Copernicus EMS in support of crisis preparedness and response operations

Copernicus Emergency Management Service

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The long way to EMS

2002 Elbe and Danube floods a wake-up call for the EC to provide an operational service to provide support to flood management

2010 Three million people were affected by the quake in Haiti, with death toll estimates range from 100.000 to about 160.000. Many countries responded to appeals for humanitarian aid pledging funds and dispatching rescue and medical teams, engineers and support personnel.

"Strengthening the European disaster response capacity" is the European Union new strategy for the management of natural or man-made disasters, enabling the EU to improve the coordination of its response and the use of existing instruments. The Emergency Response Coordination Centre is set up at DG ECHO

2012 The Emergency Management Service is the first one to become operational in the framework of Copernicus. A powerful European tool to supports crisis managers, civil protection authorities and humanitarian aid actors, as well as those involved in preparedness and recovery activities

2013 Danube flooding affected Hungary, Czech Republic, Germany. Both EMS Early Warning and Mapping components contributed to provide support to the authorities and 100 maps over 22 Areas of Interest, starting from 10 hours after the event were delivered to the users over 10 days during the event

2015 The Nepal earthquake killed nearly 9.000 people and injured nearly 22.000. Copernicus EMS took part to the massive international effort to provide support to local communities and emergency response authorities.

Emergencies have no boundaries, from Space

What is the Emergency Management Service?

emergency.copernicus.eu

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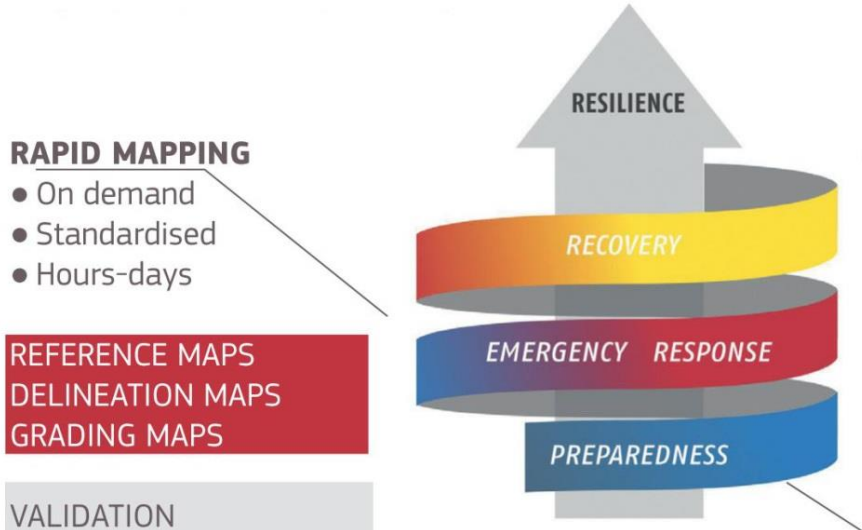
Copernicus EMS - components



RAPID MAPPING
- On demand
- Standardised
- Hours-days

REFERENCE MAPS
DELINEATION MAPS
GRADING MAPS

VALIDATION

RISK AND RECOVERY MAPPING
- On demand
- Tailored to user needs
- Weeks-months

REFERENCE MAPS
PRE-DISASTER SITUATION MAPS

REFERENCE MAPS
POST-DISASTER SITUATION MAPS

VALIDATION

EARLY WARNING
- Floods: EFAS
- Forest Fires: EFFIS

CONTINOUS ALERTS

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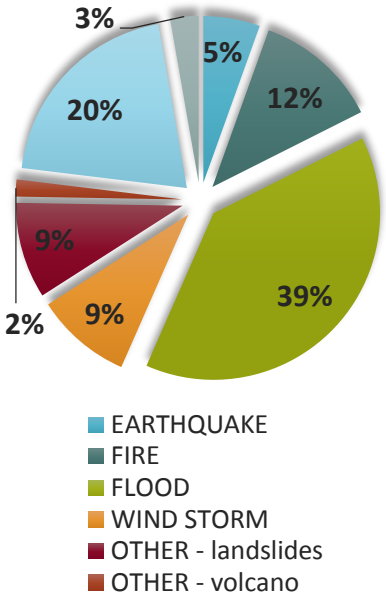
EMS Mapping: what kind of disasters?



Rapid Mapping activations up to September 2016

Emergency Management

What are Copernicus EMS Mapping Services?

Rapid Mapping -RM

On-demand and fast provision (within hours or days) of geospatial information in support of emergency management activities immediately following an emergency event such as: natural & man-made disasters globally

Risk and Recovery Mapping - RRM

Delivery of maps and analyses within weeks or months, in support of activities dealing with recovery, reconstruction, disaster risk reduction, preparedness and prevention

- More than 5 years of un-discontinued H24/365 operations
- 200+ RM activations and 33 RRM
- More than 40 worldwide Users organizations triggering the service
- Providing support in more than 50 different Countries worldwide
- More than 2300 maps delivered to the end users
- Accurate analysis and dossier delivered in RRM mode

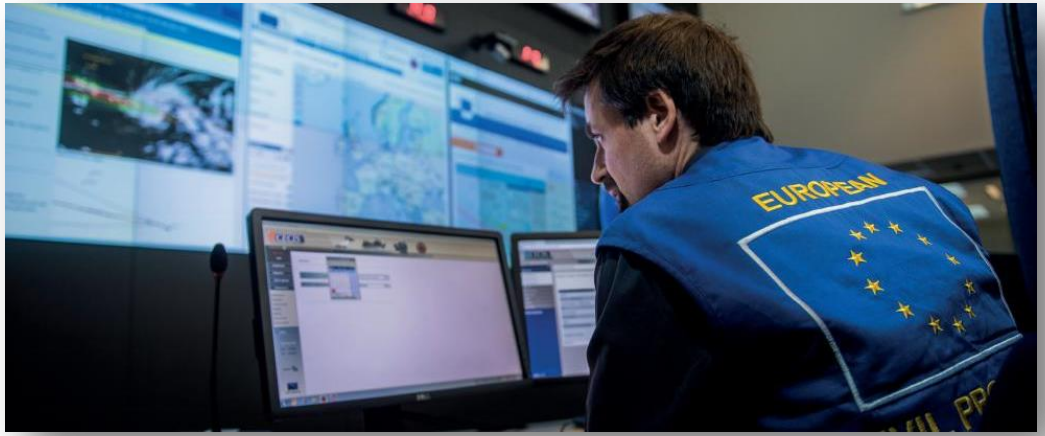
The EMS Mapping operational actors

DG JRC

European Commission Joint Research Centre, technical supervision of the production, management of dissemination platforms

Authorized Users

Generally Civil Protection Authorities or other National Focal Points, they can submit a request for activation to the ERCC



ERCC @DG ECHO

The Emergency Response Coordination Centre, entry point for EMS activations, providing 24/7 response to all activation requests

ESA

Through a dedicated mechanism (REACT) the European Space Agency provides EO data to the service provider

Service Provider

Private and academic sector consortia in charge of the production

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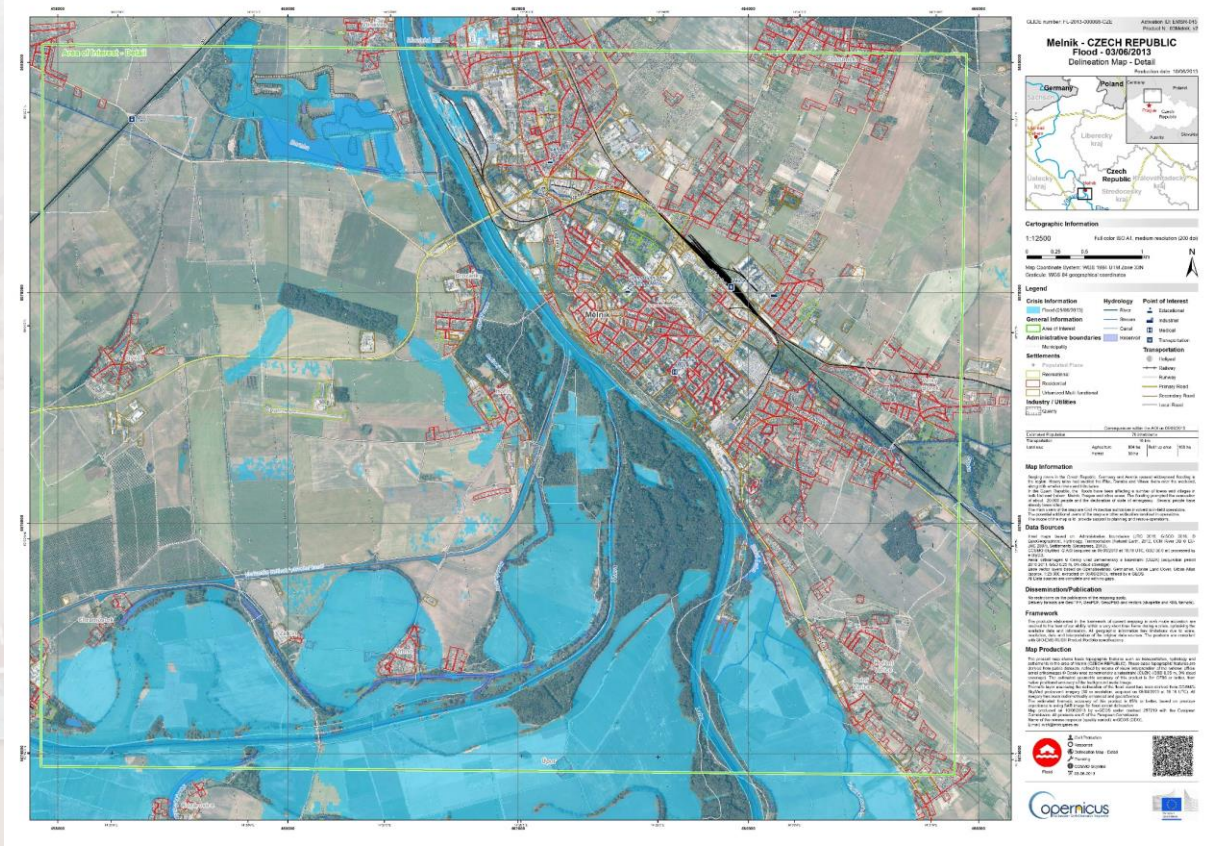
CZECH REPUBLIC ACTIVATIONS



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CZECH REPUBLIC ACTIVATIONS

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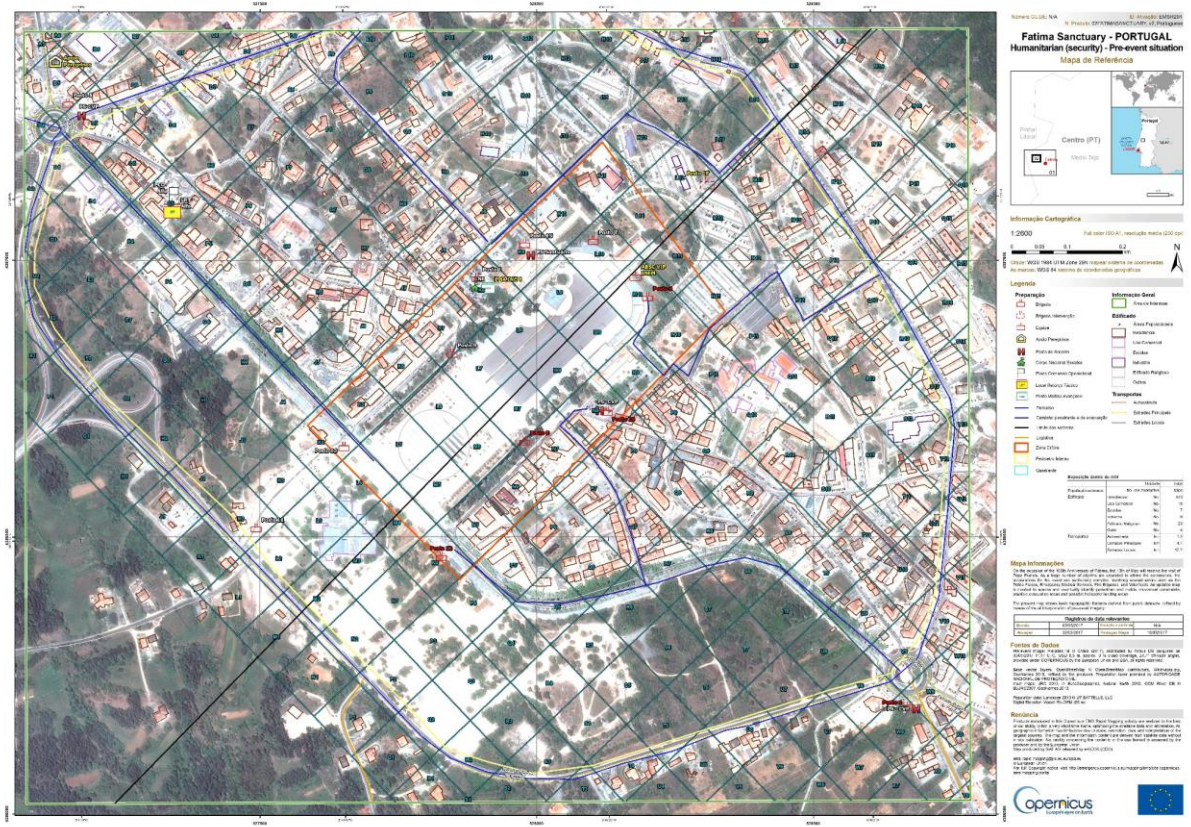
FATIMA ACTIVATION EXAMPLE



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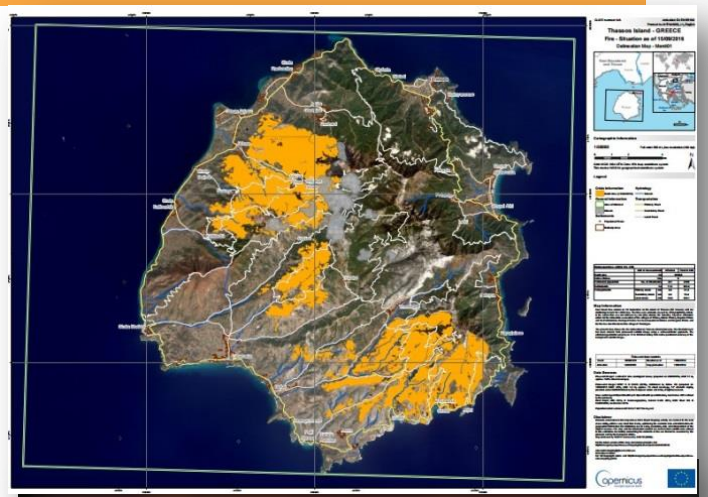
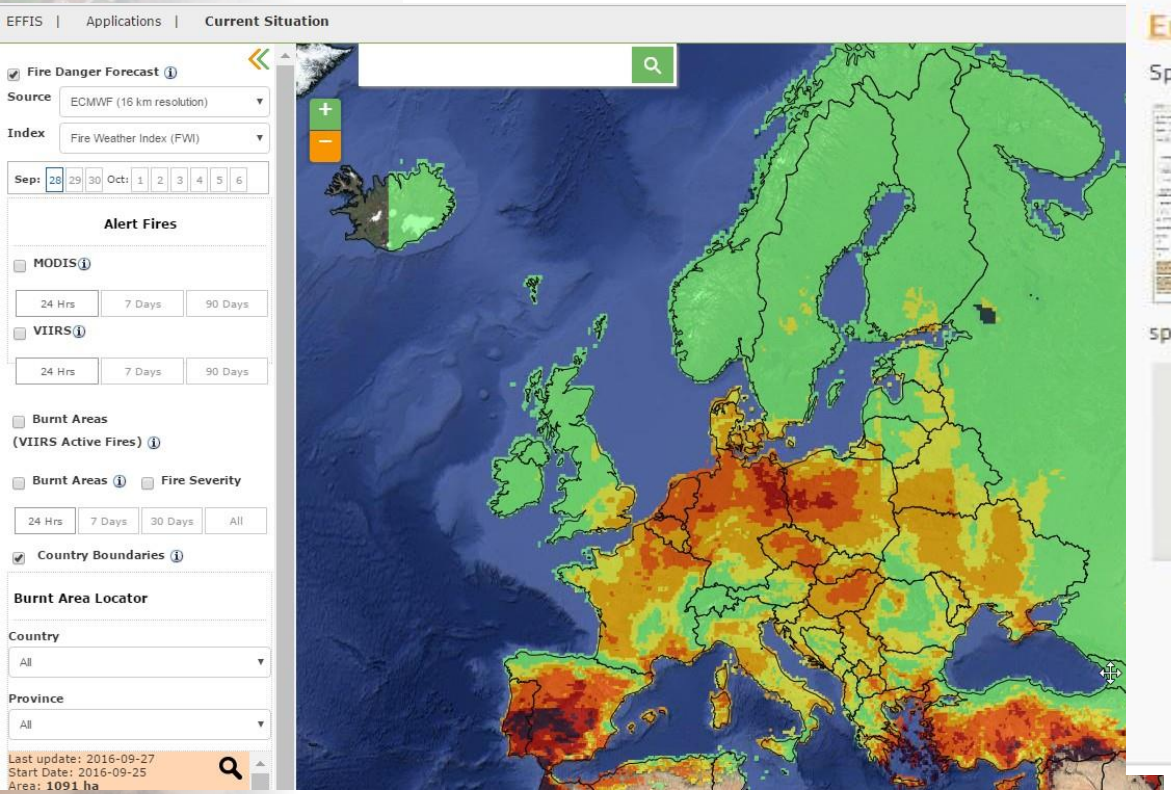
Copernicus EMS Early Warning supporting fires management: EFFIS

- EFFIS is a system established by the European Commission as focal point for information on forest fires in Europe since 1998, currently operated under the Copernicus umbrella.
- EFFIS provides EU level assessments during both pre-fire and post-fire phases, thus supporting fire prevention, preparedness, fire fighting and post-fire operations
- EFFIS complements national fire information systems through the provision of harmonised data, methods and standards



EFFIS portal services



European Forest Fire Information System

Specific applications are available in EFFIS:

Current Situation

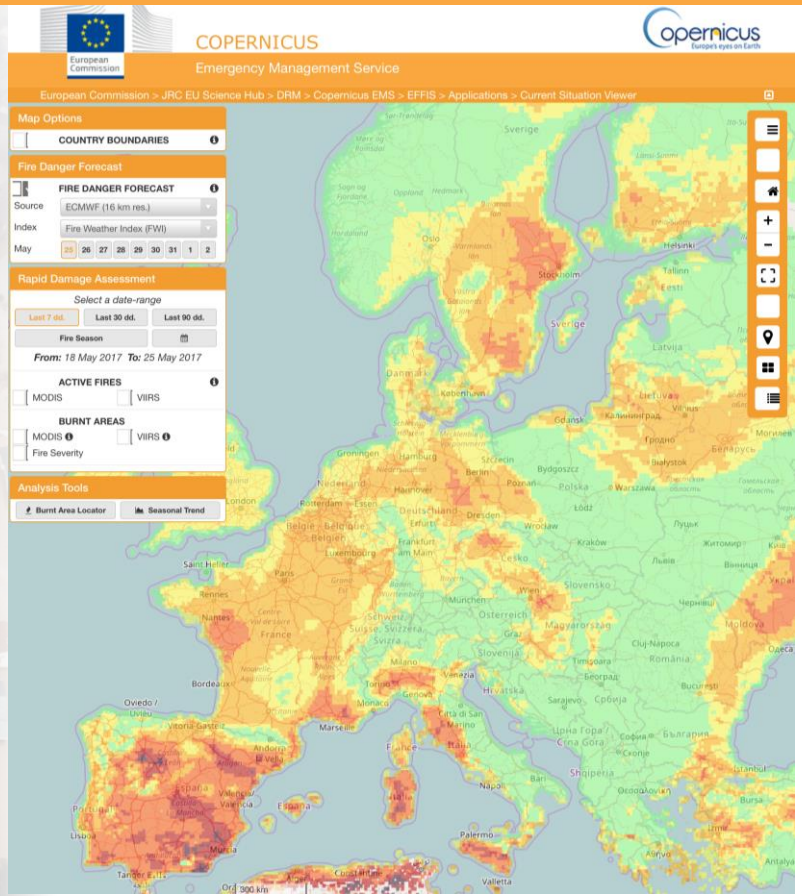
Latest data on the current fire season in Europe and in Mediterranean area. Today's meteorological fire danger maps + forecast up to 6 days, daily maps of hot spots and perimeters.

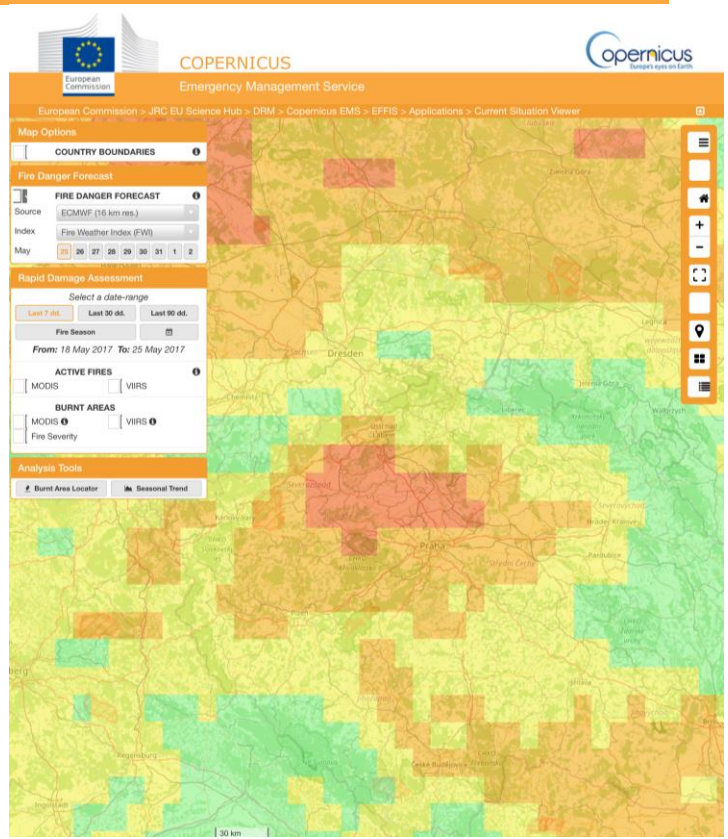
Fire News

News on wildland fires in Europe updated daily by the EFFIS team.

European Forest Fire Information System

Forest Fires are not only in Southern Europe!

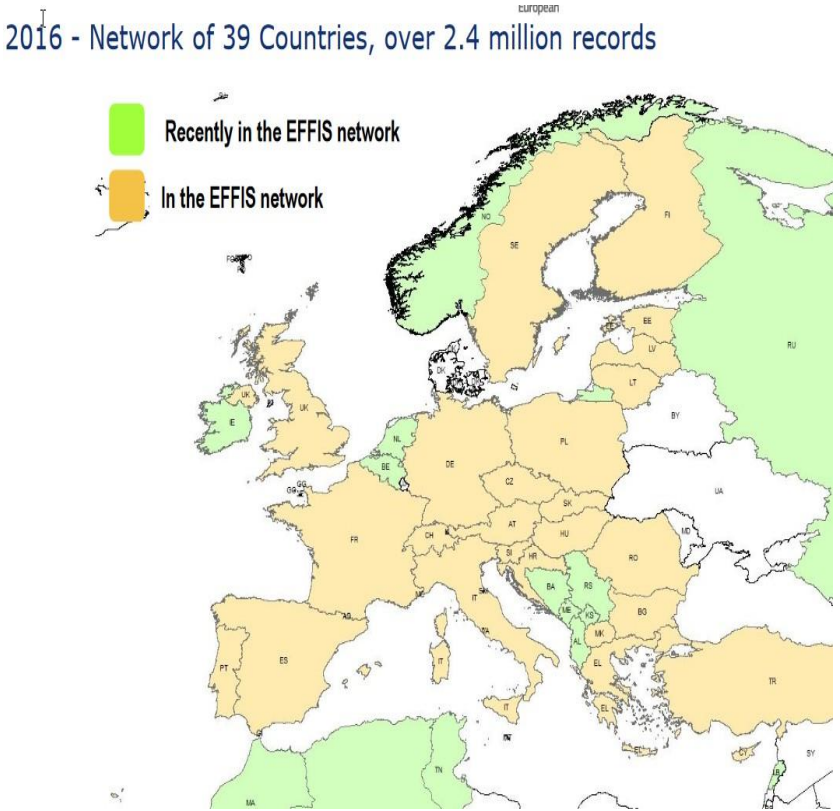




EFFIS – Users & Network

- EFFIS services and products are freely accessible via the EFFIS portal at http://forest.jrc.ec.europa.eu/effis/

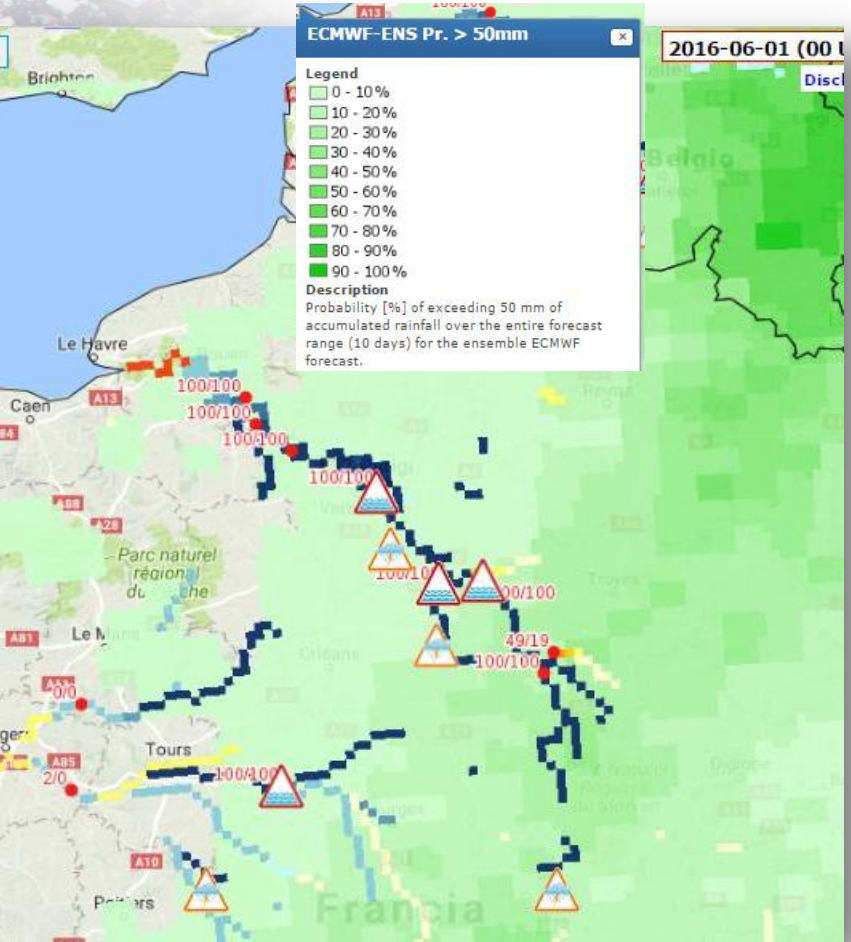
- EFFIS users include:
  - EC DGs and Services,
  - European Parliament,
  - associated national/regional forest fire and civil protection services,
  - FAO, Silva Mediterranea,
  - UNECE



Copernicus EMS Early Warning supporting flood management: EFAS

- An iniziative to increase preparedness for riverine flood across Europe and support the decision making :
  - EFAS partners to draw attention to an upcoming event so a country can make proper preparations in terms of equipment, and operationl teams and responsible officers and consult local information regularly (MetService, observations, …)
  - At the EU level to provide a congregated picture on a larger scale
- Provides flood early warning info for up to 10 days in advance, river basin wide, European scale
- Flash flood specific forecasts
- Bulletin and daily overview and notification

EFAS portal services



Flood summary layers (3/11)

Information on current and past floods situation: active information on alert areas, flood forecasting, flood probability and real time hydrographs

Hydrological layers (0/6)

Maps of the individual forecasts based on different meteorological inputs such as the ensemble for ECMWF and the COSMO consortium and the deterministic forecast from the German Weather office and the ECMWF

Flash flood layers (0/2)

Flash flood warnings are generated using the methodology of the Enhanced Runoff Index based on Climatology

Init. Conditions layers (0/11)

Maps such as the simulated soil moisture or snow water equivalent and associated anomalies, which are important background information when analysing flood forecast

Meteorological layers (0/8)

Accumulated rainfall and EFAS forecast consisting in:
deterministic medium-range forecasts:

- global model from DWD (German Weather office) and ECMWF
- ensemble forecast for flood warning times beyond 48 hours, from ECMWF and Consortium for Small-scale Modeling (COSMO)

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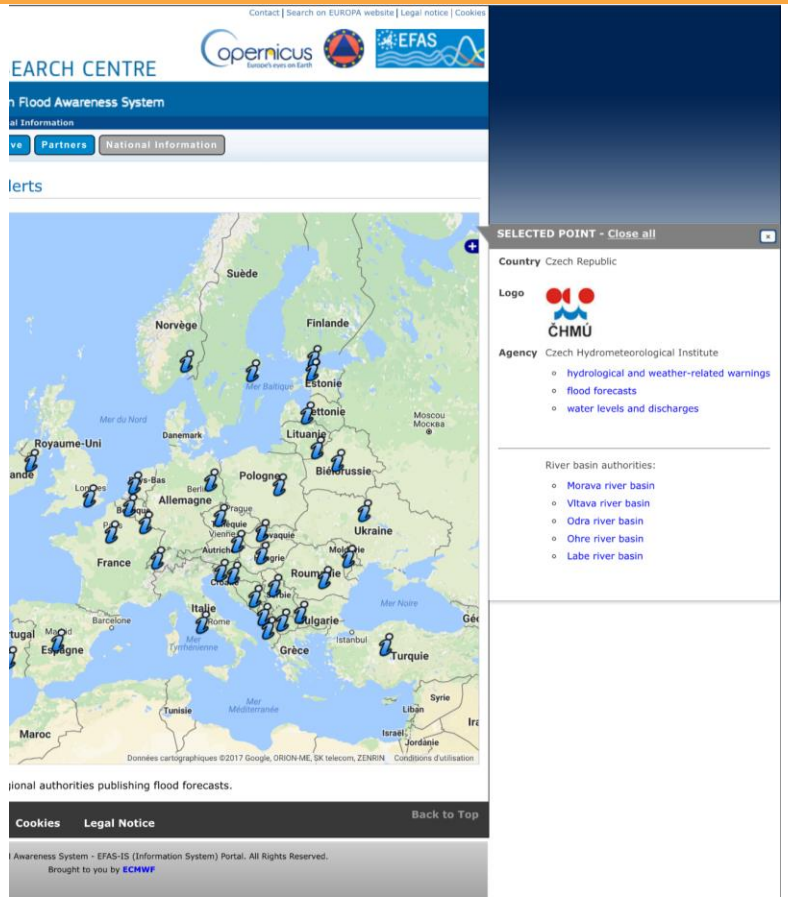
EFAS in Czech Republic



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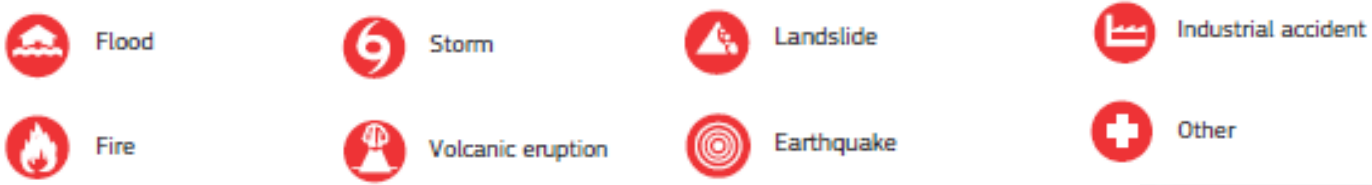
Emergency Management

Risk & Recovery Mapping Service

Risk & Recovery Mapping (RRM): The Service provides **maps** and **analyses** within weeks or months, in support of activities dealing with recovery, reconstruction, disaster risk reduction, preparedness and prevention

- **pre-disaster situation** when providing support to disaster prevention and preparedness actions (Hazard exposure, vulnerability, resilience, risk status, evacuation plans and modelling scenarios….)
- **post-disaster situation** when providing support after a disaster, such as reconstruction planning and progress monitoring (Post-disaster needs assessment, recovery plans, reconstruction/rehabilitation monitoring, including Internally Displaced Persons (IDP) and refugee camps monitoring)

Disaster types:



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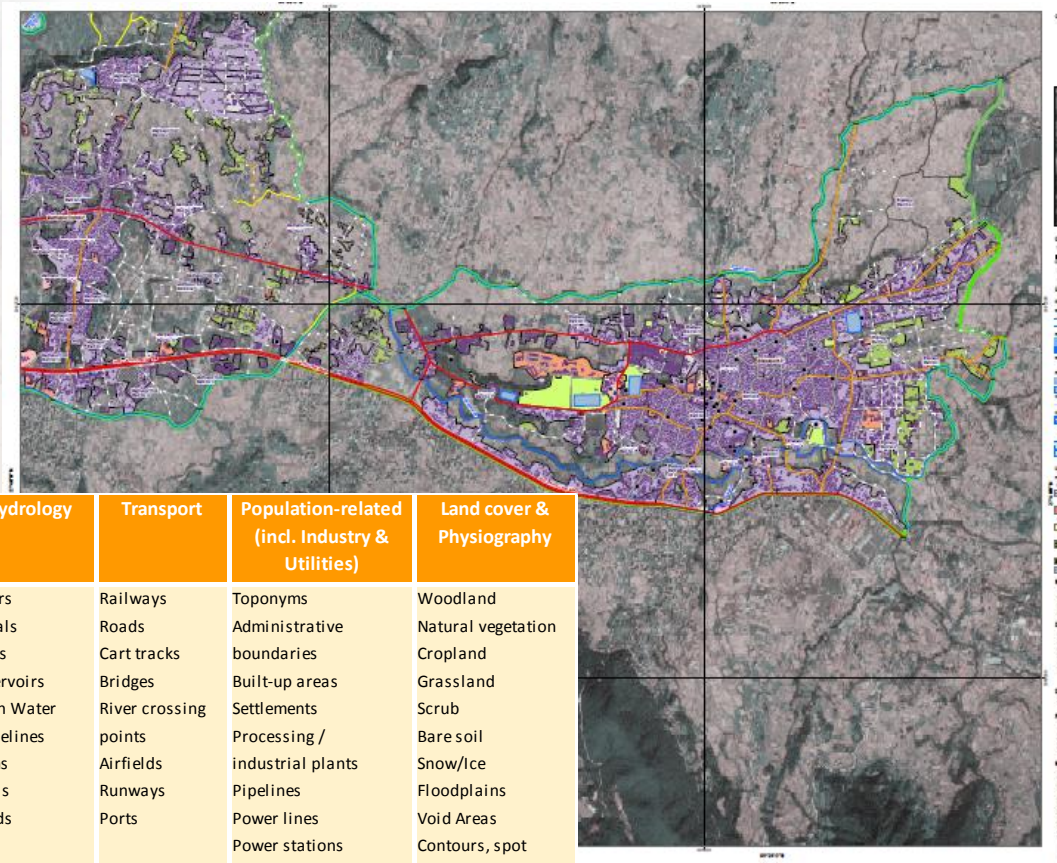
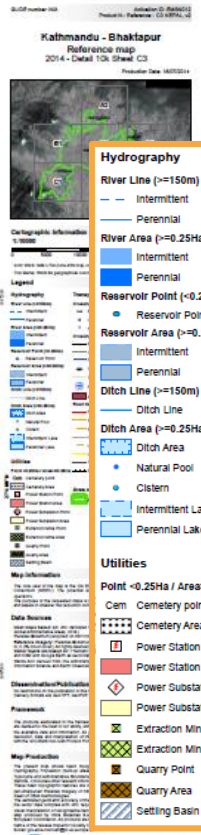
Map Types

Three types of map are provided by the **EMS Risk & Recovery Mapping Service**:

- **Reference maps** provide a comprehensive and updated knowledge of the territory and relevant assets in a disaster risk reduction context
- **Pre-disaster situation maps** provide thematic information supporting planning for contingencies on vulnerable areas. Examples include hazard exposure, vulnerability, resilience, risk status, evacuation plans and modelling scenarios
- **Post-disaster situation maps** provide thematic information in support of post-disaster activities such as reconstruction planning and progress monitoring. Examples include post-disaster needs assessment, recovery plans, reconstruction/rehabilitation monitoring, including Internally Displaced Persons (IDP) and refugee camps monitoring

Reference Map





Legend

Hydrography
- River Line (>=150m)
  - Intermittent
  - Perennial
- River Area (>=0.25Ha)
  - Intermittent
  - Perennial
- Reservoir Point (<0.25Ha)
  - Reservoir Point
- Reservoir Area (>=0.25Ha)
  - Intermittent
  - Perennial
- Ditch Line (>=150m)
  - Ditch Line
- Ditch Area (>=0.25Ha)
  - Ditch Area
  - Natural Pool
  - Cistern
  - Intermittent Lake
  - Perennial Lake

Transportation
- Crossing Point (<50m)
  - Bridge Point
  - Culvert
  - Ford
- Crossing Line (>=50)
  - Bridge
  - Culvert
  - Ford
  - Tunnel Point (<50m)
  - TunnelLine (>=50m)
  - Airfield Point (<0.25Ha)
  - Airfield Area (>=0.25Ha)
- Road Network
  - Primary paved
  - Secondary paved
  - Secondary unpaved
  - Local paved
  - Local unpaved
  - Cart Track
  - Trail
  - Railway

Utilities
- Point <0.25Ha / Area>=0.25Ha
  - Cem Cemetery point
  - Cemetery Area
  - Power Station Point
  - Power Station Area
  - Power Substation Point
  - Power Substation Area
  - Extraction Mine Point
  - Extraction Mine Area
  - Quarry Point
  - Quarry Area
  - Settling Basin

Area of Interest
- AOI

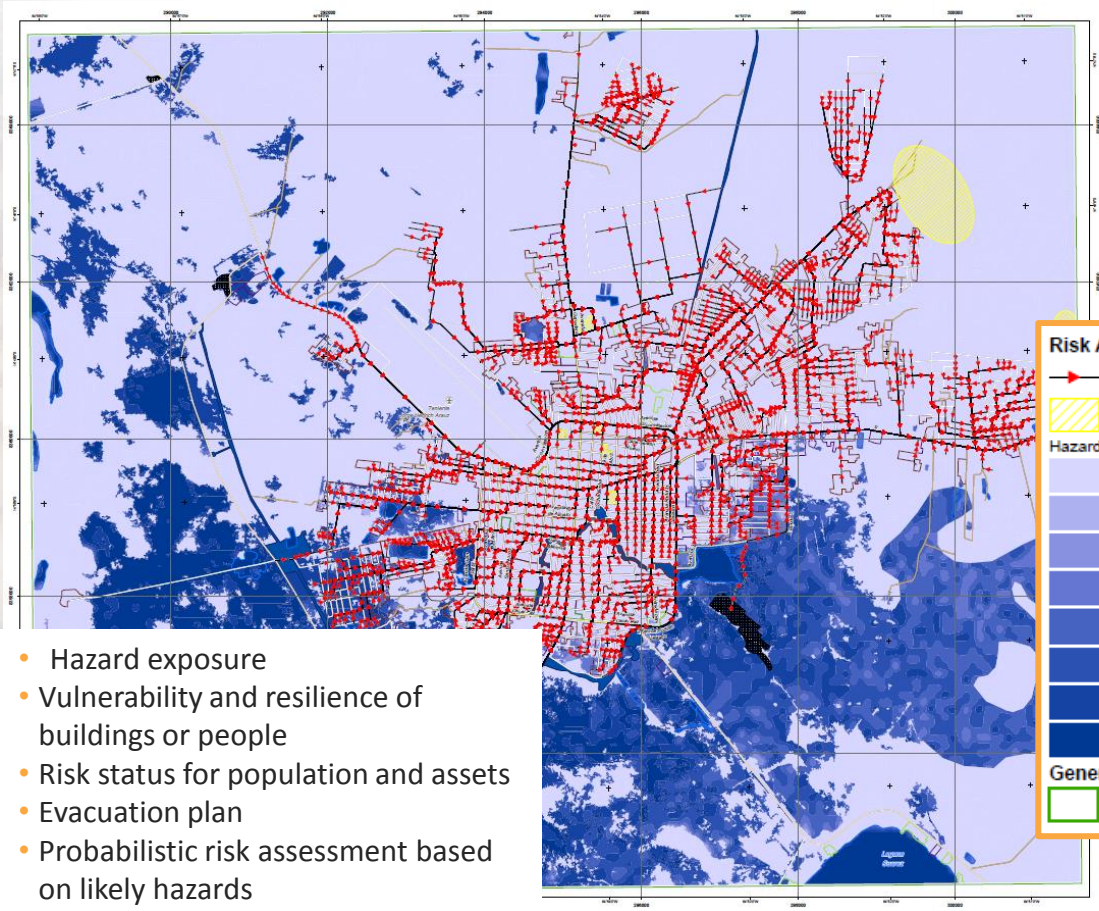
Urban Areas
- Buildings
- Built Up Area
  - Agricultural
  - Commercial
  - Educational
  - Industrial
  - Institutional
  - Medical
  - Military
  - Other
  - Recreational/Sports
  - Religious
  - Residential Formal
  - Residential Informal

Points of Interest
- Commercial
- Educational
- Fire brigade
- Governmental
- Hospital
- Hotel
- Industry
- Military
- Other
- Police station
- Recreational/Sports
- Religious

Typical key features

Hydrology	Transport	Population-related (incl. Industry & Utilities)	Land cover & Physiography
Rivers	Railways	Toponyms	Woodland
Canals	Roads	Administrative boundaries	Natural vegetation
Lakes	Cart tracks	Built-up areas	Cropland
Reservoirs	Bridges	Settlements	Grassland
Open Water	River crossing points	Processing / industrial plants	Scrub
Shorelines	Airfields	Pipelines	Bare soil
Dams	Runways	Power lines	Snow/Ice
Wells	Ports	Power stations	Floodplains
Ponds			Void Areas
			Contours, spot heights
			Cliffs

Pre-Disaster Situation Map



Application examples

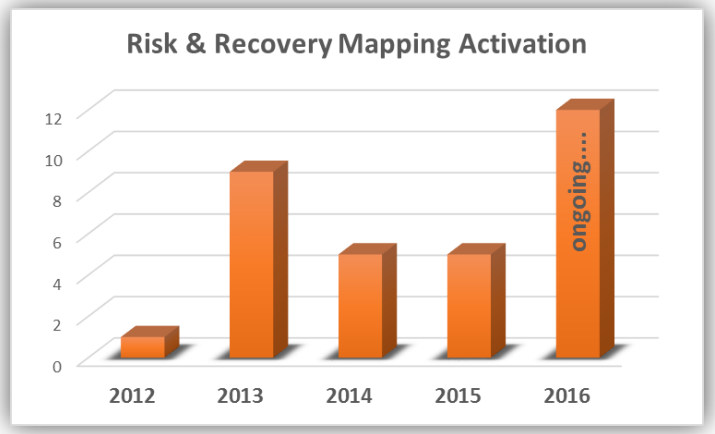
- Hazard exposure
- Vulnerability and resilience of buildings or people
- Risk status for population and assets
- Evacuation plan
- Probabilistic risk assessment based on likely hazards

RRM: The Service since 2012

- The Risk and Recovery Mapping service has been activated 32 times since the beginning of the service

2012

- Member States triggering, since 2012 are: Greece, Portugal, Germany. Many activation were triggered by DG JRC, DG ECHO or associated users
- Calls for Expression of Interest were launched at the beginning of 2016 and 2017, addressing global stakeholders in the field of disaster management and civil protection and members of NGO's working in the humanitarian field, resulting in an significant increase in activation number

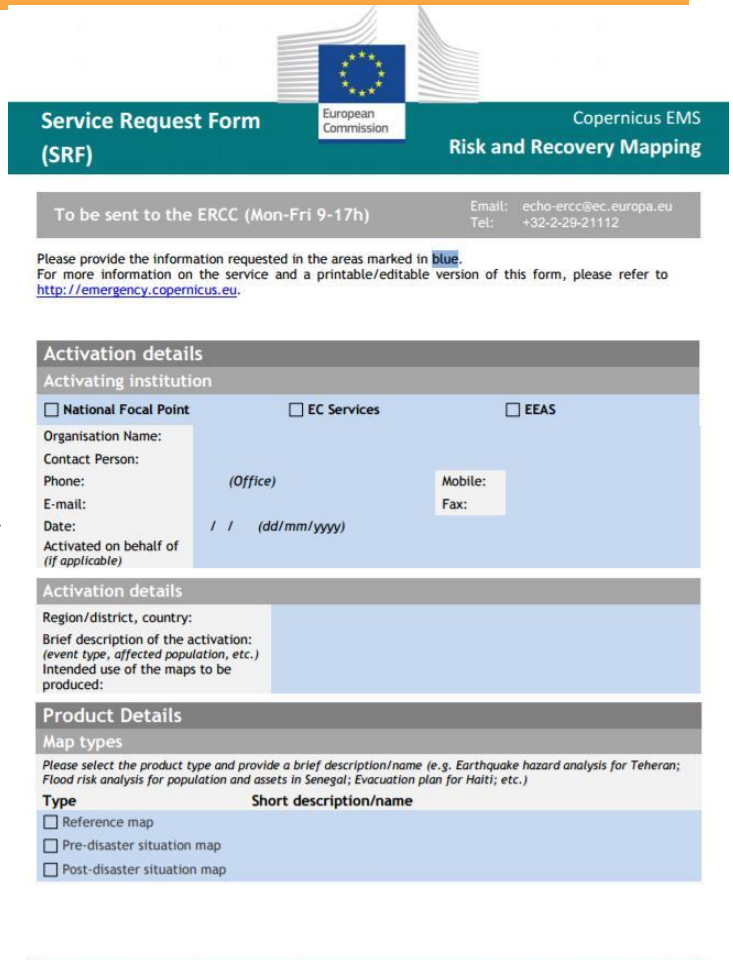


How to access the RRM Service

- The Service can be directly activated by nominated Authorised Users (AU)
- Entities which are not Authorised Users and who wish to activate the Mapping service must contact their National Focal Point or contact the ERCC
- All Commission Services and the European External Action's Situation room are Authorized Users
- The AU must fill the Services Request Form (SRF) and send by e-mail to the ERCC

More information on the Mapping service at
www.emergency.copernicus.eu/mapping

Contact ERCC at
echo-ercc@ec.europa.eu
if you want to activate the EMS mapping



European Commission

Service Request Form (SRF)

Copernicus EMS
Risk and Recovery Mapping

To be sent to the ERCC (Mon-Fri 9-17h)
Email: echo-ercc@ec.europa.eu
Tel: +32-2-29-21112

Please provide the information requested in the areas marked in blue.
For more information on the service and a printable/editable version of this form, please refer to http://emergency.copernicus.eu.

Activation details

Activating institution

☐ National Focal Point ☐ EC Services ☐ EEAS

Organisation Name:
Contact Person:
Phone: *(Office)* Mobile:
E-mail: Fax:
Date: / / *(dd/mm/yyyy)*
Activated on behalf of *(if applicable)*

Activation details

Region/district, country:
Brief description of the activation: *(event type, affected population, etc.)*
Intended use of the maps to be produced:

Product Details

Map types

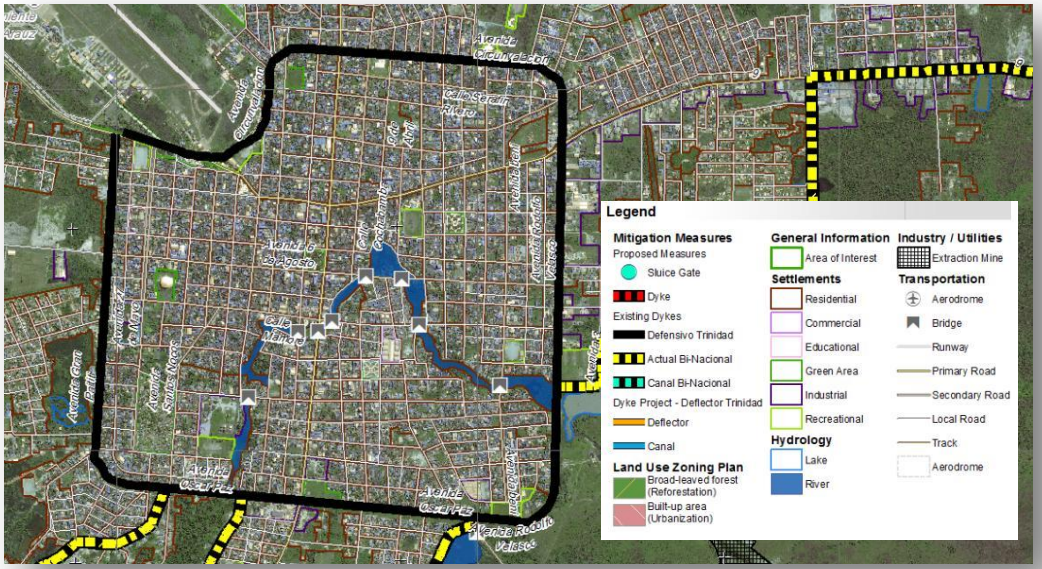
Please select the product type and provide a brief description/name (e.g. Earthquake hazard analysis for Teheran; Flood risk analysis for population and assets in Senegal; Evacuation plan for Haiti; etc.)

Type	Short description/name
☐ Reference map	
☐ Pre-disaster situation map	
☐ Post-disaster situation map	

RRM: Some examples

- Floods
  - Bolivia : vulnerability maps
- Earthquake
- Reconstruction monitoring
  - Haiti
- Risk assessments
  - Earthquake preparedness, mitigations, etc..

    Nepal
- Forest fires
  - Erosion risk maps , land slide risk maps, bio-mass losses
- Humanitarian aid
  - Population density estimates and land use database
  - Environmental degradation around refugee camps



This map of Rio Mamore, Bolivia, highlight the existing and proposed measures for flood defense and was delivered as part of a series of maps dealing with pre-disaster preparedness and vulnerability analysis in the region

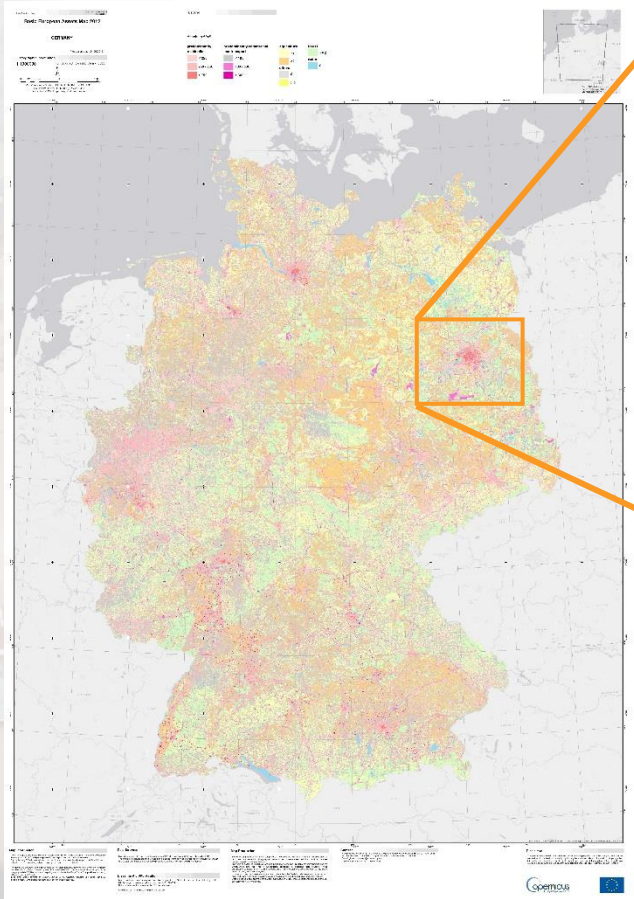
EMSN024: Basic European Assets Map

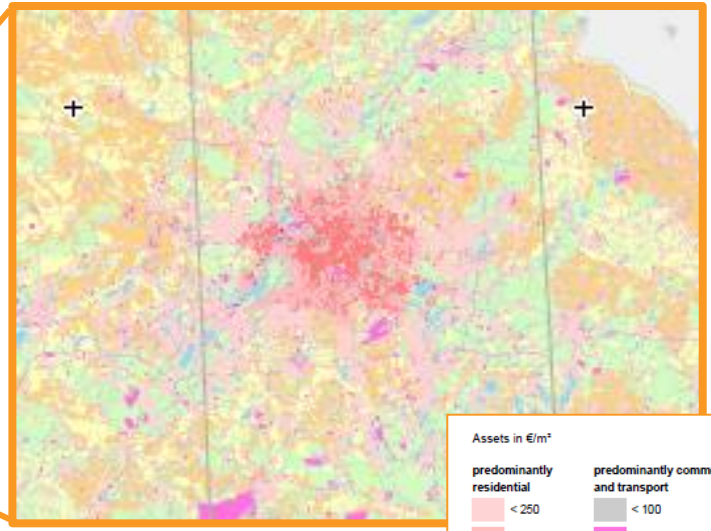
Event Type: Other
Activation Time (UTC): 2014-04-22 00:00
Activation Status: Closed
Affected Countries/Territories:
Federal Republic of Germany
Area Descriptor: Germany
Authorized User:
BBK Germany
Activation Reason:
Risk analysis for natural hazard topics, damage assessment

This RRM activation has been requested by the BBK (Bundesamt fuer Bevoelkerungsschutz und Katastrophenhilfe), Federal Office of Civil Protection and Disaster Assistance

- The **target** of the activation is to generate a detailed asset-map for Germany, expressing values in EURO/m2. Assets have been shown not only as cumulative layer of different types of assets (e.g. private households, industry, commerce, vehicles, agriculture, etc.), but as accessible single contributing layers as well, each of them expressing its value in EURO/m2
- **Intended use** of the maps is to **contribute to the national risk assessment in Germany**. It is a highly appreciated product as input for multi-risk and vulnerability maps
- The geographic extent covers the national territory of Germany

EMSN024: Basic European Assets Map





Legend

Assets in €/m²

predominantly residential	predominantly commercial and transport	agriculture	forest
< 250	< 100	<2	<= 2
250 - 750	100 - 500	>2	water
> 750	> 500	others	0
		0	
		> 0	

- **BEAM** – Basic European Assets Map has been provided over the whole territory of Germany

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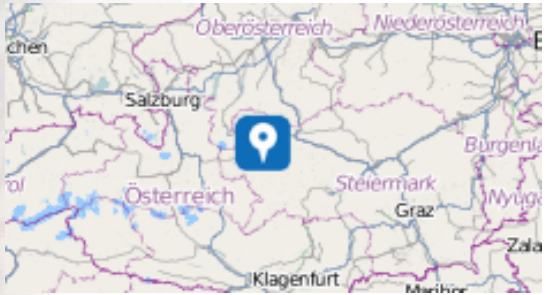
EMSN021: Earthquake risk assessment Austria – Planning and Recovery



Event Type: Earthquake
Activation Time (UTC): 2016-01-01 00:00
Activation Status: Closed
Affected Countries/Territories:
Republic of Austria
Area Descriptor: Austria
Authorized User:
Ministry of the Interior, Dep. II/13, Austria
Activation Reason:
Risk assessment and mitigation measures

- Austria is situated in a region of low to moderate seismic hazard, reported as 10% probability of ground motion exceeding 0-1-0.2 g PGA (Peak ground acceleration) in 50 years (2013-2063). Despite this moderate hazard levels the current estimation of seismic risk is high
- The service implementation, refers to the analysis of the potential impact of earthquake activity including a number of secondary hazards, namely:
  - Landslide prone areas in built-up areas
  - Flood Risk originating from upstream blocked rivers
  - Industrial Accidents

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EMSN021: Earthquake risk assessment Austria – Planning and Recovery

The specific activation focuses on the generation of:

- **Risk assessment products**: Exposure, vulnerability and risk maps
  - ✓ **Hazard**: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. In technical settings, hazards are described quantitatively by the likely frequency of occurrence of different intensities for different areas, as determined from historical data or scientific analysis
  - ✓ **Exposure**: People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses
  - ✓ **Vulnerability**: The characteristics and circumstances of a community, system or asset that makes it susceptible to the damaging effects of a hazard
  - ✓ **Risk**: Risk is the combination of the consequences of an event (hazard) and the associated likelihood/probability of its occurrence, (ISO 31010)

- **Mitigation measures proposal** with respect to all evaluated risks, evaluating and proposing adequate measures according to the encountered circumstances

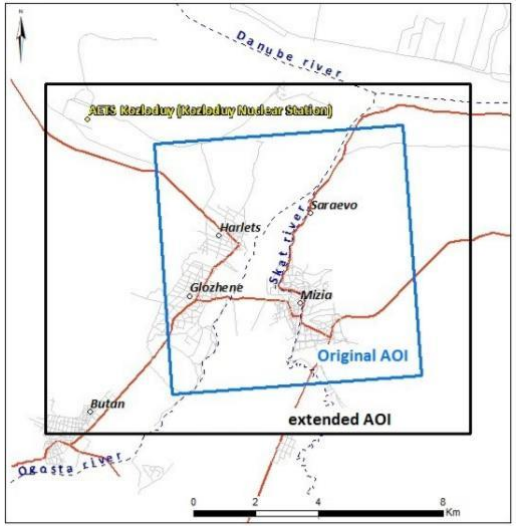
EMSN021: EXPOSURE (Population)

- Population exposure is realized in grid format of 500m, calculating the population density per grid cell
- Seismic hazard and population exposure mapping depicts the population density in grid format categorized in five different classes (Very Low, Low, Medium, High, and Very High)

EMSN021: Vulnerability

- Estimation of buildings' vulnerability
- Assessment of the seismic vulnerability of electrical, gas and oil utilities network
- The vulnerabilities have been classified in five different categories (very low, low, medium, high, very high)

EMSN022: Bulgaria: Post-disaster analysis



Event Time (UTC): 2014-07-31 00:00
Event Type: Flood
Activation Time (UTC): 2016-05-04 00:00
Activation Status: Closed
Affected Countries/Territories:
Republic of Bulgaria
Area Descriptor: Mizia town, Bulgaria
Authorized User:
Earth Observation Center (SMC), Ministry of Interior, Bulgaria

- The **objective** of the activation is to provide Post Disaster assessment of the key dynamics of the 2014 flood in the area and the resulted damages (sectorial), to elaborate Risk Assessment products and to propose Mitigation Measures
- The **area analyzed** is the Mizia town (Vratsa region), falling in the Skat River Basin, where significant surface run-off occurred in 2014 as a consequence of heavy precipitations registered from 31 July to 2 August 2014 (70 up to 220 mm. almost as much as 50%of the average annual precipitation within the Danube plain)

GLIDE NUMBER: F L - 2 0 1 4 - 0 0 0 1 1 3 - B G R

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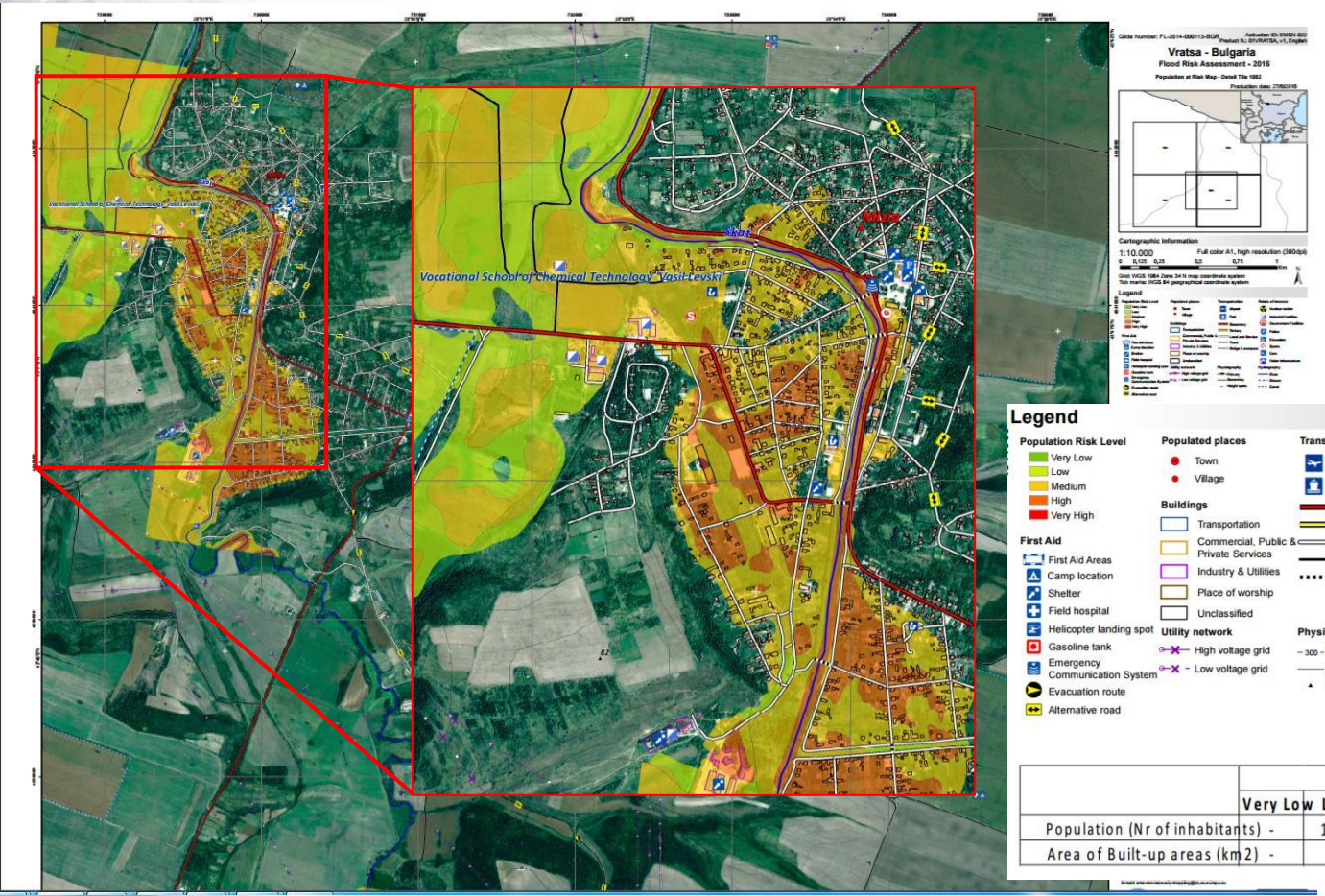
EMSN022: Population at Risk- Vratsa



- Standard (aggregation) GIS techniques were applied at the census data layer, to produce information on population at district, community & block levels
- Assets at risk identified focussing on population and infrastructures

Legend

Population Risk Level
- Very Low
- Low
- Medium
- High
- Very High

First Aid
- First Aid Areas
- Camp location
- Shelter
- Field hospital
- Helicopter landing spot
- Gasoline tank
- Emergency Communication System
- Evacuation route
- Alternative road

Populated places
- Town
- Village

Buildings
- Transportation
- Commercial, Public & Private Services
- Industry & Utilities
- Place of worship
- Unclassified

Utility network
- High voltage grid
- Low voltage grid

Transportation
- Airport
- Port
- Secondary
- Tertiary
- Local and Service
- Track
- Bridge & overpass

Physiography
- 300 - Primary
- Secondary
- Height spots

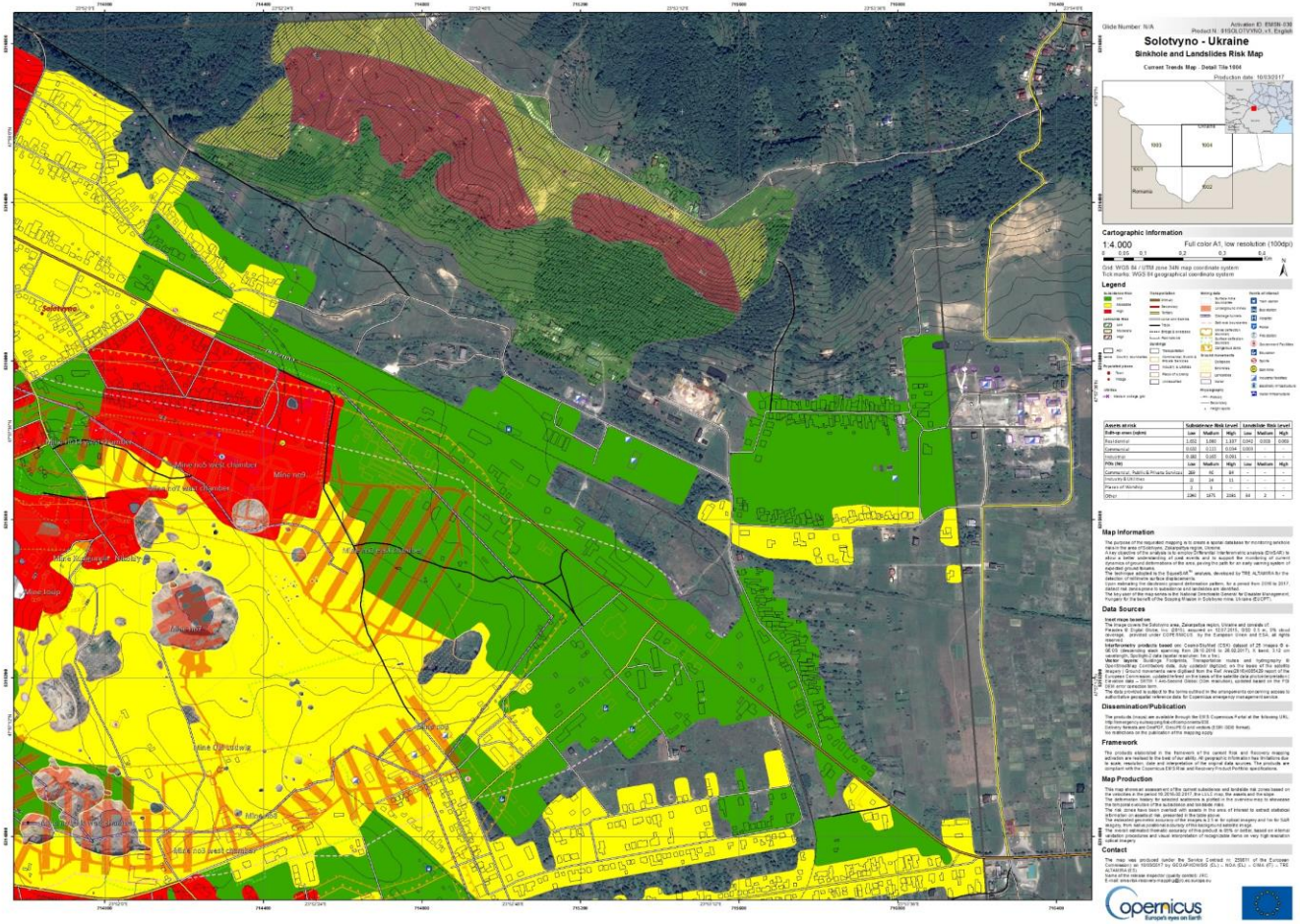
Points of Interest
- Nuclear station
- Industrial facilities
- Government Facilities
- Police
- Education
- Sports
- Dam
- Water infrastructure

Hydrography
- River
- Stream
- Canal

	Risk Level				
	Very Low	Low	Medium	High	Very High
Population (Nr of inhabitants) -		1330	2010	832	-
Area of Built-up areas (km2) -		-	0,7	0,5	-

EMSN30: Landslide and sink hole risk

Emergency Management



Emergency Management

DO NOT HESITATE!
CONTACT US FOR SUPPORT!

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