

GEO WEEK 2018

KYOTO, JAPAN

Monday 29 October, 14.00-18.00

Earth Observations for Disaster Risk Reduction

The BEYOND EO Center of Excellence for Disaster Risk Reduction

Alexia Tsouni
BEYOND EO Center of Excellence
National Observatory of Athens

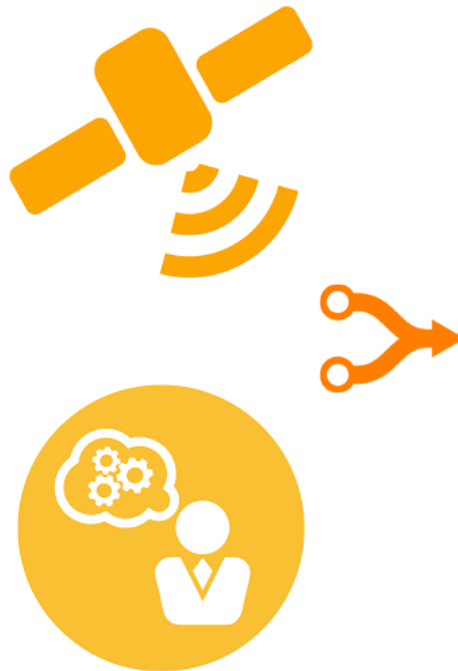
The logo for BEYOND, featuring the word "BEYOND" in a bold, blue, sans-serif font. The letter "Y" is stylized with a white satellite dish or antenna shape integrated into its structure.

Side event organised by the GEO Secretariat

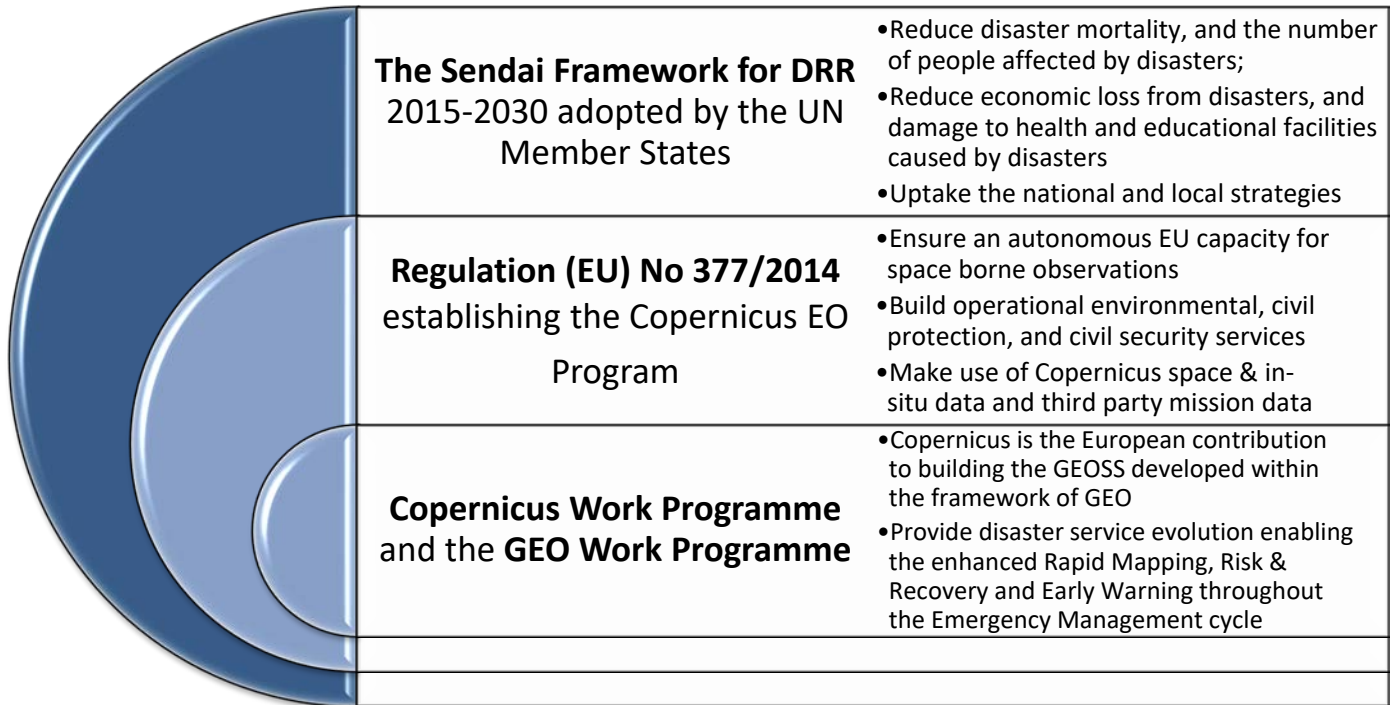
The continuous provision of **useful, accurate and timely information** through coordinated and sustained **Earth Observation** together with INSPIRE data, Copernicus, and GCI information

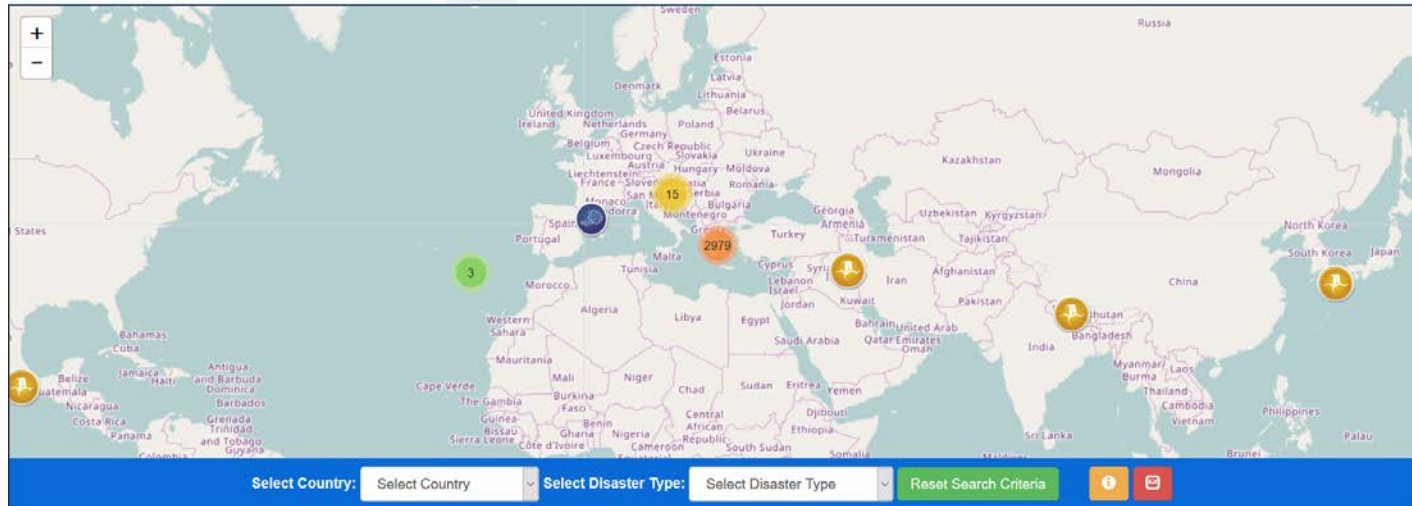
is a **key enabler**

for **informed decision making**, in response to regional challenges and towards the achievement of the **UN SDGs** and the implementation of relevant **EU Directives**.



Relevant Political framework linking EO with Disaster Risk Reduction





The BEYOND Center of Excellence develops research and provides EO-based disaster management services addressing priorities and needs from South Eastern Europe to worldwide. The Center's creation was supported by EU FP7-REGPOT-2012-2013-1 and costed 2,3 Meuros.

<http://beyond-eocenter.eu/>

Support for Emergency Response and Emergency Support at Global Level



Fire Brigades / Civil Protection : Real Time Support for Early Warning, Damage Monitoring, and Damage Mapping and Assessment

General Directorate of Rehabilitation (Ministry of Infrastructures and Transport) : Early warning, and timely assessment of damages at VHSR in cases of Earthquake disasters, fires, and floods

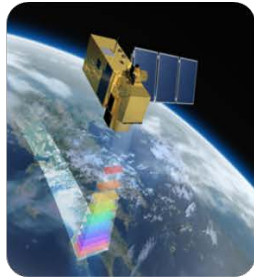
General Directorate of Forest and Natural Ecosystem Protection (Ministry of Environment and Climate Change): Detailed damage mapping due to fire hazards, and risk assessment for land sliding, and soil erosion, and flooding in damaged areas

Forestry Services over the Globe: Damage assessment of peri-urban fire occurrences at VHSR for land protection against illegal use

Local Authorities: In multi hazard assessment and monitoring (e.g. toxic cloud dispersion, dust circulation, heat waves)



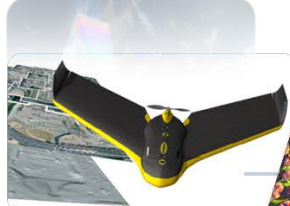
Monitoring Systems



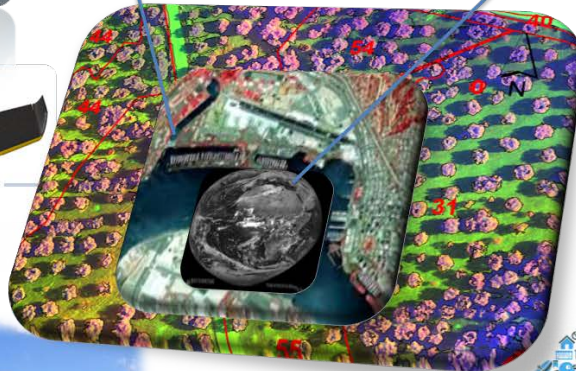
Polar orbit satellites
X-/L-band Station
Sentinel Mirror Site



Geostationary orbit satellites
MSG Seviri

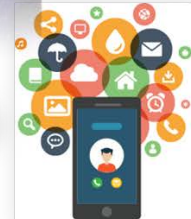


UAVs



in-situ

In-situ platforms & networks





BEYOND SATELLITE ACQUISITION FACILITIES 3RD PARTY MISSIONS

Polar orbit satellites, X-/L-band - 300TB Archive, Operation 24/7
EOS AQUA, TERRA, SUOMI NPP, NOAA/AVHRR, METOP, FY.

Operates two **MSG acquisition stations of DVB-S & DVB-S2 systems**

Exploit high throughput provided with the new EUMETCast Europe service, based on using the EUTELSAT 10A

part of EUMETSAT's network



BEYOND GEOSYNCHRONOUS SATELLITE ACQUISITION FACILITIES 3RD PARTY MISSIONS

3 geostationary satellites MSG1-2-3
Data collection per 5 minutes



SENTINEL IMAGE PROCESSING TOOLBOX

Sentinel Image Processing Toolbox Overview and Description Text.

[View the Sentinel Processing Toolbox User Manual](#)

NOA Hellenic National Sentinel Data Mirror Site Team

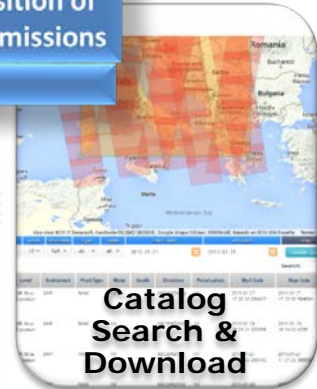
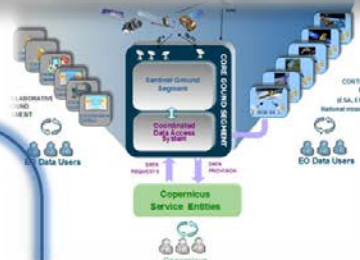
NOA Official Prof. Katerina E. Tsipoula, President of NOA
Scientific Coordinator Dr. Iyona Kollmitzer, Research Director
Webmaster: IFSI, Vasiliki Terziou, Research Associate
Development: IFSI, Vasiliki Terziou, Research Associate
Curator: IFSI, Vasiliki Terziou, Research Associate



Last Updated: 03 March 2015
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NOA Web Site: www.noa.gr
NOA4SIS Web Site: www.noa4sis.gr
Contact Us

BE OND

Operates the 1st Collaborative Ground Segment (**Hellenic Sentinel Data Hub- Mirror Site**), allowing near real time acquisition of S-1, S-2, S3, and future S5P satellite missions
Empowered by GRNET SA/GEANT

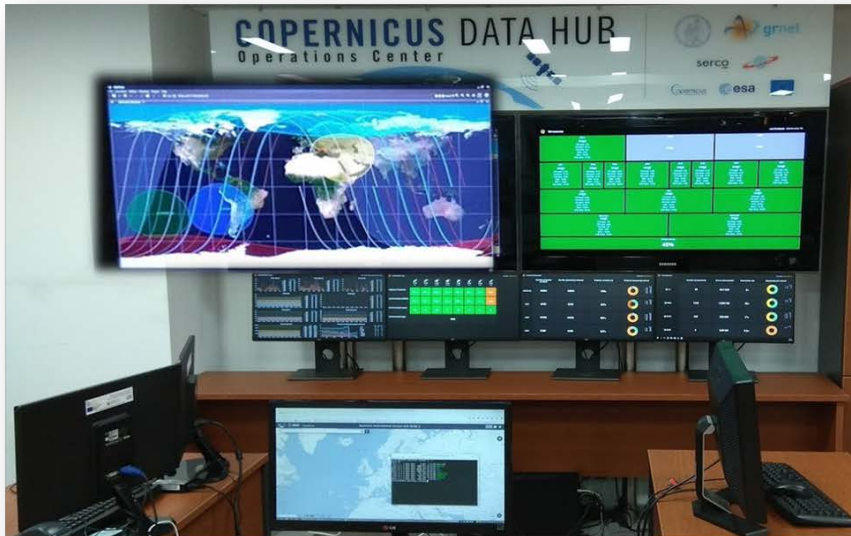


<http://sentinels.space.noa.gr>

**BEYOND OPERATES
COPERNICUS ACQUISITION
FACILITIES:
THE HELLENIC MIRROR SITE**

Distributes 150-200 GB/day
Operates non-stop 24/7/365
Powered by GRNET/GEANT
Network Speed 150-200 Mbps

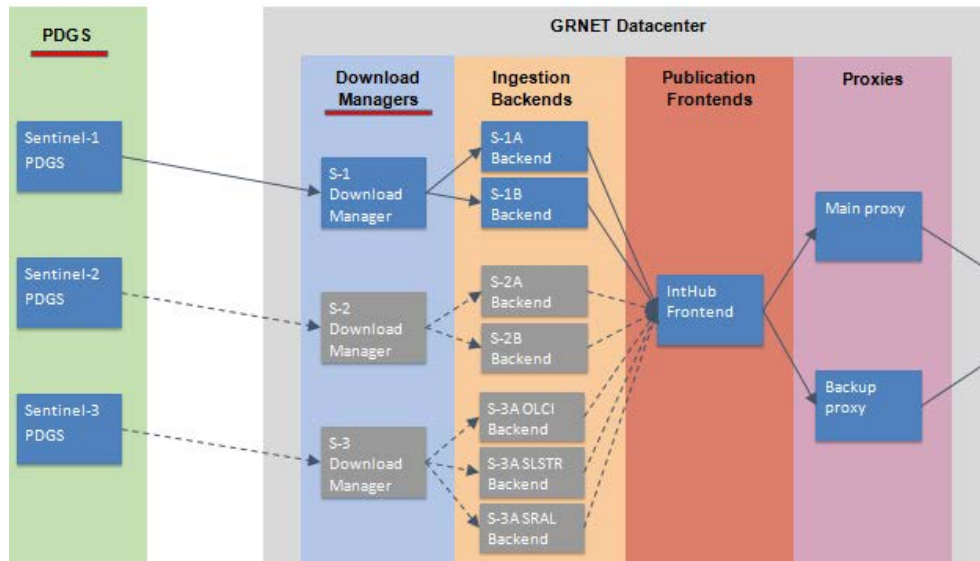
International Sentinel DataHub



COPERNICUS DATA HUB
Operations Center



Distributes 55 TB/day
Operates non-stop 24/7/365
Powered by GRNET/GEANT
Network Speed 500-700 Mbps



58 Virtual Machines:

- ~1 TB RAM
- ~530 virtual CPUs
- ~4.5 TB disk storage



A **550 TB** network filesystem for storing **> 500 thousand** Sentinel products at any time

- INTHUB #1
- COLHUB #3
- DIASHUB #3
- AfricaCastHub
- S-5p PreOps Hub
- S-5p Expert Users Hub
- TMPHUB #1
- HNSDMS

COPERNICUS DATA HUB
Operations Center



- InSar based Crust deformation mapping
- Small scale deformation rates - PS SAR Processing
- Landslide modeling
- Earthquake modeling
- Volcanic/Lava modeling
- Soil/Coastal Erosion models

GeoHub Services

- Fire spread modeling
- Fire risk analysis
- EO Active Fire Mapping
- EO Burn Scar Mapping (Rapid/Seasonal)

FireHub Services

- Dust circulation modeling
- Smoke dispersion modeling
- Toxic gases dispersion modeling (industrial accidents)

AirHub Services

- EO based Flood Mapping
- Flood Modeling
- Hydraulic Modeling

FloodHub Services



The role of the BEYOND EO Center of Excellence in the European EO Programme Copernicus for emergency management worldwide: Prevention - Preparedness - Risk Assessment - Response - Mitigation



- Regulation (EU) No 377/2014 - Copernicus
- Copernicus Work Programme
- Sendai Framework (UN) for Disaster Risk Reduction 2015-2030

COPERNICUS
Emergency Management Service

Home | What is Copernicus | EMS - Mapping | EMS - Early Warning System

LATEST NEWS - 2017-03-08 | [EHSN038] Post-disaster situation analyses of flood and landslides in Lima, Peru

EMS - MAPPING

- Service Overview
- Who can use the service
- How to use the service
- Products: Rapid Mapping
- Products: Risk and Recovery
- Quality control / Feedback
- User Guide

RAPID MAPPING

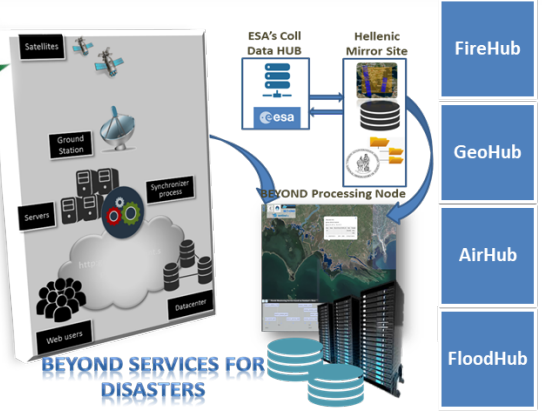
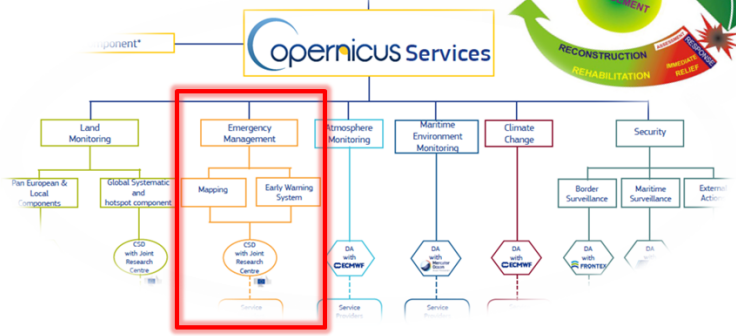
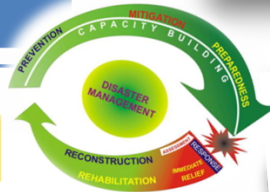
- List of Activations

List of EMS Risk and Recovery Mapping Activations

Title	Event Type	Event Date (UTC)	Affected Countries
Corcans	Drought	Start date	Afghanistan
	Epidemic	Start date	Algeria
	Extreme temperature	E.g. 2017-10-08	Australia
	Humanitarian	End date	Austria
	Infection	End date	Bangladesh
	Mass movement	E.g. 2017-10-08	Belgium
			Berlino

Act. Code Title Country/Terr. Feed

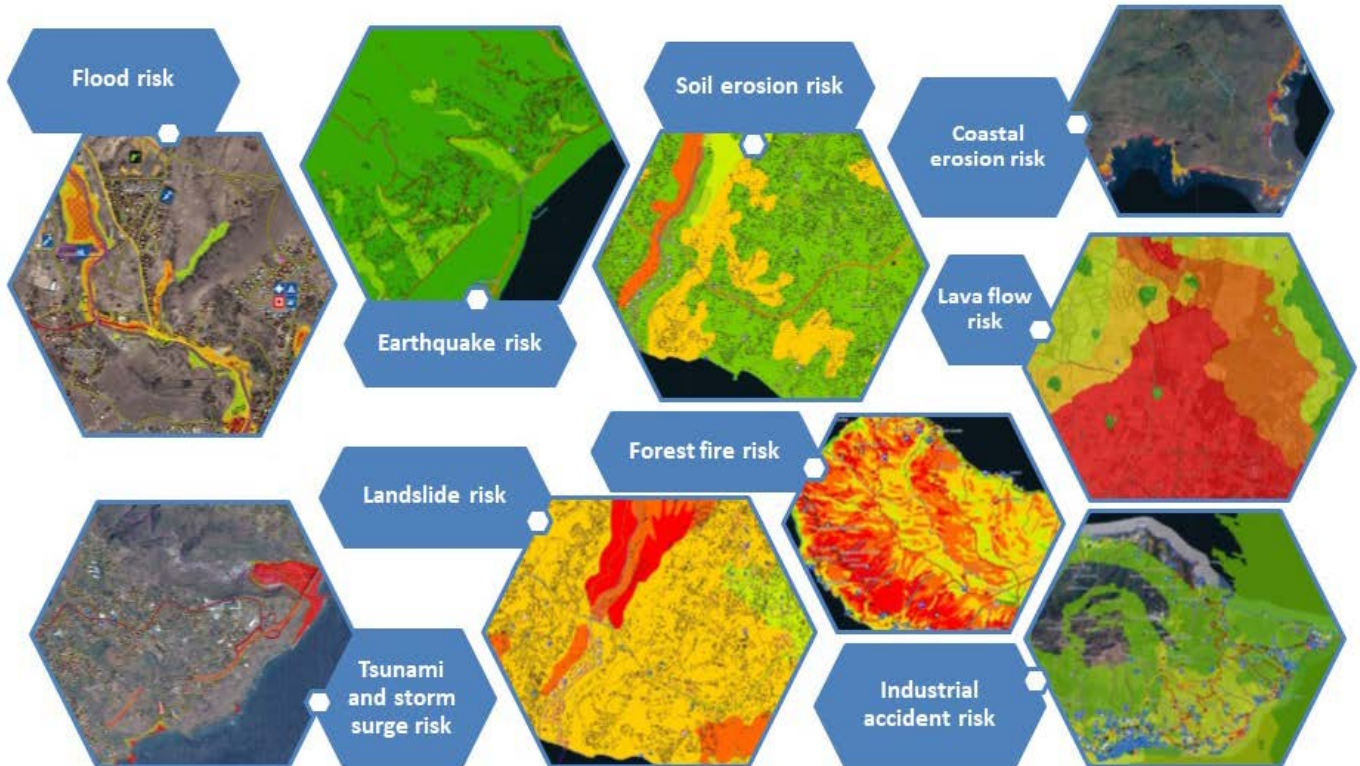
EHSND43	Tsunami risks assessment in Southern Italy	Italy	
EHSND41	Forest fire risks assessment in Croatia	Croatia	
EHSND40	Nation-wide asset mapping Finland	Finland	



COPERNICUS EMERGENCY MANAGEMENT SERVICE



COPERNICUS EMERGENCY MANAGEMENT SERVICE



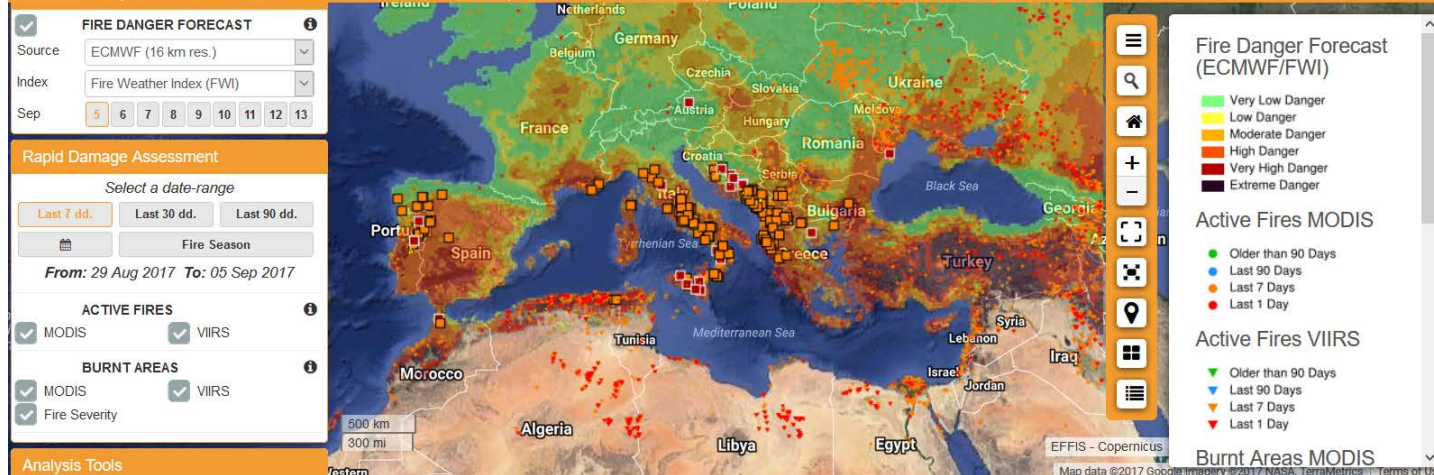


COPERNICUS

Emergency Management Service



European Commission > JRC EU Science Hub > DRM > Copernicus EMS > EFFIS > Applications > Current Situation Viewer



BEYOND WITHIN COPERNICUS EMS PROVIDES ACTIVE FIRES & BURNED AREA MAPS DAILY OVER EUROPE, N. AFRICA, M. EAST, BALKANS

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Centre of Excellence for EO-based monitoring of Natural Disasters

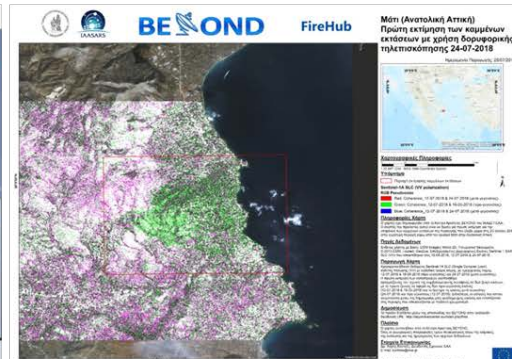
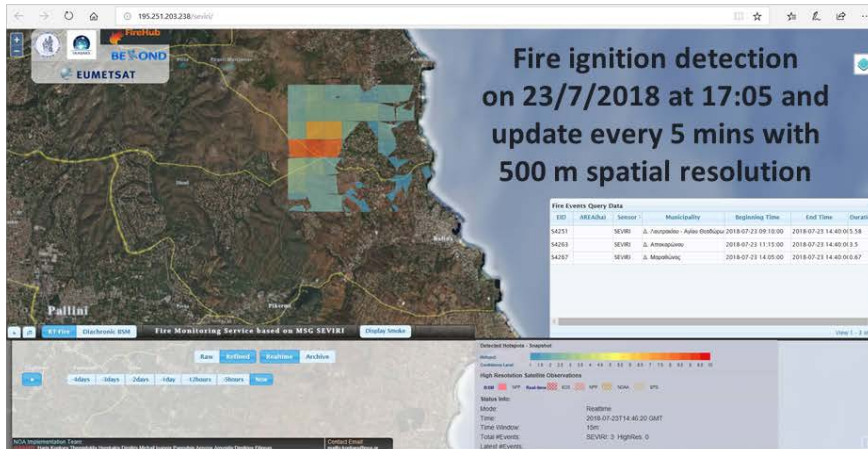
FireHUB



**Lethal fire (99 casualties)
on 23/7/2018 in Mati,
Attica region, Greece**



Near-real-time fire monitoring and burnt areas mapping using remote sensing (satellite & airborne)



Burnt areas mapping using satellite images Sentinel-1A (pre- and post-)

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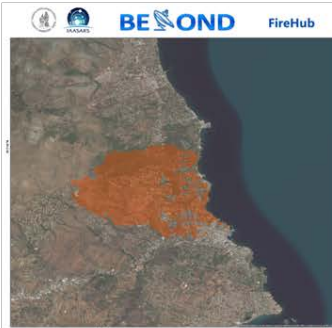
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**1st burnt areas mapping (1300 ha)
using satellite images LANDSAT-7 ETM
(pre-) & LANDSAT-7 ETM, SENTINEL-
3A, SENTINEL-2 (post-)**



**2nd burnt areas mapping (1260 ha)
using satellite image WORLDVIEW-3
(30 cm spatial resolution)**



**3rd burnt areas mapping using
airborne image UAV Falcon
(3,5 cm spatial resolution)**

Flood events are the world's most frequent natural disasters affecting a large number of people and assets.

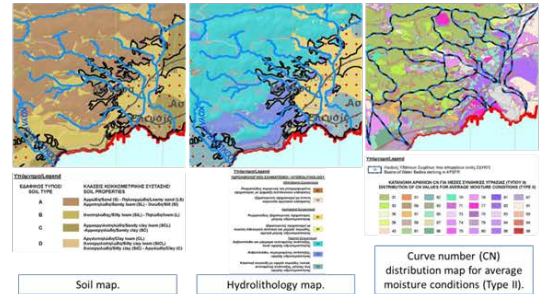
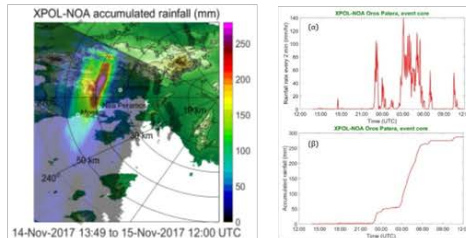
During the past 30 years, flooding killed more than 200,000 people and affected more than 2,8 billion others worldwide.



Lethal flood (24 casualties) on 15/11/2017 in Mandra, Attica region, Greece



Flood monitoring using remote sensing (satellite & airborne), in-situ data, modelling, and **crowdsourcing**



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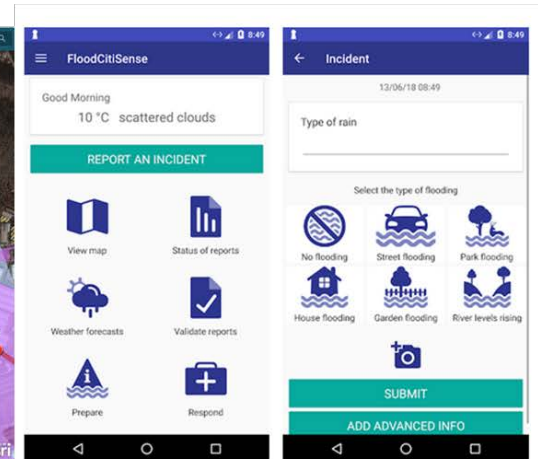
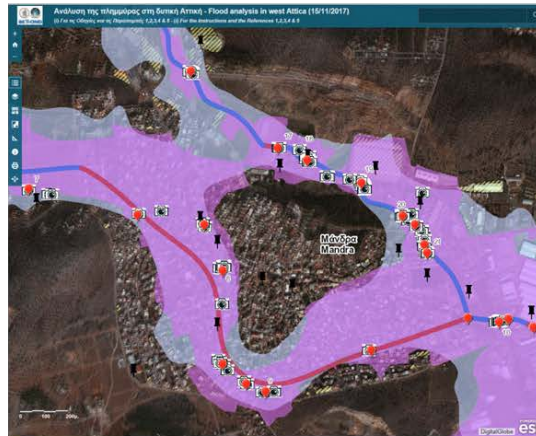


FloodHUB



SMURBS
ERA-PLANET


FloodCitiSense





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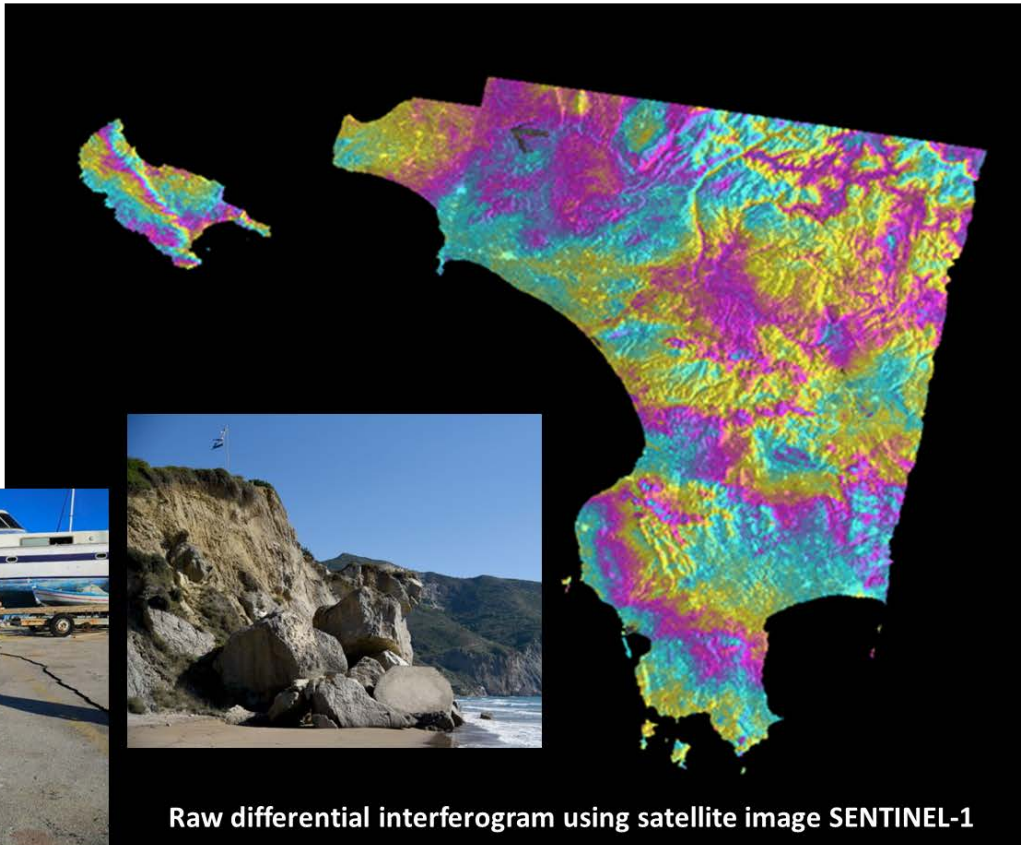


GeoHUB



**Earthquake M6.6 on
25/10/2018 in Zakynthos
island, Ionian sea, Greece**

**Near-real-time spatial
deformation mapping
using remote sensing
(satellite)**



Raw differential interferogram using satellite image SENTINEL-1

thank you!

BE  OND

Centre of Excellence for EO-based monitoring of Natural Disasters

<http://www.beyond-eocenter.eu/>

