

Remote Sensing of Forests and Forest Fires in Europe

Lorenzo Busetto, Jesus San Miguel, Andrea Camia

FOREST RESOURCES AND CLIMATE UNIT Institute for Environment and Sustainability Joint Research Centre - Ispra

17.06.2013





The FORESTMOD Action (Forest Modeling and Information Systems)

Centre

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

- Analyzing the role of forests in providing economic benefits (e.g. timber, biomass for renewable energy, etc.) and ecological services (biodiversity, soil and water protection, etc.), at European level
- Developing maps, models and information systems related to forestry, enabling improved accessibility to information through the European Forest Data Centre (EFDAC)





- The activity of the Forest Mapping group had been "historically" focused on developing Pan European Forest maps characterized by the following main features:
 - Consistent over Europe
 - Independent of national boundaries
 - Higher level of spatial detail than previously available (e.g. able to detect small patches or non-forest openings and corridors)
 - High level thematic accuracy
 - Compatible with INSPIRE standards





Main Outcomes

Forest Cover 2000 Map

<u>http://forest.jrc.ec.europa.eu/activities/forest-mapping/forest-cover-map-2000/</u>

Forest Cover 2006 Map

<u>http://forest.jrc.ec.europa.eu/activities/forest-mapping/forest-cover-map-2006/</u>

Forest Type 2006 Map (Coniferous/Broadleaved)

http://forest.jrc.ec.europa.eu/activities/forest-mapping/forest type-map-2006/





Forest/Non-Forest Map 2000

Input Data

 ca. 400 Landsat ETM scenes (GLCF+Image2000); Shuttle Radar Topography Mission (STRM), Version2

Training Data

 CORINE Land Cover 2000 (44 Land use/cover classes)

Processing Method

• Per-scene supervised classification after segmentation of images (k-NN classifier)

Validation

- Visual validation against google earth
- Against LUCAS dataset









Forest/Non-Forest Map 2000



Pekkarinen, A., Reithmaier, L. & Strobl, P. 2009. Pan-European forest/non-forest mapping with Landsat ETM+ and CORINE Land Cover 2000 data. ISPRS Journal of Photogrammetry and Remote Sensing





Forest/Non-Forest Map 2000

Landsat ETM+:

CORINE 2000:

Forest/Non-forest:







Forest/Non-Forest and Forest Type Map 2006

Input Data

- More than 2000 scenes (SPOT/LISS III) (Image2006)
- MODIS 250 m monthly composites (For forest type discrimination)

Training Data

CORINE Land Cover 2000-2006

Processing Method

- Per-scene supervised classification of Image 2006 data (Neural Network classifier) for Forest/Non Forest layer production
- Data fusion with MODIS data followed by NN classification for Forest Type classification

Validation

- Visual interpretation of Google earth image data
- National Forest Inventory data







Forest/Non-Forest and Forest Type Map 2006



Kempeneers, P. et al. (2011) Data Fusion of Different Spatial Resolution Remote Sensing Images Applied to Forest-Type Mapping. IEEE Transactions on Geoscience and Remote Sensing





Forest/Non-Forest and Forest Type Map 2006







- Produced maps are useful for
 - ✓ Analysis of variations in forest area (e.g., used for FRA2010 RS survey in Europe)
 - $\checkmark\,$ Analysis of pattern, fragmentation and connectivity indicators
 - ✓ Inputs for small scale models (e.g., Primary production models)
 - ✓ "Starting point" for analysis of the effects of climate change on forests





Morphological Spatial Pattern (MSPA) maps

esearch





Derived using Morphological Spatial Pattern Analysis (MSPA-<u>Guidos</u> freeware developed by the JRC) downloadable at: http://forest.jrc.ec.europa.eu/download/software/guidos



Morphological Spatial Pattern (MSPA) maps

LARGE FIRES

INFRASTRUCTURE FOREST CLEARANCE



First Meeting of SCERIN - Prague - 17 June 2013



Data Distribution

 Visualization through the EFDAC web viewer: <u>http://forest.jrc.ec.europa.eu/efdac/appl</u> <u>ications/viewer//</u>





Data Distribution

- Visualization through the EFDAC web viewer: <u>http://forest.jrc.ec.europa.eu/efdac/appl</u> <u>ications/viewer//</u>
- Download as geotiff through the FORESTMOD action website: http://forest.jrc.ec.europa.eu/download/ data/

European	JOINT RESEARCH CENTRE
Europa » EC » JRC » IES » FRC » Fore	st + Download + Data + Forest Data Download
FORESTMOD	Forest Data Download
About Forest	
() Team	To download the forest data please take the following steps:
Partners and Customers	 Select the forest data to download from the drop down menu.
() Download	 Click on the grid area of interest to download a geotif formatted raster map
Software	relact forget data to download. Forget MSPA 2000
③ Data	
Google Earth Overlays	Forest MSPA 2000
③ Forest Data Download	
Activities	Ö
() EFFIS	25 35 click to download 55
() EFDAC	
	· 21



Current and future activities

The "next update" of the pan-European forest maps will not be produced by the JRC

- Produced in the framework of the Copernicus Land Monitoring Services (Formerly, GIO land). Six lots, assigned to different contractors
- Based on IMAGE2012 data (LISS + RapidEye)
- JRC providing support and consultancy

From forest distribution maps to "value-added" products !

- It's good to know where forests are... but what about their characteristics ?
- The forest mapping group is currently "switching focus" to the production of forest biomass maps, exploiting the available distribution maps, RS data and other information sources







Pan-European Above Ground Woody Biomass Increment map (provisional)





The EFDAC Network

- Mapping and monitoring of Forest characteristics at European level is made difficult by the lack of harmonized ground-reference data !
- 2008-2012: JRC Framework Contract to provide forest data and services to the European Forest Data Centre (EFDAC) through the collaboration with national NFIs





The EFDAC Network

- NFI Network (E-Forest Consortium) and software infrastructure developed, allowing National Forest Institutes to directly provide(upload) datasets of interest (e.g., species presence/absence; basal area...) for forest modeling, maps validation, etc.
- Data presently used for example for species distribution and habitat suitability modeling







Presence of Fagus Sylvatica within inventory plots (Data from NFI E-Forest Consortium)



Habitat Suitability Map (Present Climate)



The EFDAC Network

- 2013-2016 new Framework Contract
- Focus on collecting data for the establishment of new modules in EFDAC towards the development of a Forest Information System for Europe (FISE):
 - ✓ Forest health and vitality, including potential harmful effects to forests from abiotic (e.g. fires, wind storms) and biotic (e.g. pests) agents
 - ✓ Forest resources, including the assessment of carbon balance and adaptation to climate change.
 - ✓ Biodiversity, including green infrastructure and alien species
 - ✓ Biomass production and availability for the "Bio-economy"





FOREST FIRES: EFFIS (European Forest Fires Information System)

- Established in 2000; EC focal point for information on forest fires in Europe
- 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 harmonized data, methods and standards







Include several sub-modules:

Fire Danger monitoring and Forecasting

- Analysis of fire spread risk, based on meteorological indicators and fuel characteristics (FWI system)
- Forecasts of danger conditions up to 7 days from present (25 Km resolution)





Include several modules:

Real-Time Burnt Areas Mapping

 Active fires located by integrating MODIS hot spots info...





Include several modules:

Real-Time Burnt Areas Mapping

 Active fires located by integrating MODIS hot spots info...and "Fire News" automatically collected and manually checked

	FFFIS European Forget Eire Information Surtam									
Commission	LI FID-Europea	in rolest rife	information sy	stem						
uropa » EC » JRC » IES » FRC » FORESTI	MOD * EFFIS * Applic	ations » Firen	ews							
14010	12/2010/00/11/12									
EFFIS	Firenews									
EFFIS	Find a location									
About EFFIS				100	2	(and	32.21	92 .	The state	1
Reports and Publications						A.				
③ Applications			Uni	ted Danmar		Беларусь				
O Current Situation			Ireland Eire	Deutschla	Polska (Poland)	(Belarus)			5	
(5) Fire History				Germany	the	Укра	ina nel		mano	Vacances
Firenews			Bayot	France	Augurian R	omânia			- a	(Kazakhisti
·	-		Biscay	-	100	Romania)				-
Geofeeds				Hta					01-1	bekinton
Geofeeds Greate a fire	-		Españ (Spain)	UTA (TA	EA	Nor.	Türkiye		O'zt (Uz)	bekiston bekistan)
Geofeeds Geofeed a fire Data and Services	North		España (Spain) Portugal	Unta Dia	Med/letrane	×	Türkiye (Turkey)		Oʻzt (Uz) Türkmenis (Turkmenist	bekistan) itan tan)
Geofeeds Create a fire Data and Services Clobal Manage (Rata)	North Atlantic Ocean		Españ (Spain) Portugal	era Ca	Medillerrane. Sea	80	Türkiye (Turkey)	العراق	Oʻzt (Uzi Türkmenist (Turkmenist	bekiston bekistan) itan tan) lanj Afghanistar
Geofeeds Geofeeds Create a fire Data and Services Global Viewer (Beta)	North Atlantic Ocean		Espan (Spain) Portugal (Morocco)		Medilerrane Sea		Türkiye (Turkey)	العراق	O'zt (Uz) Türkmenist (Turkmenist (Turkmenist (Uz) (Iran)	bekiston bekistan) itan tan) Alghanistan (Fakis
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta)	North Atlantic Ocean Coogle	т.	Españi (Seain) Portugal (Merecco)	diran Aligeria)	Medilerrane Sea (Laya)	8°	Türkiye (Turkey)	العراق (iraq) بالسعودية	Oʻzi (Uzi Türkmenisi Turkmenisi Turkmenisi (Uzi (Iran)	bekiston bekistan) itan tan) (Pesistan (Pekis Permalir
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGi (Beta)	North Atlantic Ocean Coogle Mapdata	Q 92013 Google, INCC	Españ (Spain) Portugal (Morecco) i Jacal i Madicak - Termini e o	Algera)	Medviterrane Sea (LEya)	terpi	Türkiye (Turkey)	lingite total	O'zi (uzi Türkmenisi Turkmenisi (Turkmenisi (iran) 65,95773,3984	bekiston bekistan) itan itan Afghanistan (Fakis Permatri 6098 3697
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGi (Beta)	North Atlantic Ocean Coogle Mapdats Search	G B2013 Google, Into I:	Españ (Senn Portugal (Merecco) el Jacal al Mastiank - <u>termini e c</u>	الحرار مراجع	Mediterrane Sea (Libya) 06/05/20	теурн теурн	Türkiye (Turkey)	4.355-00-00-00-00-00-00-00-00-00-00-00-00-0	Oʻzi Türkmenis Türkmenis Uukin (ran) 55,95773, 3984 Filter	bekiston bekistan) itan tan) Afghanistan (Fakis Pormalin 6098 3697
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta)	North Atlantic Ocean Mapdas Search	Q D2013 Google, INTO I: Country	Españ (Span) Portugal (Meroco) I) Jani I, Meroco)	And the second s	Meddlerane (Liliya) 06/05/20	Ttempil	Türkiye (Turkey) ister o: 06/12	al sand ling) 4/2013 News	Oʻzi Türkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis (Turkmenis)) (Turkmenis (Turkmenis)) (Turkmenis)	bekistan bekistan itan (Junu la 91 Afgranistan (Pakis Permalin 6098 3697
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGi (Beta)	North Atlantic Ocean Magdata Search Place Alanno	P2013 Google, Initio I: Country Italy	Españ (Span) Portuga (Merceca) (Saal) (Saa) (Saal) (Saa) (Saa) (Saa) (Saa) (Saa) (Saa) (Saa)	and in all all all all all all all all all al	Example 1 (12) Medilerrane (Laya) 06/05/20 • 2013	Trayfi Critical False	Türkiye (Turkey) bibin bibibin bibin bibibibi	(ina) (i	City Türkmenis Turkmenis Ulul (ran) 65.95773, 3986 Filter	bekistan) bekistan) itan arij Afgnanistan (Pahis Permalin 6098 3697
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGi (Beta)	North Atlantic Ocean Mag das Search Place Alanno Bocairent	S2013 Google, Iked to Country Italy Spain	Portugal (Senin) (Senin) (Merceca) (Senin) (Se	Argentin Augerta) Prom: • Update June 10 June 9,	الم الم الم الم الم الم الم الم	Trayph Trayph D13 T Critical False False	Türkiye (Turkey) bita bita bita bita bita bita bita bita	vigent vi vi vi vi vi vi vi vi vi vi vi vi vi	City Türkmenis Türkmenis Ului (rrin) 05,95773, 3994 Filter ked ked	bekiston bekistan itan itan iliani (Pasisi Permatin 6098 369
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGi (Beta)	North Atlantic Ocean Mag das Search Place Alanno Bocairent Bodrum	P2013 Google, INEO Country Italy Spain Turkey	Españ Control Portugal I Jack - Termines Size 15	المحركي المحما المحركي المحما المحماكي المحما المحماكي المحما المحماكي المماكي المماكماكماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم المماكم مماكم مماكم مم مماكم مماكم مم مماكم مم مماكم مم مماكم مماكم مم مماكم مم مماكم مماكم مم مماكم مم مماكم مم مم مم مم مم مم مم مم مم مم مم مم مم مم	Can Medilerrare (Laya) 06/05/20 ¢ , 2013 2013 2013	Titical False False False	Türkey (Turkey) bitte b: 06/12	visation of the second	Por Cristian Türkmenis Türkmenis Türkmenis Türkmenis Valut (Iran) Filter	bekiston bekiston tan lani dignaristar (Pskis Permain 6098.3697
Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta)	North Atlantic Ocean Mag data Search Place Alanno Bocarant Bodrum Bucak	Country Country Italy Spain Turkay Turkay	Portugal (Moreco) (Mo	ر من	06/05/20 2013 2013 2013 2013	Trayer Trayer D13 T Critical False False False False	Türkey (Turkey) beta a: 06/12	9 jail 1000 2013 News 1 News lin 1 News lin 2 News lin 2 News lin	Construction of the second sec	bekiston bekiston itan المال (Pakis Permatir 6098 3697
 Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta) 	Noith Atlantic Ocean Magdata Search Place Alanno Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent	Country Raly Spain Turkay Spain	Españ Portuga (Merioro) Ilonal Size 15 5 12	ر من	06/05/20 0.2013 2013 2013 2013 2013 2013 2013	Critical False False False False False	türkiye (Turkey) bişhin bi O6/12 ¢	V2013 News I News In I News In I News In I News In I News In I News In	Construction of the second sec	bekiston bekiston tan algmanistan Algmanistan (Psisti Permatin 6098 369
 Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta) 	Noith Atlantic Ocean Coogle Magdas Search Plac Alanno Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent Bocairent	Country Ealy Spain Turkay Spain Turkay Spain Greece	Portuga (Mercecia) (Me	figeria figeria	06/05/20 06/05/20 ¢ , 2013 2013 2013 2013 2013 2013 2013	Titeyph Titeyp	türkiye (turkey) bişter c: 06/12 ∳	ol, all Viagi Viagi Viagi Viagi Viagi News In News lin 1 News lin 1 News lin 1 News lin 1 News lin	Control Contro	bekiston bekiston tan Algnanistan Algnanistan (Pakis Permain 6098 369
 Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta) 	North Atlantic Ocean Coogle Inapdas Search Place Alanno Bocairent	E2013 Googie, Into Country Tały Spain Turkay Spain Turkay Spain Greece Greece	Españ Portuga Idual Idual Size 15 5 12	August	06/05/20 06/05/20 0 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013	TESYON TESYON OLI T Critical False False False False False False False	türkiye (turkey) bibbs bi 06/12 ¢	vijagi vi vi vi vi vi vi vi vi vi vi vi vi vi	Criteries Childrenetis Child	bekiston bekiston tan algunitari Afgnaristar (Pakis Permain 6098 369
 Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta) 	North Atlantic Ocean Coogle Mapdas Search Bacanan Bacan Bacanan Bacanan Bacanan Bacanan Bacanan Bacan	Country Rahy Spain Turkay Spain Turkay Spain Greece Spain	Portuga Alpeal Alpeal Size 15 5 12	August	06/05/20 06/05/20 0 2013 2013 2013 2013 2013 2013 2013 2013 2013	TESYON TESYON D13 T Critical False False False False False False False False	turkaye from eyr beta c: 06/12 ¢	vijagi vi vi vi vi vi vi vi vi vi vi vi vi vi	Control Contro	bekiston bekiston tan Ulauta9 Argnanista Permati 5058 365
 Geofeeds Create a fire Data and Services Global Viewer (Beta) VGi (Beta) 	North Atlantic Ocean Cocean Search Bocaranta Bocaranta	Country Italy Spain Turkay Spain Turkay Spain Greece Greece Spain Spain	Size	Autorial Aut	Construction Const	Toppel Toppel Toppel Talse False False False False False False False False False False False	Türkiye Türkiye boto 06/12	V2013 News News In News In Ne	kad kad kad kad kad kad kad	bekiston itan itan itan itan itan itan itan Permalia Sotos Sotos Sotos
 Geofeeds Create a fire Data and Services Global Viewer (Beta) VGI (Beta) 	North Atlantic Ocean Magdas Search Manno Bocariant Bodrum Bucal Comera Comera Com	Construction Co	Portuga (Moreco) (Moreco	Augents A	Construction Const	Toppel Toppel Talse False False False False False False False False False False	Turkıye (Tankıy Do: 06/12	V2013 News 1 News lin 2 News lin 1 News lin	ked	bekiston itan inn illia



Include several modules:

Real-Time Burnt Areas Mapping

- Active fires located by integrating MODIS hot spots info...and "Fire News" automatically collected and manually checked
- Burnt Areas (>40ha) manually digitized on top of MODIS 250 m satellite images (Daily Update) (Info regarding each identified burnt area stored and provided through the web viewer (start/end date; Burnt Area; Affected land cover; etc.)
- Identified fires account for about 75% of total yearly burnt area in Europe







JOINT RESEARCH CENTRE

Weekly report on forest fire activity in Europe and the Mediterranean

area

24-08-2012 - 30-08-2012

The map below shows the location of main forest fire events mapped by EFFIS during the last 7 days

Only fires > 100 hectares are shown at this scale. Dot size is according to the extent class of the fire event.



The full list of fires mapped by EFFIS in the last 7 days is in the following pages.

For each fire, the following information is given: Date of last update, Location (province), Burned area (ha).

Notes on the fire list:

Fires are grouped by country and are sorted by decreasing size within each country. Fires with burned area larger than 500 ha are highlighted in bold.

Weekly reporting on fire activity in Europe

European Union

Bulgaria

- 2012-08-27: Slivovo Burgas 1744 (ha)
- 2012-08-29: Kireevo Vidin 1674 (ha)
- 2012-08-27: Rilski manastir Kyustendil 246 (ha)
- 2012-08-28: Dolna banya Sofia 118 (ha)

France

- 2012-08-27: Eyguieres Bouches-du-Rhone 775 (ha)
- 2012-08-27: Borne Ardeche 33 (ha)

Greece

- 2012-08-29: Dimos Aylonos Evvoia 3724 (ha)
- 2012-08-27: Dimos Kalampakas Trikala 692 (ha)
- 2012-08-30: Dimos Melitis Florina 658 (ha)
- 2012-08-29: Dimos Kyrroy Pella 426 (ha)
- 2012-08-28: Dimos Melitis Florina 389 (ha)
- 2012-08-25: Koinotita Afidnon Attiki 327 (ha)
- 2012-08-29: Dimos Kameirov Dodekanisos 302 (ha)
- 2012-08-24: Dimos Elation Zakynthos 242 (ha)
- 2012-08-29: Dimos Askioy Kozani 151 (ha)
- 2012-08-25: Dimos Paravolas Aitoloakarnania 74 (ha)
- 2012-08-28: Dimos Lagana Zakynthos 54 (ha)
- 2012-08-27: Dimos Nemeas Korinthia 35 (ha)
- 2012-08-29: Dimos Moysovron Chania 17 (ha)

Italy

Research

Centre

- 2012-08-26: Sclafani Bagni Palermo 1294 (ha)
- 2012-08-28: Pisticci Matera 784 (ha)
- 0040 00 00. Niesele Case C00 (he)



Include several modules:

Post Fire Regeneration Monitoring

- Based on analysis of time series of MODIS 250m vegetation indexes (end of summer data)
- Allows to monitor the post-fire regeneration dynamics





- Other modules (at various stages of development):
 - Fire Severity Assessment...
 - Fire Emissions Assessment...
 - Seasonal forecasting (weather anomalies)...
 - Fire smoke dispersion...
 - Fire spread...





FOREST FIRES MONITORING: The EFFIS Network

Network of countries involved in the exploitation and further development of EFFIS

Country	Year Joined EFFIS					
Portugal	2000		Number	of particing	ating count	ries
Spain	2000	·		or particip	uning count	1103
France	2000	2000				
Italy	2000	2000				
Finland	2000	· ·				
Germany	2000	2001				
Greece	2000					
Bulgaria	2002					
Cyprus	2002	2002				
Romania	2002	·	-			
Austria	2003	0000				
Czech Republic	2004	2003				
Hungary	2004	· ·				
Latvia	2004	2004				
Lithuania	2004					
Poland	2004				4	
Slovenia	2004	2005				
Slovakia	2004	· ·	-			
Sweden	2004	2006				
Turkey	2004	2006				
U. K.	2005	· ·				
Croatia	2006	2007				
Estonia	2006					
Switzerland	2006					
Montenegro	2007	2008				
FYROM	2008	·				
Albania	2009	2000				
Kosovo	2009	2009				
Russia	2010	· ·				
Norway	2011	2010				
Serbia	2011					
Algeria	2011					
Lebanon	2011	2011				
Morocco	2011	·				
Tunisia	2011		0 1	0 2	0 3	10 40
Netherlands	2011	· `	0 1	<u>د</u>		40
Ireland	2011					

First Meeting of SCERIN - Prague – 17 June 2013



FOREST FIRES MONITORING: The EFFIS Network

 Network of countries participating in the exploitation and further development of EFFIS







FOREST FIRES MONITORING: The EFFIS Network EFFIS Fire Database

EFFIS members are both benefiting from EFFIS, and providing it data !

ID	Unique Fire identifier	FIREID
TIME OF FIRE	Date of first alert [YYYYMMDD]	DATEAL
	Time of first alert [HHMM]	TIMEAL
	Date of first intervention [YYYYMMDD]	DATEIN
	Time of first intervention [HHMM]	TIMEIN
	Date of fire extinction [YYYYMMDD]	DATEEX
	Time of fire extinction [HHMM]	TIMEEX
		-
	Province Code (national nomenclature)	PROVCODE
	NUTS3 code	NUTS3
LOCATION OF FIRE	Commune Code (national nomenclature)	CODECOM
ECCATION OF TIRE	Commune Name (national nomenclature)	NAMECOM
	Latitude [decimal degrees]	NORTH
	Longitude [decimal degrees]	EAST
		1
	Burned Area FOREST [Ha]	BAFOR
SIZE OF FIRE	Burned Area OTHER WOODED LAND [Ha]	BAOW
SIZE OF FIRE	Burned Area OTHER NON WOODED NATURAL LAND [Ha]	BAONW
	Burned Area AGRICULTURE AND OTHER ARTIFICIAL LAND [Ha]	BAAGR
	Presumed Cause (EU categories code)	CAUSE_EU

	Presumed Cause (EU categories code)	CAUSE_EU
CAUSE OF FIRE	Presumed Cause (Country detailed categories code)	CAUSE_CO





FOREST FIRES MONITORING: The EFFIS Network EFFIS Fire Database

 Allows to analyze characteristics and temporal trends of burnt areas in Europe





First Meeting of SCERIN - Prague – 17 June 2013





Joint report of JRC and **Directorate-General** Environment





Incas 2007 (2





Report on forest fires in Europe up to October, 2012

- Average **burnt area** in the EU in the last 12 years approx. **470,000 ha/**yr.
- Estimated **annual losses** in the last 12 years approx. **2 billion/year**
- 2012 fire campaign:
 - Early fire activity due to drought in the EU Med region (approximately 100,000 ha burnt by the end of March)
 - Spring fire activity in central Europe (e.g. fire in Hungary approx. 1000 ha)
 - Damages area above average of last decades (approx. 567,000 ha)
 - Large impact in Natura2000 areas (approx. 180,000 ha)
 - Considerable number of human casualties





EFFIS – Extension to a Global Fire Information System

(beta system in partnership with the GOFC Fire IT, supporting GEOSS)







Thanks for your attention !

effis@jrc.ec.europa.eu

efdac@jrc.ec.europa.eu





Global Wildfire Information System (beta) Fire Danger Assessment

Single Model Deterministic Components up to 10 days



Probabilistic (Ensemble) Components up to 15 days



Additional Monthly & Seasonal Products up to 4 months

Weekly Anomalies of Temperature & Precipitation from Monthly Forecast System

Seasonal Anomalies of Temperature & Precipitation



EFFIS – Extension to a Global Fire Information System

(beta system in partnership with the GOFC Fire IT, supporting GEOSS)





Global Wildfire Information System (prototype)

Fire activity in Russia – July 31, 2012



EFFIS Global Viewer





Assessment of fire severity



Joint Research

