EUROPEAN
CRISIS MANAGEMENT
LABORATORY

JRC for NEAMWAVE 2026

JRC Information on existing tools and applications

19 February 2026, 10:00-11:30 (CET)

European Commission

NEAMWave 26 – selected scenario for phase C

European Crisis Management Laboratory

Virtual tour: https://joint-research-centre.ec.europa.eu/laboratories-and-facilities/european-crisis-management-laboratory_en

Emergency Response Coordination Centre

Story map: https://storymaps.arcgis.com/stories/0a88b4c2a84c468295d98e8f5627843d

- **SN-05: 24 Mar, NE Atlantic Ocean: Joint scenario by IPMA & CENALT** (8.5 Mw, 36.64°N, 11.80°W) as per exercise manual
- **JRC will participate playing its usual role in real life emergencies**, i.e. to support with scientific knowledge and advice the ERCC and the Union Civil Protection Mechanism through it.

JRC tools and applications for tsunami events analysis

- GDACS rapid impact estimation
- ECHO Daily Flash and Map
- GSS dedicated view
- WebCritech (i) World Sea Level Database (ii) Sea Level Machine (iii) TAD – Tsunami Alert Device
- Copernicus Emergency Management Service (CEMS) activation

GDACS rapid impact estimation

➢ **Event summary** with key event parameters

➢ **GDACS score**

In general, GDACS events are produced automatically or semi-automatically for each hazard independently, using dedicated algorithms and the data available, **with expert supervision**. Every event on GDACS features a score and color, based on the **estimated risk that the given event poses to the exposed population and affected area**.

For EQ and TS, the following risk components are considered:

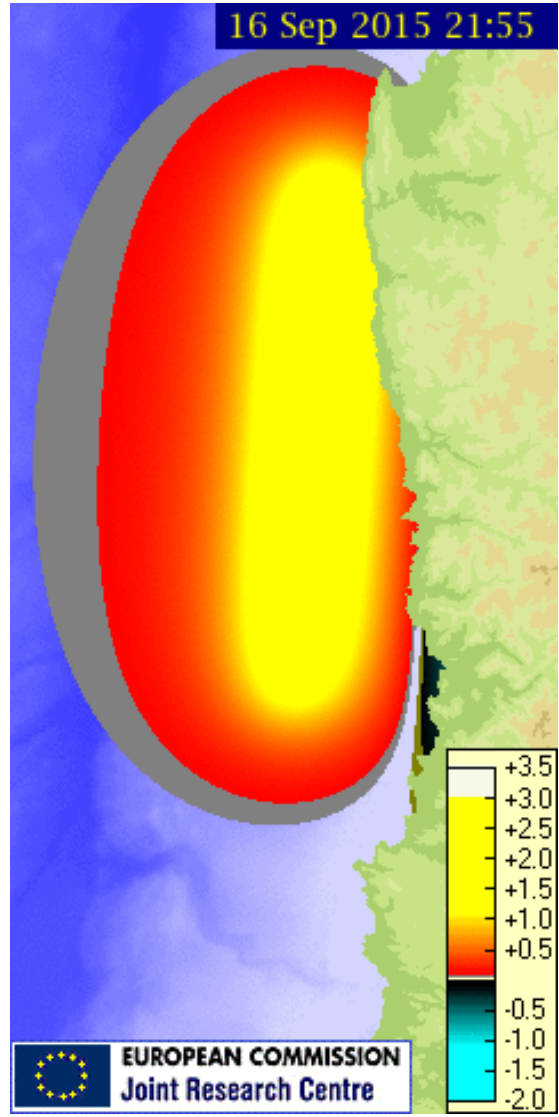
- The **intensity of the physical hazard**, such earthquake magnitude, depth, MMI etc.;
- The **exposure to this hazard** in terms of the population and infrastructure potentially affected by it;
- The **humanitarian vulnerability of the potentially affected countries**, estimated with coefficients based on historical fatalities in the affected area;
- The **coping capacity of the potentially affected countries or subnational units** (when available), estimated with socio-economic variables from INFORM.

GDACS notifications are not meant to override or replace alerts or information from local or national civil protection authorities. Expert assessment of the situation and evacuation and response plans must always be carried out by competent decision-makers in designated positions of authority. Instead, GDACS provides the international humanitarian response community and any other national or international entity with a global situational awareness platform about ongoing or imminent natural disasters.

GDACS rapid impact estimation

For tsunami events:

- **Extraction of the impact estimation in 10 to 20 minutes** after the EQ, based on epicentre location, magnitude, depth
- Fault form and the fault movement normally not considered but can be used via **WebCritech Tsunami Analysis Tool (TAT)**
- Propagation calculation using the **HySea model**, developed by Malaga University.
- Model is triggered by EQ **of M ≥ 6.2 occurring under water or inland within 40 km from the coastline**.
- In case a new estimation of the EQ is done (location, magnitude or depth) a new tsunami calculation is triggered.
- The tsunami score is based on the calculated **maximum wave height estimated at any calculated point**.
- In case the HySea calculation system failed to calculate on the fly a potential event, a tsunami database of pre-calculated parameters is queried, and outputs are used to look up a tsunami wave height from the JRC Tsunami Database (containing over 132000 scenarios).
- The bathymetry is chosen to limit the computing time: as the magnitude of the event increases, the resolution decreases in order to reduce the computing time and cover the whole geographical domain involved.

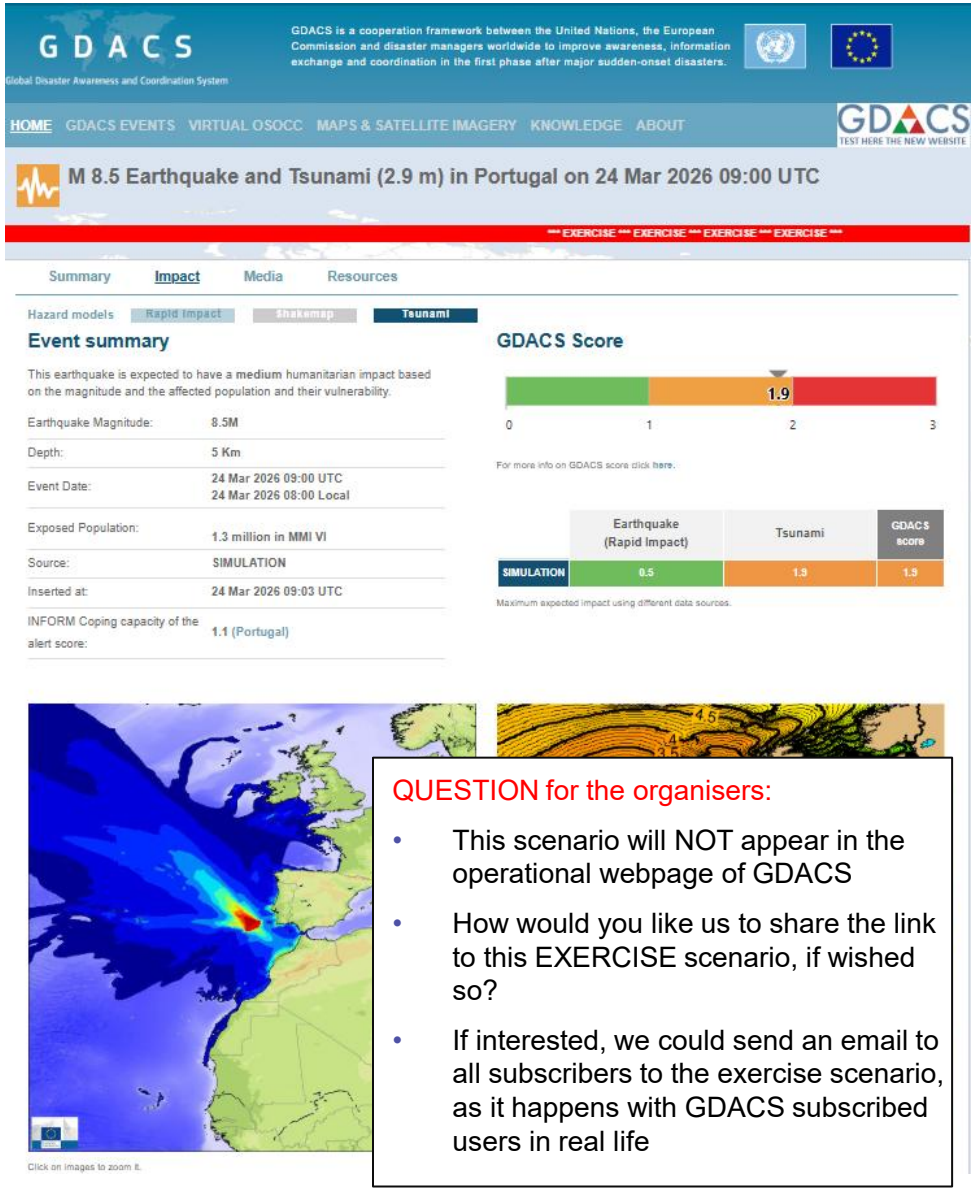


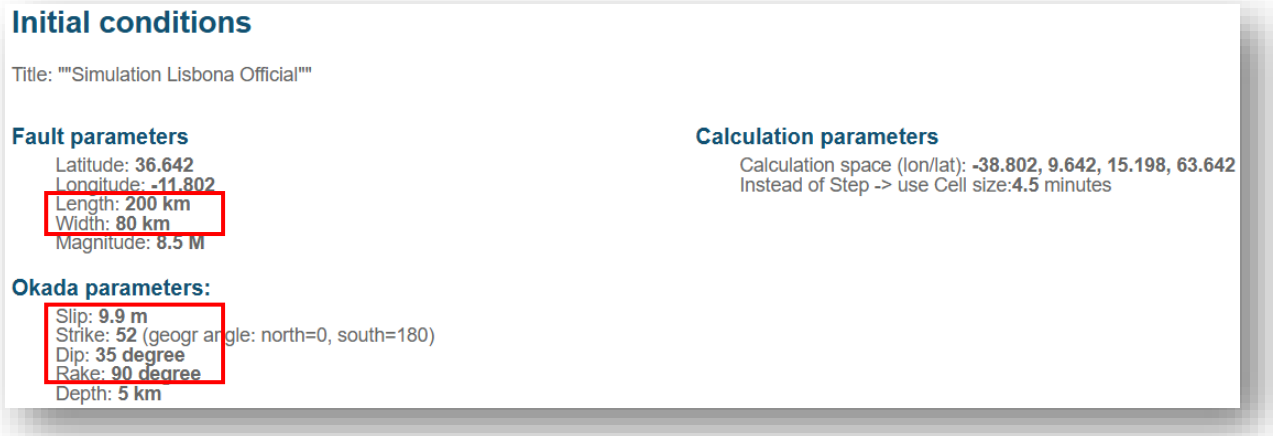
GDACS Alert Level	GDACS Alert score [Tsunami]	Maximum wave height at coast (m)
RED	Above 2	≥3
ORANGE	from 1 to 2	≥1 & <3
GREEN	from 0 to 1	>0 & <1

Source: GDACS.

GDACS rapid impact estimation for NEAMWAVE 2026

- GDACS rapid impact estimation:
  - Event summary with key event parameters
  - GDACS score
  - Calculated tsunami wave height and travel times
  - Tsunami affected locations (expected arrival time and wave height)
  - GTS messages with tsunami measurements, when available





QUESTION for the organisers:

- This scenario will NOT appear in the operational webpage of GDACS
- How would you like us to share the link to this EXERCISE scenario, if wished so?
- If interested, we could send an email to all subscribers to the exercise scenario, as it happens with GDACS subscribed users in real life

Example from exercise of 10 March 2021

Global Telecommunication Service

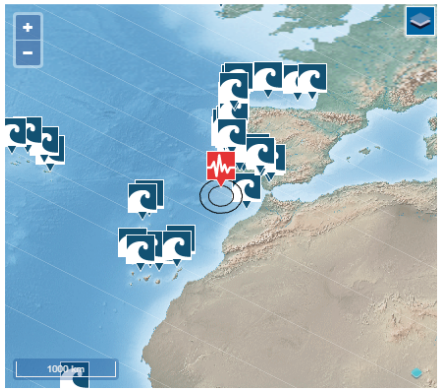
GTS (Global Telecommunication Service) is the official Warning and Alerting channel by the World Meteorological Organization (WMO) adopted by several Warning Organizations. As soon as a new GTS message regarding Tropical Cyclones(WT) or Tsunami(WE) the messages are processed and possibly assigned to the specific event. When a new GTS message is present an new tab in the specific event report page is present.The presence of a GTS message is shown in the homepage with a dedicated icon.

Click on the messages list to visualize on the right the detailed text.

Measurements Levels

Source

SOURCE	GAUGE LOCATION	LAT	LON	TIME (UTC)	HEIGHT (m)	PERIOD (min)
IPMA	Sagres (Portugal)	37.01	-8.93	09:22	**2.56**	51
IPMA	Lagos (Portugal)	37.08	-8.68	09:31	**2.17**	57
IPMA	Sesimbra (Portugal)	38.44	-9.11	09:34	**1.67**	31
IPMA	Sines (Portugal)	37.95	-8.89	09:37	**2.58**	43
IPMA	Cascais (Portugal)	38.69	-9.42	09:40	**2.4**	36
IPMA	Arrifana (Portugal)	37.3	-8.87	10:00	**4.19**	22
IPMA	Faro (Pt)	36.98	-7.87	11:09	**2.46**	37



10/03 14:02 WENT40LPMG101400
10/03 13:18 WENT40LPMG101317
10/03 12:05 WENT40LPMG101204
10/03 11:01 WENT40LPMG101100
10/03 10:41 WEMQ40LFPW101033
10/03 10:22 WEMQ40LFPW100959
10/03 10:13 WENT40LPMG101012
10/03 10:02 WENT40LPMG101000
10/03 09:52 WEMQ40LFPW100937
10/03 09:28 WENT40LPMG100926
10/03 09:13 WEMQ40LFPW100908
10/03 09:08 WENT40LPMG100907

2021-03-10 14:02 message from IPMA link

Key information extracted from original GTS message :

Evaluation Watch

- Sea level readings indicate a TSUNAMI was generated
- Observations and models indicate that no more TSUNAMI waves are expected
- When no major waves are observed for two hours after the estimated time of arrival or damaging waves have not occurred for at least two hours then local authorities can assume the threat is passed
- Danger to boats and coastal structures can continue for several hours due to the continuing sea level changes and rapid currents
- As local conditions can cause a wide variation in TSUNAMI wave action the all clear determination must be made by local authorities
- This will be the final message issued for this event unless additional information becomes available

Original Message :

```
WENT40 LPMG 101400
TSUNAMI EXERCISE MESSAGE NUMBER 008
NEAM IPMA TSUNAMI SERVICE PROVIDER
ISSUED AT 1400Z 10 MAR 2021

... END OF TSUNAMI WATCH ...
THIS ALERT APPLIES TO BELGIUM ... CAPE VERDE ... DENMARK ... FRANCE ... GERMANY ...
ICELAND ... IRELAND ... MAURITANIA ... MOROCCO ... NETHERLANDS ... NORWAY ... PORTUGAL ...
SPAIN ... SWEDEN ... UNITED KINGDOM

THIS MESSAGE IS ISSUED AS ADVICE TO GOVERNMENT AGENCIES. ONLY
NATIONAL AND LOCAL GOVERNMENT AGENCIES HAVE THE AUTHORITY TO MAKE
DECISIONS REGARDING THE OFFICIAL STATE OF ALERT IN THEIR AREA AND ANY
ACTIONS TO BE TAKEN IN RESPONSE

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 0900Z 10 MAR 2021
COORDINATES - 35.57 NORTH 9.89 WEST
DEPTH - 27 KM
```

QUESTION for the organisers:

- The GTS messages of NEAMWAVE26 will be issued via the official GTS comms channels?
- And will they respect the official denomination code?

ECHO Flash and Daily Map

Flash Items 1-10 of 32

ME | INTERNATIONAL | 12 December 2025 | Published

Japan - Earthquakes

(GDACS, USGS, JMA, media)

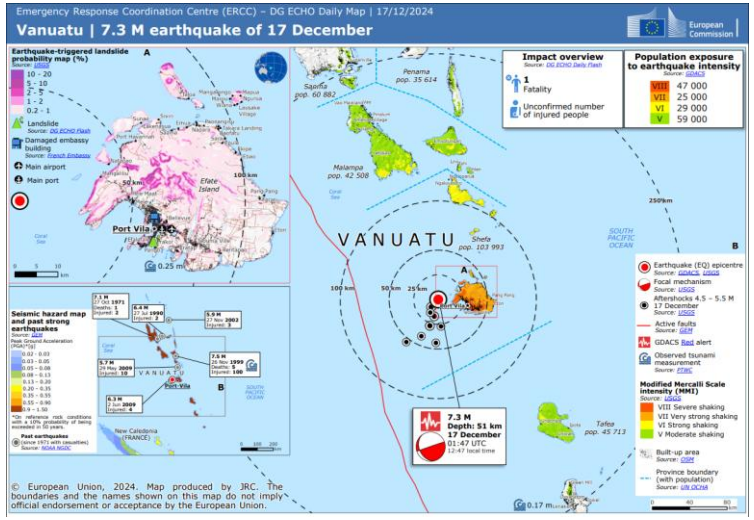
- A new strong earthquake of 6.7 M (revised to 6.9 M, according to the Japanese authorities) occurred at a depth of 10.7 km off the eastern coast of northern Honshu island, northern Japan on 12 December at 2:44 UTC (12:44 local time). The epicentre was located in the Northwest Pacific Ocean, approximately 115 km east of the city of Rokkasho, Aomori prefecture, in the same area as the previous 7.6 M earthquake that occurred on 8 December. The event was followed by two aftershocks of 5.5 M and 4.7 M in the area.
- For the main event, USGS PAGER estimates up to 127,000 people were exposed to moderate shaking. Tsunami advisories were issued along the eastern coasts of Hokkaido and Aomori prefectures soon after the main event and were lifted early in the morning (local time) of 12 December. The Japan Meteorological Agency reported observed tsunami waves up to 20 cm across both the aforementioned prefectures.
- Japanese authorities and media reports, as of 12 December, state that evacuation orders were issued for around 6,000 people across 180 municipalities throughout Hokkaido and Aomori prefectures.

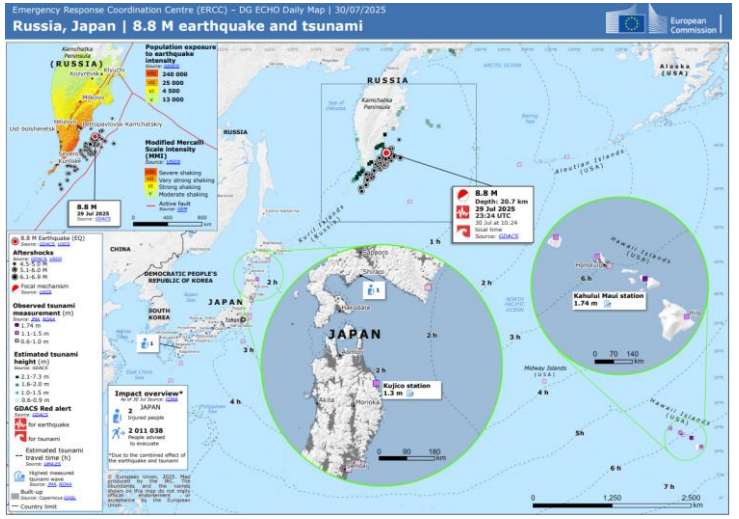
Main Event Type Earthquake

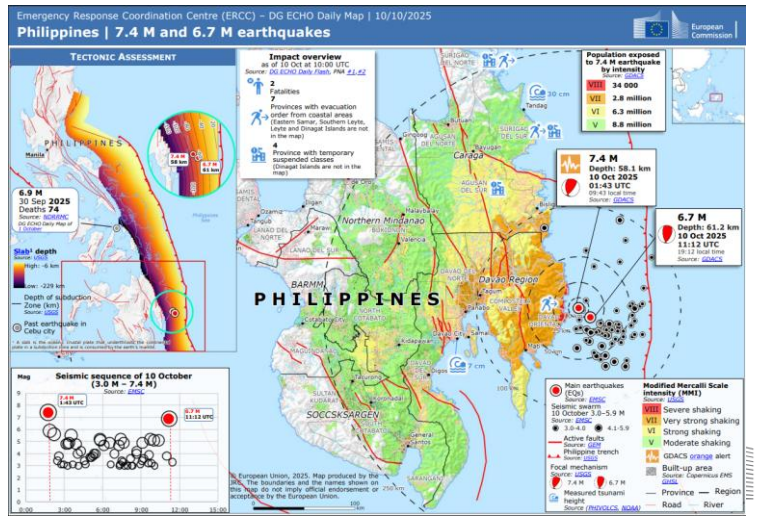
Event Types Tsunami

Countries Japan

Examples from past tsunami events

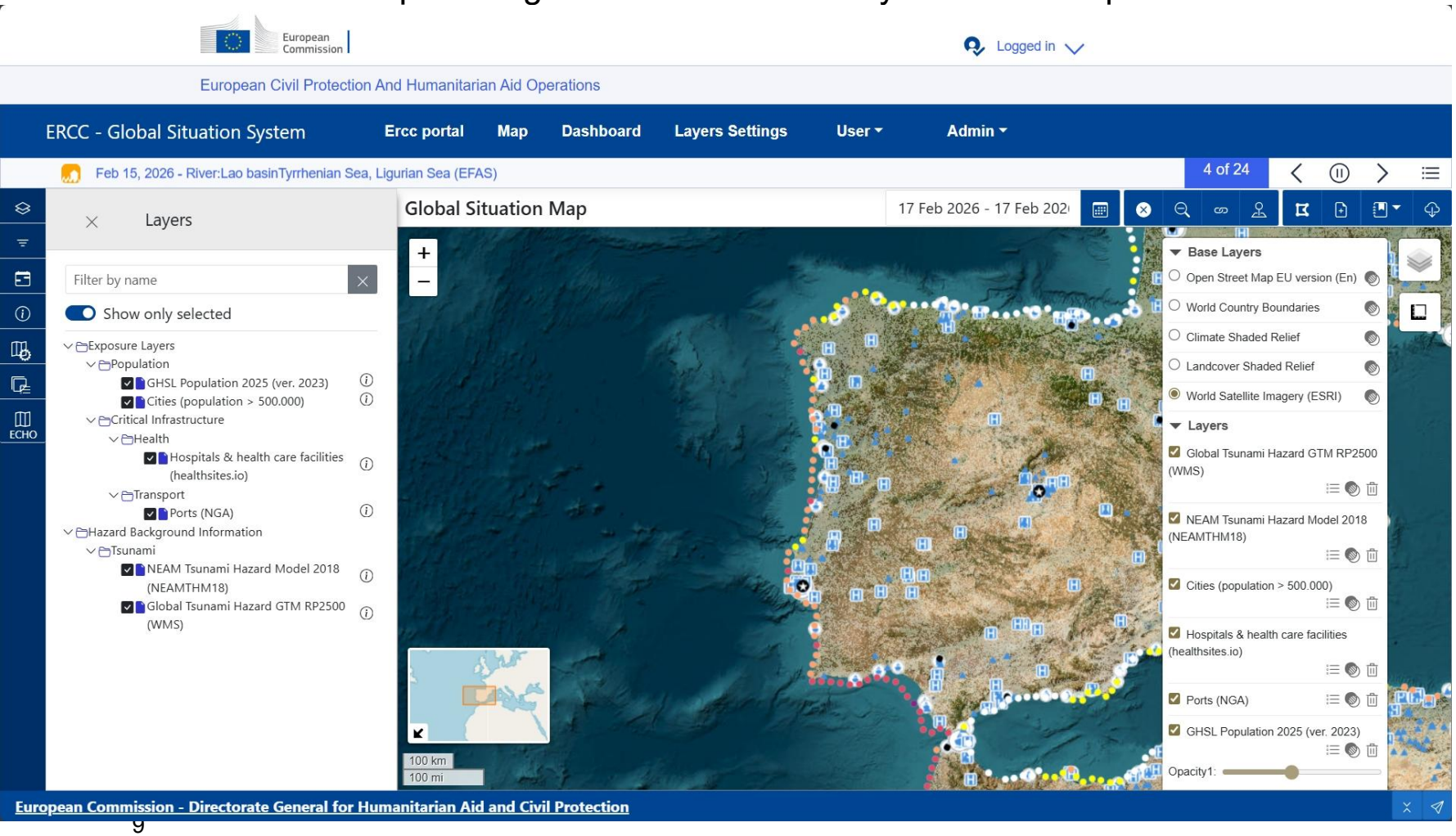


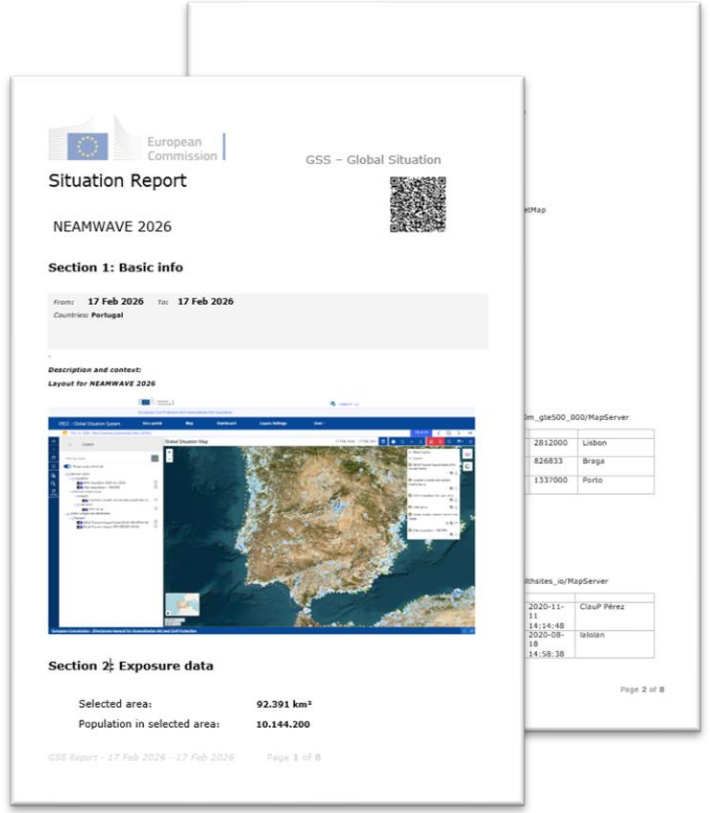




GSS dedicated view

Dedicated View with preconfigured resources directly loaded in map



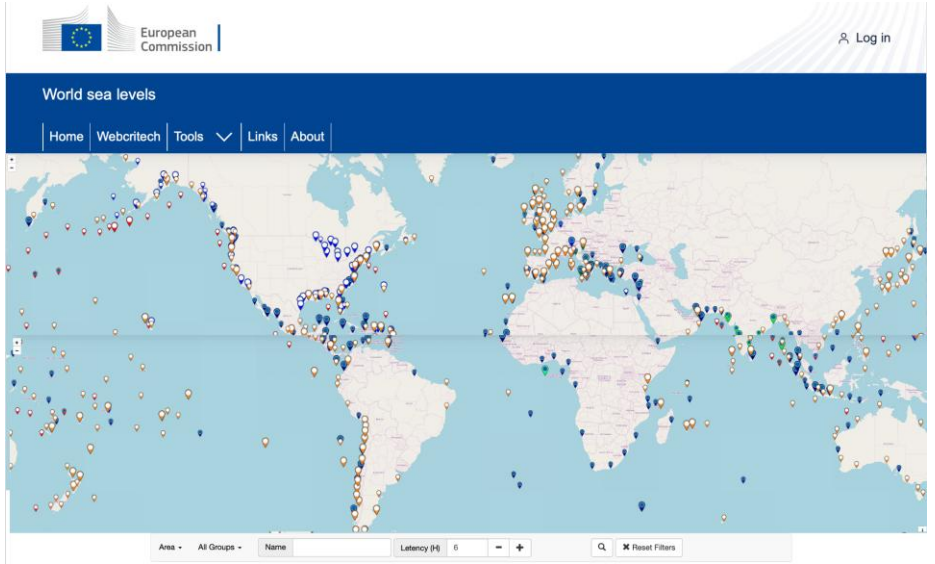


Extraction of an editable word report based on map content and selected area

https://erccportal.jrc.ec.europa.eu/gss/

WebCritech

WebCritech is made of two main components:



- **Sea level data acquired from multiple providers** (GLOSS, IPMA, ISPRA, NOAA, NOA, etc.) collected via web scraping and stored in the **World Sea Levels (WSL) Database**. Before being stored in the WSL database, data are normalized in a standardized structure, thus offering an homogenous overview of more than 700 devices, grouped by provider and displayed on a map. Users can access technical information about each device, including its location and historical statistics. The data stored in the World Sea Levels (WSL) Database are used in various applications, including the GDACS tsunami impact estimations.

- The **Tsunami Analysis Tool (TAT)** integrates near real-time sea level data available in the WSL Database to calculate tsunami wave propagation and impact based on EQ parameters. This tool allows to calculate the estimated wave height and travel time of a tsunami using i) pre-event calculated tsunami scenario grid containing 136 000 calculations based on historical tsunami events or ii) ad-hoc scenario automatically calculated in near-real-time by HYSEA algorithm immediately after an earthquake is classified in GDACS as capable of inducing a tsunami.

Sea level data from WebCritech are analysed and displayed on the **Tsunami Alerting Devices (TAD)**, which consists of an electronic board installed in vulnerable areas to warn the population about impending disasters. It has been successfully tested in Mediterranean sea, Indonesia, and in the first instance, Portugal.

Since 2020, JRC is not maintaining the IDSL network anymore, but provides only the remote support to the Member States of NEAMTWS to maintain the stations.

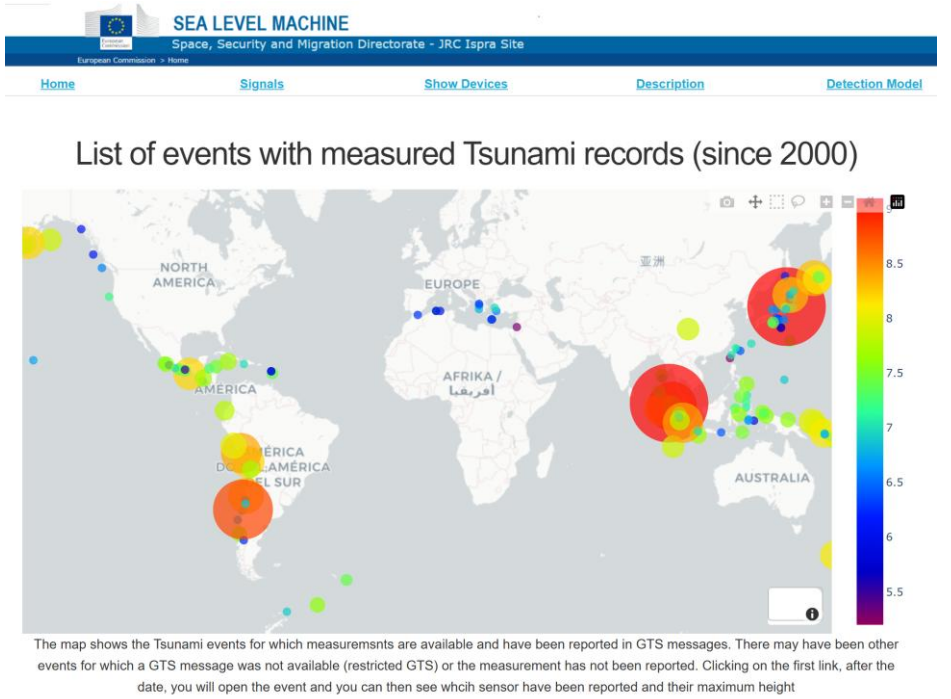
Sea Level Machine

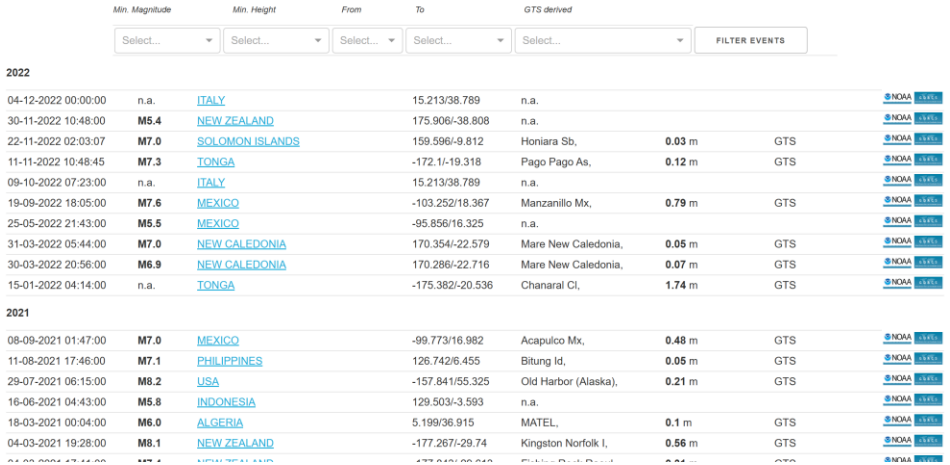
The Sea Level Machine is a web site that provides visualization and basic analysis (amplitude and period reading) of all the sea-level recordings from Tsunami events occurred since year 2000 globally

The data are obtained from the NOAA NGDC database.

For each event the corresponding report in the Global Disaster Awareness and Coordination System (GDACS) is identified and connected. This allows extracting the GTS message that were produced by the Tsunami Service Providers for that event, and that are stored in the GDACS database.

https://www.ngdc.noaa.gov/hazard/tsu_db.shtml
http://www.gdacs.org



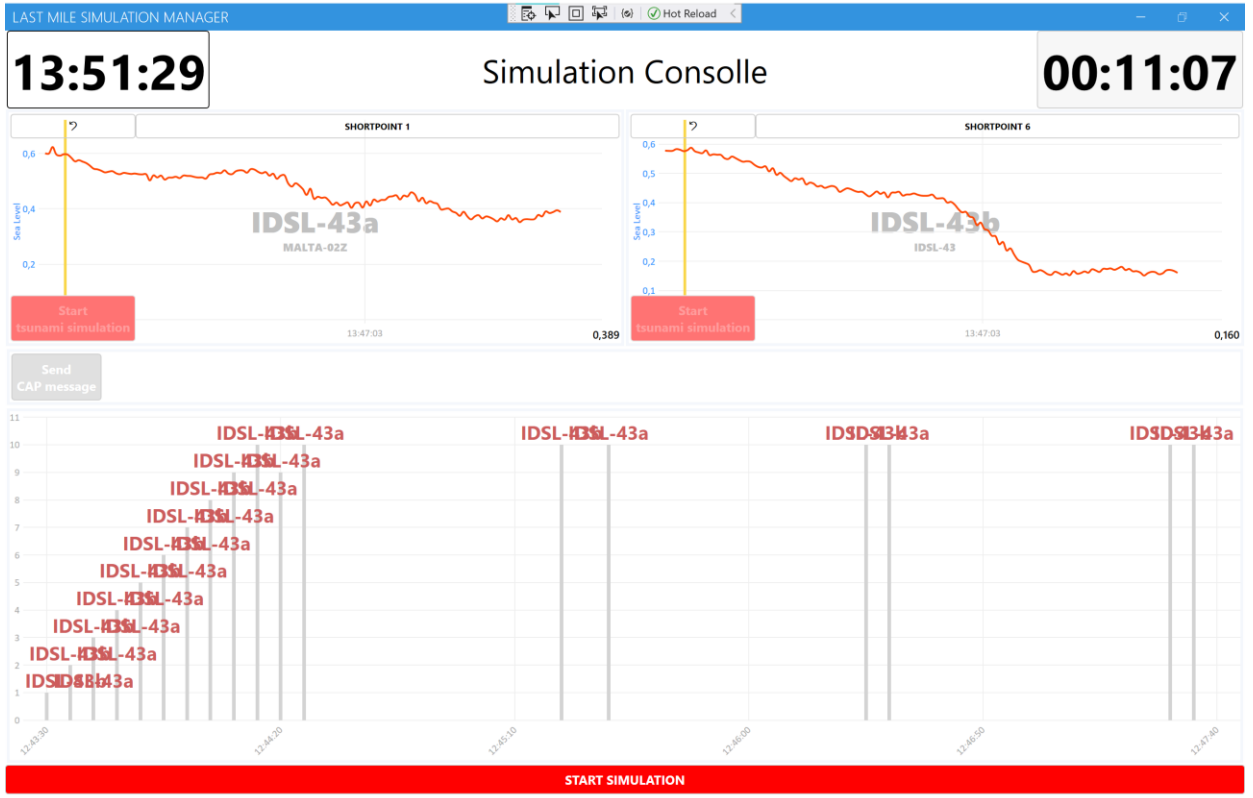


Simulated devices

Based on the software running the IDSL, simulated devices can provide simulations of real-time sea level measurements.

The same technique was used in previous exercises, where the simulated devices were integrated in the awareness network first, and in the alert network also.

The system is also able to dispatch alerts in CAP format during the exercise.



Call for action: converting WebCritech into a research-oriented platform

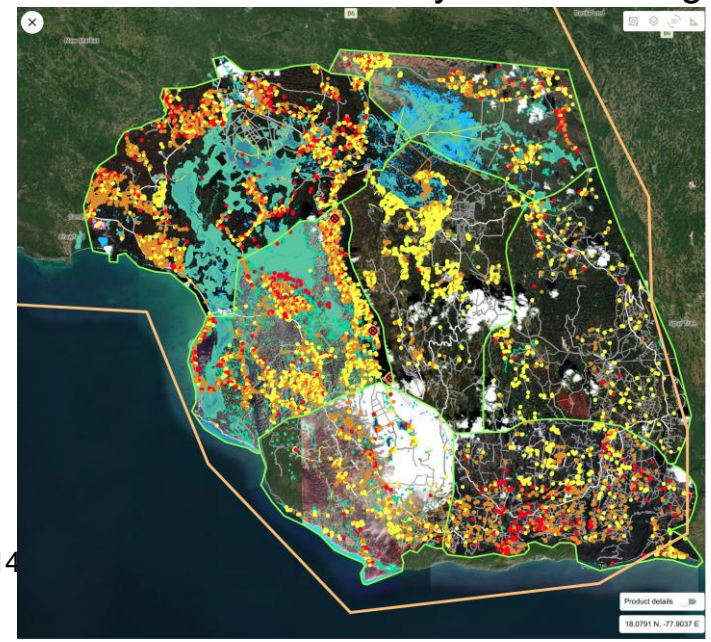
- **The WebCritech platform is the result of almost 20 years of research** to support the operational functions of the Tsunami Service Providers.
- WebCritech represents today the **access to a huge database of sea level measurement homogenized among a plethora of different instruments and providers at a global scale.**
- **JRC decided to gradually convert WebCritech** from a platform aimed at supporting the Tsunami Service Providers **to a more "research-oriented platform“ for academic institutions**, maintaining its links to the sea level measurements providers globally and to GDACS.
- Investing on the more scientific aspects while keeping, and improving, the real-time feature of WebCritech, it will help **to strengthen the cooperation between JRC and the NEAMTWS of UNESCO**, maintaining a central role in the scientific and technical support to the Member States.
- **Therefore JRC plans to revamp the Webcritech platform** by enhancing useful core functionalities and creating a single access point for data collection, visualization, analysis and dissemination, and models validation.

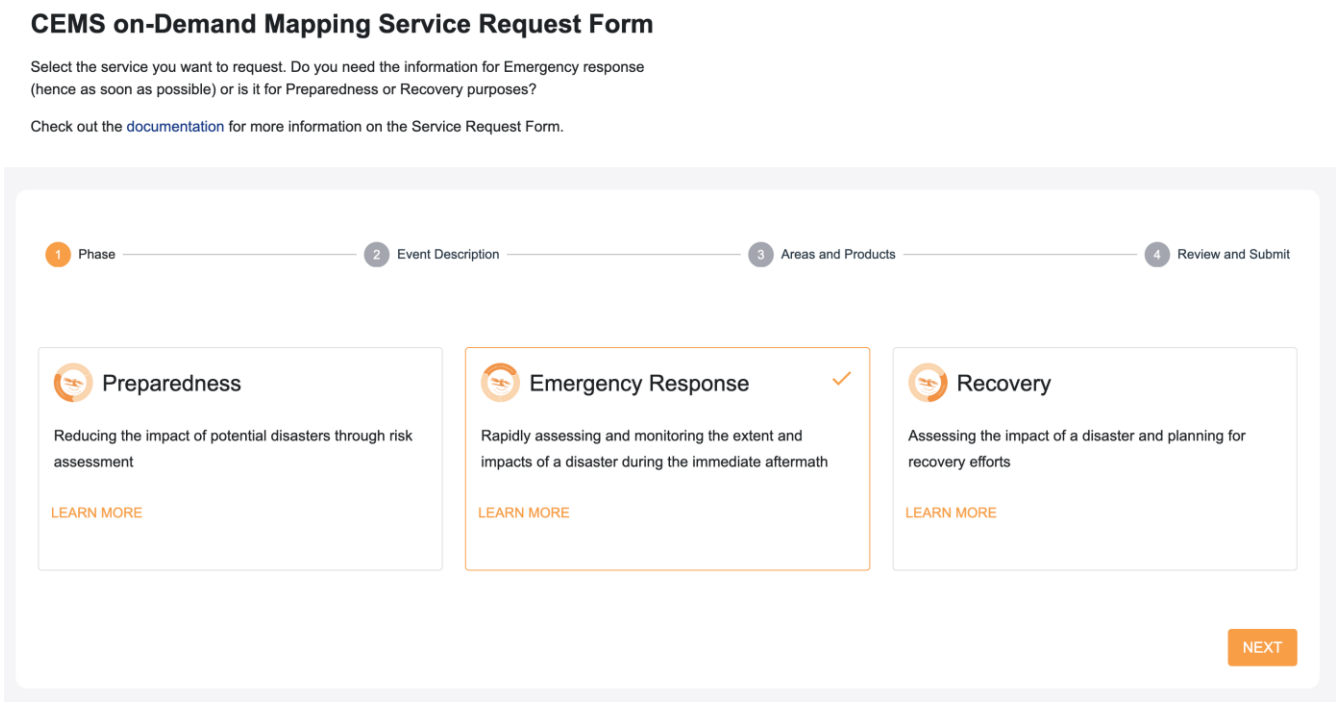
The JRC invites interested scientists from the ICG NEAMTWS community to join the ECML as Unpaid Visiting Scientists. They will have the opportunity to work with ECML team in Ispra, Italy, for a period of up to one year, collaborating on our efforts on WebCritech and contributing with their expertise.

Copernicus Emergency Management Service (CEMS)

Emergency Reponse: Triggering the Rapid Mapping Activation

- Fast damage assessment to coastal cities in the immediate aftermath of the Tsunami or Earthquake from satellite
- How to trigger the activation
- What and when to expect the analysis
  - Confirmation email
  - Data availability and aerial flights

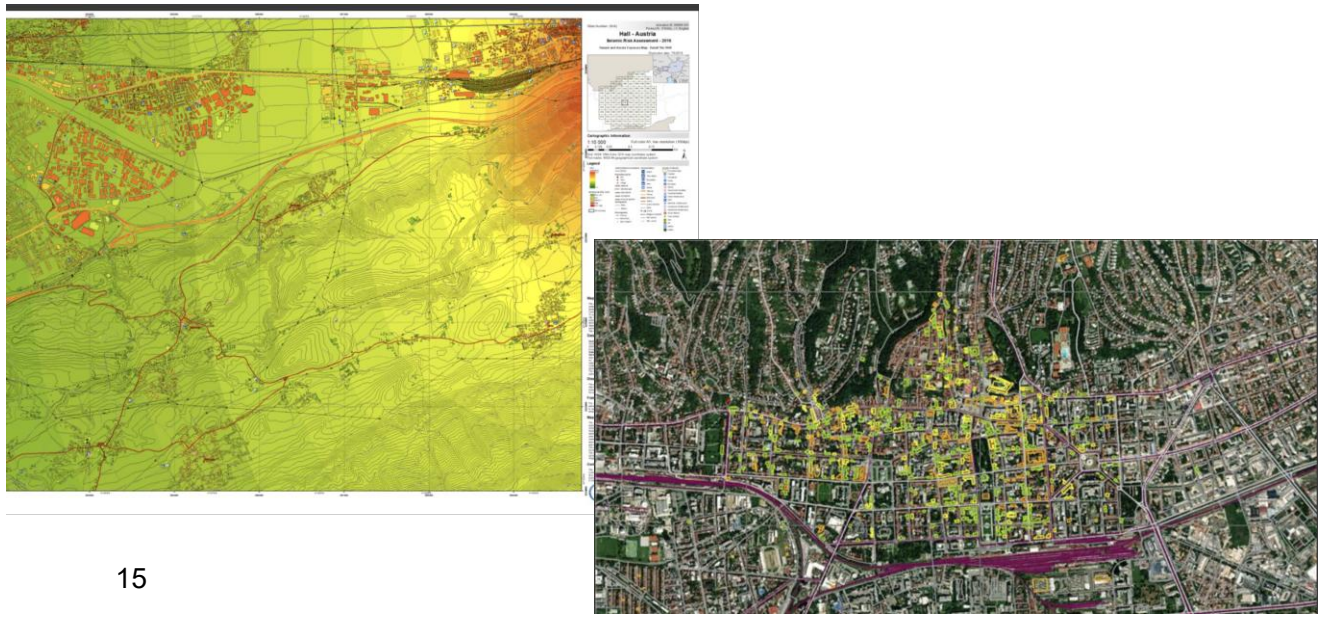


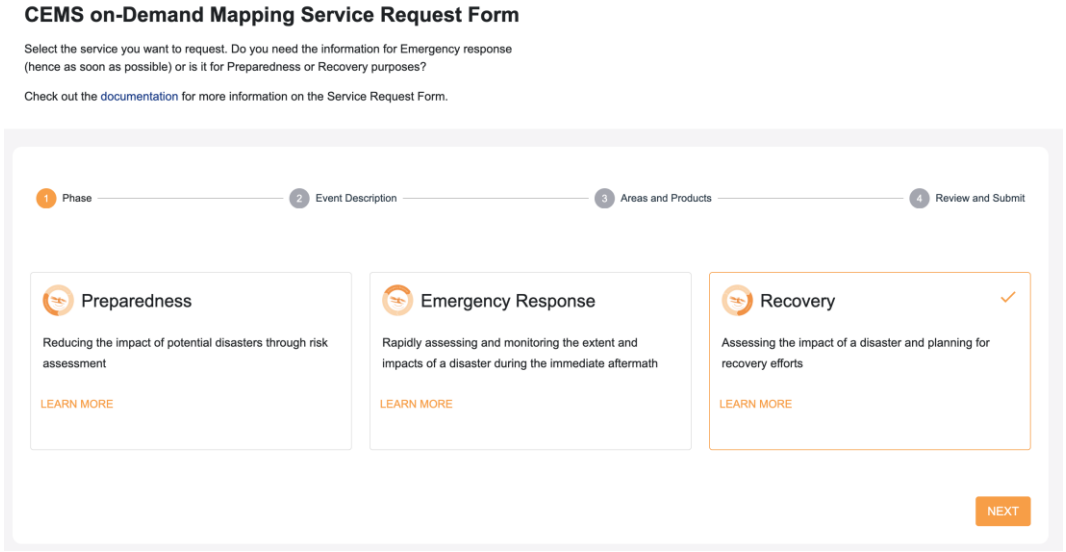


Copernicus Emergency Management Service (CEMS)

Preparedness or Post Disaster: Triggering the Risk & Recovery Mapping Activation

- Preparedness and Risk Assessment
- Post Event Reconstruction Monitoring
- How to trigger the activation
- What and when to expect the analysis





Thank you

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