European Commission

Copernicus EMS in support of crisis preparedness and response operations

Guenter Strunz
Linda Tomasini
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Copernicus Emergency Management Service

Copernicus
Europe's eyes on Earth

Space

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What are the Emergency Management Services?

European Commission

COPERNICUS

Emergency Management Service

Copernicus Europe's eyes on Earth

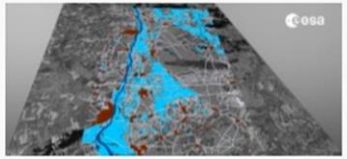
Copernicus Emergency Management Service

Copernicus Emergency Management Service (Copernicus EMS) provides information for emergency response in relation to different types of disasters, including meteorological hazards, geophysical hazards, deliberate and accidental man-made disasters and other humanitarian disasters as well as prevention, preparedness, response and recovery activities. Three modules constitute the Copernicus EMS:

Copernicus EMS - Mapping

The Copernicus EMS - Mapping addresses, with worldwide coverage, a wide range of emergency situations resulting from natural or man-made disasters. Satellite imagery is used as the main datasource. The service covers in particular:

- Floods
- Tsunamis
- Earthquakes
- Landslides
- Fires
- Severe Storms
- Volcanic eruptions
- Technological disasters
- Humanitarian crises



0:00 / 1:22

Copernicus EMS - Mapping

European Flood Awareness System

The European Flood Awareness System (EFAS) is the first operational system that monitors and forecasts flood events across Europe. It provides its partners (national/regional authorities, as well as the European Commission's Emergency Response Coordination Centre) with a wide range of complementary, added value flood early warning information including related risk assessments up to 10 days in advance.

European Flood Awareness System

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

Company General Use

The Copernicus Emergency Management Service components

Rapid Mapping

Delivery of maps soon immediately following a catastrophic events

Risk and Recovery Mapping

Delivery of maps within weeks or months to support recovery, disaster risk reduction, prevention, and preparedness

Early Warning & Monitoring

Flood alerts, wildfire danger predictions and near-real time monitoring of wildfire impacts

Copernicus EMS - components

Mapping

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

Company General Use

Emergency Management

What is Copernicus EMSMapping Services?

Industrial accident

Other

Flood

Fire

Storm

Volcanic eruption

Landslide

Earthquake

Rapid Mapping

On-demand and fast provision of geospatial information immediately following an emergency event

Risk and Recovery Mapping

Analyses delivered within weeks or months, in support of recovery, disaster risk reduction, preparedness and prevention

- 5 years of un-discontinued H24/365 operations
- 306 RM activations and 54 RRM
- More than 40 worldwide Users organizations triggering
- Providing support in more than 50 different Countries worldwide
- More than 3000 maps delivered

Company General Use

Emergency Management

Which type of maps and when?

Rapid Mapping -RM

- **Reference maps:** baseline for generating post-emergency products
- **Delineation maps (with monitoring option)** outline the extent of the area affected by the event.
- **Grading maps** assessment of the impact caused by the disaster.
- **Activation Extent Map** atlas of the maps produced

Risk and Recovery Mapping - RRM

- **Reference maps** comprehensive knowledge of the territory and exposed assets and population
- **Pre-disaster situation maps** up-to-date thematic information for contingencies on areas vulnerable to hazards
- **Post-disaster situation maps** for use beyond the immediate response phase, to assess recovery needs, long-term impact of the disaster event, progress in reconstruction efforts

Service Level 1 (SL1)

- Reference maps: 9 h
- Delineation and Grading maps: 12 h Service

Service Level 5 (SL5)

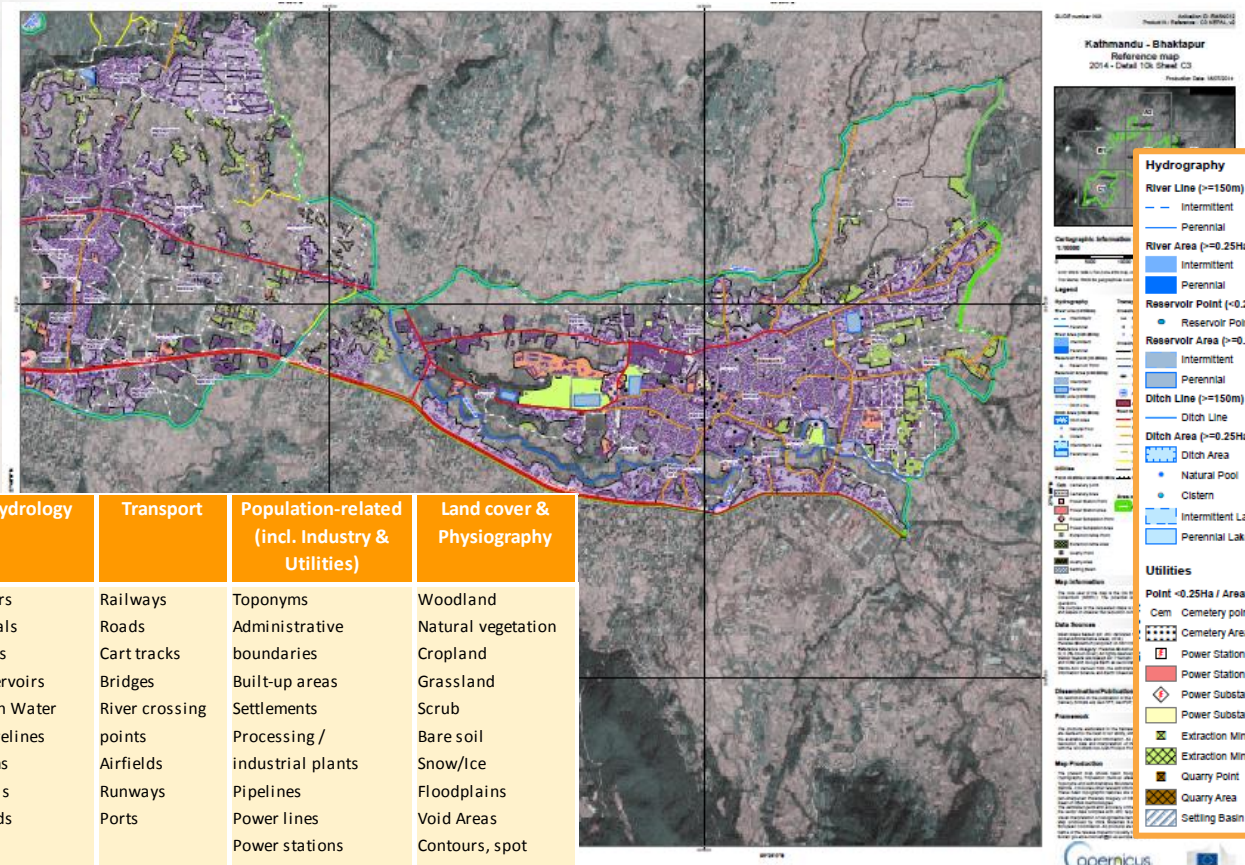
All map types typically in 5 working days

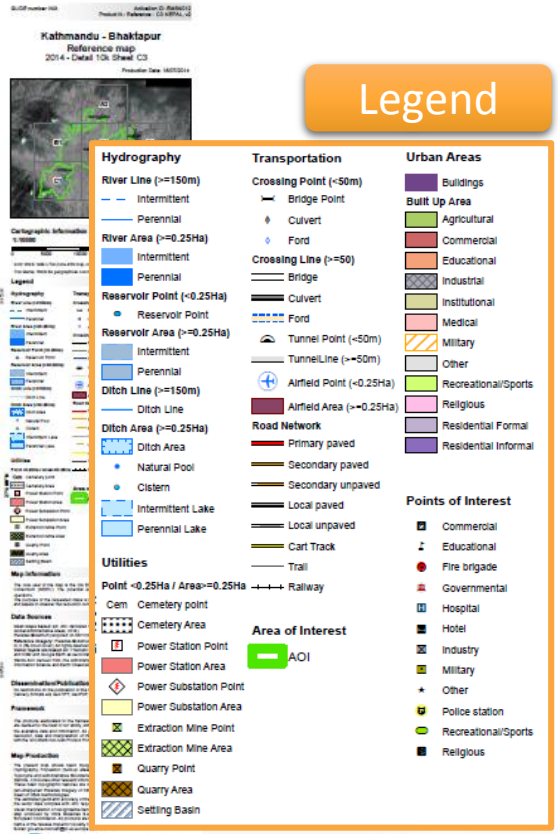
Multilingual support

Translation of relevant cartographic elements of the maps in official EU languages

Company General Use

Reference Map

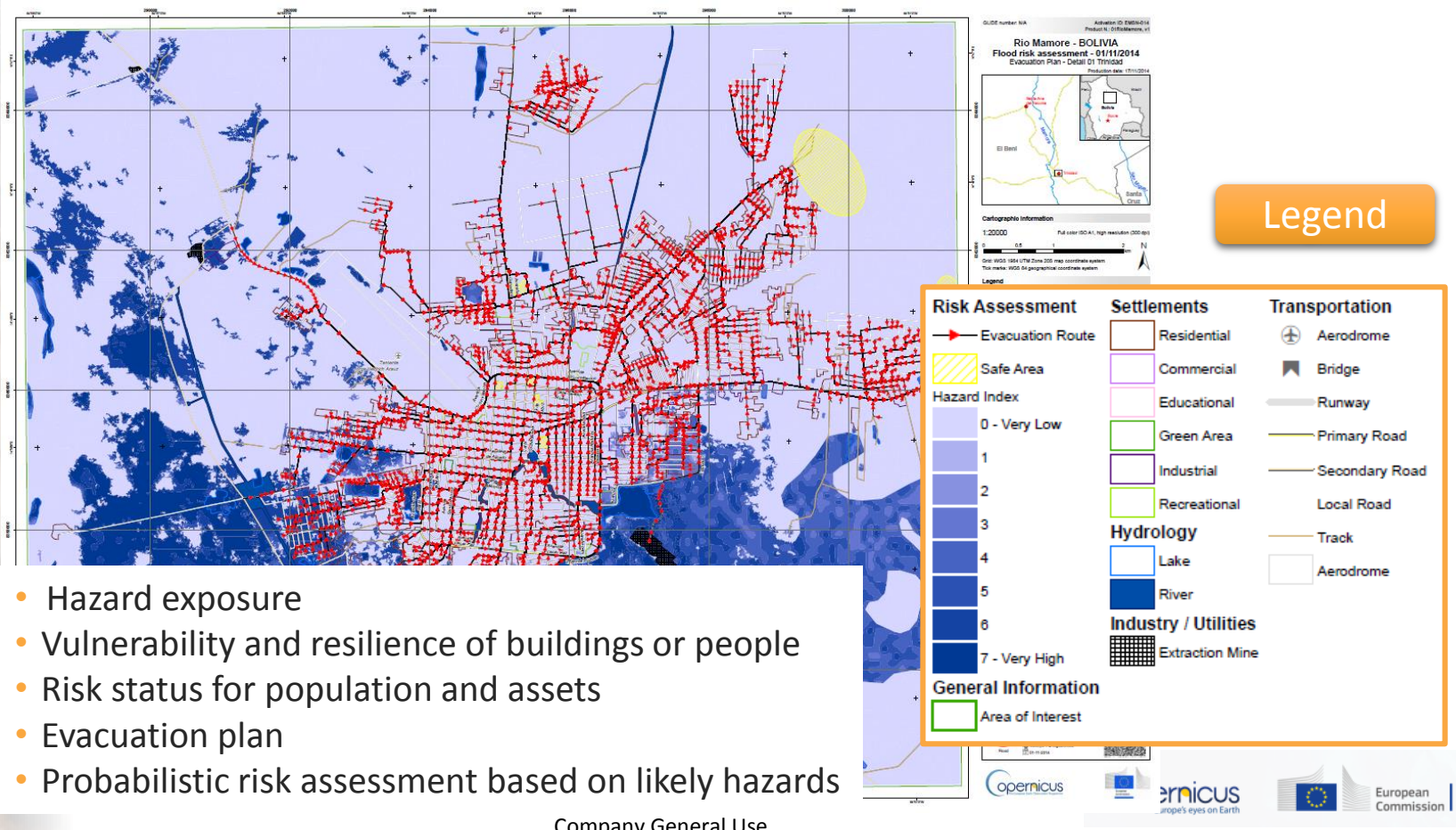




Typical key features

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

RRM Pre-Disaster Situation Map



Legend

Application examples

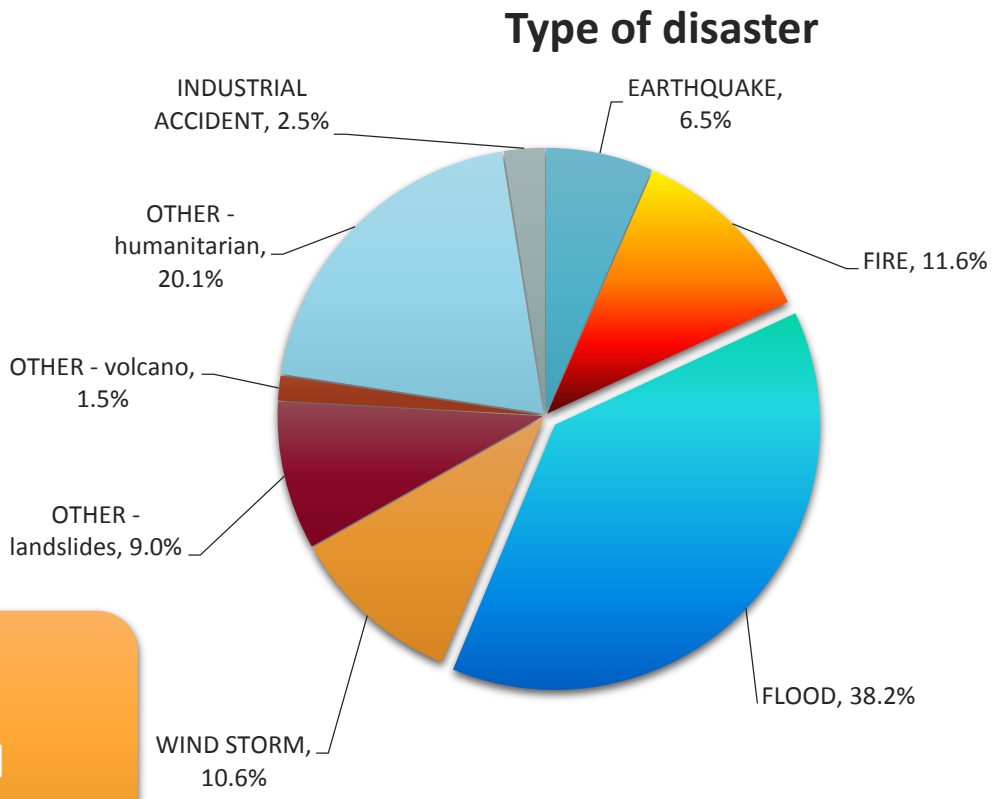
- Hazard exposure
- Vulnerability and resilience of buildings or people
- Risk status for population and assets
- Evacuation plan
- Probabilistic risk assessment based on likely hazards

Emergency Management

R M Grading Map

EMS Rapid Mapping (RM) figures

153 RM activations



Copernicus EMS Mapping currently activated for Hurricane Florence and Typhoon Mangkhut

Company General Use

Emergency Management

Who can use the Service?

There are three distinct user categories:

- **Authorized Users** may trigger the service directly to the European Response Coordination Centre (ERCC)
  - National Focal Points (NFPs) in EU Member States and in countries participating in the European Civil Protection Mechanism as well as EC Services (DGs) and the Situation Room of the EEAS.
- **Associated Users** must go through the Authorized Users to trigger the service
  - local, regional and other public entities
  - International Governmental Organisations (e.g. UN agencies, World Bank), and National & International Non-Governmental Organisations
  - entities and institutions within the EEAS sphere such as EU Delegations, the INTCEN, the EU Satellite Centre
- **General Public Users** are not authorised to trigger the service, but can be informed of an activation request through the web portal

Emergency Management

Copernicus EMS - components

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EARLY WARNING
- Floods: EFAS
- Forest Fires: EFFIS

CONTINOUS ALERTS

EFFIS

Company General Use

Operational EFFIS components

1. Fire danger forecast

2. Active fire and burnt area mapping

Applications

Current Situation Viewer
Long-term seasonal fire weather forecast
Long-term monthly fire weather forecast
Fire History
Fire News
Data request Form
Data and services

European Commission

COPERNICUS
Emergency Management Service

Copernicus Europe's eyes on Earth

European Commission > JRC EU Science Hub > DRM > Copernicus EMS > European Forest Fire Information System (EFFIS)

About EFFIS | Reports and Publications | Applications | Partners

Welcome to EFFIS

The European Forest Fire Information System (EFFIS) supports the services in charge of the protection of forests against fires in the EU countries and provides the European Commission services and the European Parliament with updated and reliable information on wildland fires in Europe.

A number of specific applications are available through EFFIS:

Since 1998, EFFIS is supported by a network of experts from the countries in what is called the Expert Group on Forest Fires, which is registered under the Secretariat General of the European Commission. Currently, this group consists on experts from 40 countries in European, Middle East and North African countries. In 2015, EFFIS became one of the components of the Emergency Management Services in the EU Copernicus program.

The link to some of the most widely used applications is provided below. Additional applications such as the extension of EFFIS to the global level into a Global Wilfire Information System (GWIS) are available through the side "Applications" box.

Current Situation

The most up to date information on the current fire season in Europe and in the Mediterranean area. This includes today meteorological fire danger maps and forecast up to 6 days, daily updated maps of hot spots and fire perimeters.

Fire News

A selection of news from the press on wildland fires in Europe updated daily by the EFFIS team. News can be browsed for specific countries selected by the user from the news map.

New feature

Make your specific requests of data by the new
Data Request Form

Visit the brand-new
Global Wildfire
Information System
Viewer

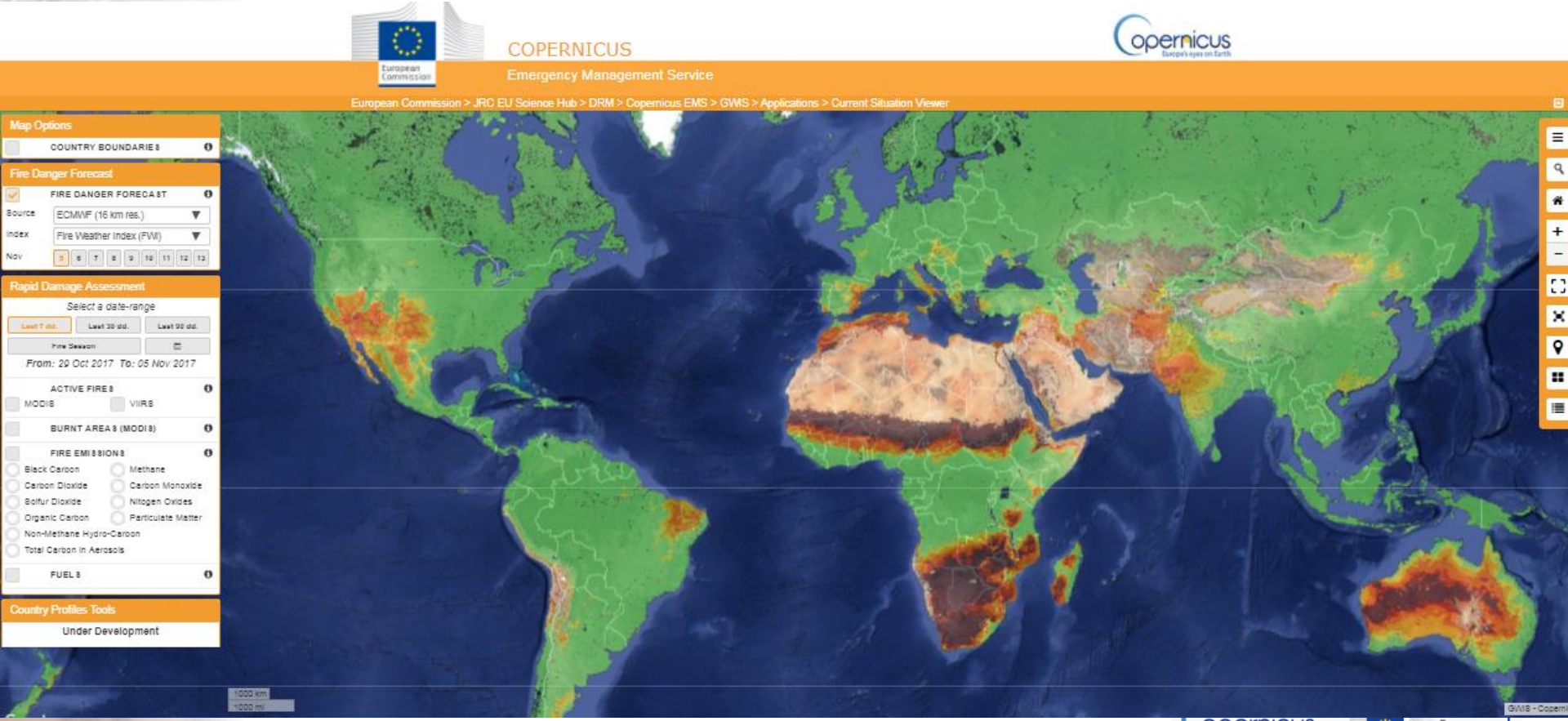
EFFIS Damage Assesment

EFFIS Burned Area (ha)
Total EU28 Countries
Mapped: (% Forest)
Estimated:
Total EFFIS Coverage
Mapped:
Estimated:

(Updated daily)

RDA Disclaimer and layer information

Global Wildfire Information System



Emergency Management

Copernicus EMS - components

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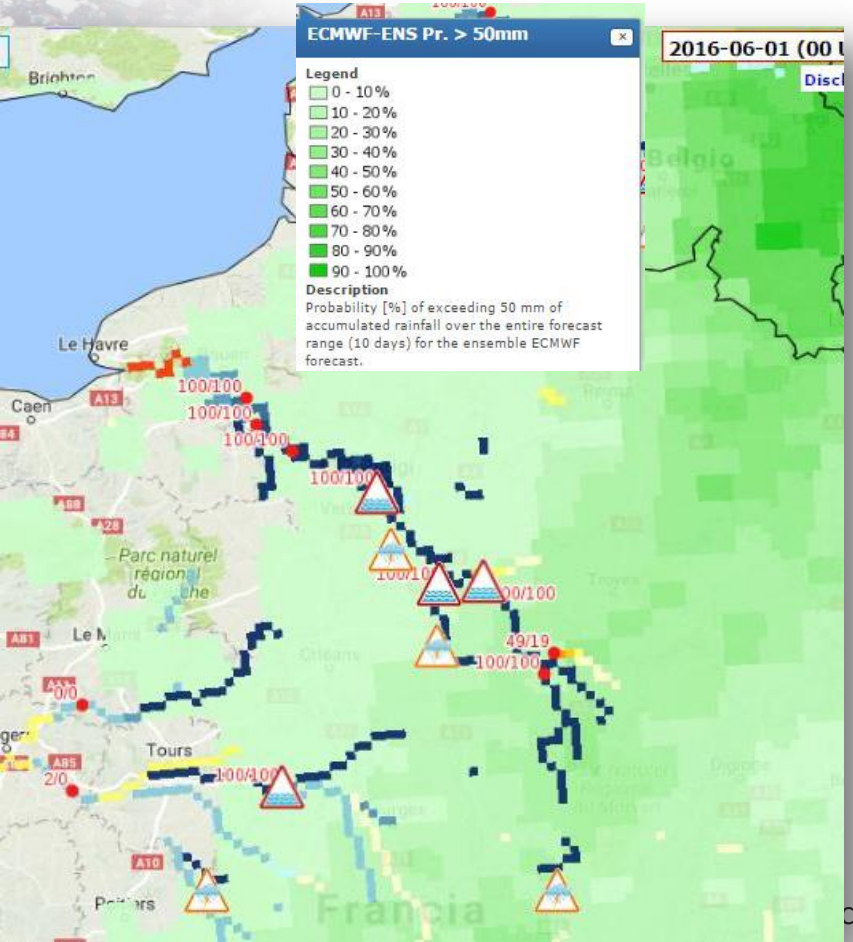
CONTINOUS ALERTS

EFAS

Company General Use

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)

Copernicus EMS - components

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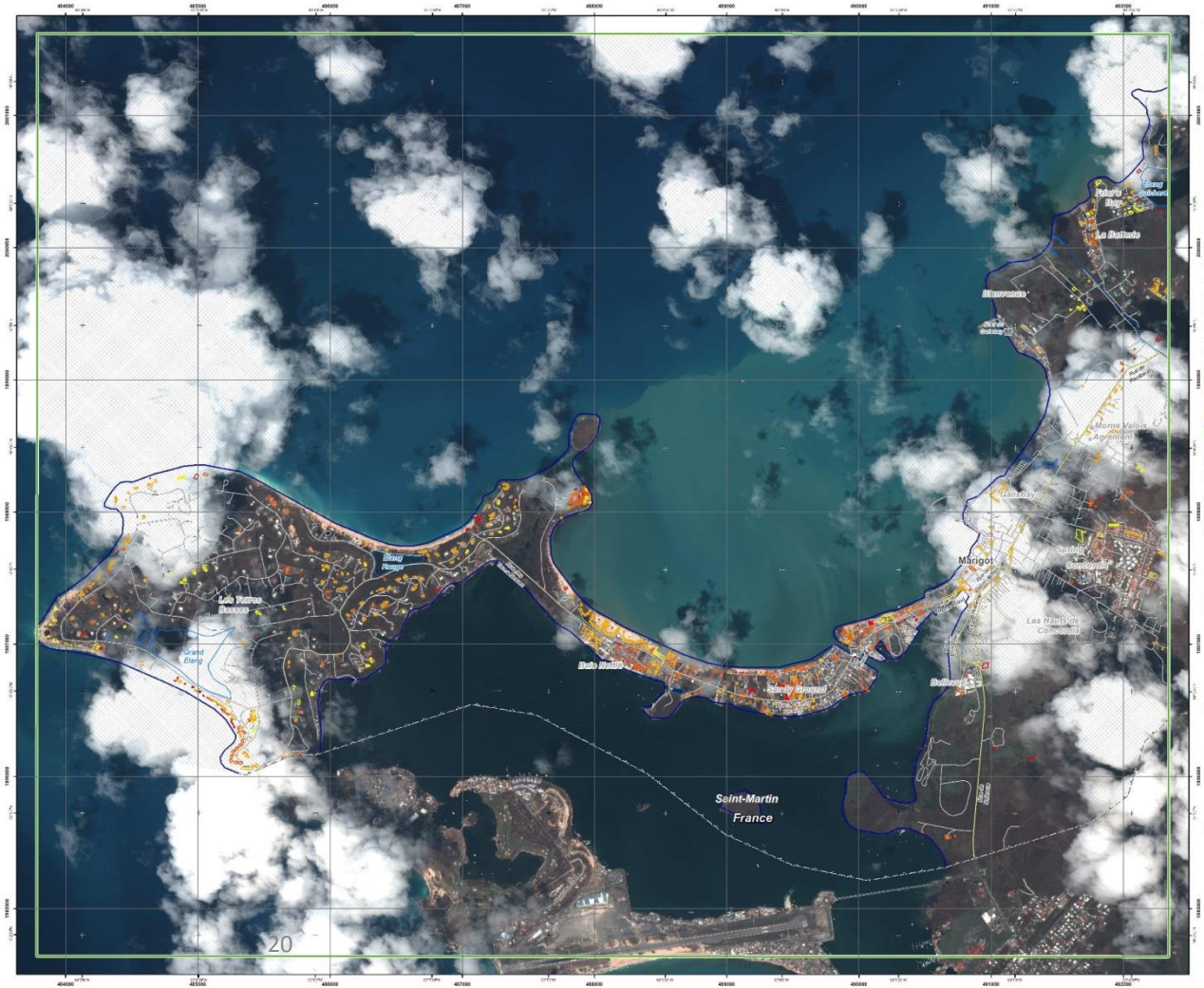
CONTINOUS ALERTS

Company General Use

Sandy Ground, Saint-Martin
Image Pléiades Pleine résolution
AVANT Irma : 12/02/2017

Sandy Ground, Saint-Martin
Image Pléiades Pleine résolution
APRES Irma : 10/09/2017

Pléiades © 2017 CNES, distribution Airbus Defense and Space



GLIDE number: N/A

Activation ID: EMSR232
Product N.: 04MARIGOT, v1, English

Marigot - SAINT MARTIN (FR.)

Wind storm - Situation as of 10/09/2017

Grading Map - MONIT01

Cartographic Information

1:13000 — Full color ISO A1, medium resolution (200 dpi)

0 — 0.25 — 0.5 — 1 km

N

Grid: WGS 1984 UTM Zone 20N map coordinate system
tick marks: WGS 84 geographical coordinate system

Legend

Crisis Information

Building Grading
- Destroyed
- Highly Damaged
- Moderately Damaged
- Negligible to slight damage

General Information
- Area of Interest
- Clouds

Administrative boundaries
- International Boundary

Settlements
- Populated Place

Hydrology
- Coastline
- Stream
- Lake

Transportation
- Bridge
- Harbour
- Primary Road
- Secondary Road
- Local Road

Consequences within the AOI

Infrastructure	(m) of measurement	Destroyed	Highly damaged	Moderately damaged	Negligible to slight damage	Total affected	Unit in AOI
Affected infrastructure	**No. of assets**	**DS**	**DH**	**DM**	**DN**	**DT**	**UNIT**
Settlements	Destroyed	No.	0	0	0	0	0
	Damaged	No.	0	0	0	0	0
	Contracted	No.	0	0	0	0	0
	Inaccessible	No.	0	0	0	0	0
	Recreational	No.	7	10	175	1	186
	Industrial	No.	0	0	0	0	0
	Medical	No.	0	0	0	0	0
	Administrative	No.	0	0	0	0	0
Transportation	Bridge	No.	0	0	0	0	0
	Harbour	No.	0	0	0	0	0
	Primary roads	km	0	0	0	0	0.7
	Secondary roads	km	0	0	0	0	7.6
	Local roads	km	0	0	0	0	0.0

Map Information

Hurricane Irma has been upgraded to a powerful category five storm as warnings have been issued for several Caribbean islands.
The hurricane that sustained winds of up to 280km/h, Irma is projected to hit the islands, causing storm surges, life-threatening winds and torrential rain.

The present map shows the damage grade assessment in the area of Marigot (Saint Martin, FR.). The thematic layer has been derived from post event satellite images by means of visual interpretation. The estimated geometric accuracy is 5 m CE90 or better, from native positional accuracy of the background satellite image.

Relevant date records

Event	06/09/2017	Irma starts as cat	10/09/2017
Activation	05/09/2017	Map production	11/09/2017

Data Sources

Reference image: Pleiades-1B© CNES (2017), distributed by Airbus DS (acquired on 10/09/2017 at 14:34 UTC, GSD 0.5 m, approx. 0% cloud coverage in Act. 28.4° off-nadir angle), provided under COPERNICUS by the European Union and ASI, all rights reserved.
Post-event image: Pleiades-1B© CNES (2017), distributed by Airbus DS (acquired on 06/09/2017 at 14:54 UTC, GSD 0.5 m, approx. 30% cloud coverage in Act. 10.2° off-nadir angle), provided under COPERNICUS by the European Union and ASI, all rights reserved.
Post-event image: Pleiades-1B© CNES (2017), distributed by Airbus DS (acquired on 10/09/2017 at 14:40 UTC, GSD 0.5 m, approx. 25% cloud coverage in Act. 28.4° off-nadir angle), provided under COPERNICUS by the European Union and ASI, all rights reserved.

Base vector layers: OpenStreetMap © OpenStreetMap contributors, Wikimapia.org (accessed 2013), entered by the producer.
Inset: Natural Earth 2012, © EuroGeographics, Natural Earth 2012, GGM River DB © KUHNICROSS (accessed 2013).

Disclaimer

Products elaborated in this Copernicus EMS Rapid Mapping activity are realised to the best of our ability, with a very short time frame, optimising the available data and information. All geographic information has limitations due to scale, resolution, date and interpretation of the original sources. The map and the information contained are derived from satellite data without in situ validation. No liability concerning the contents or the use thereof is assumed by the producer and by the European Union.
Map produced by e-GEOS released by SERTIT (ICOS).

For the latest version of this map and related products visit:
http://emergency.copernicus.eu/EMSR232

cc: erms-support@ec.europa.eu
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For full Copyright notice visit http://emergency.copernicus.eu/mapping/terms-the-copernicus-ems-mapping-portal

Copernicus — Europe's eyes on Earth

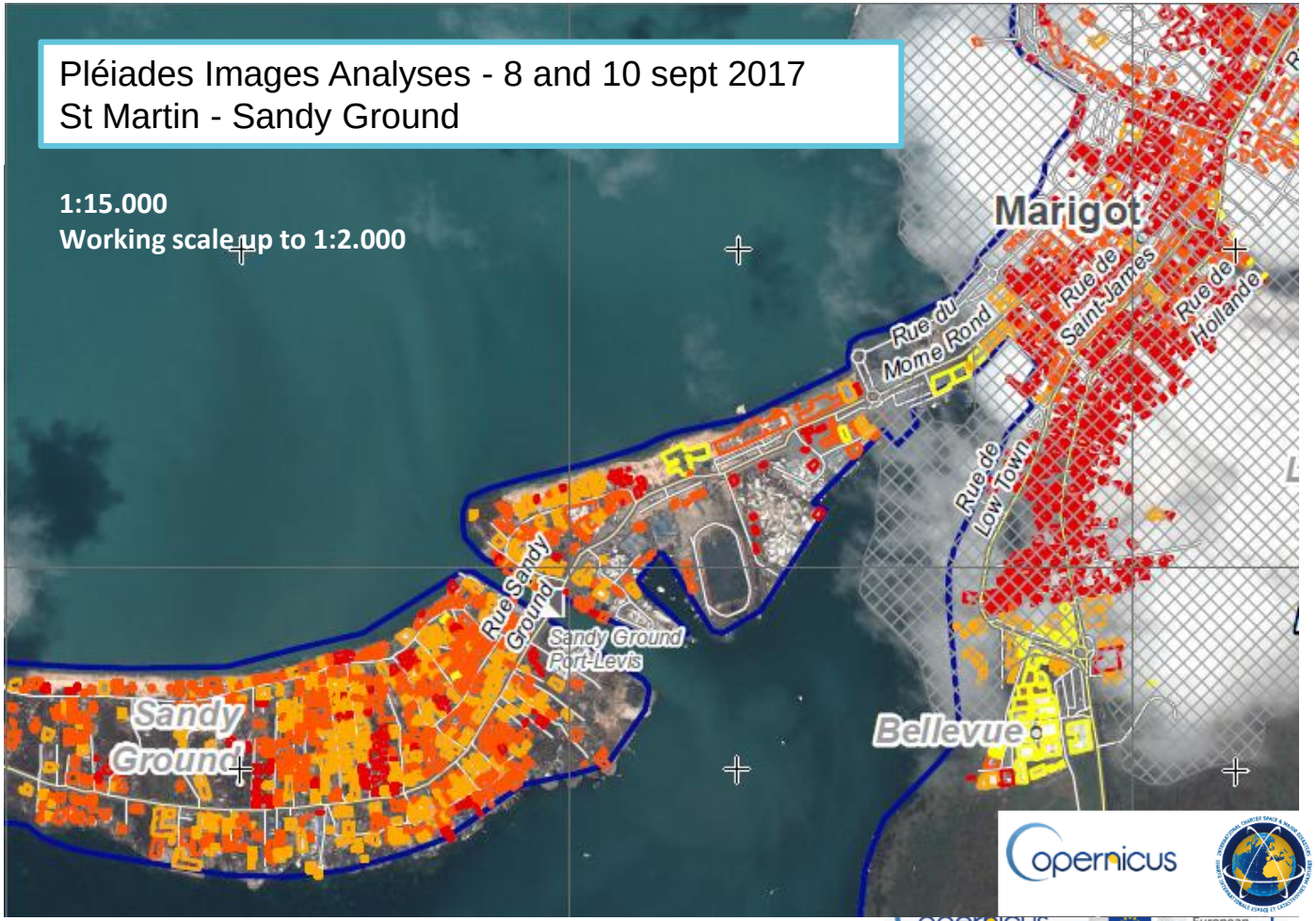
Emergency Response

6 to 8 hours production after satellite image reception

Emergency Response

Pléiades Images Analyses - 8 and 10 sept 2017
St Martin - Sandy Ground

1:15.000
Working scale up to 1:2.000



Legend

Crisis Information

Building Grading

- Destroyed
- Highly Damaged
- Moderately Damaged
- Negligible to slight damage

General Information

- Area of Interest
- Clouds

Administrative boundaries

- International Boundary

Settlements

- Populated Place

Hydrology

- Coastline
- Stream
- Lake

Transportation

- Aerodrome
- Primary Road
- Secondary Road
- Local Road

Industry / Utilities

- Quarry

Company General Use

Post-Irma Monitoring

« Risk and Recovery Mapping »

Production delay : weeks/months)

Emergency Management Service/
Risk and Recovery Mapping
(CEMS/RRM)

Activation by
DGSCGC/COGIC
08/02/18

UTILISATEUR
AUTORISÉ

Activation demand by
Délégation interministérie
le 07/02/18

DÉLÉGATION INTERMINISTÉRIELLE
POUR LA RECONSTRUCTION DES ÎLES
DE SAINT-BARTHÉLEMY ET SAINT-MARTIN

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Company Ge

Service Request Form (SRF)

European Commission

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:	DIRECTION GÉNÉRALE DE LA SÉCURITÉ CIVILE ET DE LA GESTION DES CRISES		
Contact Person:	Pierre Chastanet - Guillaume Lopes		
Phone:	+33 1.45.64.46.46 *(Office)*	Mobile:	
E-mail:	cogic-centretrans@interieur.gouv.fr	Fax:	
Date:	08/02/2018 *(dd/mm/yyyy)*		
Activated on behalf of *(if applicable)*	Ministère des Outre-mer - Délégation interministérielle		

Activation details

Region/district, country:	French part of Saint Martin island and Saint Barthélemy
Brief description of the activation: *(event type, affected population, etc.)*	This request follows Hurricane IRMA , which affected this territories
Intended use of the maps to be produced:	Monitoring of the reconstruction

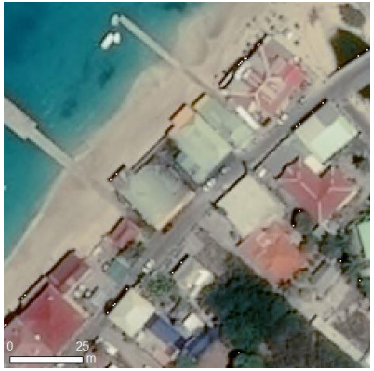
European Commission

Post-Irma Reconstruction Monitoring

- **Initial state of building damage** (septembre 2017)
  - 4 levels of damage :

Buildings Damage Grading

- 01-Negligible to slight damage
- 02-Moderate damaged
- 03-Severe damaged
- 04-Destroyed
- 99-Not Applicable (clouds)



Pre-Irma

Post-Irma, septembre 2017

- **Recovery Monitoring** (once/month then once/3 months)
  - 5 types of evolution

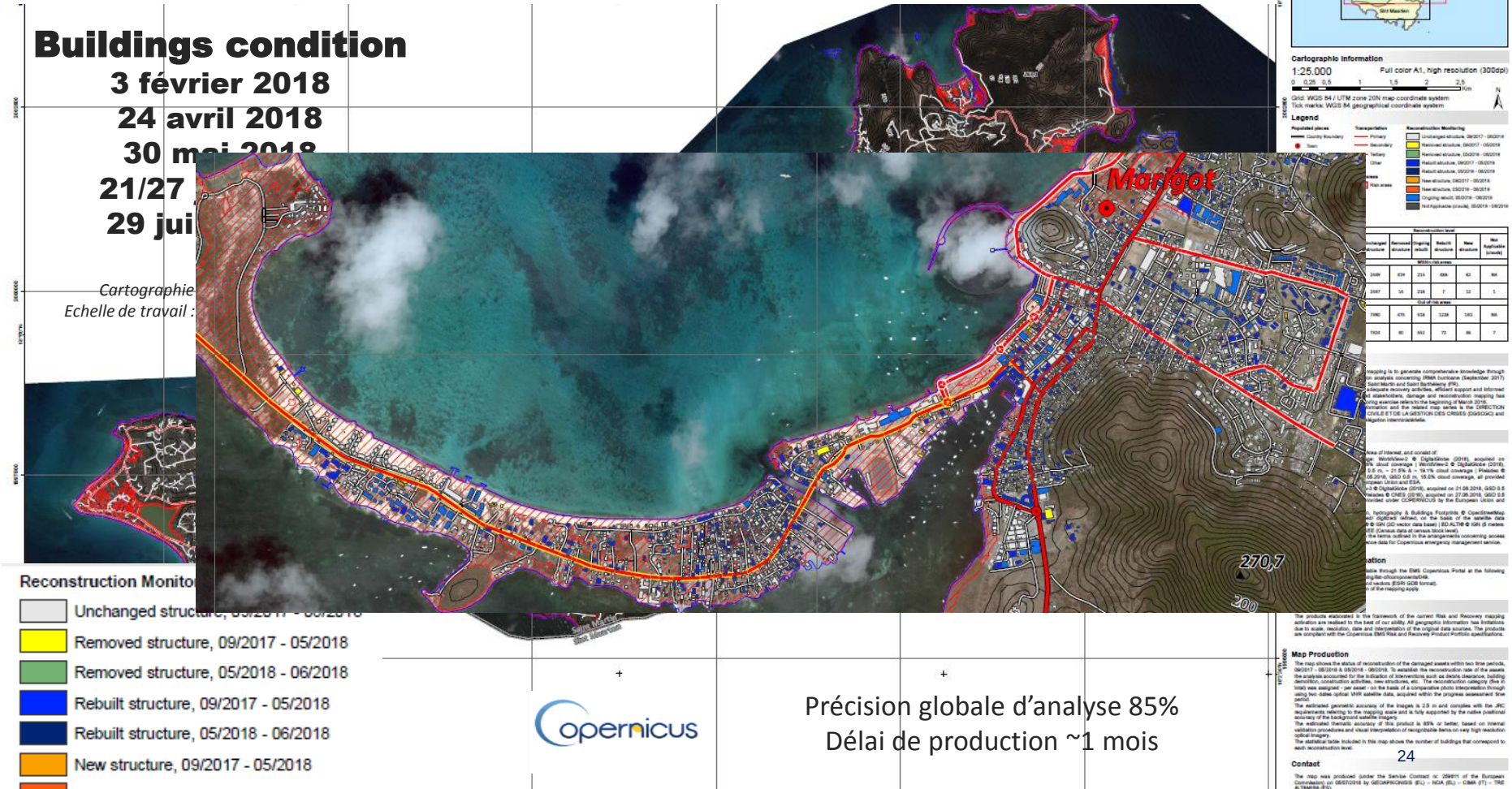
Reconstruction Monitoring

- Unchanged structure, 09/2017 - 06/2018
- Removed structure, 09/2017 - 05/2018
- Removed structure, 05/2018 - 06/2018
- Rebuilt structure, 09/2017 - 05/2018
- Rebuilt structure, 05/2018 - 06/2018
- New structure, 09/2017 - 05/2018
- New structure, 05/2018 - 06/2018
- Ongoing rebuilt, 05/2018 - 06/2018
- Not Applicable (clouds), 05/2018 - 06/2018

Monthly monitoring

- Dedicated monitoring : **landfills**, debris fields, **gravels**, **shipwrecks**

Post-crisis monitoring



Précision globale d'analyse 85%
Délai de production ~1 mois

RECOVERY OBSERVATORY

Concept of "Recovery Observatory"

- Access to EO derived products in the Recovery phase
- EO data acquired during the full Recovery period (months, years)
- Strong ties to local users and to international organisations

CEOS WG Disasters **"Recovery Observatory" (RO) pilot :**

High-profile **demonstration in a real case** of value of using satellite EO to support Recovery from a major disaster :

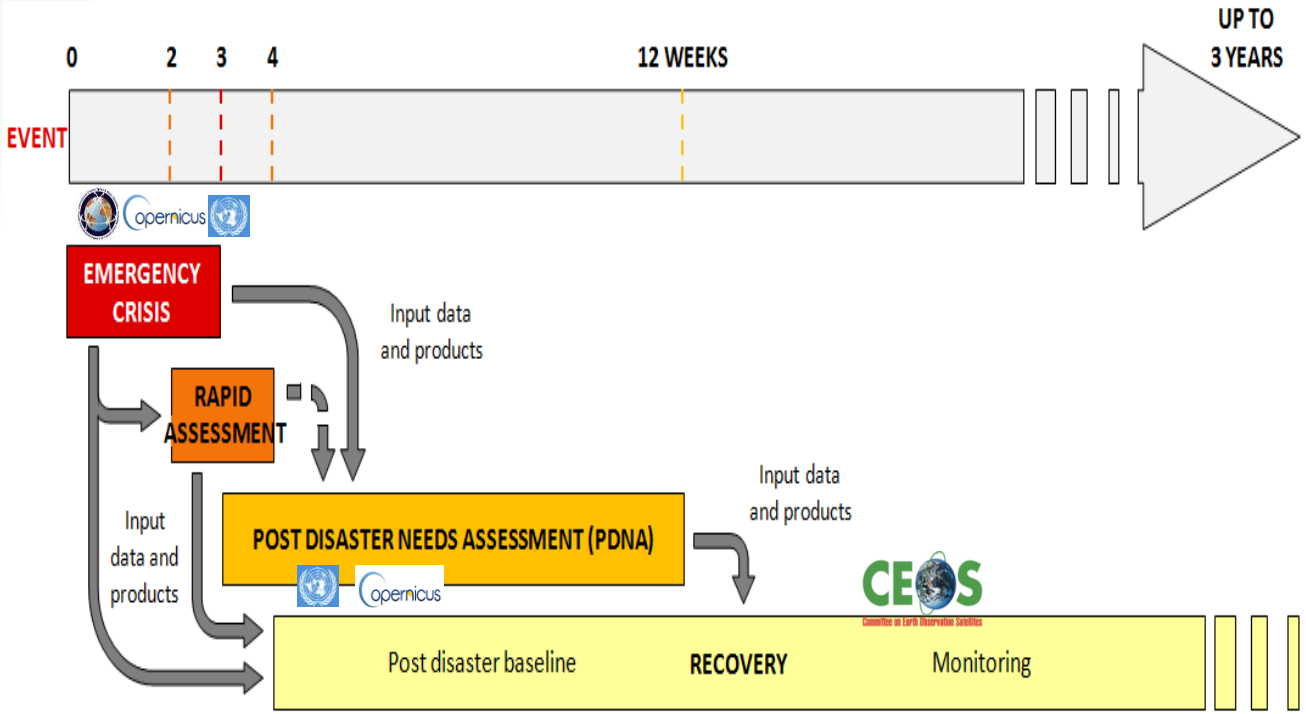
- Near-term (rapid assessments, post PDNA);
- Long-term (major recovery planning and implementation, estimated 3-4 years);

Definition of a ***generic and replicable RO*** , for further use by international stakeholders (best practice, recommendations, ITT …).

Emergency Management

The Recovery Observatory and the post-crisis period

"Urgent response":
Charter, Copernicus, Sentinel-Asia



"Recovery Observatory" : long-term recovery monitoring

Company General Use

Imagery for a Recovery Observatory

Collection of satellite images and maps at several scales during 3 to 4 years after a major disaster

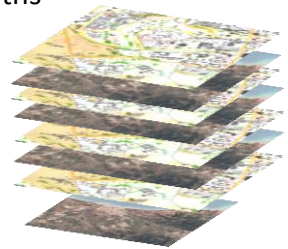
***Ancillary data remain indispensable*: terrain validation data, aerial and drone data, statistics, cartography, ….**

Overview area

Mid-scale products from Sentinel data at 10m resolution

- Change in landcover, open spaces
- Vegetation loss or re-growth
- Agriculture

Update frequency:
every 10 days to 6 months



Hot spot zooms

Large scale products from very high resolution data

- Urban areas, housing, ….
- Transport infrastructure, coastal areas, …
- IDP camps, …
- Specific areas of interest

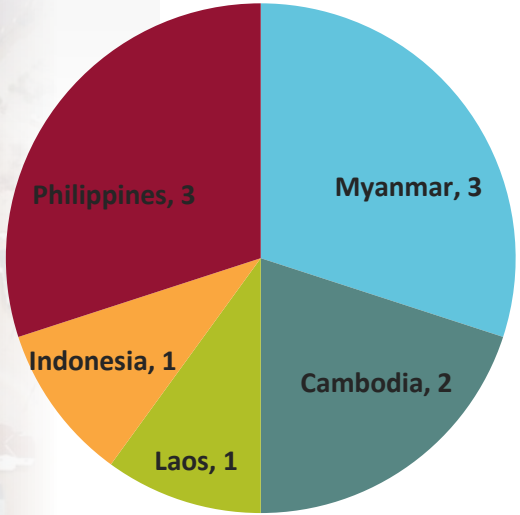
Update frequency: every 2 to 4 months

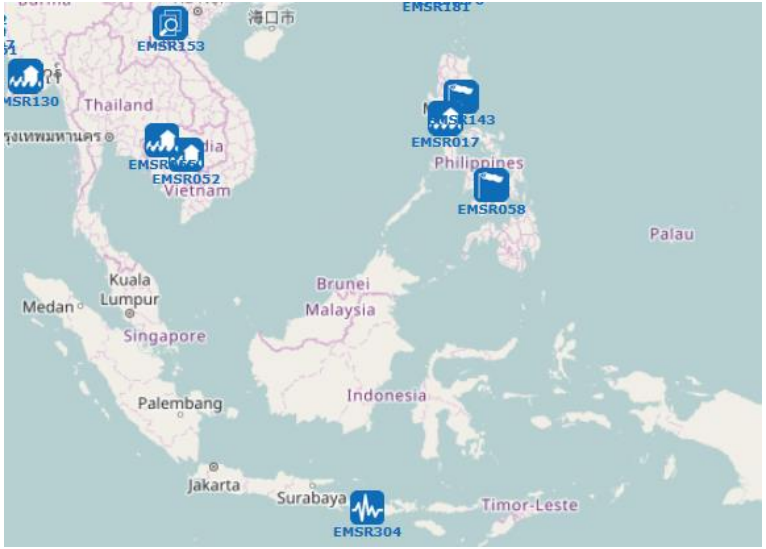
Company General Use

Produit	Utilisateur-clef	Elaboration	Données satellites
Buildings	CIAT/ Planning Ministry	SERTIT, Copernicus EMS	Pléiades, WV
Land Use	ALL	CNIGS/CNES	Orthophotos, Sentinel-2
Forest	ONEV /Environnement Ministry	Copernicus EMS	S2, Spot6/7, Optique THR
Agriculture	Agriculture Ministry	Copernicus EMS	Sentinel-2, SPOT
Macaya Park Monitoring	ANAP / ONEV / Env. Min.	Copernicus EMS SERTIT	Optical THR, radar THR
Suivi bassins versants	ONEV/ Agriculture Ministry	CIMA Foundation	MNT 1m/20cm and radar THR
Terrain Motion / Mining quarries	BME / Public Work Ministry	EOST, ASI	CSK, Pléiades, Spot6/7
Vector Borne Disease risk	Heath Minister/ OMS	NOAA	L8, Images NOAA + statistic needs
Air pollution	ONEV / Ministère Santé	NASA	S5P Tropomi Interest pronounced

EMS Activations in ASEAN countries

ASEAN Activations 2012-2018

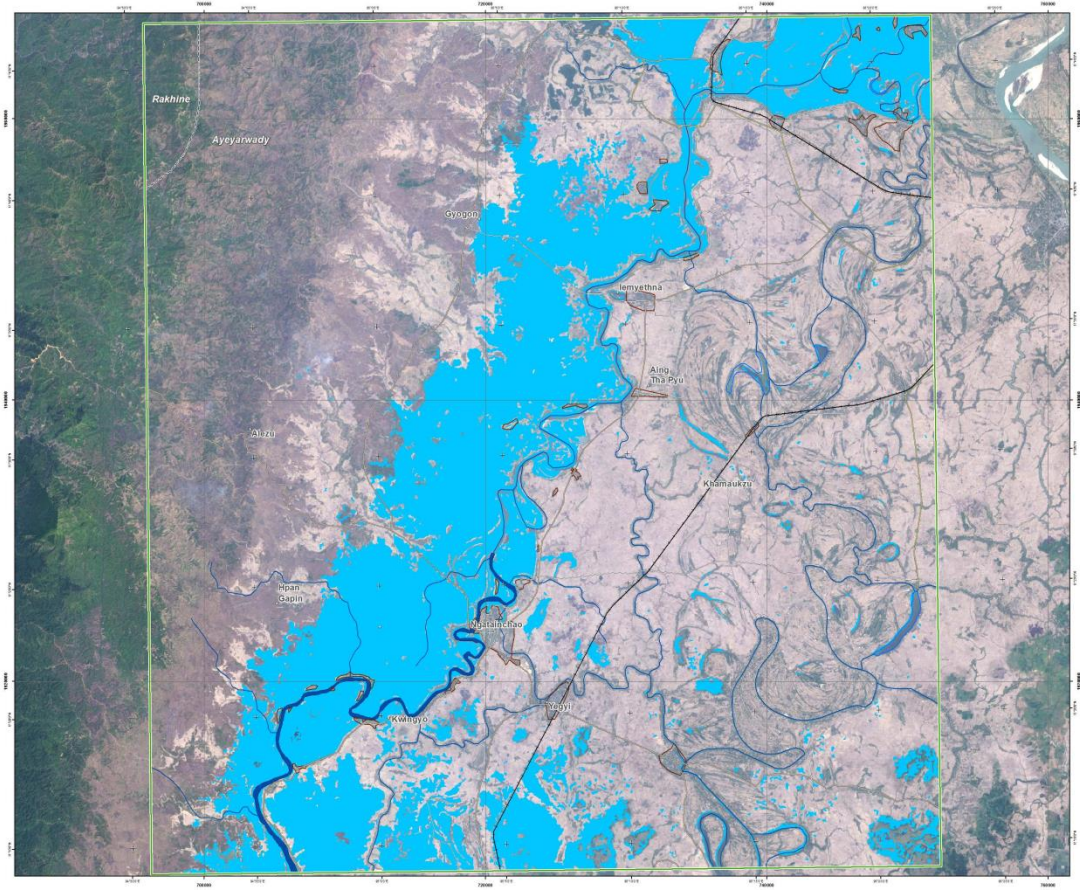




EMS Activations in ASEAN countries

CONTRACT	Year	ID	NAME	Triggering Entity	Initial trigeering entity	Disaster location Country	Disaster Type
GIO-RUSH	2012	EMSR007	Myanmar IDPs situation	DG ECHO	UN WFP	Myanmar	OTHER
GIO-RUSH	2012	EMSR017	Floods in Philippines	DG ECHO		PHILIPPINES	FLOOD
GIO-RUSH	2013	EMSR051	Refugee camp in Myanmar	DG ECHO		Myanmar	OTHER
GIO-RUSH	2013	EMSR052	Flood in Cambodia	DG ECHO	UN WFP	Cambodia	FLOOD
GIO-RUSH	2013	EMSR055	Flood in Cambodia	DG ECHO		Cambodia	FLOOD
GIO-RUSH	2013	EMSR058	Typhoon in Philippines	DG ECHO		Philippines	WIND STORM
Copernicus-RM	2015	EMSR130	Flood in Myanmar	DG ECHO		Myanmar	FLOOD
Copernicus-RM	2015	EMSR143	Flood in Philippines	DG ECHO		Philippines	WIND STORM
Copernicus-RM	2016	EMSR153	Cold Spell in Hauphan, Laos	DG ECHO		Laos	OTHER
Copernicus-RM	2018	EMSR304	Earthquake in Lombok, Indonesia	DG ECHO		Indonesia	EARTHQUAKE

Floods in Myanmar, August 2015



GLIDE number: N/A

Activation ID: EMSR139

Product N.: 08YEGY1, v1, English

Yegyi - MYANMAR
Flood - 01/08/2015
Delineation Map - Monit03

Cartographic Information

1:110000 — Full color ISO A1, low resolution (100 dpi)

0 2.5 5 10 km — N

Grid: WGS 1984 UTM Zone 46N, map coordinate system

Tick marks: WGS 84 geographical coordinate system

Legend

Crisis information
- Flooded Area (13/09/2015 23:33)

General Information
- Area of Interest

Administrative boundaries
- Region

Settlements
- Populated Place
- Built-Up Area

Hydrology
- River
- Lake
- River

Transportation
- Railway
- Primary Road
- Secondary Road
- Local Road

Consequences within the AOI on 13/09/2015

			Affected	Total in AOI
Flooded area		ha		14868
Estimated population		inhabitants	173068	1017615
Settlements	Built-up areas	ha	101	3018
Transportation	Primary roads	km	1	50
	Secondary roads	km	16	244
	Local roads	km	24	254
	Railways	km	10	75

Map Information

Unusual heavy monsoon rains have been affecting Myanmar since 10 July causing river overflows and floods. In the past few days, torrential rains damaged farmland, roads, railways and bridges.

The non-users of the map will Hungarian Response Coordination Centre (EECC).

Relevant date and time records (UTC)

Event	01/08/2015 00:00	Last news status	13/09/2015 23:33
Activation	07/08/2015 10:00	Map production	14/09/2015

Data Sources

Sentinel 1-A (acquired on 13/09/2015 23:33, GSD 20 m) provided by European Space Agency.

Reference: ® ASA (JAXA) (acquired on 17/09/2010 05:13 UTC, GSD 25 m) provided under ESA CSC-DA DVM License.

Landsat 8 (U.S. Geological Survey (acquired on 09/09/2015, GSD 15 m, approx. 0.88% cloud cover).

Basic vector layers based on OpenStreetMap © OpenStreetMap contributors, Wikimapia.org, Geofabrik, objects, 1:10000, retracted on 01/01/2001, refined by ±0.05. Source information is included in vector data.

Digital Elevation Model (DEM) SRTM 1 Arc-sec, height in meters above mean sea level.

Population data: Landscan 2014 © UT-BATTELLE, LLC.

All Data sources are complete and with no gaps.

Administrative boundaries: Myanmar Information Center (JRC 2013). Hydrology; Transportation (Natural Earth, 2013); Settlements (OpenStreetMap, 2013).

Dissemination/Publication

Delivery formats are GeoTIFF, GeoPDF, GeoJPEG and vectors (shapefile and KML formats). Map products available in the Copernicus EMS Portal at the following URL: http://emergency.copernicus.eu/mapping/list-of-components/EMSR139

Map products are in the Public Domain.

Disclaimer

The products elaborated in the framework of current mapping in each mode activation are realized to the best of our ability within a very short time frame during a crisis, optimizing the available data and information. All geographic information has limitations due to scale, accuracy, date and interpretation of the original data sources. The products are compiled with Copernicus EMS Rapid Mapping Product Portfolio specifications.

Map Production

The present map shows the flood delineation in the area of Yegyi (MYANMAR). The basic topographic features are derived from public datasets, refined by means of visual interpretation of pre-event image/s available.

The procedure followed for the delineation of the event have been derived from pre/event image/s available.

All satellite images have been radiometrically enhanced, orthocorrected with RPC approach and co-registered.

The estimated geometric accuracy of this product is 40 m CE90 or better, from native positional accuracy of the background satellite image.

The thematic accuracy is estimated to be 80% or better, based on previous experience in using high-resolution SAR for flood extent delineation. Please be aware that the thematic accuracy might be lower in urban and forested areas due to known limitations of the SAR technique.

Only the area covered by the Area of Interest has been analyzed.

Contact

Map produced by GEKITIT under contract 259738 with the European Union.

Phone: +32 (0)2 296 40 40 (Brussels time: 9:00-17:00 CET)

E-mail: mapmaking@ems.copernicus.eu

Copernicus Europe's eyes on Earth

US n Earth

European Commission

EMS contacts

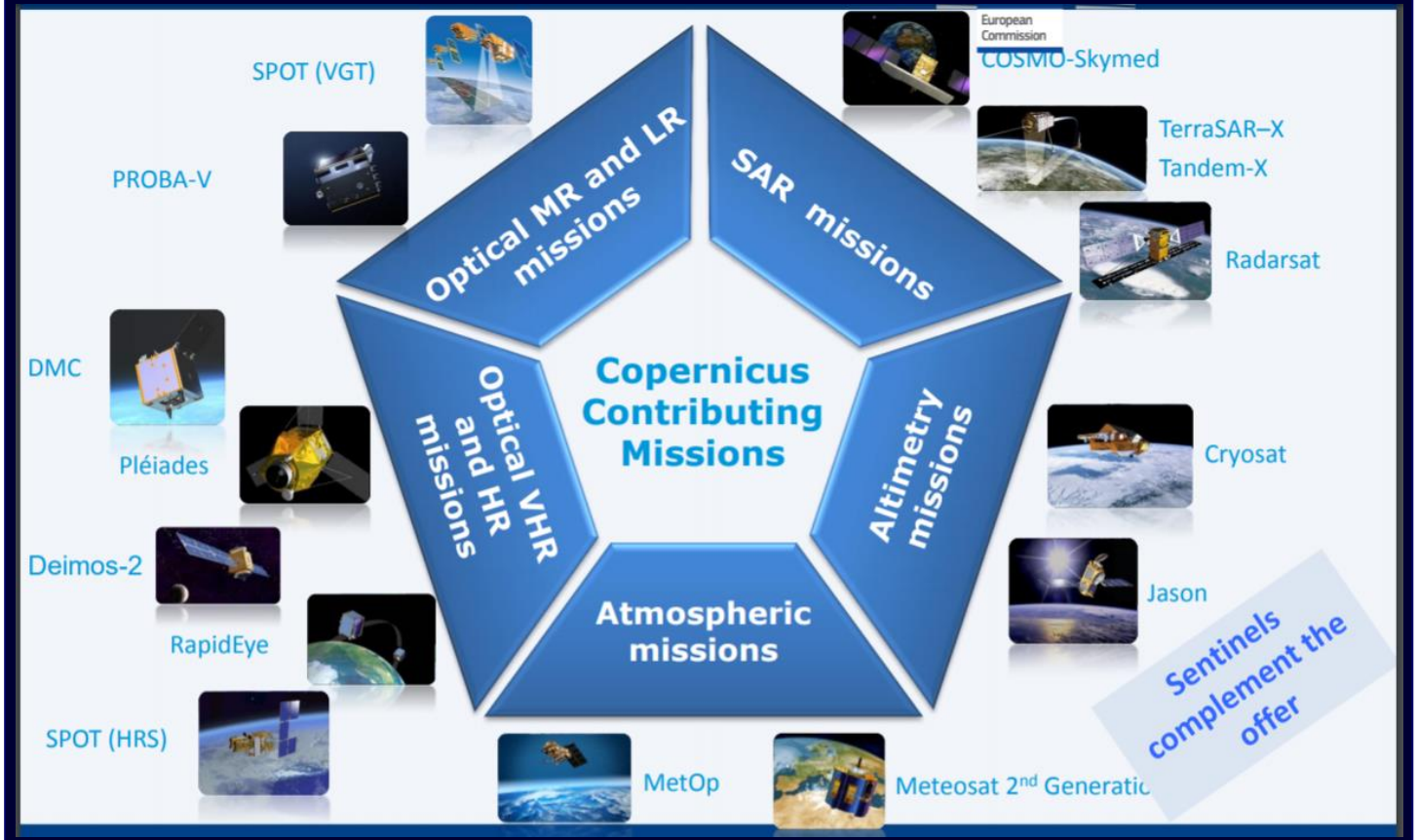
Visit emergency.copernicus.eu

Get support
support@copernicus.eu

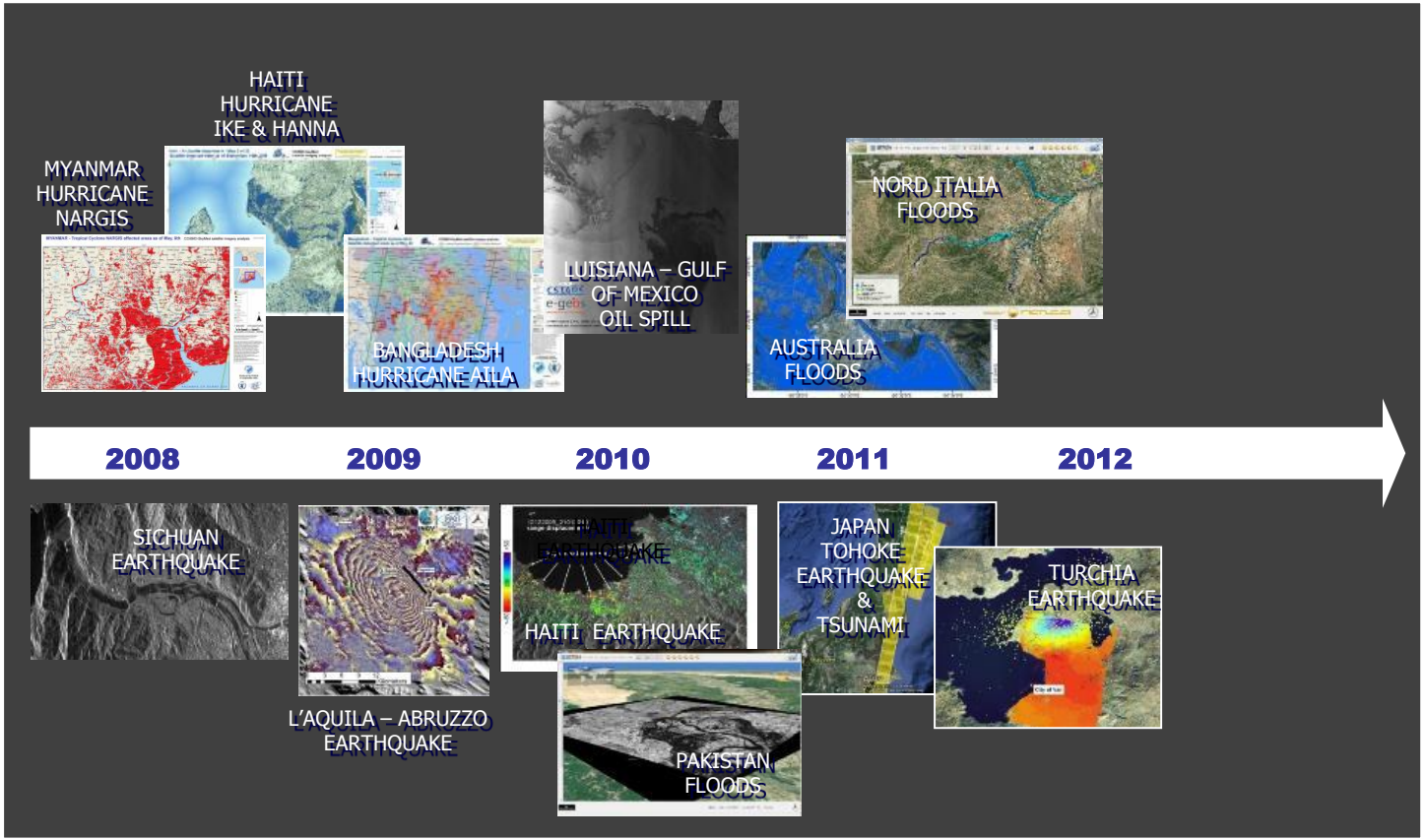
Get access to EMS mapping
echo-ercc@ec.europa.eu

Company General Use

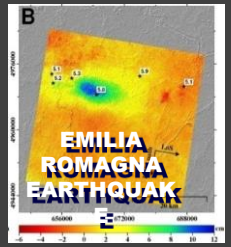
COPERNICUS Contributing Missions

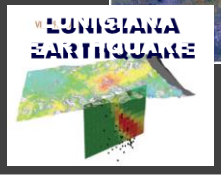


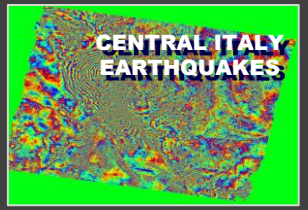
EMERGENCIES, some examples…



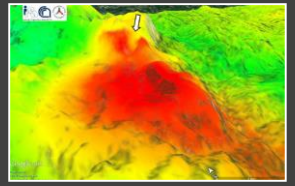
EMERGENCIES, some examples







2013 2014 2015 2016 2017 2018



Japan tsunami(2011)

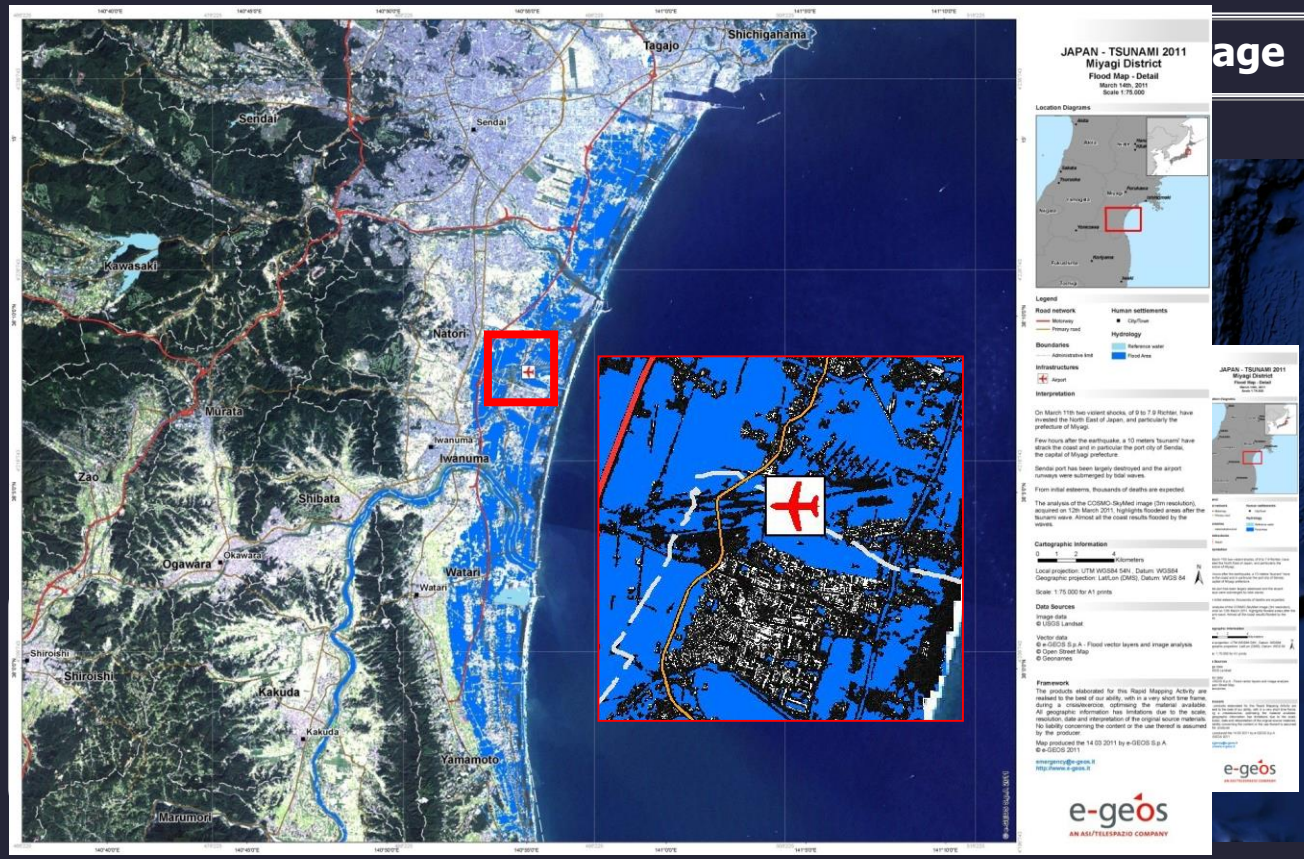
Event description:

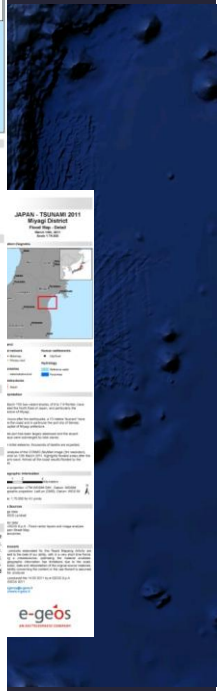
- On March 11th, 2011 two violent shocks of 9 to 7.9 Richter have invested the North-East of Japan . Few hours after the shock a 10 meters tsunami hit the coast causing devastations in the coastal areas. Moreover, several nuclear plants have been seriously affected and a nuclear treat has been issued.

Triggering entity: Autoactivation of e-GEOS Emergency Team

- e-GEOS started acquiring daily COSMO-SkyMed (Spotlight-2 and Stripmap modes) images over the whole coastal area and the Fukushima nuclear power plants.
- Flood extent and damages to nuclear plants have been mapped and delivered to JSI (Japanese Space imaging) for further distribution to governmental agencies involved in disaster management.

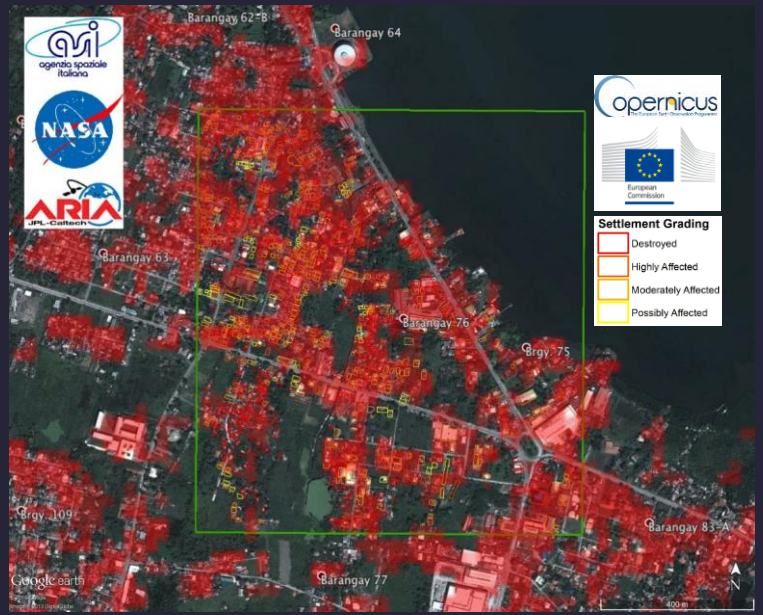
Japan tsunami(2011)





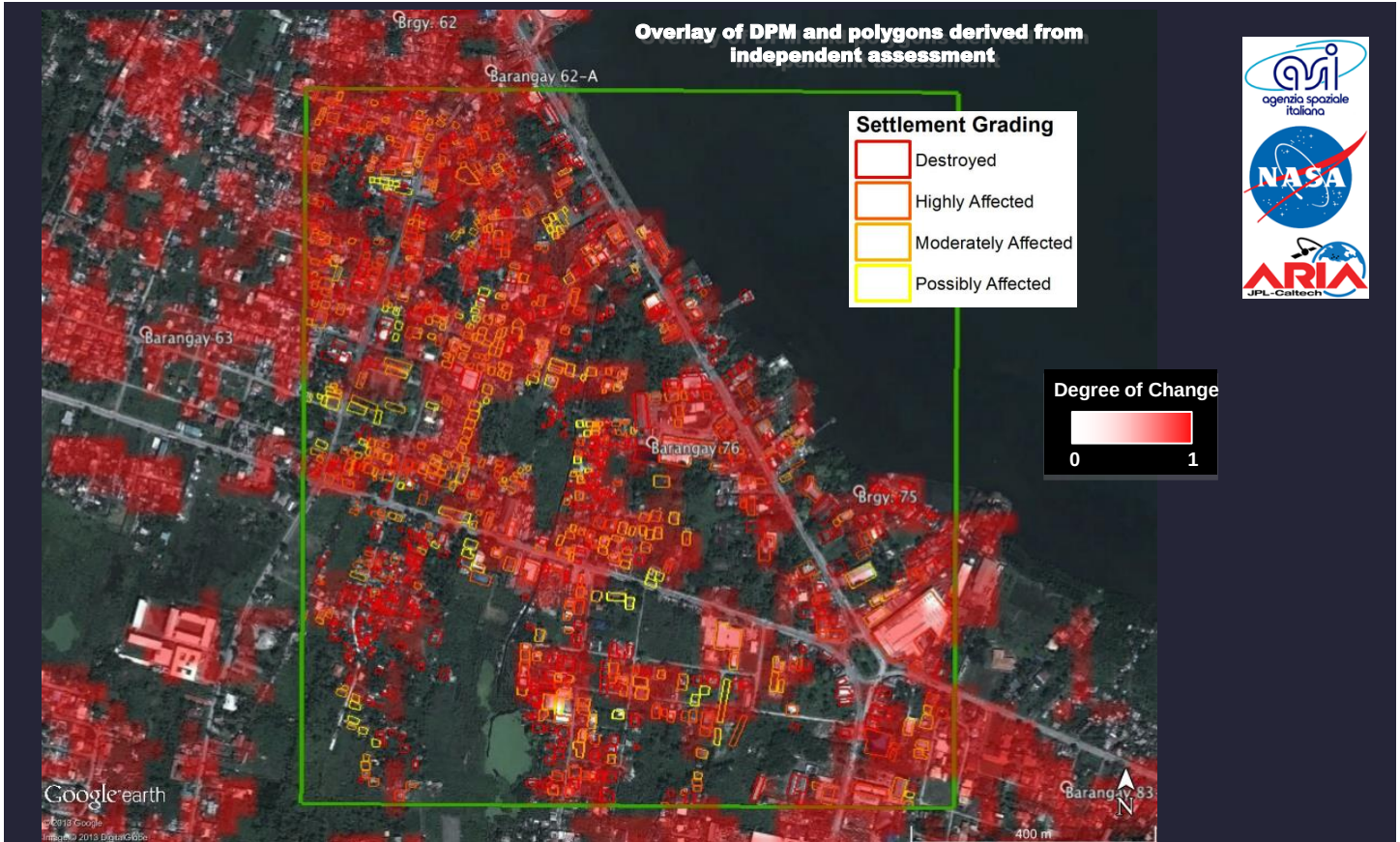
Super Typhoon Haiyan (2013)

- 2013-11-08 0:00AM (UTC): Haiyan struck Philippines
- 2013-11-11 (Day 3): COSMO-SkyMed data acquisition
- 2013-11-11 (Day 3): damage map delivery



Original COSMO-SkyMed Data – ©ASI-Agenzia Spaziale Italiana 2013

Super Typhoon Haiyan (2013)



Humanitarian Emergency

Event description:

- Since August 2012 the conflict in Syria has been forcing civil population to migrate towards the border with the nearby Jordan
- A IDP camp was set up by UNHCR in Al Mafraq area

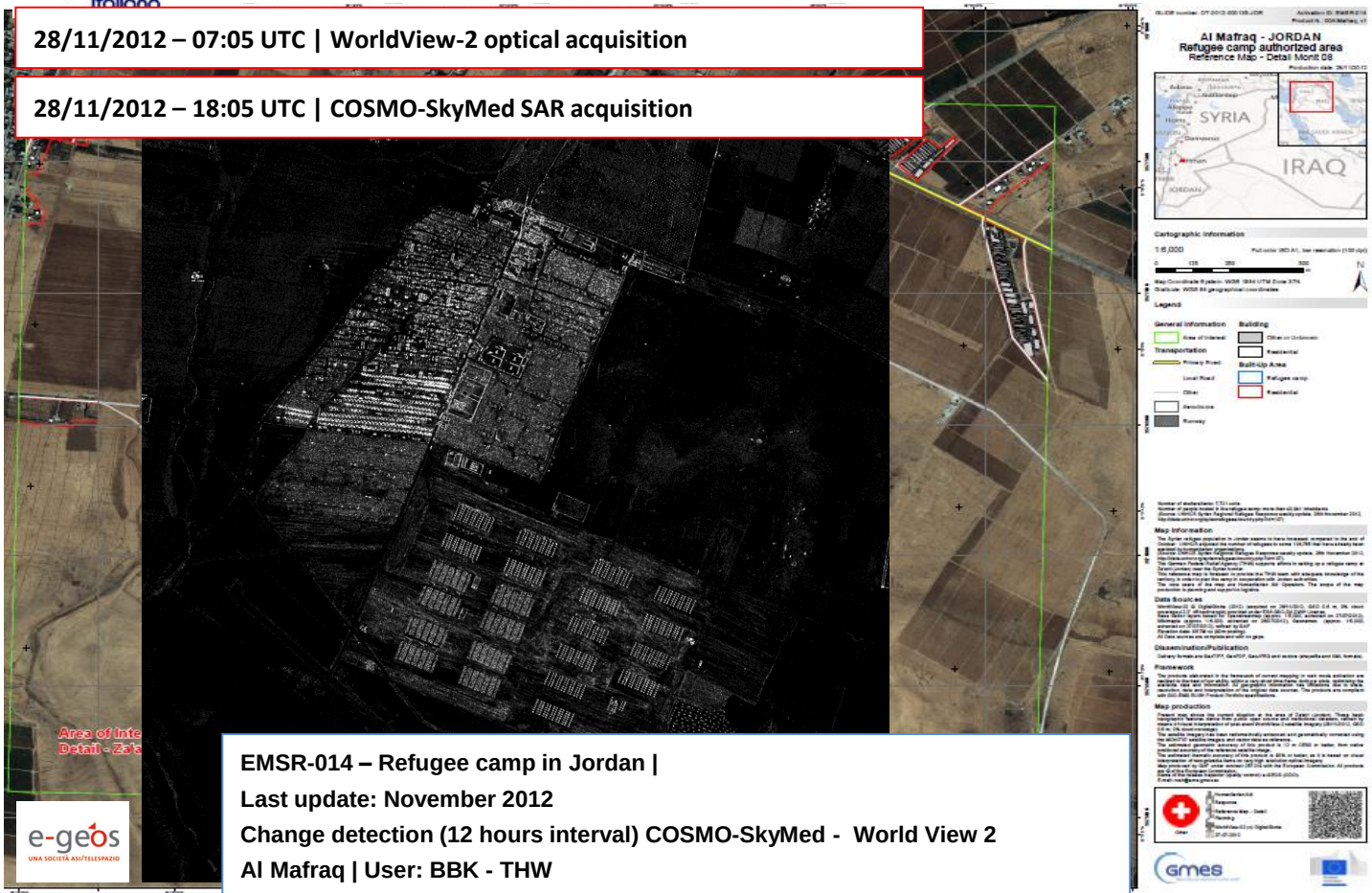
Triggering entity: German BBK on behalf of THW (through EC MIC)

- e-GEOS has been activated by the German BBK on behalf of THW (German entity for humanitarian aid operations) to regularly monitor the evolution of Al Mafraq IDP camp.
- e-GEOS has been regularly acquiring both optical and SAR data over more than six months, providing constant updates to the relief operators involved.

Optical – SAR integration

28/11/2012 – 07:05 UTC | WorldView-2 optical acquisition

28/11/2012 – 18:05 UTC | COSMO-SkyMed SAR acquisition



EMSR-014 – Refugee camp in Jordan |

Last update: November 2012

Change detection (12 hours interval) COSMO-SkyMed - World View 2

Al Mafraq | User: BBK - THW

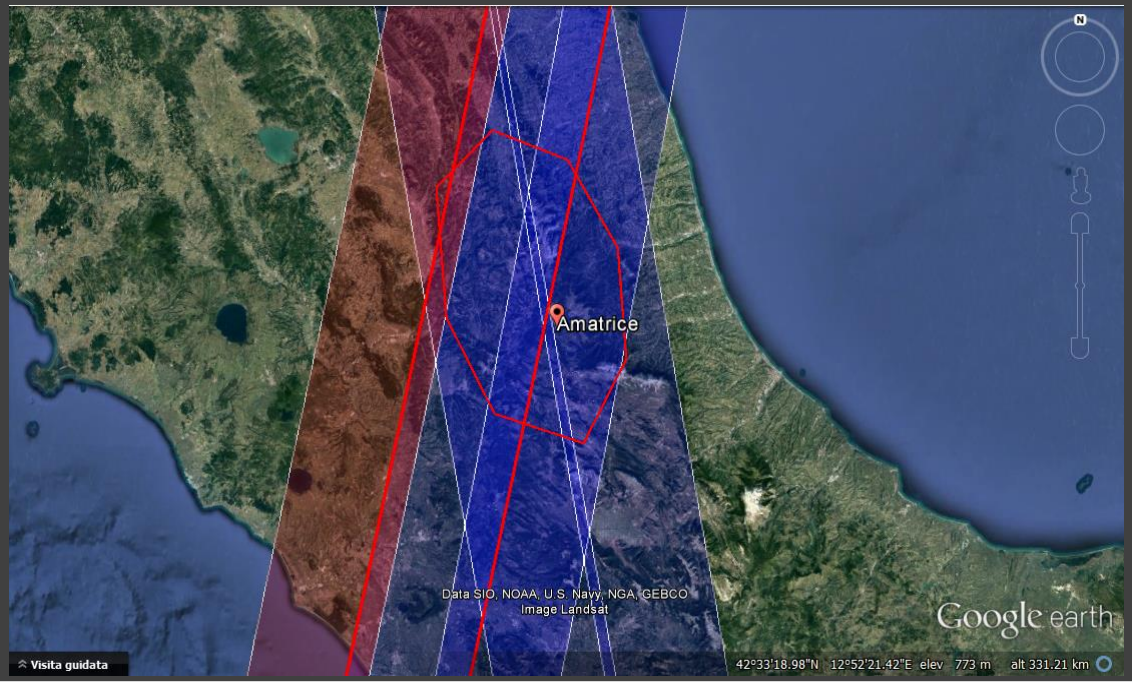
IDP camp - Jordan (2013)

Two months later…..

CENTRAL ITALY'S 2016 EARTHQUAKES

COSMO-SkyMed ACTIVATION

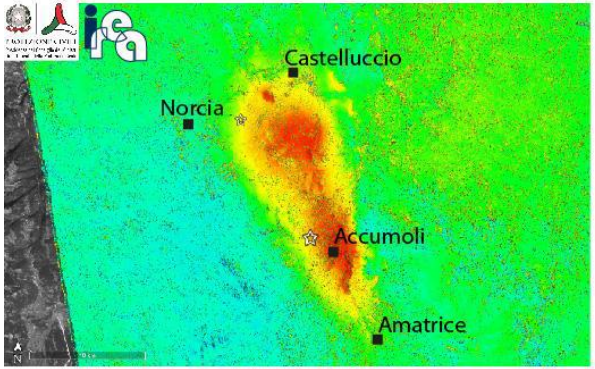
The first DTO interferometric with a previous Map_Italy image was in the afternoon of 24 August and was scheduled as **Very Urgent**



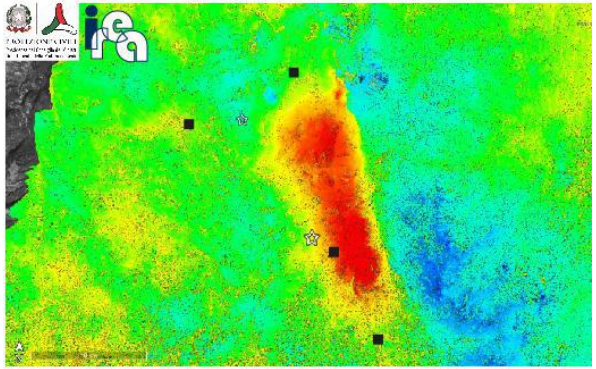
AMATRICE – ACCUMOLI earthquake
24 August 2016

ALOS-2 & SENTINEL-1 CONTRIBUTION

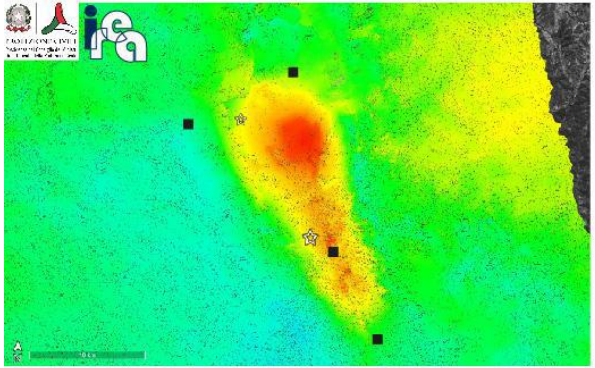
ALOS Asc 09092015_24082016



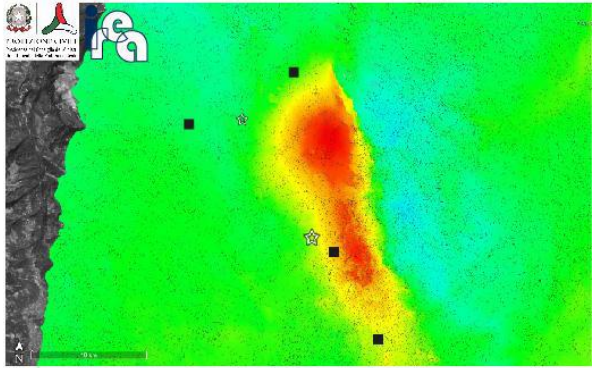
ALOS Desc 25052016_31082016



S1 Asc 22082016_28082016

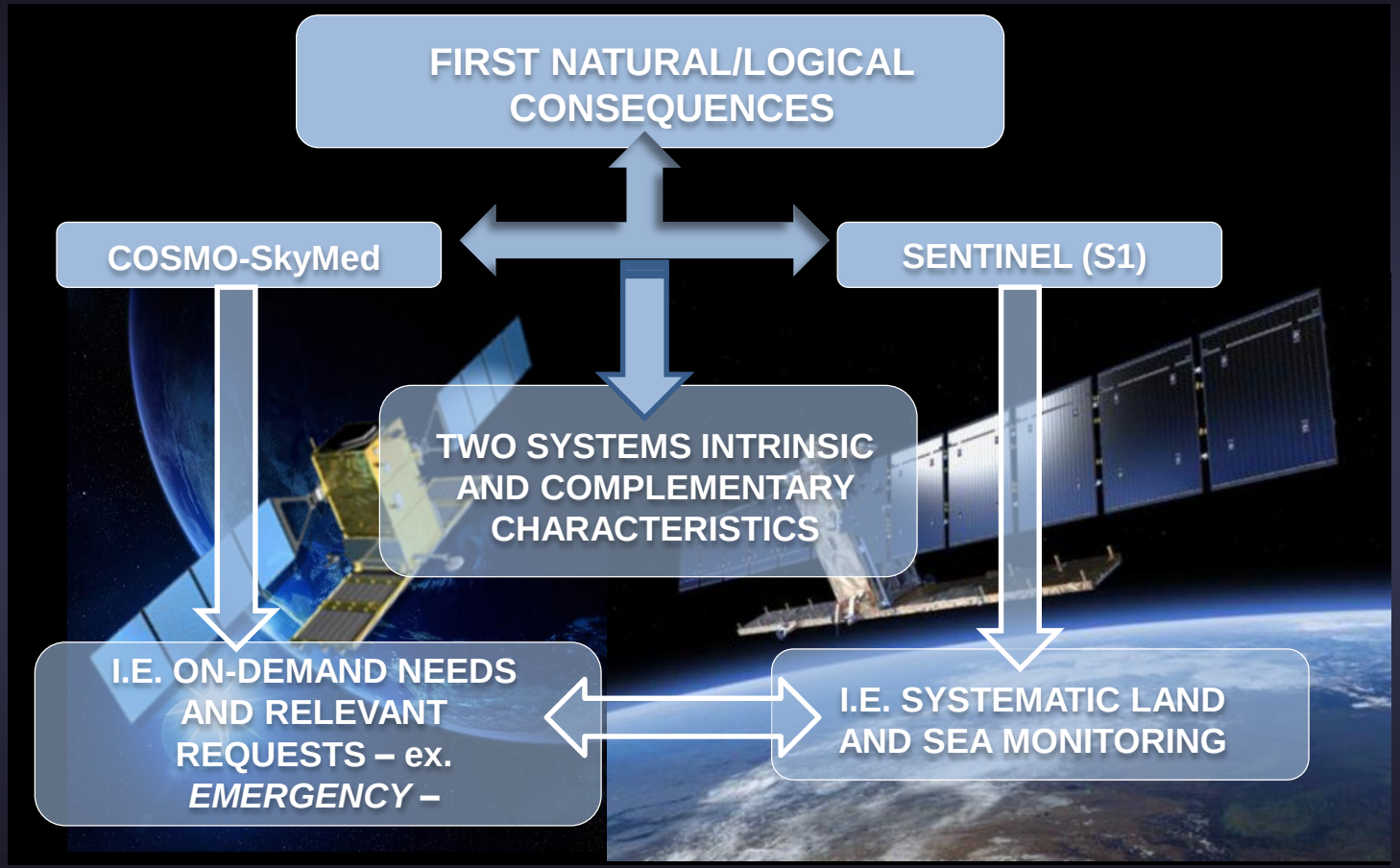


S1 Desc 21082016_27082016



LOS Displacement [cm]

<-20 >20


FIRST NATURAL/LOGICAL CONSEQUENCES
COSMO-SkyMed
SENTINEL (S1)
TWO SYSTEMS INTRINSIC AND COMPLEMENTARY CHARACTERISTICS
I.E. ON-DEMAND NEEDS AND RELEVANT REQUESTS – ex. EMERGENCY –
I.E. SYSTEMATIC LAND AND SEA MONITORING