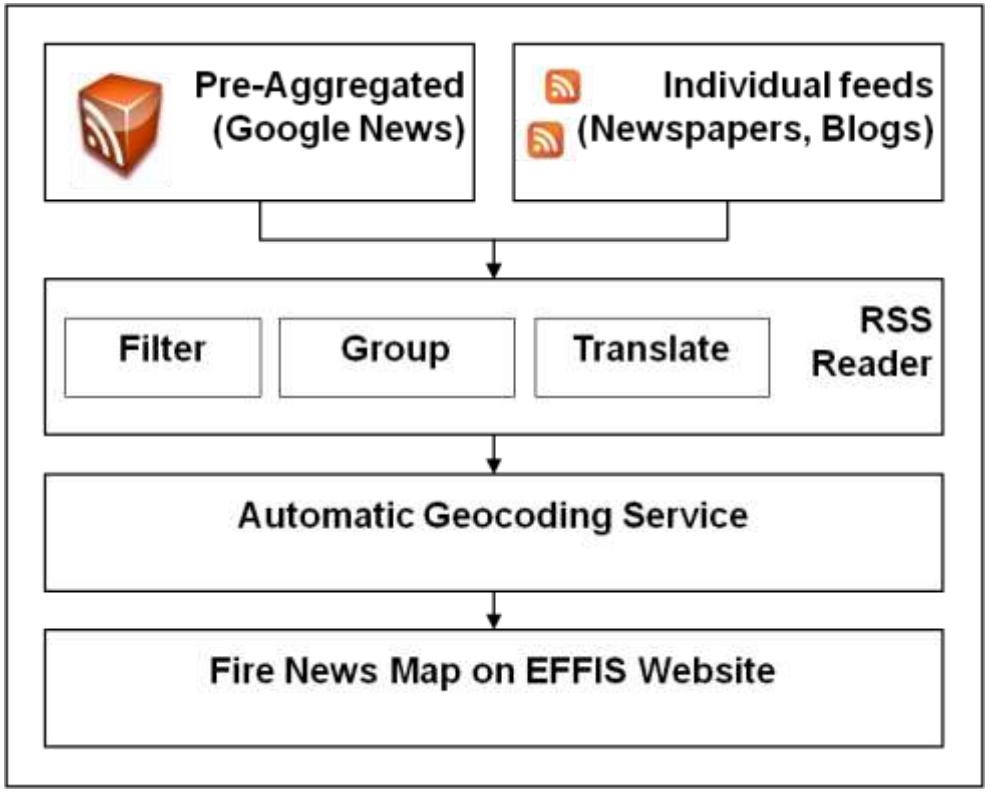
- Hotspots are checked against land cover database in order to remove false hotspots (e.g. industrial emissions, urban areas, volcanoes…).

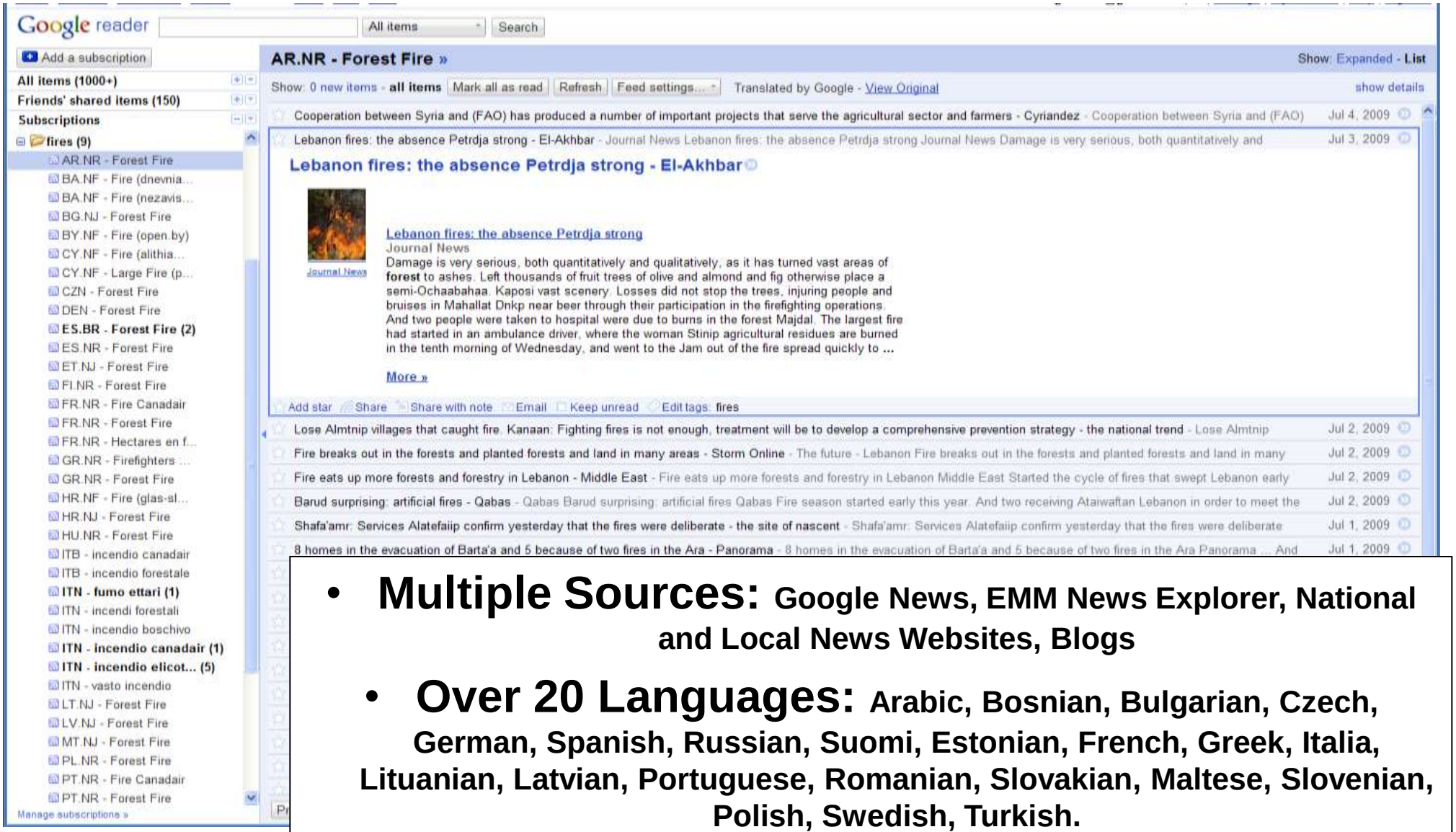
- Statistics are generated by intersecting hotspots and burned areas with land cover data and forest type map.

- Data is re-projected and automatically updated in MapServer/Geoserver every hour or on demand

Hot Spots

Detection Date	2010-09-06
Latitude	37.2
Longitude	13.8
Country	IT
Province (NUTS3)	Agrigento
Location	Palma di Montechiaro
Corine Land Cover	Agricultural areas





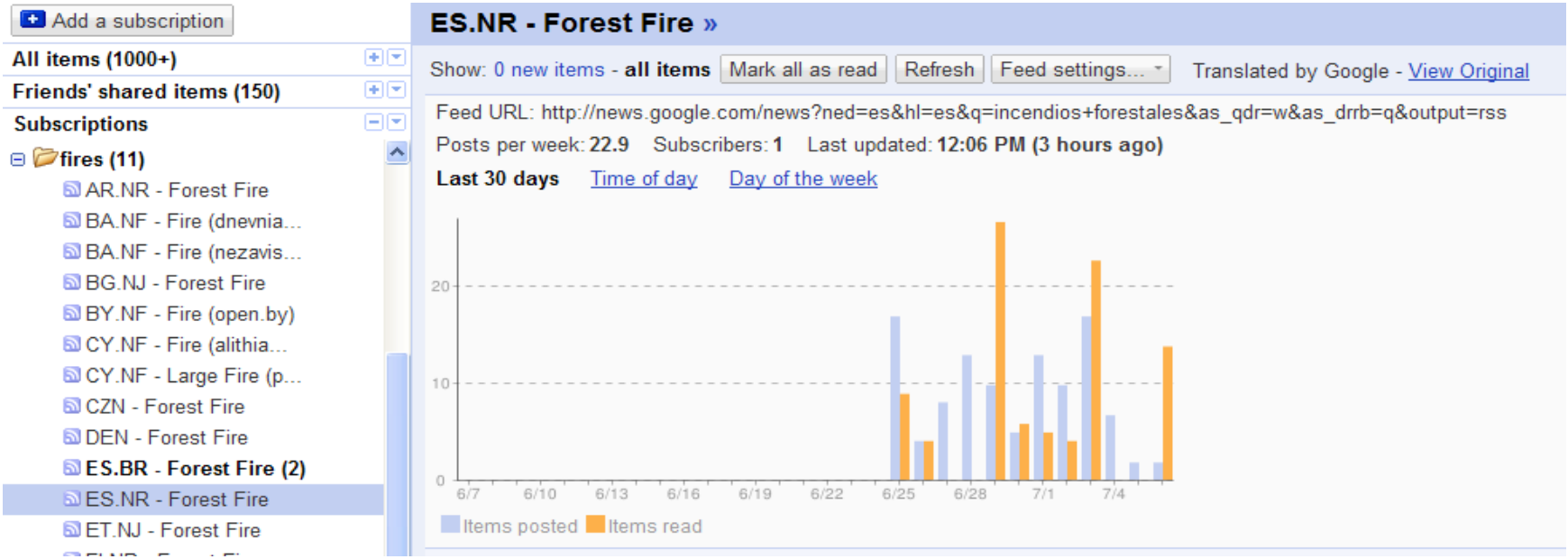
- **Multiple Sources:** **Google News, EMM News Explorer, National and Local News Websites, Blogs**
- **Over 20 Languages:** **Arabic, Bosnian, Bulgarian, Czech, German, Spanish, Russian, Suomi, Estonian, French, Greek, Italia, Lituanian, Latvian, Portuguese, Romanian, Slovakian, Maltese, Slovenian, Polish, Swedish, Turkish.**

Keywords, Filters, and Statistics

http://news.google.com/news?ned=ar_me&hl=ar&q=حرائق+الغابات&as_qdr=w&as_drrb=q&output=rss
http://news.google.com/news?ned=cs_cz&hl=cs&q=lesní+požár&as_qdr=w&as_drrb=q&scoring=n&output=rss
http://news.google.com/news?ned=hu_hu&hl=hu&q=erdőtűz&as_qdr=w&as_drrb=q&output=rss
http://press.jrc.it/rss?type=search&mode=simple&atleast=mišku+gaisru&language=lt

RSS Filter Service ***RSS Source (local news Website)*** ***Keywords***

http://www.filtermyrss.com/index.php?URL=http://www.adevarul.ro/toate-articolele.rss&KEYWORDS=incendiu



File Browser

forest

- apache
- data
- firenews
  - templates
  - templatetags
  - admin.py
  - forms.py
  - __init__.py
  - models.py
  - tests.py
  - urls.py
  - views.py
  - widgets.py
- media
- utils
- __init__.py
- manage.py
- settings.py
- settings.py.tmpl
- urls.py

models.py

```python
#python batteries
import datetime
#django batteries
from django.db import models
from django.contrib.gis.db import models as gismodels
from django.core.urlresolvers import reverse
from django.db.models.signals import pre_save

### models

class Country(gismodels.Model):
    """
    Spatial model for Countries.
    """
    # attributes
    name = gismodels.CharField(max_length=50)
    longname = gismodels.CharField(max_length=255)
    fips = gismodels.CharField(max_length=2)
    iso2digit = gismodels.CharField(max_length=2)
    geometry = gismodels.MultiPolygonField(srid=4326)
    objects = gismodels.GeoManager()

    def __unicode__(self):
        return '%s' % (self.name)

    class Meta:
        ordering = ['name']
        verbose_name_plural = "Countries"

class Fire(gismodels.Model):
    """
    Spatial model for Firenews.
    """
    # sizeclass: 0 = NA, 1-10 = Small, 11-100 = Medium, 101-500 = Large, > 500
= Major
    SIZECLASS_CHOICES = (
```

python

django

the firenews app

HOME ADD A FIRE DOWNLOAD REPORTS ABOUT

Fires

Place	Country	SizeClass	Today	Critical	News
A Coruña	Spain	Small	17	False	Extinguido un incendio cercano a un poblado c...
Agadir	Morocco	Large	9	False	Agadir : La mobilisation continue pour circon...
Aglientu	Italy	NA	26	False	Aglientu...
Aidone	Italy	NA	19	False	Incendi, fiamme in area archeologica dell'E...
Ajude	Portugal	NA	19	False	Fire: 265 men fighting fire in Viana do Caste...
Alhama de Almería	Spain	NA	9	False	Controlado un incendio que ha afectado a una ...
Al Hoceima	Morocco	Small	26	False	Al Hoceima...
Altofonte	Italy	NA	27	False	Altofonte...
Alvite	Portugal	NA	19	False	Fires: Flames active in Vila Real and Viana d...
Amarante	Portugal	NA	18	False	Fire: Four active fires in continental Portug...
Amarante	Portugal	NA	18	True	Incêndio em Amarante mantém-se com duas frent...
Andria	Italy	Major	8	False	Incendi: Puglia; distrutti 500 ettari pascolo...
Appietto	France	NA	24	False	Appietto...
Arbus	Italy	Medium	27	False	Incendi: 30 ettari in fiamme tra Arbus e Mont...
Arcos de Valdevez	Portugal	NA	19	False	Incêndios: Três fogos ativos em Portugal con...

Page 1 of 20. next

288 fires selected (with 289 related news). Remove all filters Get this KML

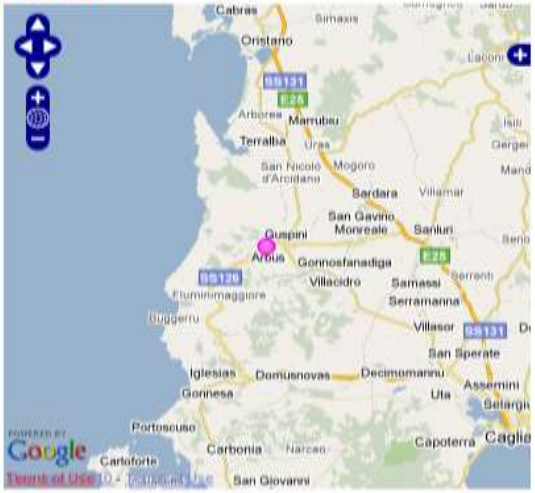
Critical: All - True - False

Size Class: All - N.A. - Small - Medium - Large - Major

Country: All - Albania - Algeria - Andorra - Armenia - Austria - Belarus - Belgium - Bosnia & Herzegovina - Bulgaria - Croatia - Cyprus - Czech Republic - Denmark - Egypt - Estonia - Faroe Is. - Finland - France - Gaza Strip - Georgia - Germany - Gibraltar - Greece - Guernsey - Hungary - Iceland - Iraq - Ireland - Isle of Man - Israel - Italy - Jersey - Jordan - Latvia - Lebanon - Libya - Liechtenstein - Lithuania - Luxembourg - Macedonia - Malta - Moldova - Monaco - Morocco - Netherlands - Norway - Poland - Portugal - Romania - San Marino - Serbia & Montenegro - Slovakia - Slovenia - Spain - Sweden - Switzerland - Syria - Tunisia - Turkey - Ukraine - United Kingdom - Vatican City - West Bank -

the firenews app HOME ADD A FIRE

Fire 813



- Place: Arbus
- Simple Place: Arbus
- Country: Italy
- Size: 30.0
- Size Class: Medium
- Update: Aug. 4, 2010
- Start Date: Aug. 3, 2010
- End Date: Aug. 3, 2010
- Today: 27
- Critical: False
- Notes:

This fire has the following news linked to it:

- Incendi: 30 ettari in fiamme tra Arbus e Montevecchio

Add a news for this fire

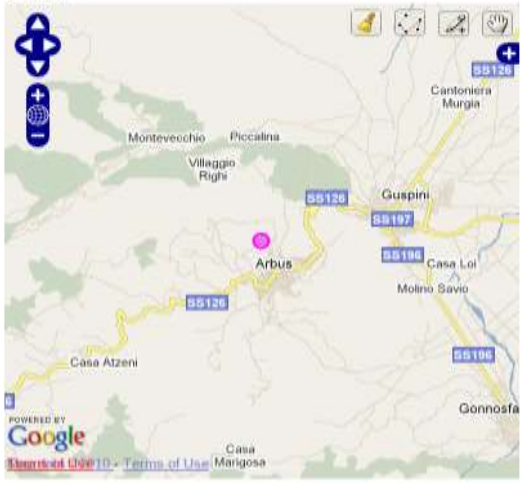
Update this fire

Delete this fire

the firenews app HOME ADD A FIRE

Update Fire 813

Geometry:



Place: Arbus

Size: 30.0

Update: 2010-08-04

August 2010

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Start Da

End Dat

Critical:

Notes:

Upd

Delete this fire

Latest News Feed
Country Fire News

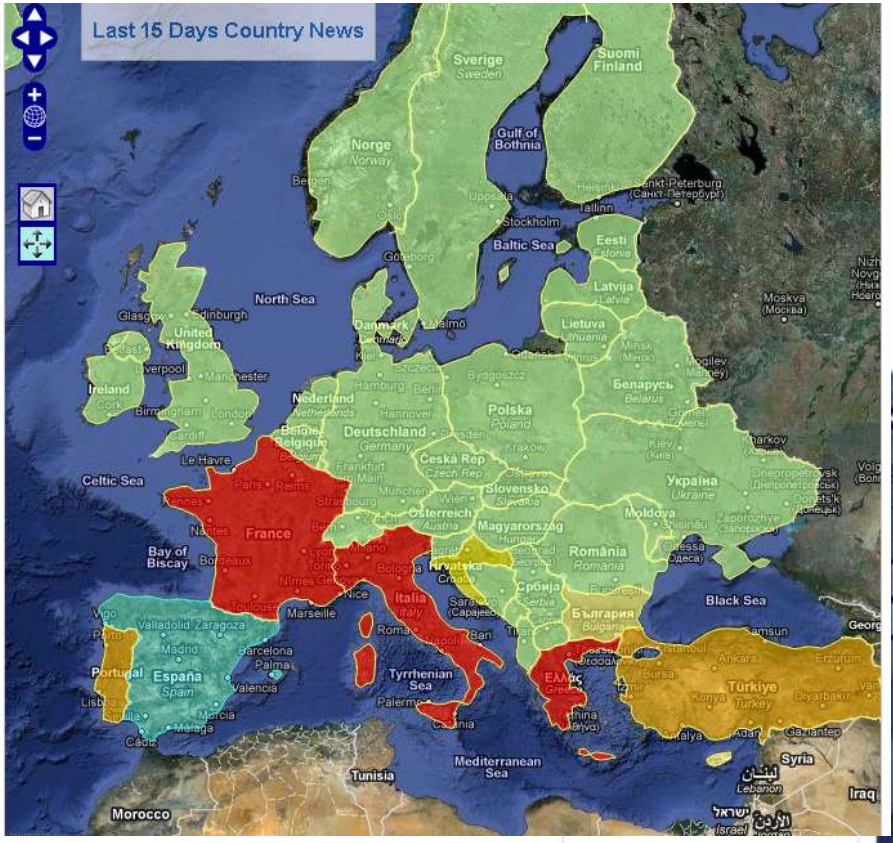
FIRE NEWS: SPAIN

2010-09-04 08:22:44
El incendio forestal de Eibar ha quedado sofocado a medianoche - ABC.es (European Forest Fire's shared items in Google Reader)
website: http://news.google.com/news/url?sa=t&fd=R&usg=AFQjCNEX2UpyiRp2...

2010-09-03 13:00:22
Extinguido el **incendio** de Benirràs doce días después de su inicio (European Forest Fire's shared items in Google Reader)
website: http://noticias.terra.es/2010/espana/0903/a el-inc...

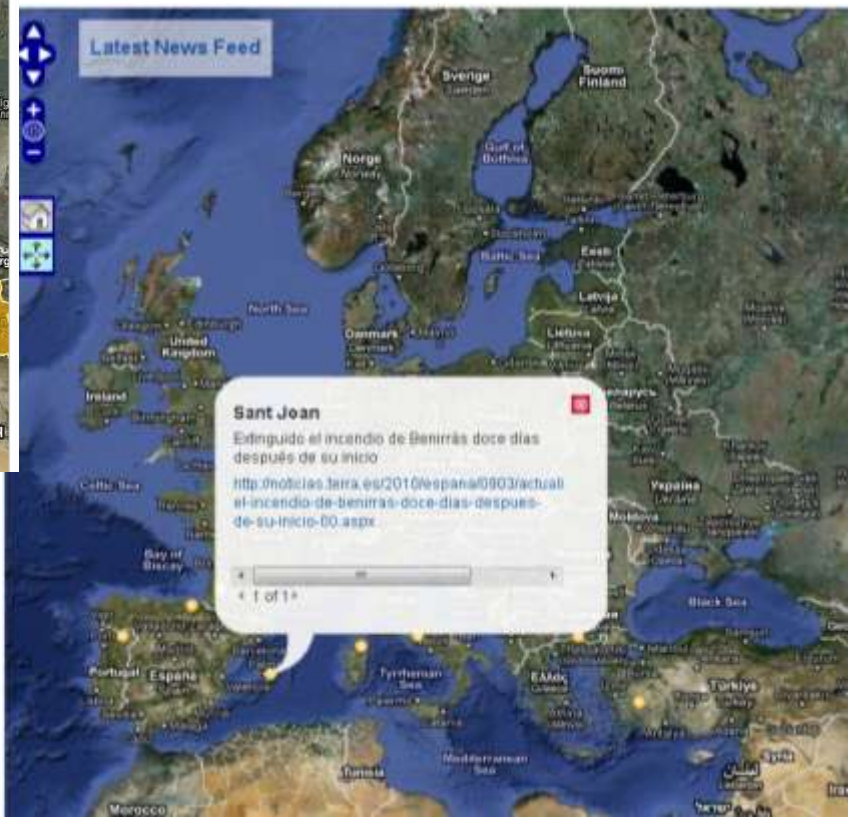
2010-09-01 16:57:50
El incendio de Laza calcina ya 1.600 hectáreas - elmundo.es (European Forest Fire's shared items in Google Reader)
website: http://news.google.com/news/url?sa=t&fd=R&usg=AFQjCNH38_p2qNY ...

News for the last 15 Days
Over 15 Items
From 10 - 15 Items
From 5 - 10 Items

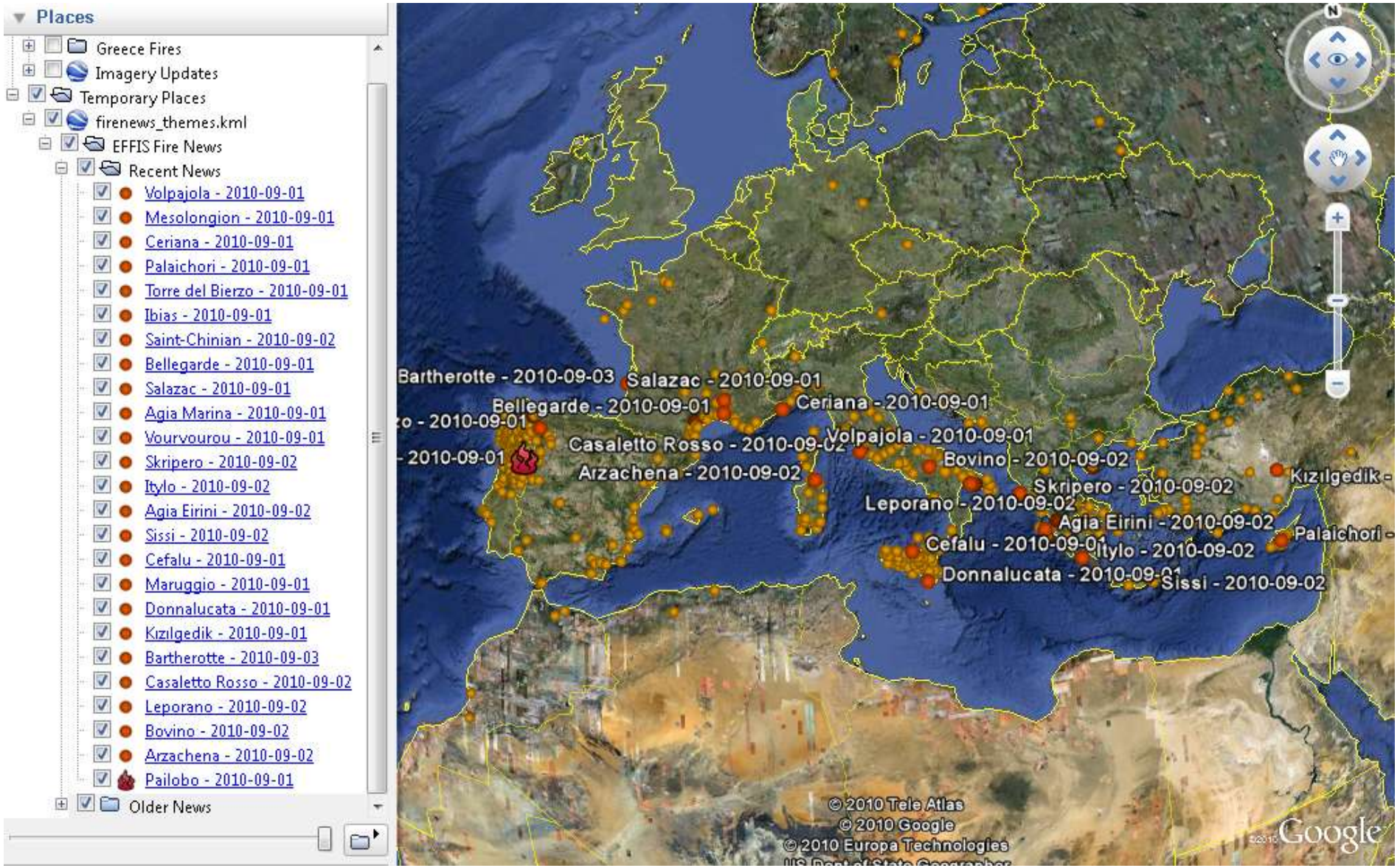


Aggregated news per country

Individual geocoded news items



effis.jrc.ec.europa.eu/news


Places
Greece Fires
Imagery Updates
Temporary Places
firenews_themes.kml
EFFIS Fire News
Recent News
Volpajola - 2010-09-01
Mesolongion - 2010-09-01
Ceriana - 2010-09-01
Palaichori - 2010-09-01
Torre del Bierzo - 2010-09-01
Ibias - 2010-09-01
Saint-Chinian - 2010-09-02
Bellegarde - 2010-09-01
Salazac - 2010-09-01
Agia Marina - 2010-09-01
Vourvourou - 2010-09-01
Skripero - 2010-09-02
Itylo - 2010-09-02
Agia Eirini - 2010-09-02
Sissi - 2010-09-02
Cefalu - 2010-09-01
Maruggio - 2010-09-01
Donnalucata - 2010-09-01
Kızılgedik - 2010-09-01
Bartherotte - 2010-09-03
Casaletto Rosso - 2010-09-02
Leporano - 2010-09-02
Bovino - 2010-09-02
Arzachena - 2010-09-02
Pailobo - 2010-09-01
Older News
Bartherotte - 2010-09-03
Salazac - 2010-09-01
Bellegarde - 2010-09-01
Ceriana - 2010-09-01
Volpajola - 2010-09-01
Casaletto Rosso - 2010-09-02
Bovino - 2010-09-02
Arzachena - 2010-09-02
Skripero - 2010-09-02
Leporano - 2010-09-02
Agia Eirini - 2010-09-02
Cefalu - 2010-09-01
Itylo - 2010-09-02
Donnalucata - 2010-09-01
Sissi - 2010-09-02
Palaichori -
Kızılgedik -
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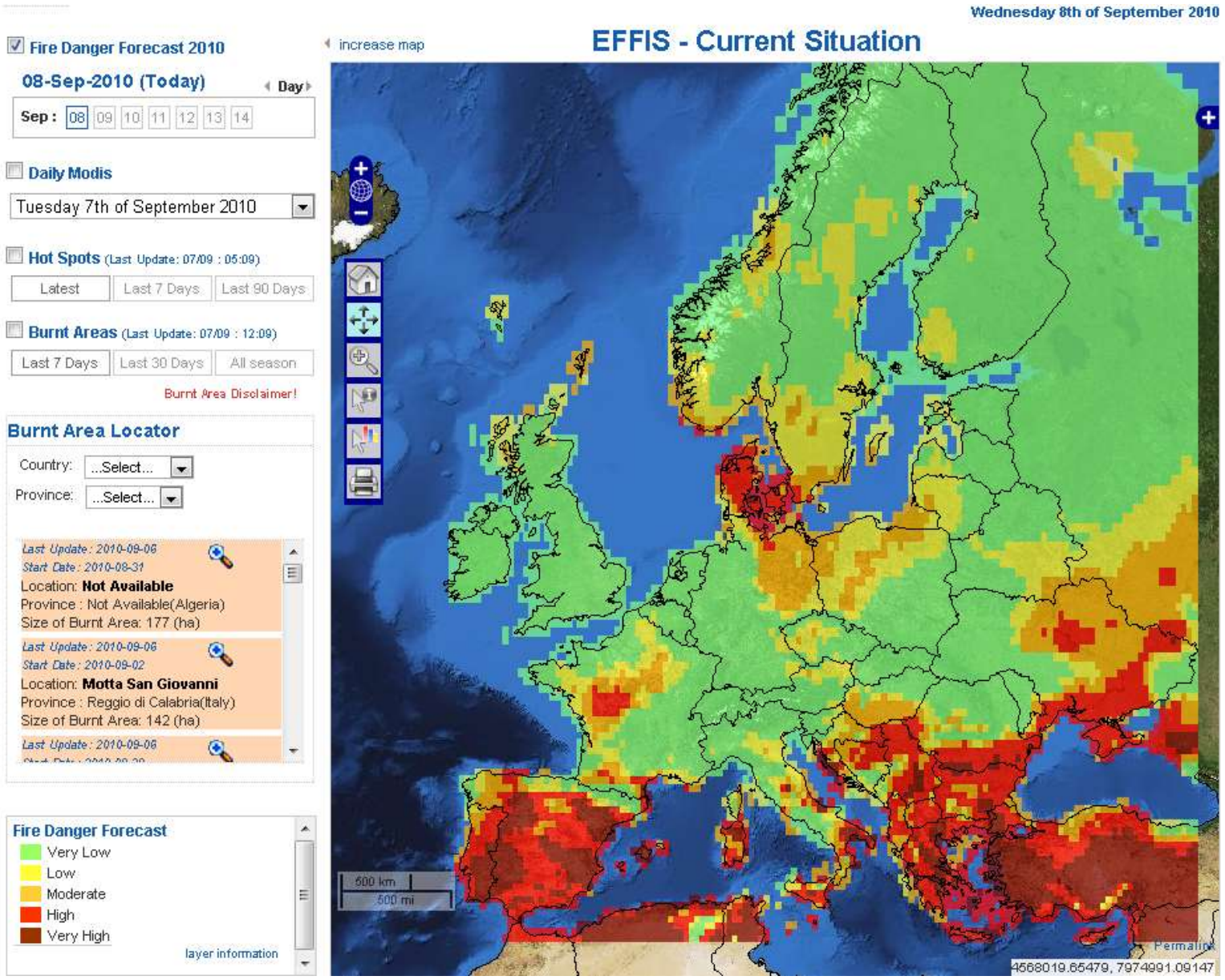
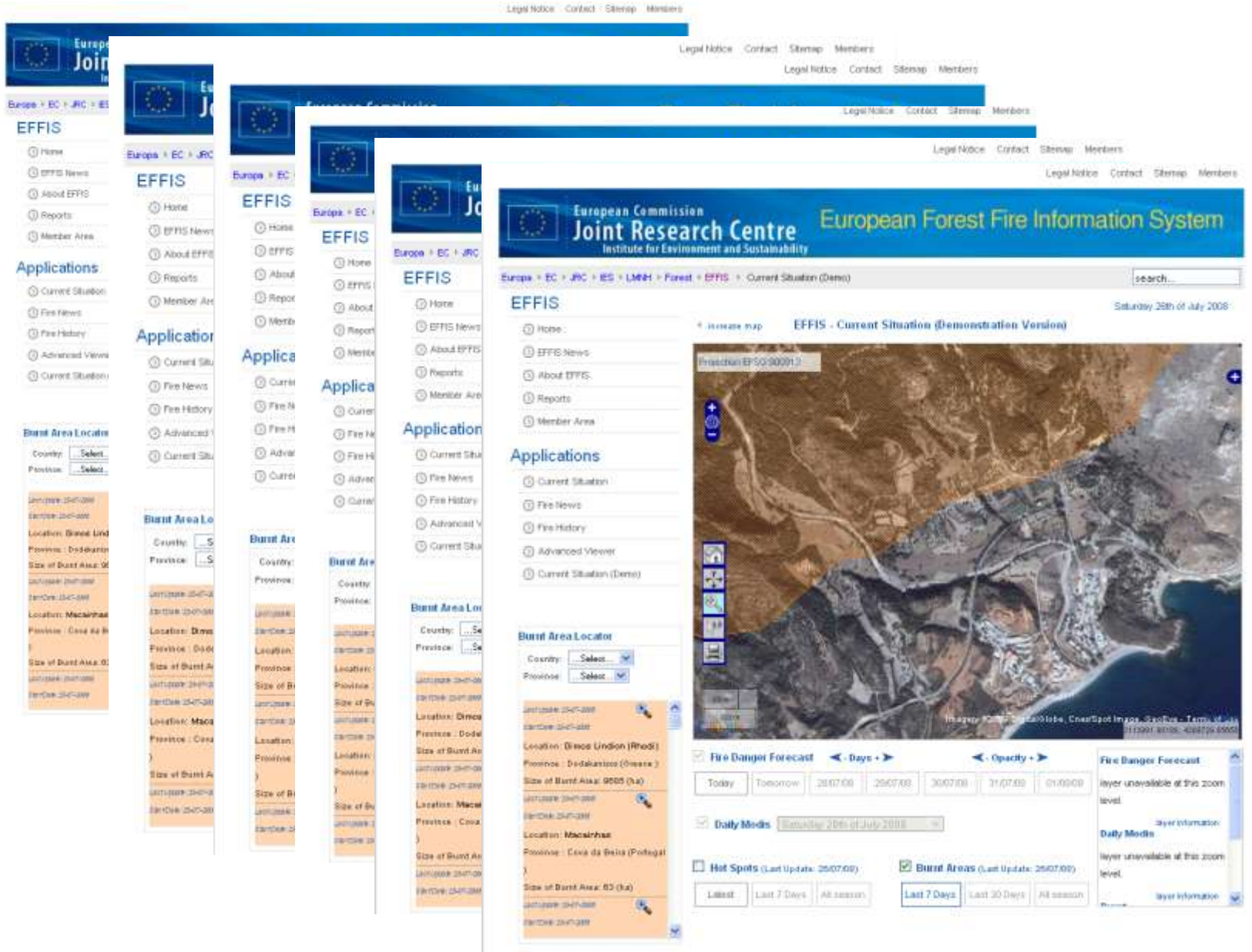
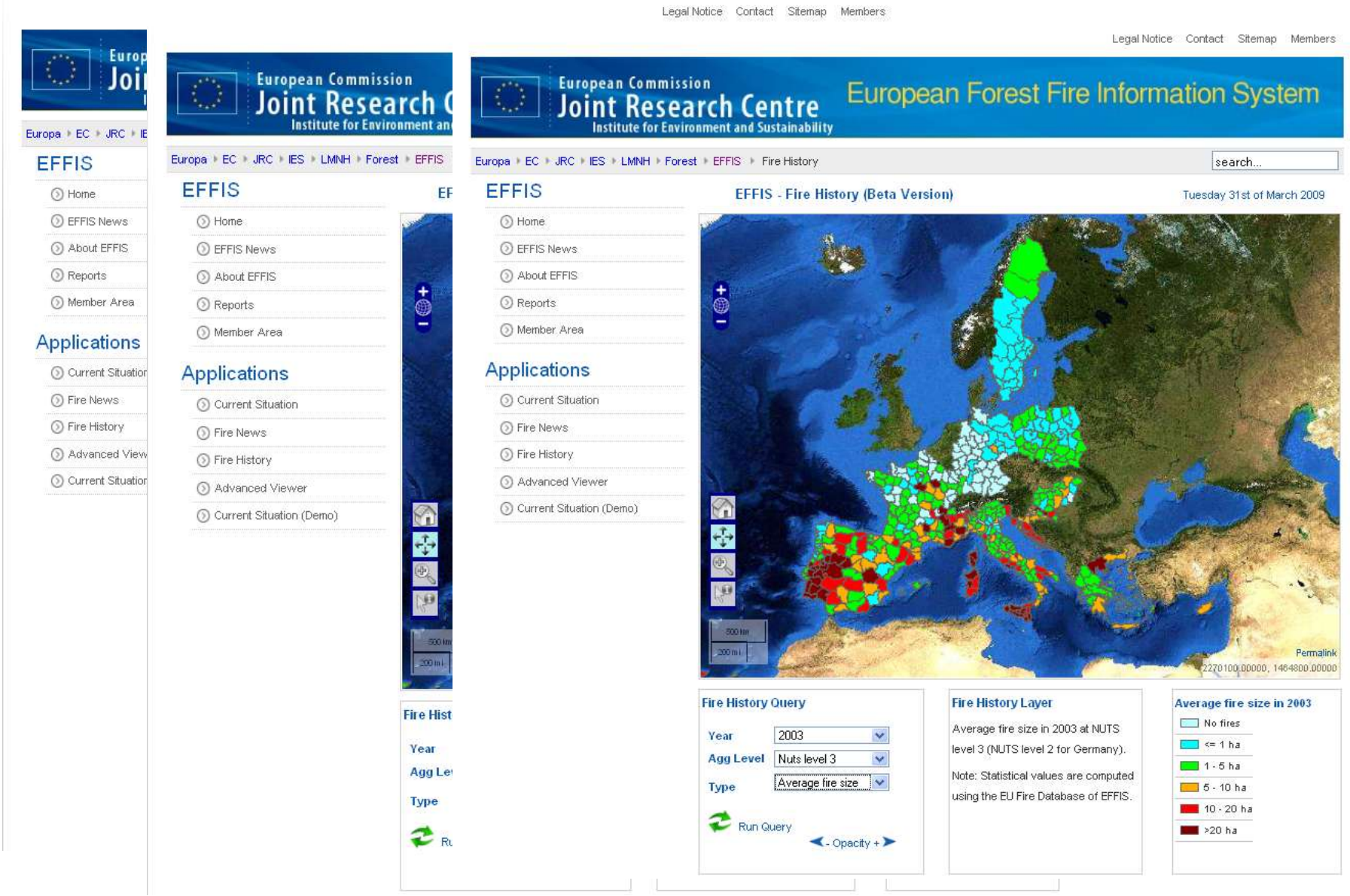
Google


Wednesday 8th of September 2010
Fire Danger Forecast 2010
increase map
EFFIS - Current Situation
08-Sep-2010 (Today)
Day
Sep : 08 09 10 11 12 13 14
Daily Modis
Tuesday 7th of September 2010
Hot Spots (Last Update: 07/09 : 05:09)
Latest
Last 7 Days
Last 90 Days
Burnt Areas (Last Update: 07/09 : 12:09)
Last 7 Days
Last 30 Days
All season
Burnt Area Disclaimer!
Burnt Area Locator
Country: ...Select...
Province: ...Select...
Last Update : 2010-09-06
Start Date : 2010-08-31
Location: Not Available
Province : Not Available(Algeria)
Size of Burnt Area: 177 (ha)
Last Update : 2010-09-06
Start Date : 2010-09-02
Location: Motta San Giovanni
Province : Reggio di Calabria(Italy)
Size of Burnt Area: 142 (ha)
Last Update : 2010-09-06
Fire Danger Forecast
Very Low
Low
Moderate
High
Very High
layer information
500 km
500 mi
Permalink
4568019.65479, 7974991.09147

Burned Areas: Ρόδος 2008

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European Commission
Joint Research Centre
Institute for Environment and Sustainability
European Forest Fire Information System
Europa EC JRC IES LMNH Forest EFFIS Fire History
search...
EFFIS
Home
EFFIS News
About EFFIS
Reports
Member Area
Applications
Current Situation
Fire News
Fire History
Advanced Viewer
Current Situation (Demo)
EFFIS - Fire History (Beta Version)
Tuesday 31st of March 2009
Permalink
Fire History Query
Year 2003
Agg Level Nuts level 3
Type Average fire size
Run Query
- Opacity +
Fire History Layer
Average fire size in 2003 at NUTS level 3 (NUTS level 2 for Germany).
Note: Statistical values are computed using the EU Fire Database of EFFIS.
Average fire size in 2003
No fires
<= 1 ha
1 - 5 ha
5 - 10 ha
10 - 20 ha
>20 ha

EFFIS

- Home
- EFFIS News
- About EFFIS
- Reports
- Member Area

Applications

- Current Situation
- Fire News
- Fire History
- Data and Services

DATA AND SERVICES

By using the data provided you aknowledge the RDA data disclaimer and agree to the terms of use under this license.

WMS	WFS	WCS
Version 1.1.1	Version 1.0.1 or 1.1.0	(temporarily unavailable)

Layer Name	WMS	WFS	WCS	KML	TMS	CSV	SHP	RSS
Fires								
Last 7 Days	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
Last 30 Days	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
Entire Season	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
Burnt Areas								
Last 7 Days	GetMap	-	-	KML	OL	-	-	-
Last 30 Days	GetMap	-	-	KML	OL	-	-	-
Entire Season	GetMap	-	-	KML	OL	-	-	-
MODIS Hotspots								
Last 24 Hours	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
Last 7 Days	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
Entire Season	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
FWI								
Today	GetMap	-	-	KML	OL	-	-	-
Tomorrow	GetMap	-	-	KML	OL	-	-	-
in 2 Days	GetMap	-	-	KML	OL	-	-	-
Fire News								
Geocoded	GetMap	GML2	-	KML	OL	CSV	ZIP	RSS
Styled KML	Not part of the main OWS service, but published as a static KML updated daily.							

The american way… ☺
http://www.youtube.com/watch?v=6BjF5XQ4TAo

…While in the EU…

MIC-ECHO is in charge of receiving offers and requests for help, then coordinating operations.

Mutual support with neighboring countries and through activation of the European Civil Protection Mechanism

European Commission
Monitoring and Information Centre for Civil Protection - MIC
Community Civil Protection Mechanism

MIC message no. **1**
Date: 2010/08/11
Time: 14:00:00 UTC

Emergency	**PORTUGAL - PT**	**FOREST FIRES IN PORTUGAL**	
Status	Request for assistance	From MIC to contact points	
MIC contact		Telephone: Fax: E-mail:	
Event	Cause: Natural disaster	Type: Fire	
Occurrence	Date: 08/10 Time: 16:09 UTC		

Situation

Over the last days Portugal has registered an average of 350 fires per day. On 10 August the total number of fires reached 430.

The weather forecast indicates that dry weather, low humidity and high temperatures will continue in the following days.

Due to the worsening of its forest fires situation the Portuguese authorities have requested assistance through the European Civil Protection Mechanism in the evening of Tuesday 10 August.

Portugal requested aerial means for forest fires combat operations preferably 4 Canadair CL-415 (2 modules) for an estimated period of 5 days.

As there were no offers of assistance from the Participating States of the EU Civil Protection Mechanism by yesterday evening and after having considered the gravity of the situation in Portugal for the next days the MIC triggered the EU Forest Fires Tactical Reserve module (EUFFTR) based in France.

The module has left its base early this afternoon. Due to difficult meteorological conditions over the Pyrenees its arrival at Ovar military base, Portugal, is estimated around 20h00 local time.

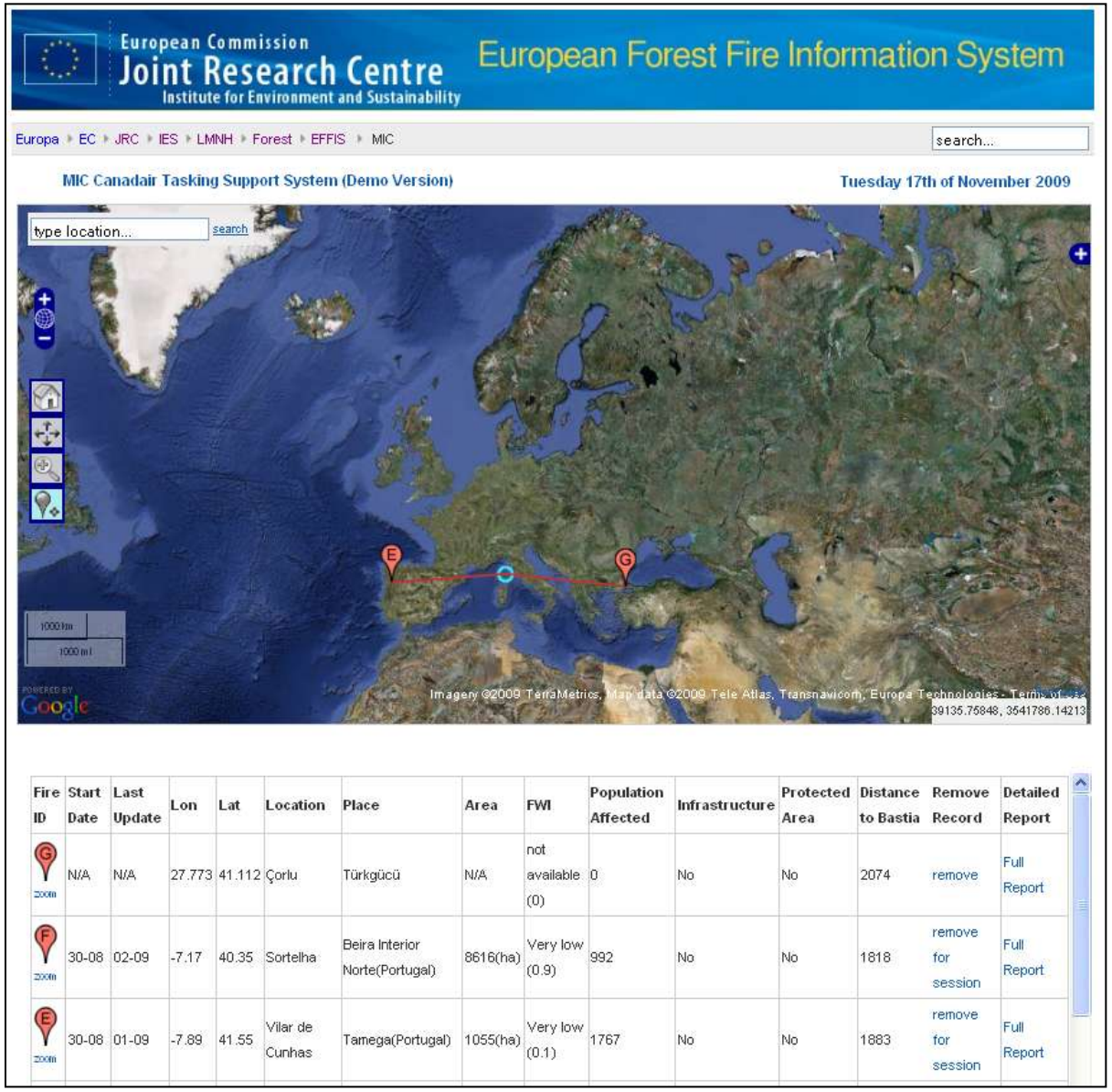
The European Union Forest Fire Tactical Reserve (EUFFTR) is a project to improve cooperation between Member States in combatting forest fires.

The EUFFTR consists of two fire-fighting planes (Canadair CL-215). The planes are an additional resource designed to reinforce the overall EU fire-fighting capacities.

http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2009-4235&language=EN

Supporting the MIC for EUFFTR tasking

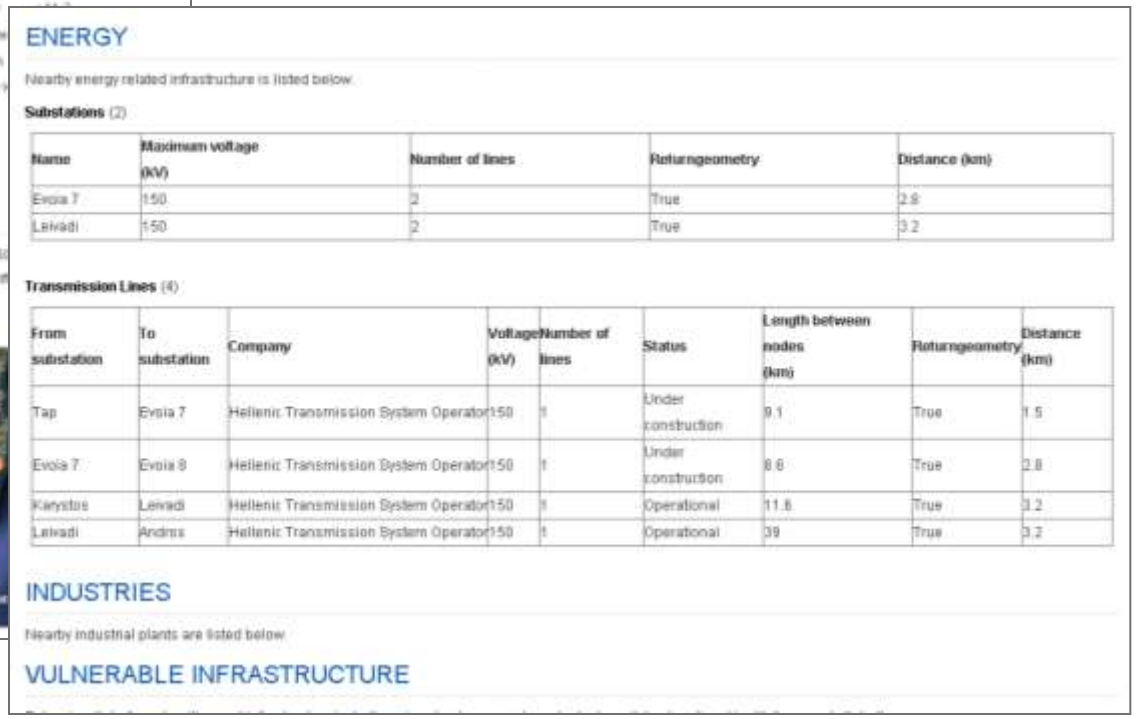
- Dedicated landing page
- Simple and intuitive interface
- Quick overview of major fires
- Critical information in one place



Fire ID	Start Date	Last Update	Lon	Lat	Location	Place	Area	FWI	Population Affected	Infrastructure	Protected Area	Distance to Bastia	Remove Record	Detailed Report
G zoom	N/A	N/A	27.773	41.112	Çorlu	Türkgücü	N/A	not available (0)	0	No	No	2074	remove	Full Report
F zoom	30-08	02-09	-7.17	40.35	Sortelha	Beira Interior Norte(Portugal)	8616(ha)	Very low (0.9)	992	No	No	1818	remove for session	Full Report
E zoom	30-08	01-09	-7.89	41.55	Vilar de Cunhas	Tamega(Portugal)	1055(ha)	Very low (0.1)	1767	No	No	1883	remove for session	Full Report

- Size of the burned area (in hectares), start date and last update;
- LAT/LON coordinates of the fire location and distance in km from the EUFFTR base in Bastia;
- Country and locality of each fire;
- Overview of fire locations and fire perimeters (as mapped by EFFIS) overlaid on high resolution satellite imagery (where available) through Google Maps API;
- Average FWI values of fire location and surrounding area;
- Summary of affected population, infrastructures and protected areas.

- Fire Weather Index (FWI) forecasts chart for 7 days of the fire area;
- Time series of perimeter updates showing fire direction and progression;
- Information regarding potential population and infrastructure affected, provided with a live connection to the IDAS Web Processing Service.



ENERGY

Nearby energy related infrastructure is listed below.

Substations (2)

Name	Maximum voltage (kV)	Number of lines	Returngeometry	Distance (km)
Evoia 7	150	2	True	2.9
Leivadi	150	2	True	3.2

Transmission Lines (4)

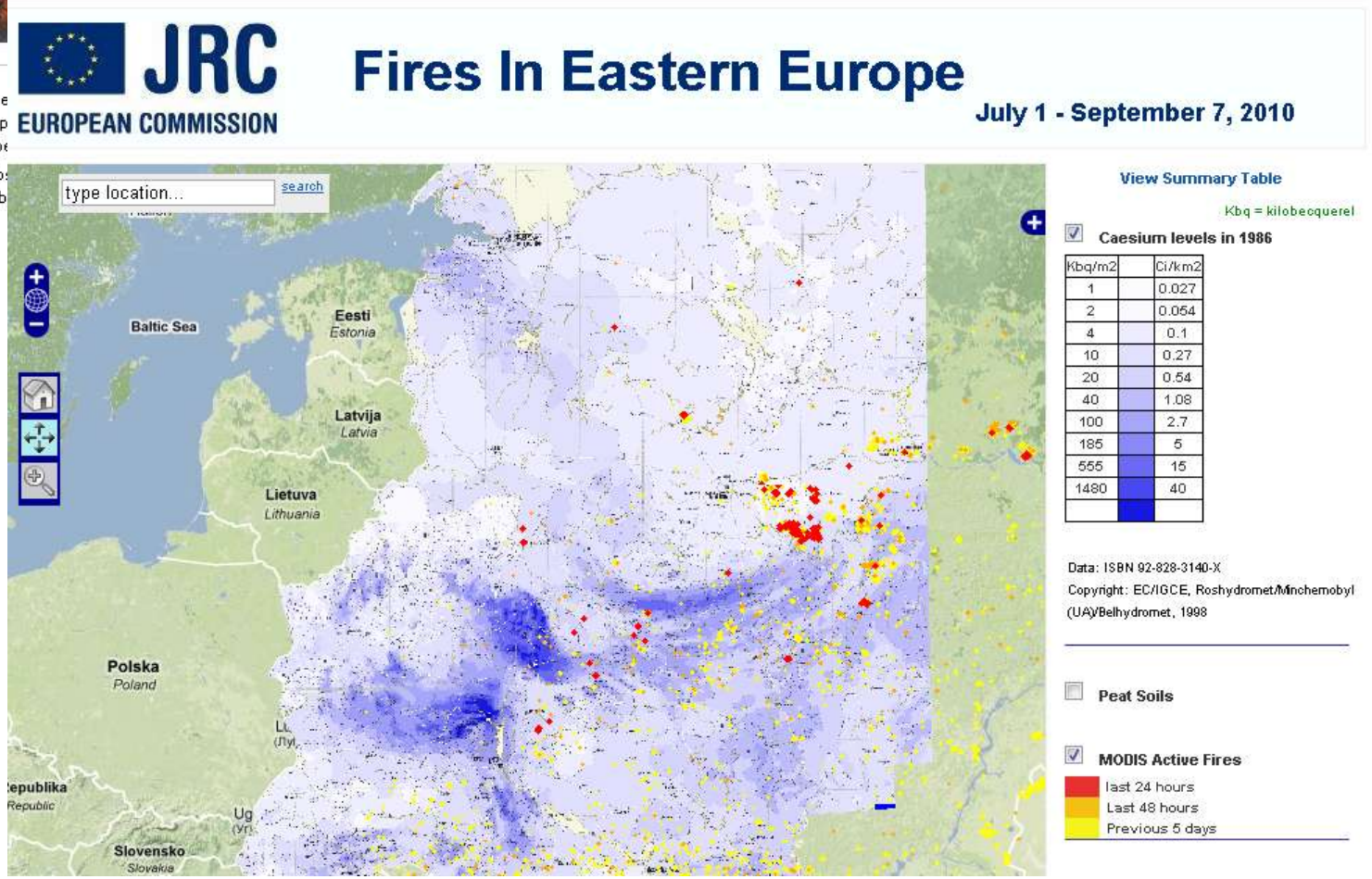
From substation	To substation	Company	Voltage (kV)	Number of lines	Status	Length between nodes (km)	Returngeometry	Distance (km)
Tap	Evoia 7	Hellenic Transmission System Operator	150	1	Under construction	9.1	True	1.5
Evoia 7	Evoia 8	Hellenic Transmission System Operator	150	1	Under construction	8.6	True	2.8
Karystos	Leivadi	Hellenic Transmission System Operator	150	1	Operational	11.8	True	3.2
Leivadi	Andros	Hellenic Transmission System Operator	150	1	Operational	39	True	3.2

INDUSTRIES

Nearby industrial plants are listed below.

VULNERABLE INFRASTRUCTURE

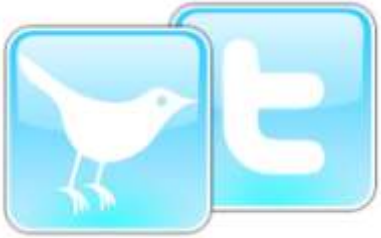
Use case: Forest fires in Russia, 2010



- Reusable code
- Quick development of new features
- Reliable and accessible user interface

- Automatic news geocoding to locality scale

- Integration of unstructured data sources
  - Twitter
  - Flickr

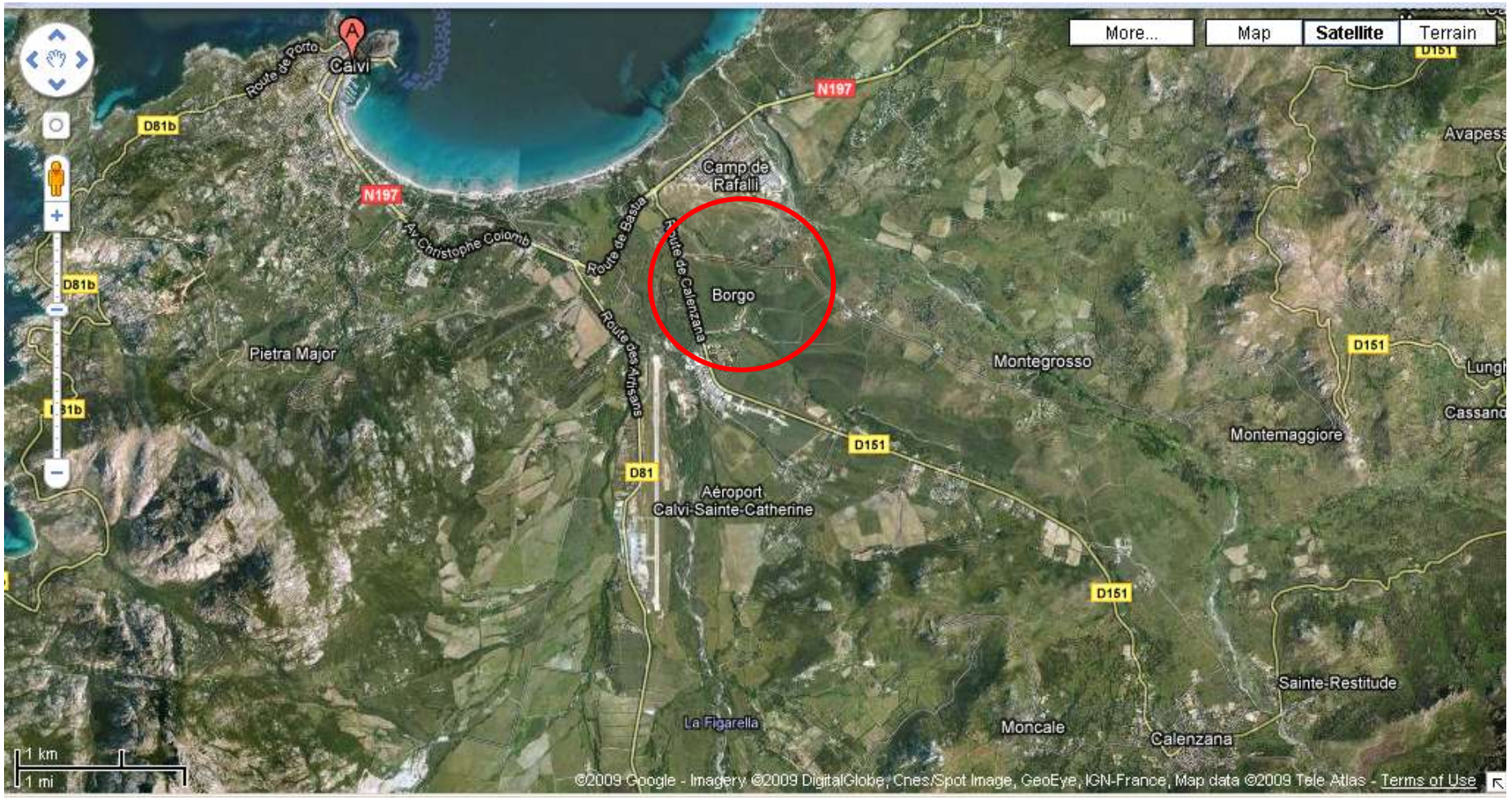


flickr

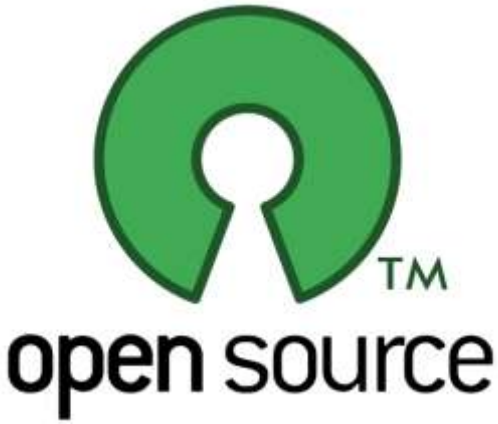
Panoramio from Google

- Integration of structured VGI
  - Open Street Map

"Sitting on tarmac at Calvi airport, big smoke plumes to the right at the end of runaway"



- Enables quick development
- Community support
- Portability
- No license nightmares
- Solid and powerful
- Open source approach = open system, interoperable.



- Recognition for usability and the service provided, from:
  - MIC ECHO and DG-ENV
  - Secretary General of the European Commission
  - Civil Protection agencies
  - Researchers and students

Future Work

- More open data, improvements to Web Services.
- Development of FOSS desktop/cloud fire mapping client.
- Migration of emission and FWI models to FOSS.
- Integration with local and global fire information systems.
- Integration with unstructured data sources.
- Mobile applications (à la Oil Reporter app)
- Release of code, Joomla Web mapping component

Thank you!

cristiano.giovando@jrc.ec.europa.eu

http://effis.jrc.ec.europa.eu