



Emergency Management

# Copernicus Emergency Management Service – *an overview*

**Attilio Gambardella, European Commission**  
**CORDiNET EO Data Access for Emergency  
Response and Disaster Risk Management  
Webinar – 23 November 2020**



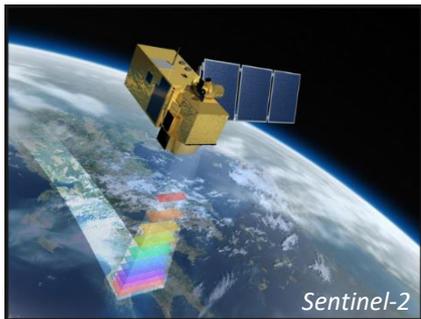


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# CEMS – A Copernicus Core Service

## Copernicus - The European Union's Earth Observation Programme Europe's eyes on Earth

### Satellite Imagery



Sentinels & ca. 30 other missions



### In-situ, reference data



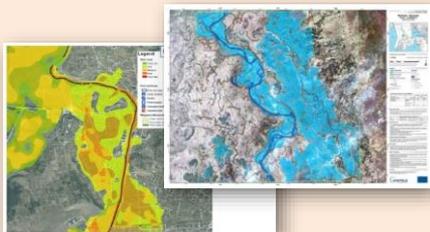


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## ON-DEMAND MAPPING

Risk & Recovery Mapping

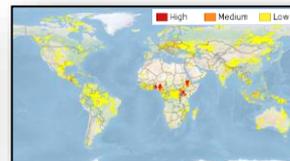
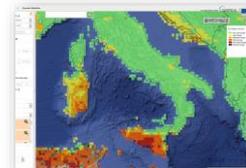
Rapid Mapping



Operational since 2012

## EARLY WARNING & MONITORING SYSTEMS

European Forest Fire Information Systems



European & Global Drought Observatory

European & Global Flood Awareness Systems





Supports all phases of the disaster management cycle:

- Warnings & risk assessments
- Information on the impact of natural and man-made disasters

Complementary to national efforts

Supporting the EU's **Emergency Response & Coordination Centre (ERCC)** in Brussels

Jointly coordinated by three Commission DGs:

- **DG DEFIS:** LEAD, overall governance, budget implementation
- **DG JRC:** technical coordination, contractual management, monitoring & quality assurance of deliverables
- **DG ECHO:** operational coordination including interface with the users & authorisation of activations





- Provides **EU-level assessments** during both **pre- and post-fire** phases
- Complements national fire information systems through the provision of **harmonised data, methods and standards**
- Expansion to global scale is ongoing (GWIS)
- **Users:** EC DGs and Services, EP, national/regional forest fire and civil protection services, FAO, UNECE, UNISDR

## Main outputs

### ➤ Fire danger forecast

- Short and long-term fire danger forecast
- Monthly and seasonal fire weather forecast

### ➤ Active fire and burnt area mapping

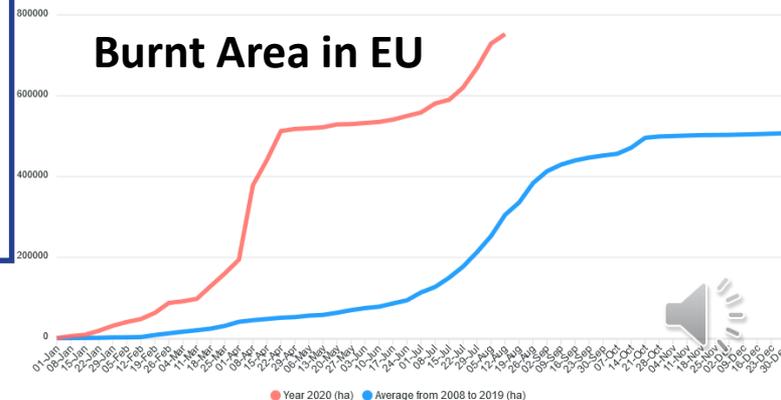
- Active fire mapping (MODIS/VIIRS/Sentinel2&3)
- Burnt area mapping:
  - 1) Medium spatial resolution (~ 300 m) near-real time (2x/day)
  - 2) High spatial resolution (~10-30 m) weekly (or bi-weekly)

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

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



Burnt Areas mapped in EFFIS (\*)





# Flood Awareness System

- **Increase preparedness** for riverine flood across Europe and **support the decision making**
- **At country level:** to provide complementary forecasts (e.g. up to 10 days, river basin wide, comparing to local forecasts, additional products)
- **At the EU level:** to provide a harmonized picture on a larger scale (Europe or global)

## Users:

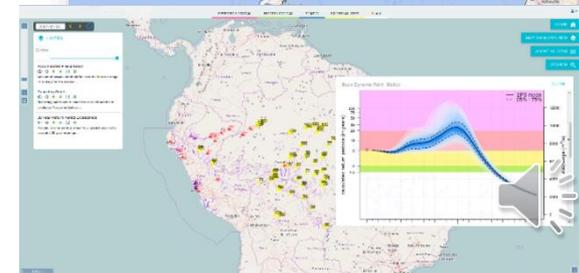
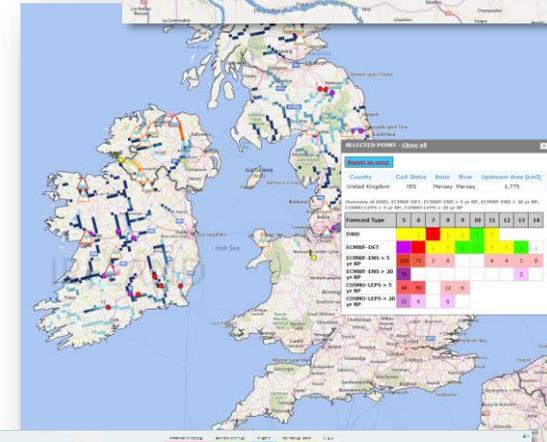
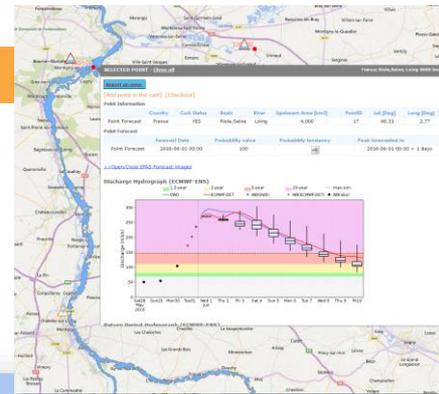
- ERCC, national/regional hydrological and civil protection services
- Development agencies, international aid organizations, private sector

## Main outputs

- River-basin wide, probabilistic, 10 (EFAS)/30 (GloFAS) day flood forecasts
- Specific additional forecast products: flash floods, seasonal outlook, impact forecasts

[www.efas.eu](http://www.efas.eu)

[www.globalfloods.eu](http://www.globalfloods.eu)





# Drought Observation System

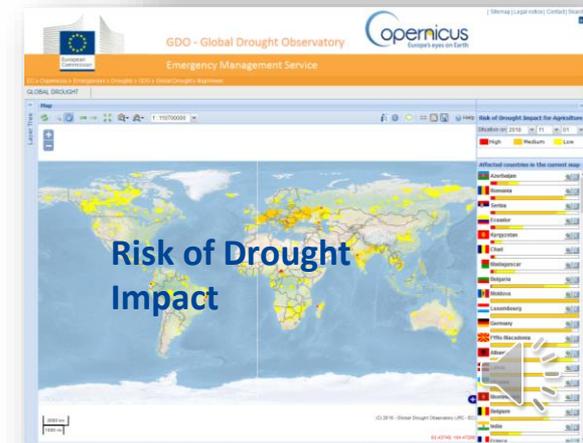
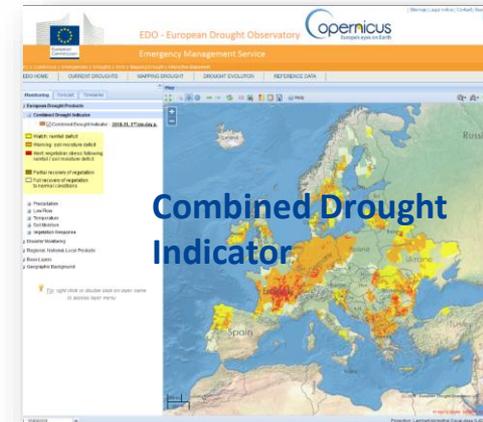
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- Monitoring (and forecasting) of drought & heat indicators (hazard, H), based on satellite, hydro-meteorological model & in-situ data
- Analysing exposure (E) and vulnerability (V) for different sectors
- Assessing the dynamic risk (R) for drought impacts in different sectors ( $R=H*E*V$ )
- Contributing to the development of a nested global drought information system (GEO) and the Integrated Drought Management Programme (WMO & GWP)

## Main outputs

- **Drought monitoring and forecasting**
  - Continuous monitoring of drought hazard at different scales
  - Medium to seasonal forecasting (under development)
- **Analysing the risk of impacts (every 10 days)**
  - Analysing the number of people and area affected
  - Warning for likely impacts in different sectors

<http://edo.jrc.ec.europa.eu> <http://edo.jrc.ec.europa.eu/gdo>





# On-Demand Mapping Modules

- Mapping of specific areas, for a specific disaster event, at user defined scales
- Available globally, for all event types

## Rapid Mapping

- 24/7/365
- Supports emergency response
- Highly standardised workflow & products
- Rapid tasking of satellite images
- Delivery in 24h (avg.), max 5 days
- Uses only EO data
- <https://emergency.copernicus.eu/mapping/list-of-activations-rapid>



**Emergency Response**

## Risk & Recovery Mapping

- During working hours
- Supports preparedness & recovery activities
- Delivery in 15 days (standard products) or 2 months (tailored studies)
- Uses EO and other data
- <https://emergency.copernicus.eu/mapping/list-of-activations-risk-and-recovery>



**Preparedness, Prevention, Recovery**



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# Rapid Mapping Product Portfolio

PRE-EVENT

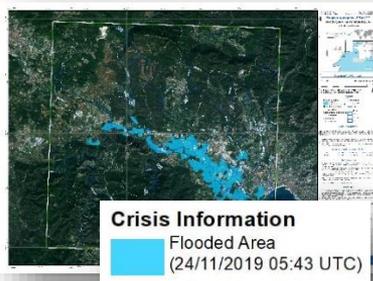
Reference (10h\*)



Pre-volcanic eruption in the Philippines, 2019 (EMSR418)

POST-EVENT

First Estimate (2h\*)

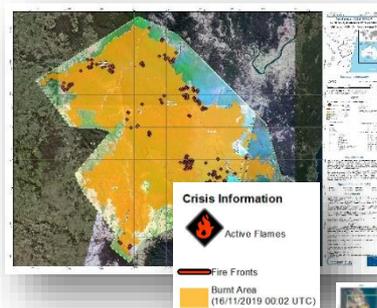


Flood delineation in France, 2019 (EMSR411)

Delineation (7h\*)

Grading (10h\*)

Delineation

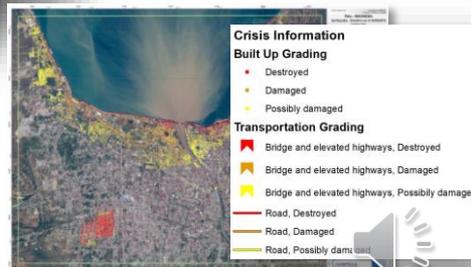


Wildfires Australia, 2019 (EMSR408)

Monitoring

Monitoring

Detailed damage assessment



\* Production time after image reception

1° impact info delivery within **24h** from user request

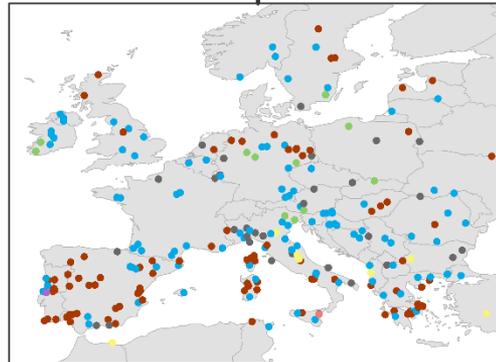
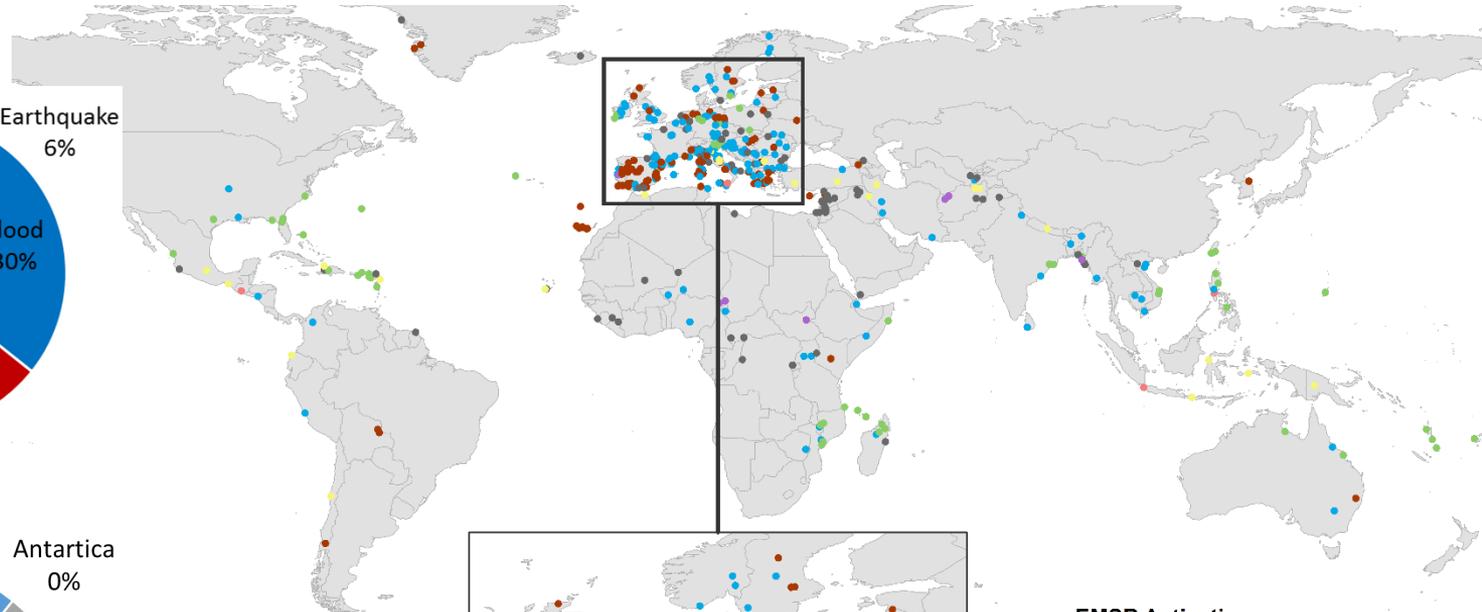
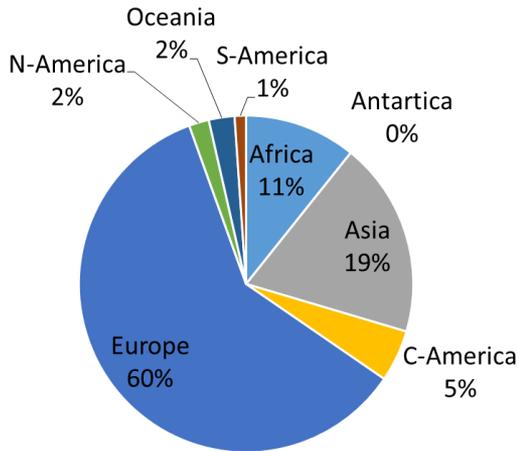
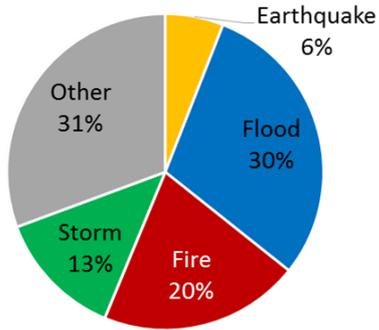


Earthquake & Tsunami in Indonesia, 2018 (EMSR317)



# Rapid Mapping Activations 2012 - 2019

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## EMSR Activations (03-2012 - 08-2020)

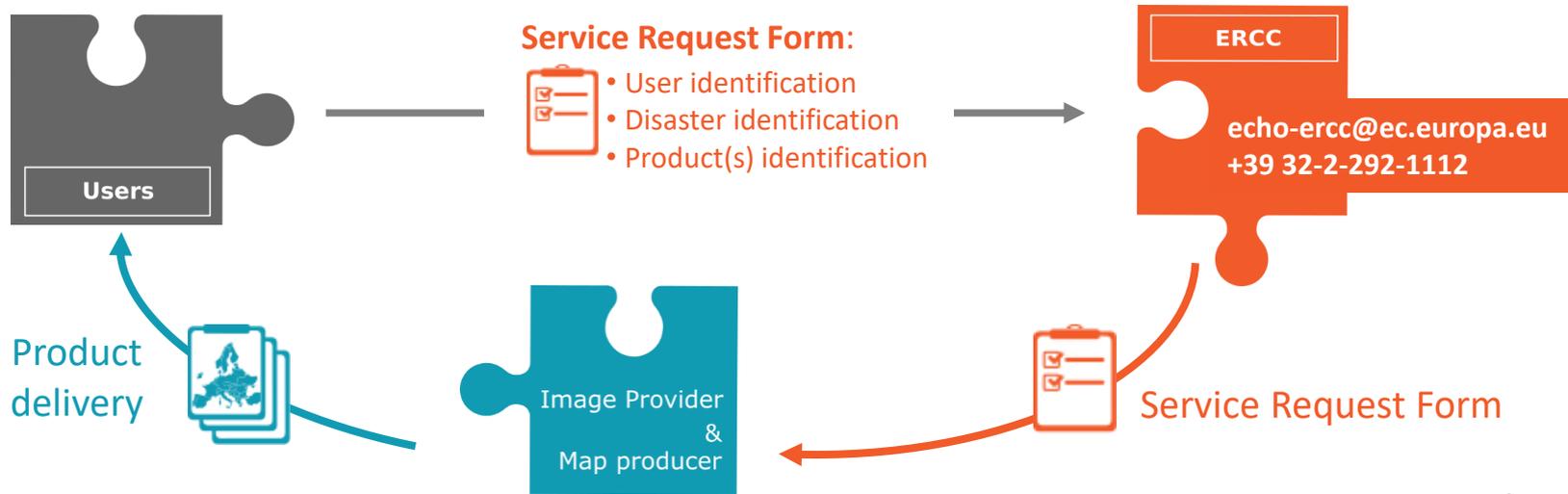
- Flood
- Wildfire
- Storm
- Earthquake
- Volcanic activity
- Humanitarian
- Other





# Workflow for On-Demand Mapping

- Direct activation only by **Authorised Users** (Civil Protection):
  - 31 focal points: 27 EU MS + Norway + Iceland + UK + EC Services + EEAS
- Not-authorized users incl. international users can activate through the EU's Emergency Response Coordination Centre (**ERCC**)



<https://emergency.copernicus.eu/mapping/ems/how-use-service>



## Risk & Recovery Mapping (RRM)

- On-demand service
- Serves prevention, preparedness, disaster risk reduction, reconstruction, recovery
- Not constrained by the need for rapid delivery
- Service is customised to suit the user requirements specific to each activation
- Product delivery in days/weeks
- Is more dependent on the integration of relevant ancillary layers





## RRM – framework contracts

RRM FLEX (complex activations)	RRM STD (standard activations)
<p>Tailor made Through specific contracts (weeks) Covers all phases of the emergency-disaster cycle</p> <ul style="list-style-type: none"><li>• Prevention, Preparedness, recovery</li></ul> <p>Disaster risk information (hazard, exposure, risk)</p>	<p>Selected list of standardized products</p> <ul style="list-style-type: none"><li>• With max AOI</li><li>• Fixed scales</li><li>• Agreed methodology</li></ul> <p>Rapidly triggered (days) Early recovery phases after response phase Does not cover pre disaster risk assessment</p>



# RRM STANDARD - product overview

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P1



P2



P3



P4



P5



P6



P7



P8



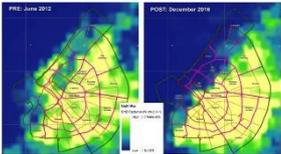
P9



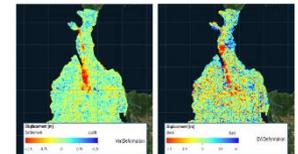
P10



P11



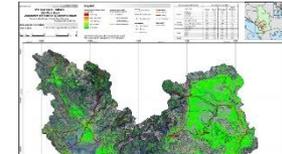
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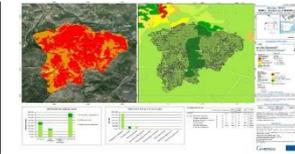
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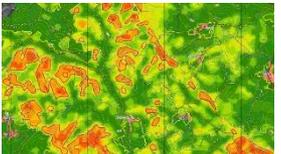
P14



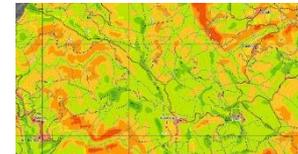
P15



P16



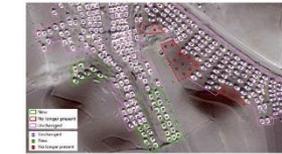
P17



P18



P19



P20





P6



**TEMPORAL ANALYSES  
OF OCCURRED FLOOD  
EVENTS**



## FLOODS

P4



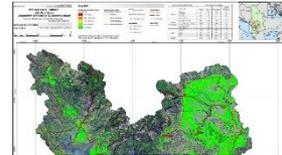
**FLOOD  
DELINEATION**

P5



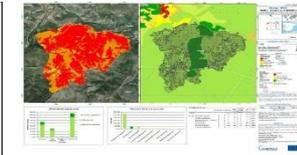
**MODELED FLOOD  
EXTENT FOR  
MAJOR EVENTS**

P14



**IMPACT  
ASSESSMENT/  
EXPOSURE ANALYSES  
ON ASSETS AND  
POPULATION**

P15



**IMPACT ASSESSMENT/  
EXPOSURE ANALYSES  
ON SELECTED ASPECT**



# FOREST FIRES

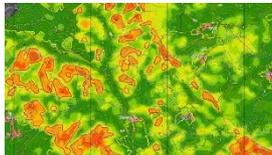


P7



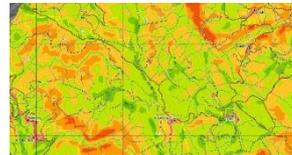
**WILDFIRE  
DELINEATION AND  
GRADING**

P16



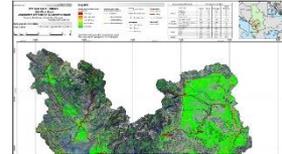
**POST-DISASTER  
SOIL EROSION RISK  
ASSESSMENT**

P17



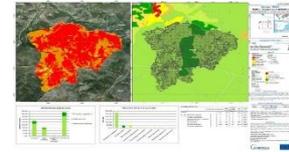
**POST-DISASTER  
LANDSLIDE RISK  
ASSESSMENT**

P14



**IMPACT  
ASSESSMENT/  
EXPOSURE ANALYSES  
ON ASSETS AND  
POPULATION**

P15



**IMPACT ASSESSMENT/  
EXPOSURE ANALYSES  
ON SELECTED ASPECT**



# DAMAGE / IMPACT ASSESSMENT



**P8**  
DETAILED DAMAGE  
ASSESSMENT  
ANALYSES OVER  
AFFECTED AREAS

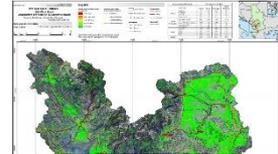


**P9**



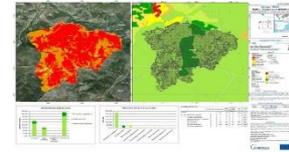
**RECONSTRUCTION  
MONITORING**

**P14**



**IMPACT  
ASSESSMENT/  
EXPOSURE ANALYSES  
ON ASSETS AND  
POPULATION**

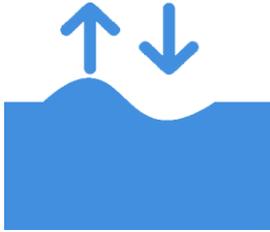
**P15**



**IMPACT ASSESSMENT/  
EXPOSURE ANALYSES  
ON SELECTED ASPECT**

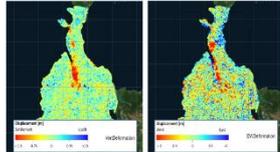


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# GROUND DEFORMATION ANALYSES

P12



GROUND DEFORMATION  
ANALYSES



## Public Portal

- Info about the modules
- Activation details
- Access to products

## Activation Viewer

- Access to vector products

<https://activations.emergency.copernicus.eu/>

<https://emergency.copernicus.eu/mapping/>

**COPERNICUS**  
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Home | What is Copernicus | Early Warning System | News

LATEST NEWS • 2020-08-04  
Copernicus Emergency Management Service maps post-cyclone recovery activities in the South Region

**EMERGENCY Copernicus Emergency Management Service - Mapping**

A service in support of European emergency response

**RAPID MAPPING**

- List of Activations
- Map of Activations
- GeoRSS Feed
- Online Manual

**RISK AND RECOVERY**

- List of Activations
- Map of Activations
- GeoRSS Feed

**OTHER**

- Map of Activations of Other Organizations
- Meetings, Workshops
- Citation Guidelines
- Citations

Map above displays only latest Copernicus EMS - Mapping Activations. To see a Map of All Activations, go to section Map of Activations in Rapid Mapping or in Risk and Recovery Mapping sub-menus respectively.

Act. Code	Title	Act. Date	Type	Country/Terr.
EMSR451	Flood in Bavaria, Germany	2020-08-04	Flood	Germany
EMSR450	Flood in Vietnam	2020-08-03	Flood	Vietnam
EMSR449	Wildfire in L'Aquila, Italy	2020-07-31	Wildfire	Italy



- <https://www.copernicus.eu/en>
  - <https://www.copernicus.eu/en/access-data>
    - <https://www.copernicus.eu/en/access-data/conventional-data-access-hubs>
      - Space data
      - Service Information
      - Services portfolios search tools
    - <https://www.copernicus.eu/en/access-data/dias>
      - DIAS



- Space data
  - [ESA](#)
    - [Sentinels](#)
      - <https://scihub.copernicus.eu/>
    - [Contributing Missions](#)
      - <https://spacedata.copernicus.eu/web/cscda/home>
  - EUMETSAT
    - Sentinels
      - <https://coda.eumetsat.int/>
      - <https://www.eumetsat.int/website/home/Data/DataDelivery/EUMETCast/index.html>



- Service Information

- Services Portfolios Search Tool
  - <https://services-portfolios.copernicus.eu/>
- Land
  - <https://land.copernicus.eu/>
- Marine
  - <http://marine.copernicus.eu/>
- Atmosphere
  - <https://atmosphere.copernicus.eu/>
- Climate Change
  - <https://climate.copernicus.eu/>
- Emergency
  - <https://emergency.copernicus.eu/>
- Security
  - <https://www.copernicus.eu/en/services/security>



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Thank you!

