

7th Annual UN-SPIDER Conference in Beijing

United Nations International Conference on Space-based Technologies for Disaster Risk Reduction - “Building resilience through Integrated Applications”

Plenary Session 1 - Policy and institutional arrangements for integrating ‘space’ in DRR decision making
23 October 2017

Integrating “space” in DRR decision making at regional and international level:

the EU Copernicus Emergency Management Service



Emergency
Management

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Slides jointly prepared with e-GEOS and JRC

ITHACA

Non-profit association, Italy

Mission

Use of Geomatics techniques in support of emergency management, with a focus on disaster preparedness and response

1th
Anniversary



Founders and donors



POLITECNICO
DI TORINO

In cooperation with:





Copernicus

Intro

As highlighted in the Conference information note:

- *a growing number of **disaster management organizations** are using **Earth Observation (EO)** images and **Geographic Information Systems (GIS)** for **disaster management**,*
- *the challenge lies in **supporting these efforts with relevant policy** also at **regional and international level**.*

Emergencies have no boundaries, from Space

In this context the **European Union** is offering to actors involved in the emergency management the **Copernicus Emergency Management Service** (Copernicus EMS), **a fully operational service** which provides geospatial information addressing emergency response, prevention, preparedness, disaster risk reduction or recovery phases



Copernicus

Copernicus Programme

Copernicus is a European Union Programme, coordinated and managed by the European Commission, aimed at **developing European information services based on satellite Earth Observation and in situ (non-space) data.**

Six **Copernicus Services** transform satellite and in situ data into **value-added information**, specifically:



Atmosphere
(CMAS)



Marine
(CMEMS)



Land
(CLMS)



Climate
(CDS)



Emergency
(EMS)



Security

**Today's
focus**





Copernicus

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Furthermore the **Sentinel Satellites** are developed for the specific needs of the Copernicus programme.

COPERNICUS AND ITS 5 SENTINELS

Observing our planet for a safer world. The European Earth Observation Programme Copernicus provides geo-information products and services based on satellite imagery.





Copernicus

ITHACA and COPERNICUS

Why is **ITHACA** presenting the EU Copernicus Emergency Management Service today?



Ithaca is part of the Copernicus EMS – **Rapid Mapping Service Provider** consortium led by **e-GEOS (Italy)** with **GAF (Germany)**, **SIRS (France)**, **SERTIT (France)** and **DLR (Germany)**



Ithaca is involved also in the **Copernicus Global Land service** (member of the **Service Provider** consortium for the **Hot Spot Monitoring** service) and in the **Copernicus In Situ component** (Consultancy service for the European Environment Agency), both led by **e-GEOS**.



Copernicus EMS - Modules

Emergency Management

emergency.copernicus.eu

The screenshot shows the Copernicus Emergency Management Service website. At the top, there is a navigation bar with the European Commission logo, the Copernicus logo, and the text 'COPERNICUS Emergency Management Service'. Below this is a news banner with the headline 'How the Copernicus Emergency Management Service supported responses to major earthquakes in Central Italy'. The main content area is titled 'Copernicus Emergency Management Service' and includes a brief description of the service. Three modules are highlighted with colored borders:

- Copernicus EMS - Mapping** (Red border): This module addresses worldwide emergency situations. It features a list of disaster types: Severe Storms, Tsunamis, Earthquakes, Landslides, and Fire. Below the list is a video player showing a satellite map with a blue highlighted area. A caption below the video reads 'Copernicus EMS - Mapping'.
- European Flood Awareness System** (Orange border): This system monitors and forecasts flood events across Europe. It includes an image of two people in high-visibility gear wading through floodwaters. A caption below the image reads 'European Flood Awareness System'.
- EFFIS and Global Wildfire Information System (GWIS)** (Orange border): This system monitors forest fire activity in real-time and archives historical information on forest fires in Europe, Middle East and North Africa. It includes an image of a forest fire at night. A caption below the image reads 'EFFIS and GWIS System'.

MAPPING

EARLY WARNING





Copernicus EMS - Modules

Emergency Management

MAPPING

RAPID MAPPING

- On demand
- Standardised
- Hours-days

REFERENCE MAPS
DELINEATION MAPS
GRADING MAPS

VALIDATION

RESILIENCE

RECOVERY

EMERGENCY RESPONSE

PREPAREDNESS

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, GWIS

CONTINUOUS ALERTS

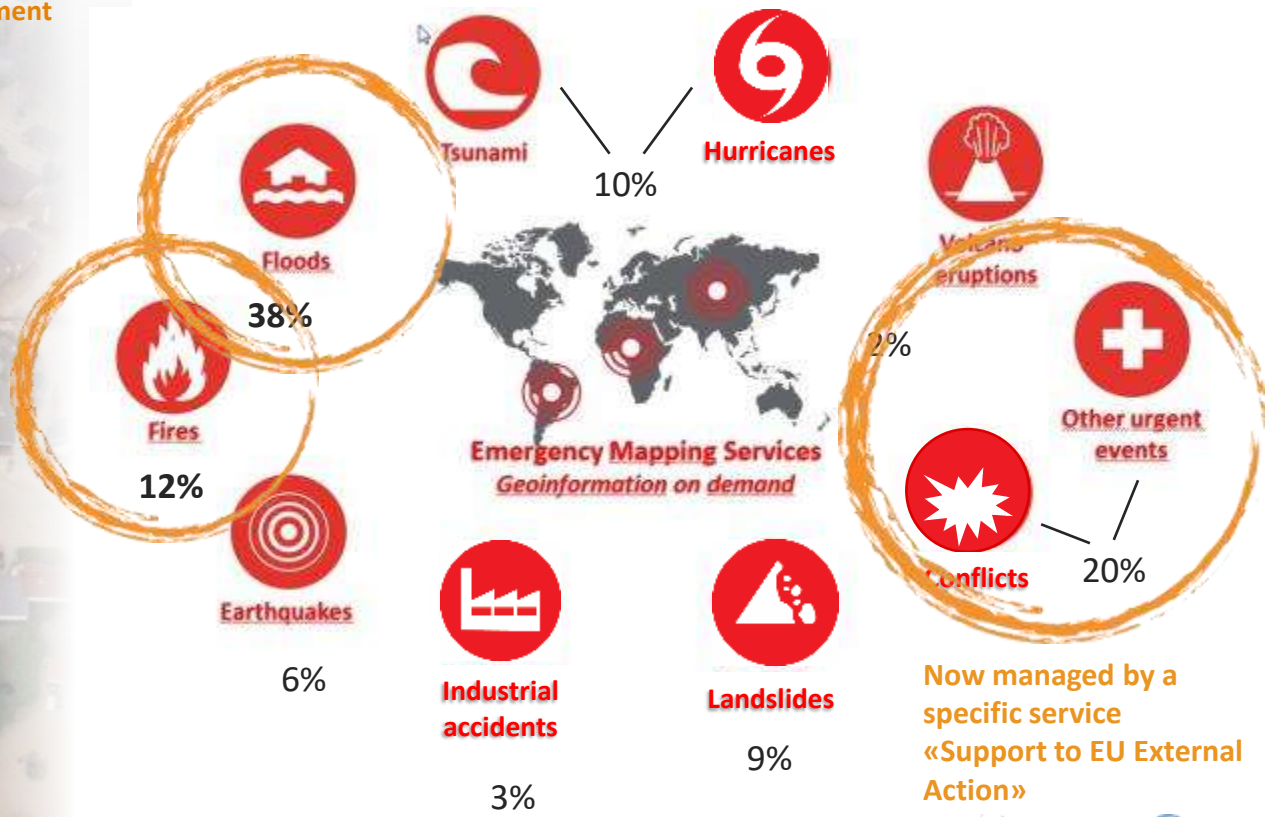
Disaster Management Cycle
phases



Emergency Management

EMS Rapid Mapping – Type of disasters

Based on **Rapid Mapping** activation as of September 2017



Now managed by a specific service
«Support to EU External Action»



EMS Mapping – Operational actors

Authorized Users

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

DG JRC

Joint Research Centre, technical supervision of operations, management of dissemination platforms



ERCC @DG ECHO

The Emergency Response Coordination Centre, interface with users, authorisation of all EMS activation requests, 24/7

ESA

The European Space Agency (REACT), providing to the Mapping service provider rush access to EO data

Service Provider

Private sector consortia, in charge of the production (from defining products, ordering and analysing imagery, to producing the final output)



Portfolio

- **Reference maps** prior to the disaster event, for comparative purpose as a baseline for generating post-emergency products.
- **Delineation maps** (with monitoring option) outline the extent of the area affected by the event.
- **Grading maps** (with monitoring option) provide an assessment of the impact caused by the disaster.
- **Activation Extent Map**, atlas of the maps produced

Areas covered by Activations (as of Sept 2017)

- **53% Regional** (EU)
- **47% International** (Outside EU)

Who is activating the service? (as of Sept 2017)

- **40% EC Services**
- **60% EU National Focal Points** (also outside EU)



Summer 2017

33 activations in August and September mainly related to:

- **Regional level** (supporting European actors)



20 for Forest Fires (16 EU + 4 Outside EU): 4 Reference, 55 Delineation, 76 Grading maps

- **International level** (supporting international community)



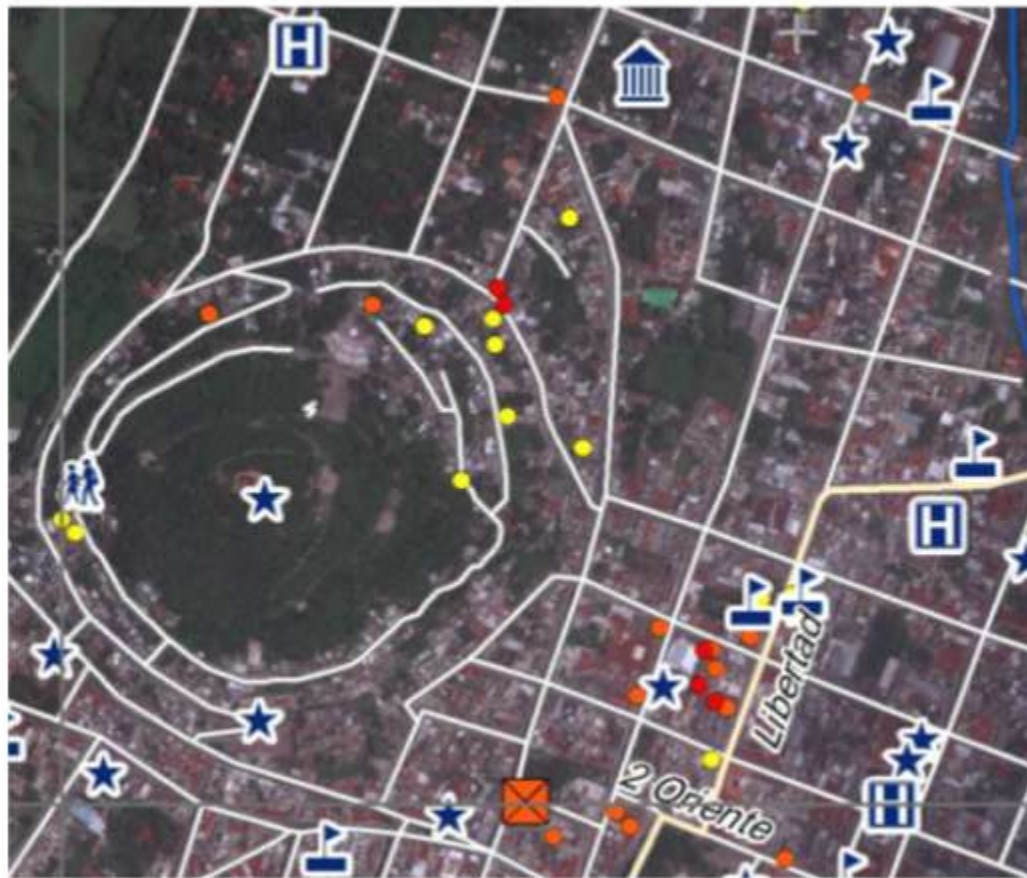
9 for Hurricanes (Harvey, Irma, Maria) in Atlantic Ocean: 26 Reference, 54 Delineation, 28 Grading maps



2 for Earthquakes in Mexico: 16 Grading maps



[EMSR244] Atlixico: Grading Map



Building Grading

- Destroyed
- Highly Damaged
- Negligible to slight damage

Crisis Information

- Road Block

General Information

- Area of Interest
- Sensor Footprint
- Clouds
- Missing data

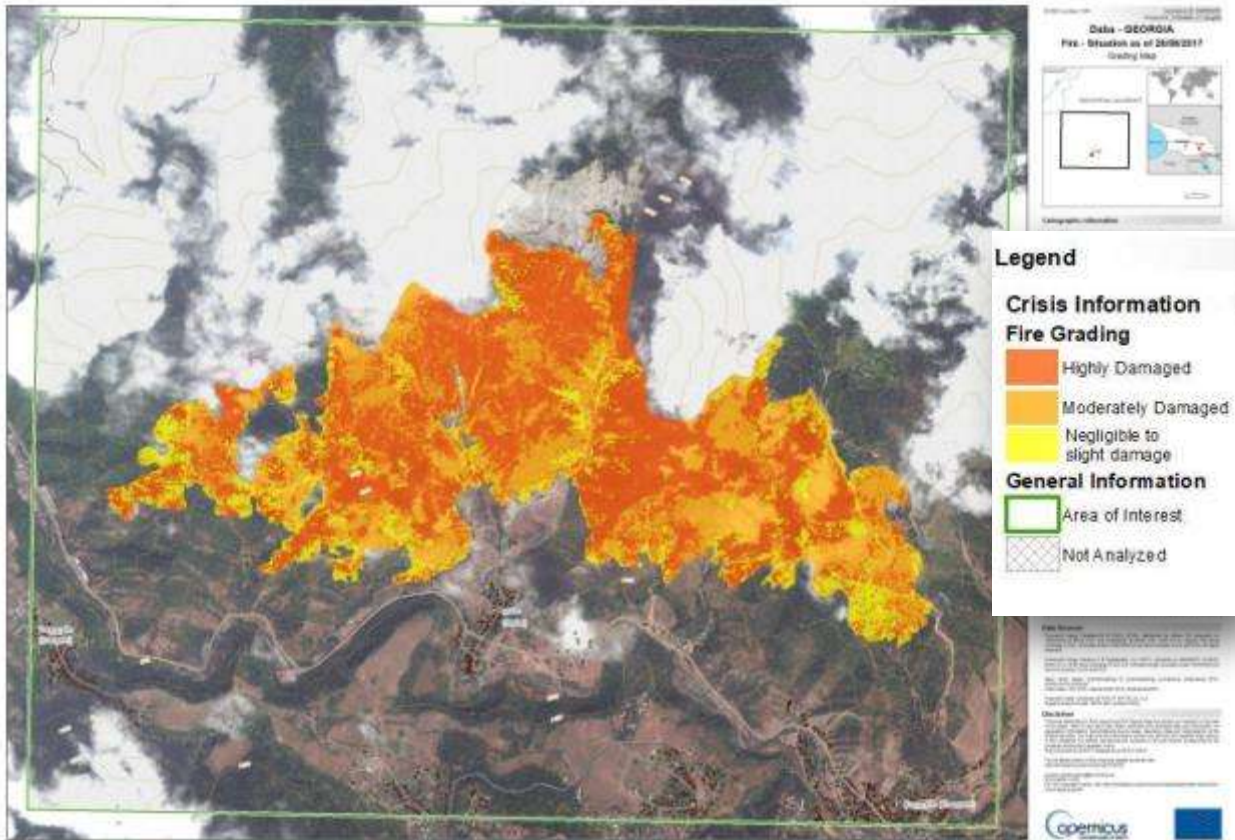
Administrative boundaries

- Municipality

OpenCity

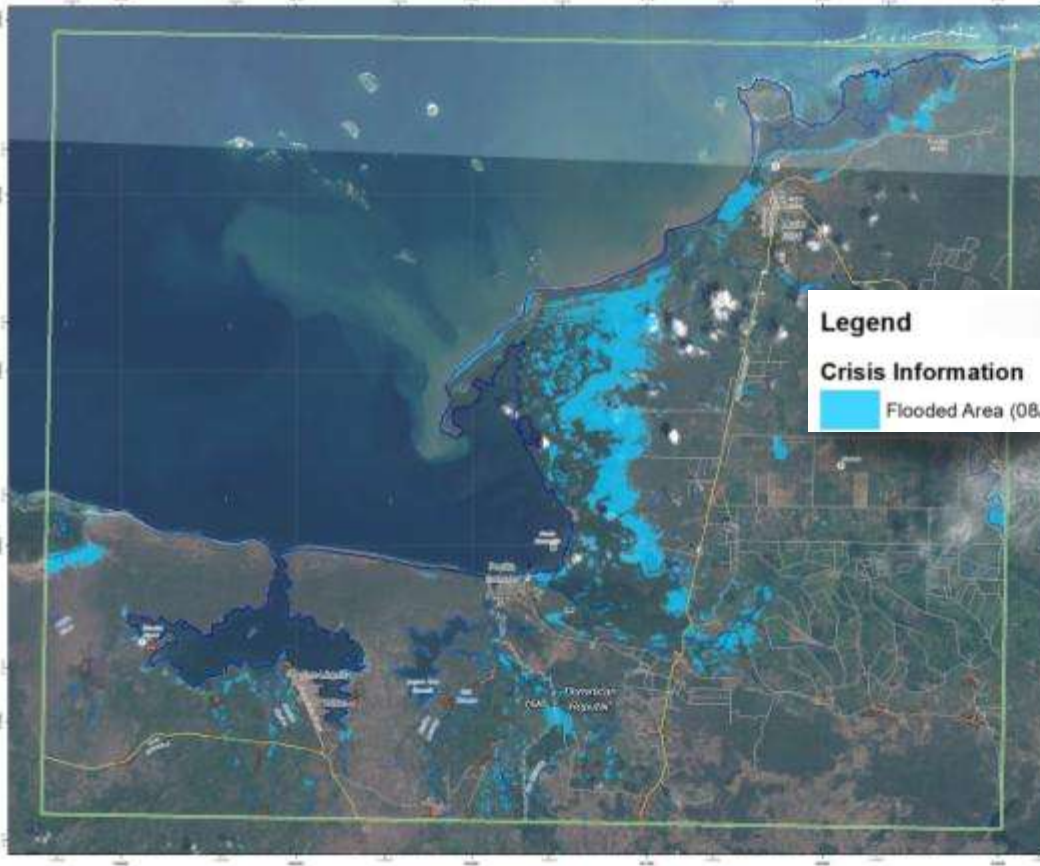


[EMSR226] Daba: Grading Map





[EMSR233] Monte Cristi: Delineation Map



Monte Cristi - SANTIAGO DOMINGUEZ REPUBLIC
Wind storm - Situation as of 08/09/2017
Delineation Map



Cartographic information:
Scale: 1:50000
Projection: UTM
Datum: WGS 1984
Units: Meters

Legend

Crisis Information

 Flooded Area (08/09/2017 22:52 UTC)

OPERATIONAL METADATA	
Project Name	EMSR233
Project ID	EMSR233
Project Manager	EMSR233
Project Status	Completed
Project Start Date	08/09/2017
Project End Date	08/09/2017

Map Information
This map was generated using Copernicus Rapid Mapping Service (RMS) data. The data is provided as a service and is not intended for use in any other context. The data is provided as a service and is not intended for use in any other context. The data is provided as a service and is not intended for use in any other context.

Disclaimer
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Risk & Recovery Mapping

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Type of maps/analyses included in the Portfolio

- **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)

Who is activating?

- **Member states** triggering, since 2012 are: Germany, Portugal (including Madeira and Azores), Austria, Bulgaria, Poland, Greece, Spain, France, Finland, Croatia, Italy. Many activation were triggered by **DG JRC, DG ECHO** or **associated users** (mainly outside EU)



EMSN-039: Seismic risk assessment, Croatia

Service request 27/07/17

National Protection and Rescue Directorate on behalf of Croatian Crisis Management Association

Activation Context

- Croatia is one of the most vulnerable countries in Europe. The areas of the strongest seismic activity are also the areas of the largest population, economic and social importance.

Activation Objective

- To provide a general reference content to be used for the generation of risk assessment products including **hazard, exposure, vulnerability and risk maps for seismic, landslide and flood hazard.**

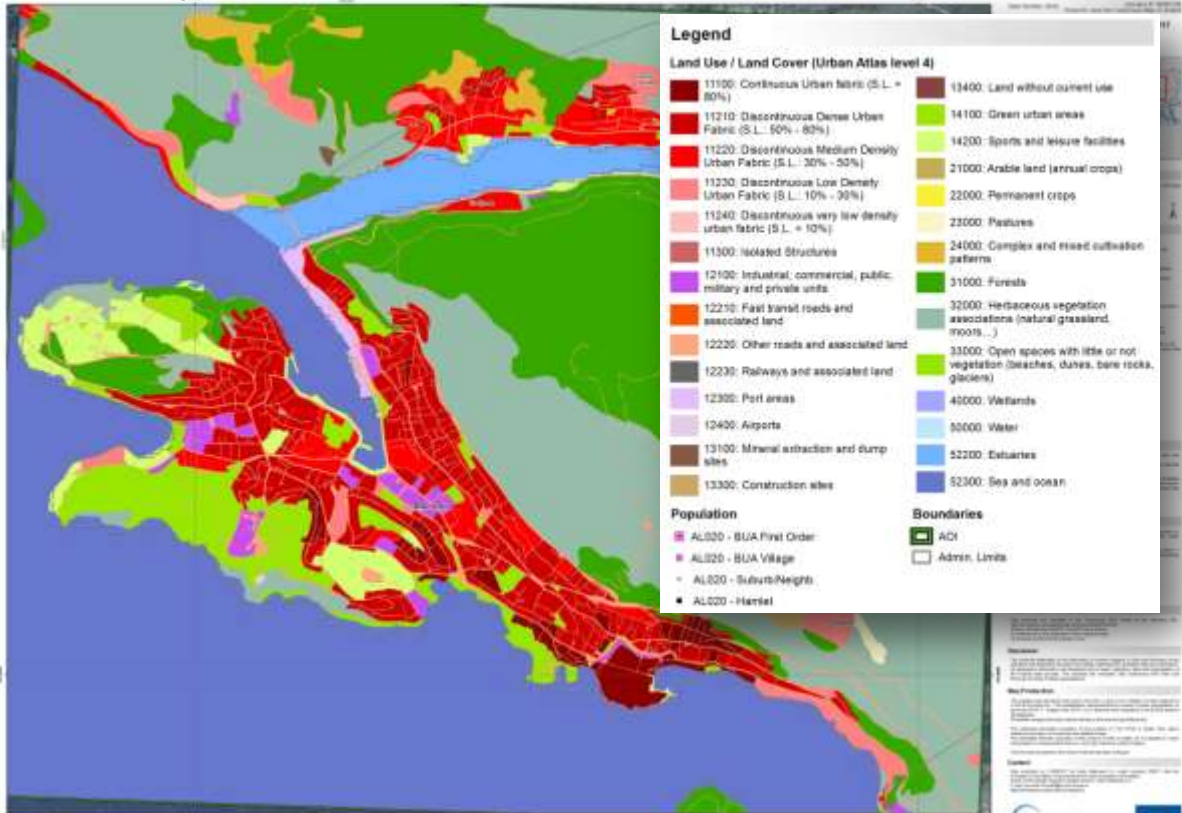
Products

- Risk assessment products, for four locations: Rijeka, Zagreb, Split and Dubrovnik:
 - **Seismic risk** Examples
 - Secondary landslide risk
 - Secondary flood risk (Zagreb)
- Mitigation measures with respect to all evaluated risks, evaluating and proposing adequate measures.



Risk & Recovery Mapping – Pre-disaster example

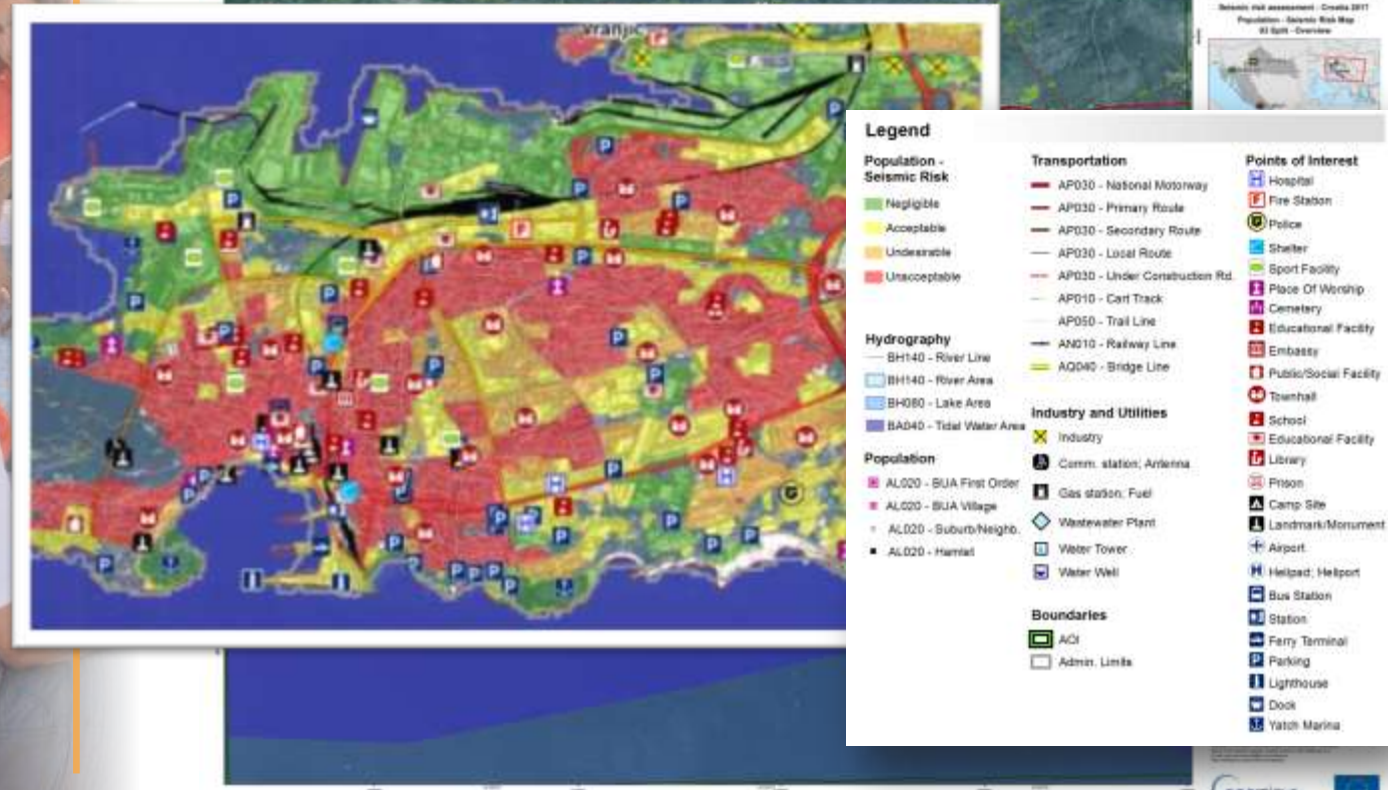
EMSN-039: Seismic risk assessment, Croatia Land cover/land use





Risk & Recovery Mapping – Pre-disaster example

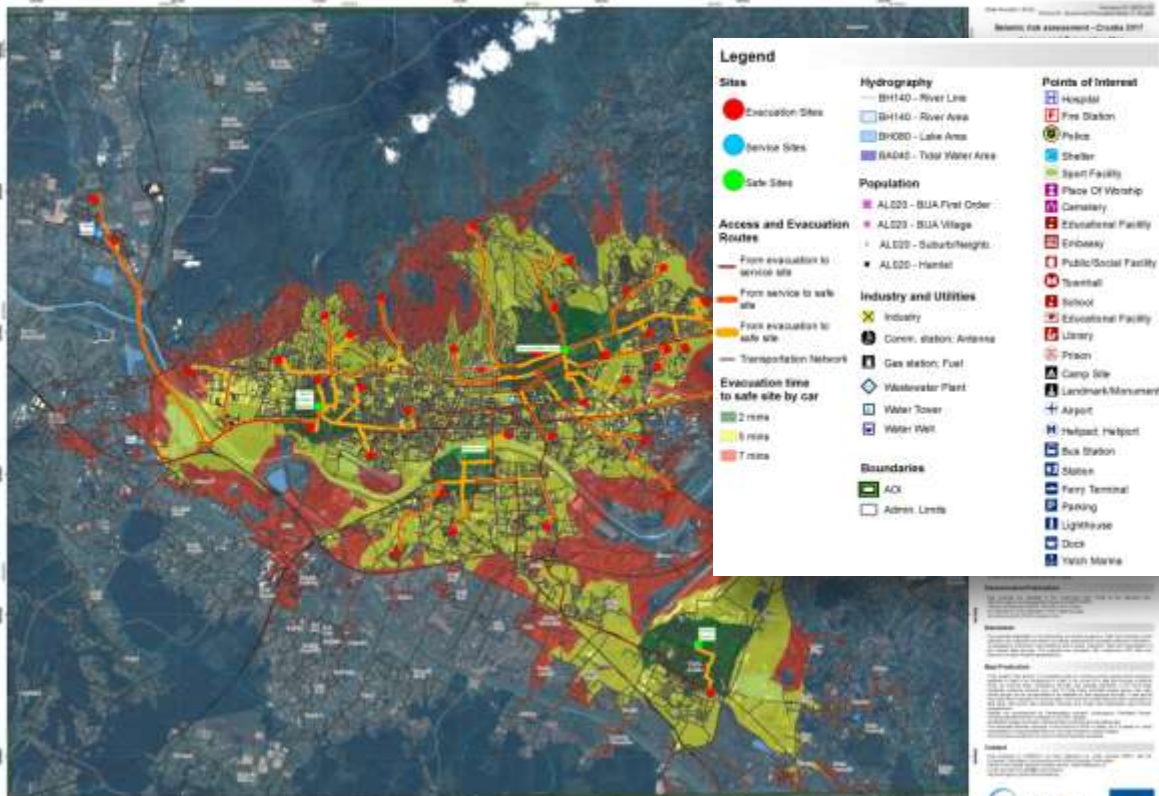
EMSN-039: Seismic risk assessment, Croatia Seismic risk to population





Risk & Recovery Mapping – Pre-disaster example

EMSN-039: Seismic risk assessment, Croatia Evacuation routes





EMSN034: Coastal flood risk analysis for population and assets, Portugal

AOI: 1: Caparica, Setúbal, Portugal

Service request 21/04/17:

Autoridade Nacional Protecção Civil (ANPC)

Scope

The scope of the service request EMSN-034 was to generate **pre-disaster situation analyses** and maps to provide thematic information supporting **planning for contingencies on vulnerable coastal areas in Caparica.**

Products

Examples

Flood risk maps considering hazard, exposure and vulnerability (physical, social, economic, environmental) with respect to assets and population. Two methodologies used (the one provided and one alternative considering physical and socio-economic vulnerability)

- Coastal erosion hazard maps
- Maps with mitigation measures, plans for disaster preparedness and response mechanisms
- UAV orthophotos and DSM



Risk & Recovery Mapping – Pre-disaster example

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EMSN034: Coastal flood risk analysis for population and assets, Portugal



Legend

Risk Level (%)
Occasional Scenario
(Methodology #1)

Return period - T = 25 years

- 40 - 125 - Unacceptable
- 15 - 30 - Undesirable
- 4 - 10 - Acceptable
- 1 - 3 - Negligible



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Copernicus Data Policy Principles

To maximize the use of value-added information produced by Copernicus, the data is made available to the public on a **full, open* and free of charge basis**.

Public Authorities can access the **imagery** which are or were used during any of the Rapid Mapping and Risk & Recovery Mapping activations, upon registration and signature of the applicable Terms and Conditions.

*However, under exceptional circumstances, dissemination restrictions may be imposed for security reasons or the protection of third party rights



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Who can use CEMS Mapping services?

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 Authorised 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 Copernicus EMS portal



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More information

Copernicus EMS Mapping service:
www.emergency.copernicus.eu/mapping

Copernicus Support Office
support@copernicus.eu

For activating Copernicus EMS
contact ERCC at
echo-ercc@ec.europa.eu

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