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TAFF

Technical Assistance Financing Facility for Disaster Prevention and Preparedness

BLOCK 2: Strengthening Early Warning Systems and Outreach

TAFF Workshop
Brussels, October 2-3, 2025

BLOCK 2

Day 1 – Thursday, October 2, 2025

13:00 – 14:30

Inspire Room

BLOCK 2: Strengthening Early Warning Systems and Outreach

A series of presentations (15 min each) will feature the latest knowledge on the topic as well as examples (project highlights) of strengthening early warning systems and outreach. The examples will follow a shared template highlighting strategic and operational contribution, knowledge/ innovation, and lessons learnt (what worked well, what could be improved, and key take-aways for other countries).

- **Sari Lappi**, Coordinator, Regional Office for Europe, WMO
- **Eric Guyader**, EWSS Manager (Defence Industry and Space, DEFIS)
- **Dan Titov**, Head of the IT Department at the State Hydrometeorological Service of the Republic of Moldova
- **Denis Chang Seng**, Programme Specialist Tsunami Resilience Section UNESCO-IOC

Seconds that Save - Modernizing Early-Warning and Reaching the Last Mile

Sari Lappi
World Meteorological Organization

WORLD METEOROLOGICAL ORGANIZATION

TAFF
Technical Assistance Financing Facility for Disaster Prevention and Preparedness

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https://www.gfdrr.org/en/taff

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EUROPEAN STATE OF THE CLIMATE
REPORT 2024

Trends in Climate Indicators

Climate indicators show the long-term evolution of several key variables that are used to assess global and regional trends in a changing climate.

Sea surface temperature

Increase since the 1980s

Global (60°S–60°N) **+0.6°C**

WMO Regional Association VI (Europe) **+1.0°C**

Mediterranean Sea **+1.3°C**

Latest five-year averages

Ocean heat content*

Increase since 1993

Global **+0.16°C**

Northeastern Atlantic **+0.03°C**

In the upper 2000 m

Sea level

Average annual increase since 1999

Global **+3.7 mm**

European **+2–4 mm**

January 1999 to July 2024

Temperature

Increase since pre-industrial (1850–1900)

Global **+1.3°C**

European **+2.4°C**

WMO Regional Association VI (Europe) **+2.5°C**

Arctic **+3.3°C**

Latest five-year averages

Greenhouse gases

Average annual increase since 2020

Carbon dioxide **+2.4 ppm**

Methane **+12 ppb**

Averaged over the whole atmospheric column for 60°S–60°N

Sea ice

Ice loss since the 1980s

Arctic (September) **-2.7 million km² (-36%)**

Antarctic (February) **-0.7 million km² (-20%)**

Last five years, relative to 1980s

Glaciers

Ice loss since 1976

Global **-9200 km³**

European **-915 km³**

Ice loss for Europe does not include peripheral glaciers in Greenland

Ice sheets

Ice loss since the 1970s

Greenland **-6776 km³**

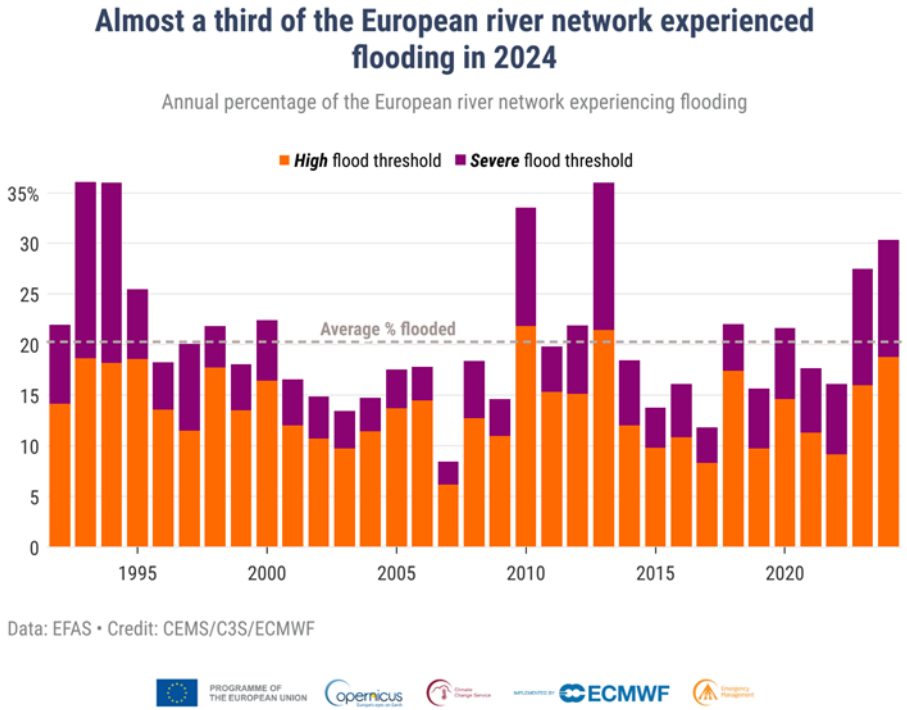
Antarctica **-5253 km³**

1972–2023 for Greenland, 1979–2023 for Antarctica

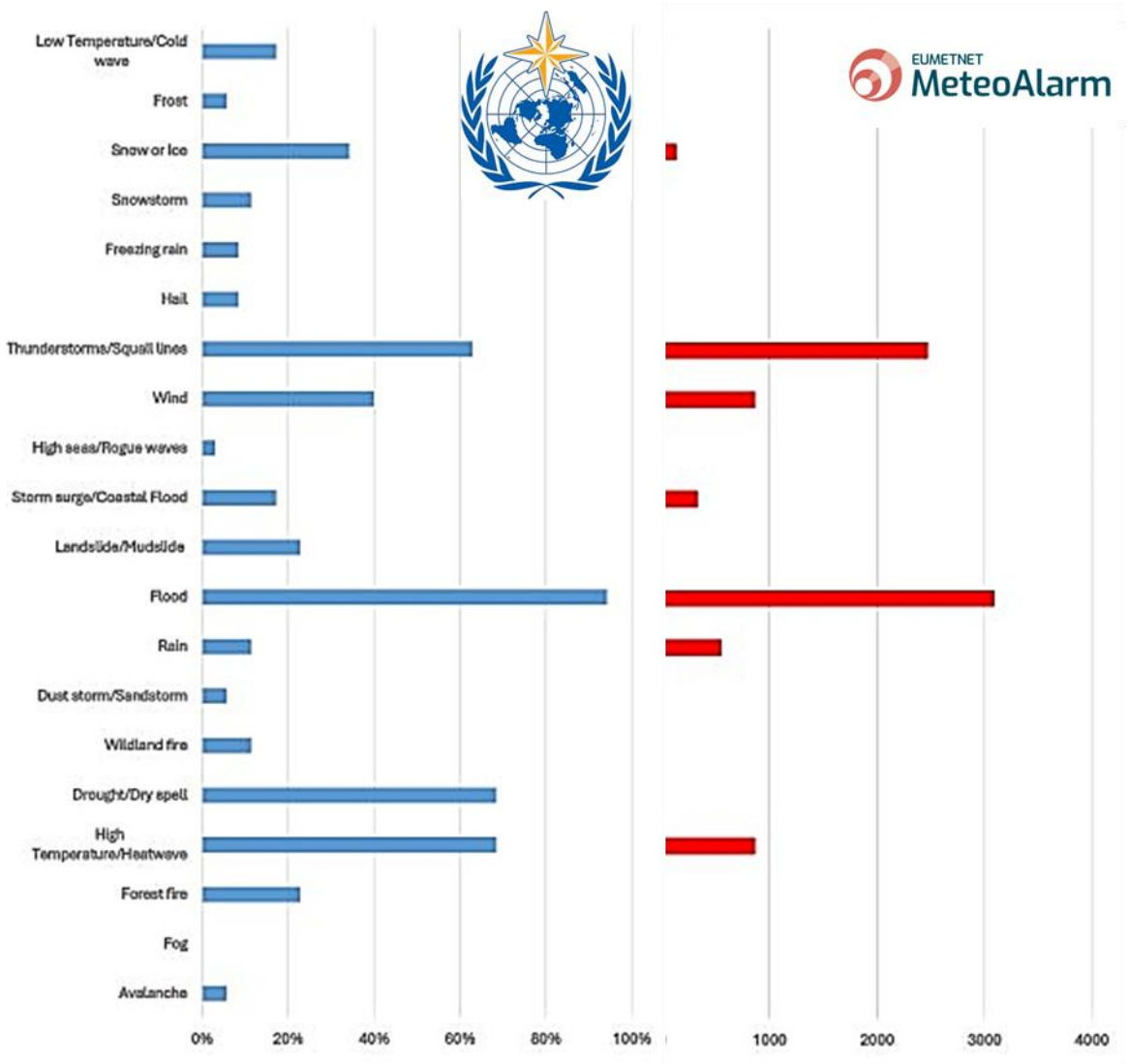
*Ocean heat content is traditionally expressed in joules, as it represents the total energy stored in the ocean. To provide a more intuitive understanding of temperature-related changes, this report presents these statistics in °C.

PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
Climate Change Service
IMPLEMENTED BY ECMWF
WORLD METEOROLOGICAL ORGANIZATION

Weather and climate related hazards in Europe

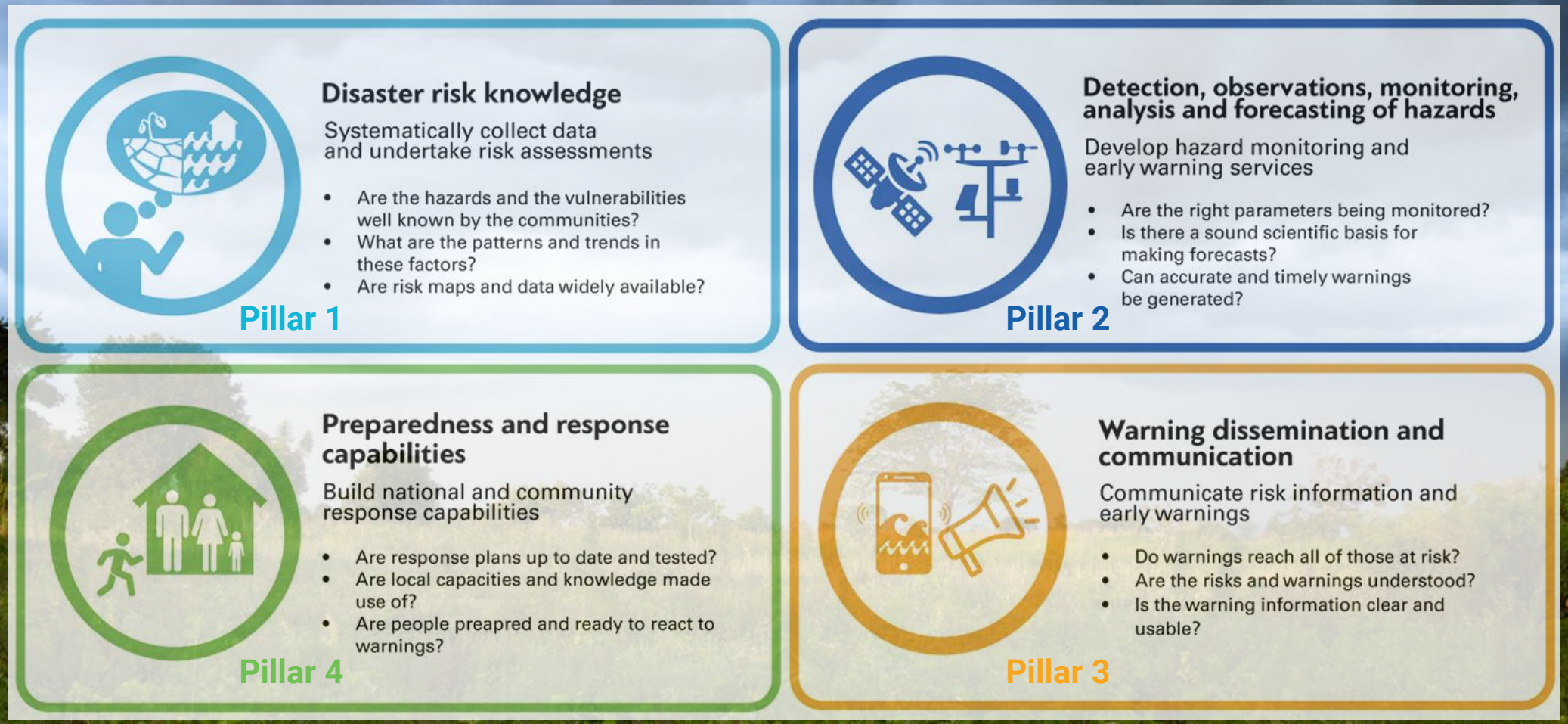


Percentage of the European river network that exceeded the 'high' (orange) and 'severe' (purple) flood thresholds during 1992–2024 (European State of the Climate 2024 report)



1st graph: Percentage of WMO Members having identified the hazard as their top 5 national priority (2024). Second graph: Total numbers of red warnings in 2023

Early Warnings for All: Structure & Objectives



NMHSs are essential for EWSs

Role of National Meteorological and Hydrological Services:

- Develop modern **infrastructure** and capacity to maintain high standards of observations and data;
- Prepare and deliver high quality **early warnings** and **impact-based forecasts**;
- Maintain adequate, well trained **human resources** to **gather, process, archive and exchange data**;
- Participate and access **research** that leads to improved monitoring and predictions;
- Understand and integrate the **needs of various user communities** (e.g. emergency management authorities).

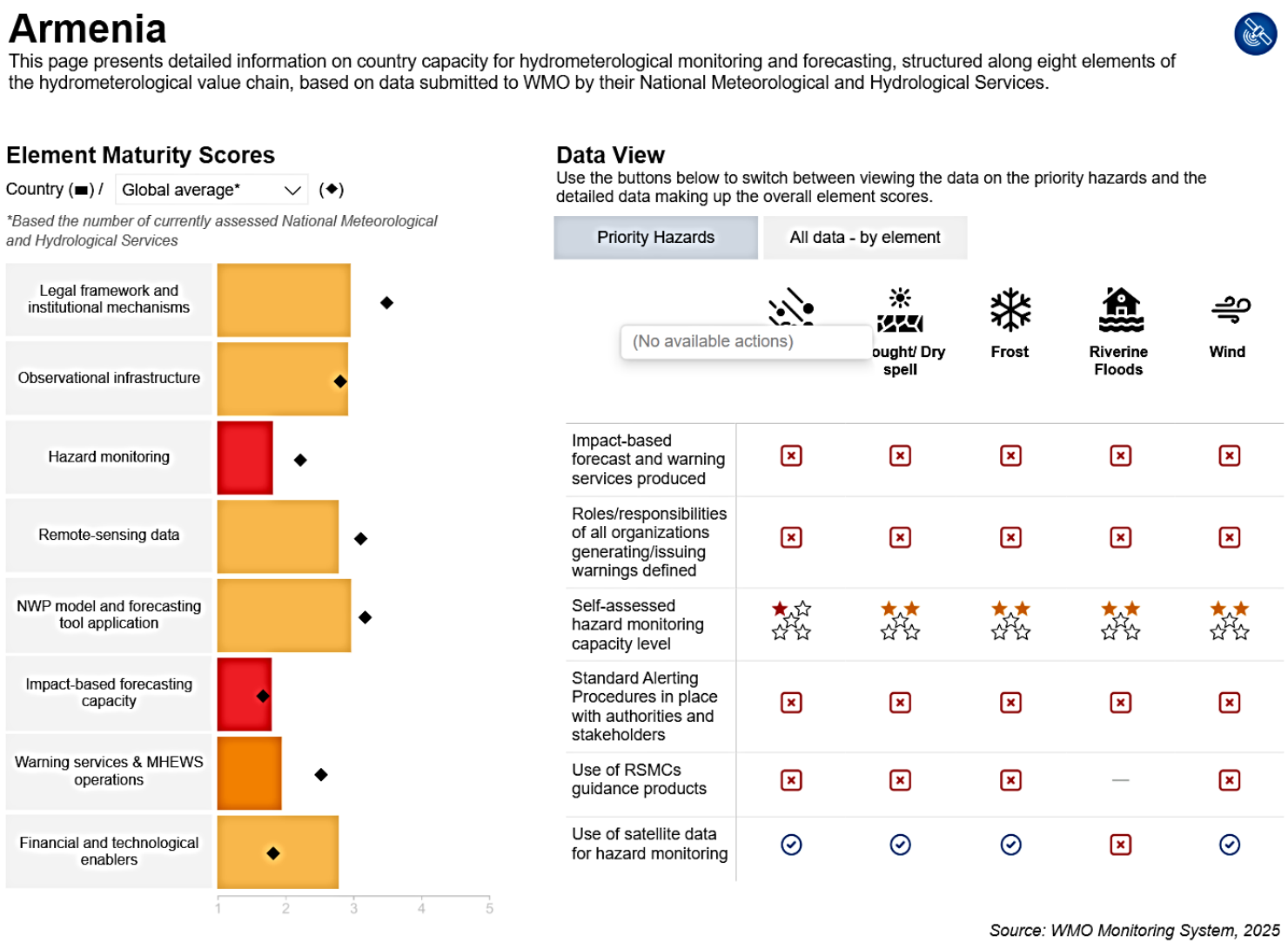


Early warning capacities in Europe

Many countries don't have adequate MHEWS systems

Challenges:

- Big gaps in the observing, data processing and forecasting systems;
- Lack of formal links between the stakeholders in the dissemination chain;
- Missing regulatory frameworks that connect early warnings to emergency plans;
- Regional coordination and collaboration → build on and scale up existing efforts and capacities.



Source: WMO Monitoring System, 2025

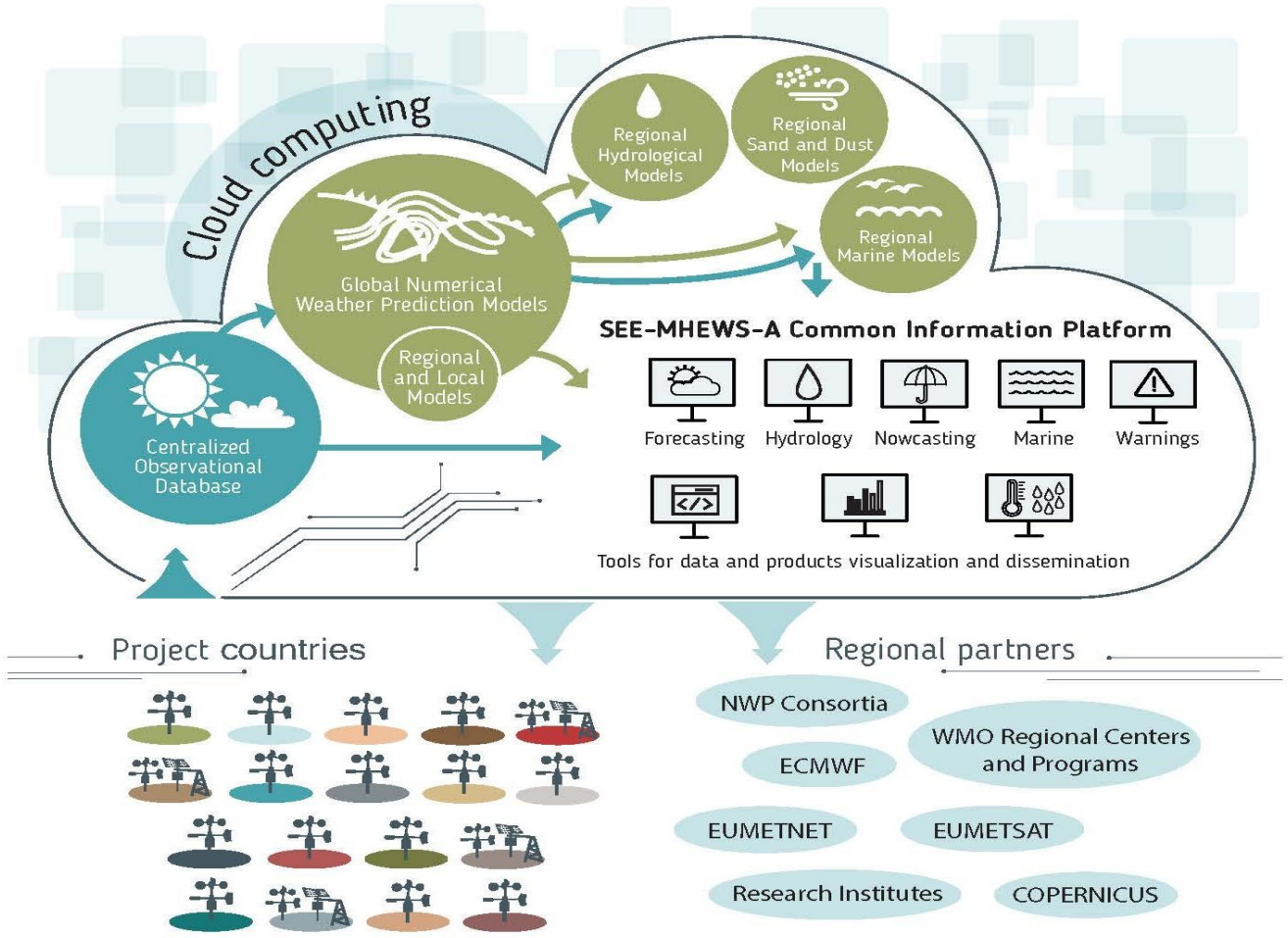
https://earlywarningsforall.org/site/early-warnings-all/dashboards/early-warnings-all-dashboard

Scale-up existing regional initiatives (SEE-MHEWS-A)

South-East European Multi-hazard Early Warning Advisory System

(SEE-MHEWS-A)

- Improve collaboration in hazard identification
- Jointly **create a MHEWS**
- Collaborate on the **operational data exchange**
- Sustain in continuous **development and maintenance of the common system**
- Great **potential for testing new technologies** such as **AI**



AI and ML reshaping the forecasting

AI is reshaping forecasting: state-of-the-art weather predictions with far less computing power have already proven capable of producing reliable short-to-medium-range weather forecasts → will extend to other areas.

Challenges: NMHSs must keep pace and carefully integrate AI into operations while maintaining sovereignty and trust.

Opportunities:

- AI pilot projects – e.g. “Forecast-in-a-Box”: A portable AI-powered weather forecasting system, developed by MET Norway, tested in Malawi, and being adapted for new pilots (including in Europe).
- Considerable potential in earth observations manage large datasets, find new insights in data, generate new products and services.
- Democratize access, enabling all countries to leapfrog to advanced forecasting.

E-AI (EUMETNET): Europe's coordination hub

- **What it is:** A programme under EUMETNET coordinating AI across the forecasting value chain, with active working groups incl. WG1 (Data Curation), WG3 (Ops/MLOps), WG6 (Nowcasting).
- **20 NHMS, EUMETSAT, ECMWF, About 400 participants, dedicated experts or points of contact.**
- **Why it matters for EW4ALL:** Shared data, tools and practices → faster adoption, reproducibility, and less duplication across NHMS.
- **Nowcasting community (WG6/MLCast):** Open, Europe-wide effort to ship an MLCast package (v1 target: end-2025) with shared datasets, pre-trained models, and verification tools.

EUMETNET

E-AI Programme Manager: Roland Potthast @ DWD

Nowcasting to support rapid response

- Support operationalization of nowcasting models for short-term weather predictions, to rapidly respond to evolving weather conditions.
- Highest life-saving leverage in 0–6 h.
- Flash floods, severe convection, winter storms and orographic rain dominate in Europe → nowcasting is pivotal.



Nowcasting-in-a-Box (concept for EW4All)

Proposal to develop — not an existing product

- **Purpose:** Portable, verifiable nowcasting stack (ML + non-DL) packaged in a container for easy deployment / maintenance.
- **Why:** Accelerate NHMS adoption; reduce vendor lock-in; enable fair intercomparison and twinning/training.
- **Core components:** Data adapters, Model runner, Post-processing, Visualisation, Storage/export, Verification kit
- **Where it runs:** Self-contained container/bundle on laptop / HPC / European Weather Cloud.
- **Alignment:** Builds on E-AI WG1/WG3/WG6; inspired by Forecast-in-a-Box.

Forecast in a Box – Credit: ECMWF

Testing Warnings, Building Resilience

- WMO prepared an EW4All Rapid Assessment for 11 countries in South-East Europe, South Caucasus and Middle-East: EWSs are not subjected to regular system-wide tests and exercises in none of these countries.
- When tests or exercises are conducted, NMHSs are often not included.

Proposal

- Operational crisis simulations related to hydrometeorological hazards (e.g. floods) with strong involvement of NMHSs in addition to all other national stakeholders.
- Potentially part of existing regional initiatives (e.g. SEE-MHEWS-A)

Expected outcomes

- Test functionality of EWSs under real or simulated hazard conditions.
- Assess coordination between NMHSs, civil protection, local authorities, and the public.
- Evaluate communication: clarity, reach, speed, and comprehension of warnings.
- Improve preparedness: identify bottlenecks, build trust, and update plans and procedures.

Thank You & Contacts

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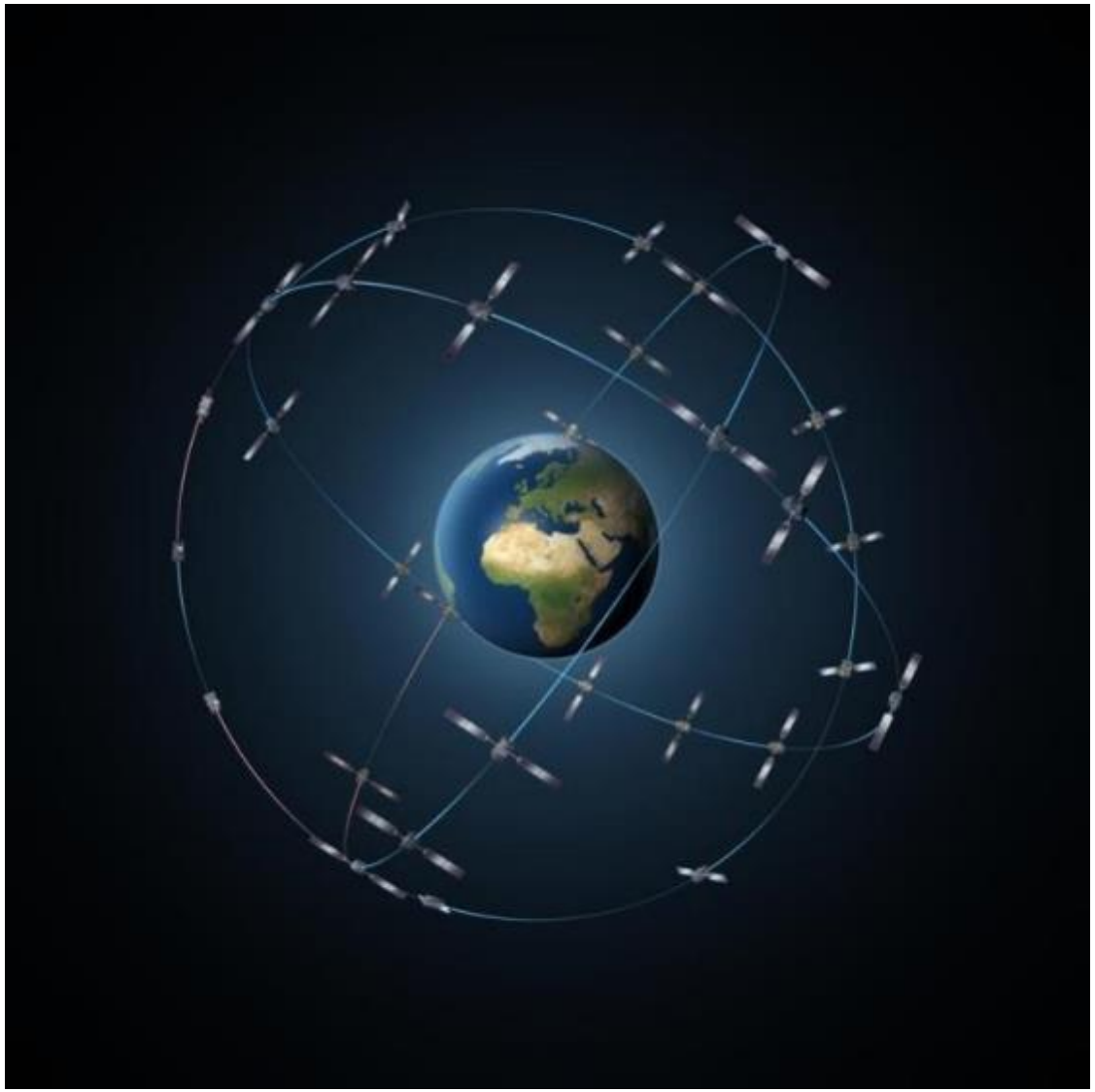
Alerting citizens with Galileo

The Emergency Warning Satellite Service

TAFF workshop • Brussels, 2-3 October 2025

Eric.Guyader@ec.europa.eu

GALILEO TODAY



– Critical infrastructure of the EU

– 32 satellites in orbit

– Operational services, or in roll-out phase

– Unrivalled performance

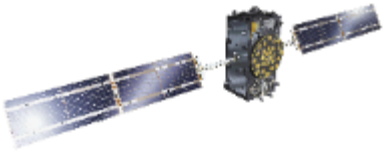
– Modernization on-going

WHAT IS EWSS ?

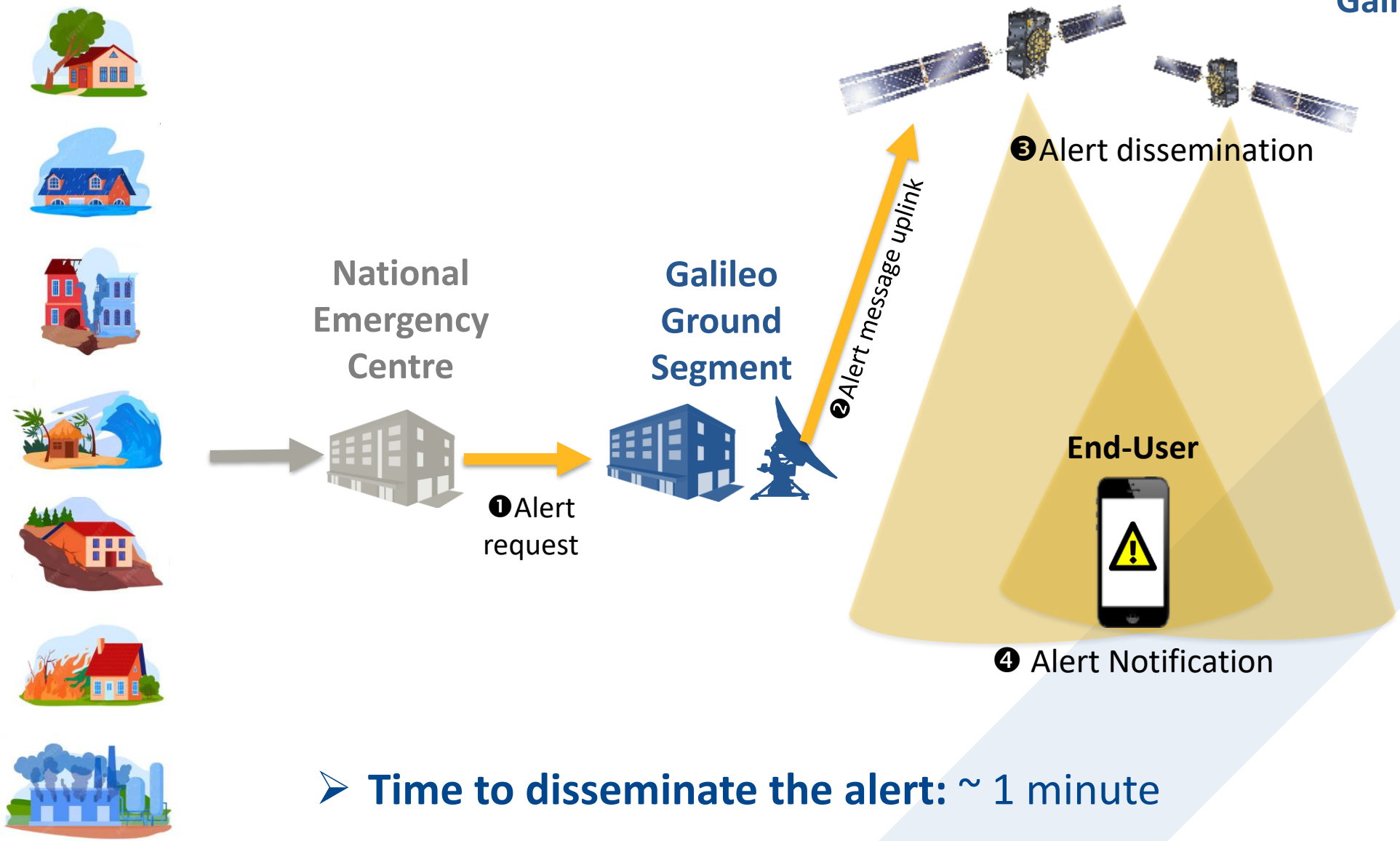
A satellite channel offered to EU National Authorities,

Based on the European GNSS constellation **Galileo,**

For broadcasting warning messages to population in case of looming disaster.



SERVICE CONCEPT

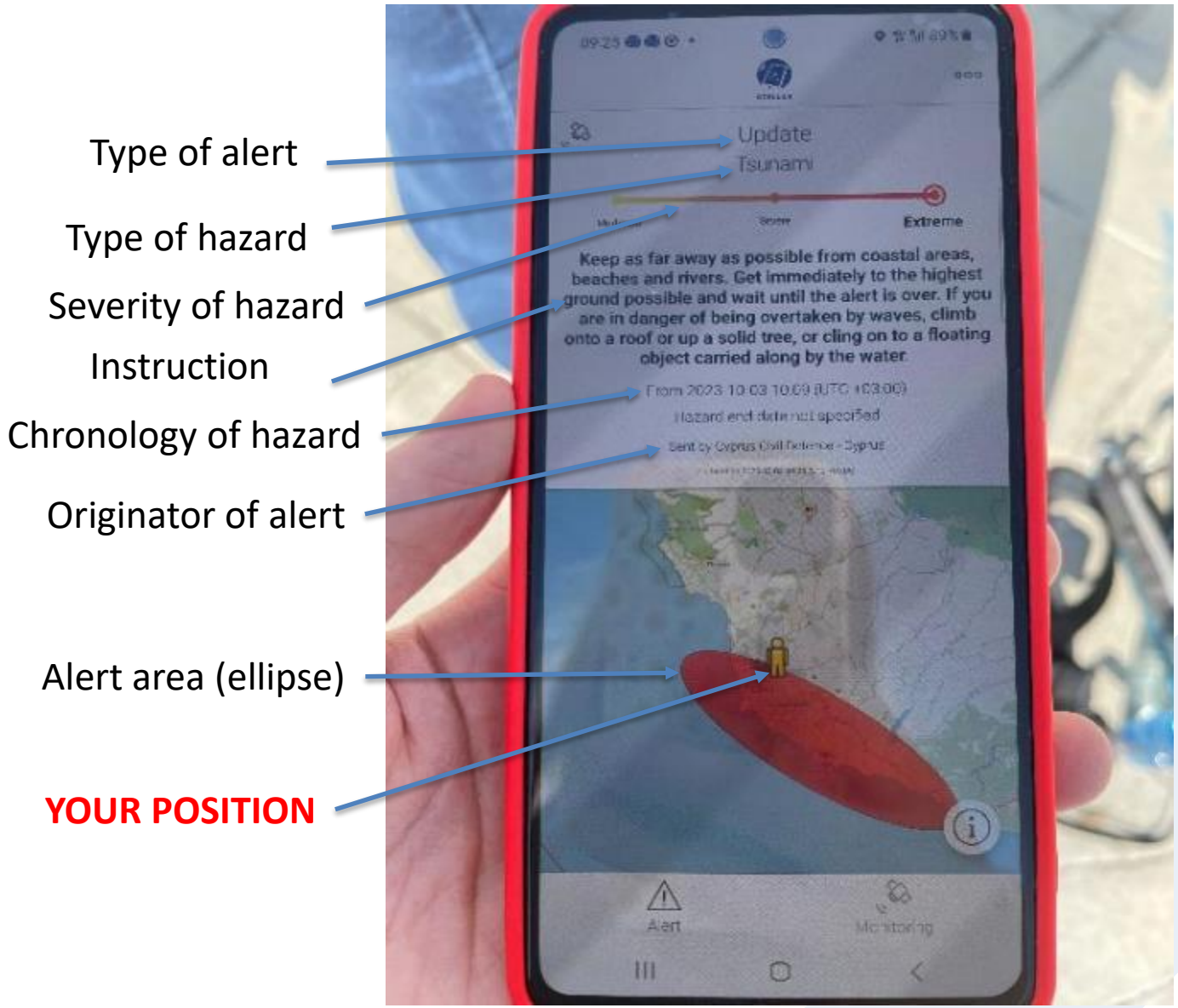


➢ **Time to disseminate the alert:** ~ 1 minute

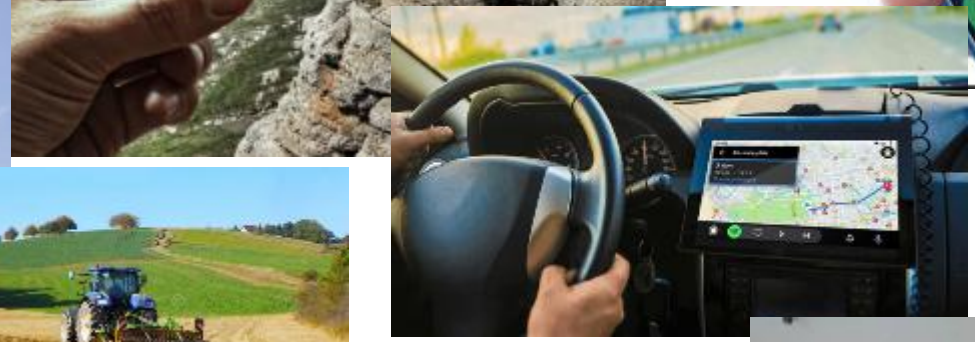
EWSS TEASER

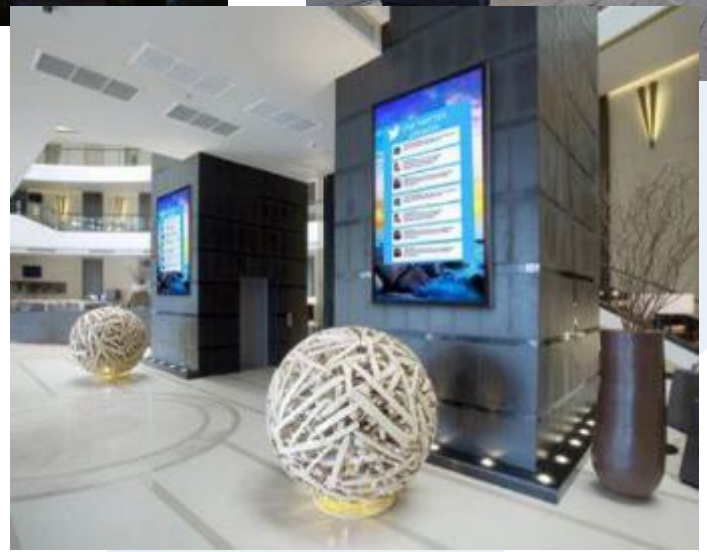
Click to play

DISPLAY OF ALERT MESSAGE



TARGET AUDIENCE

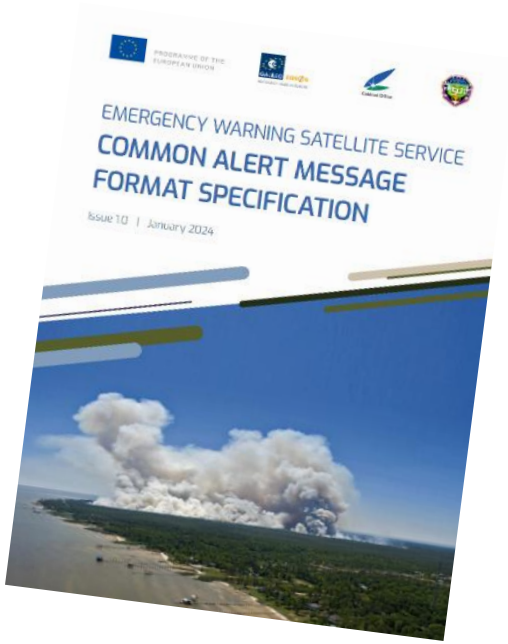




WHERE WE ARE

✓ **In-field demonstration campaign finished**
- 4 locations in EU (FR, DE, CY, BE/LU). All very successful !

✓ **Message format specification available***
- Joint effort EU-Japan (Galileo-QZSS)
- Message content available in 25 languages



➢ **Introduction of the capacity in the Galileo system**
- All contracts signed and on-going
- Service declaration: 2026

➢ **Introduction of the capacity in EU MS**
- EU contrib. : Pilot phase on-going for MS to test the service
- EU contrib.: Technical assistance for setting up the I/F with Galileo

➢ **Introduction of the capacity in user devices**
- EU contrib. : Smartphone app' available in 2025 (Android + iOS)

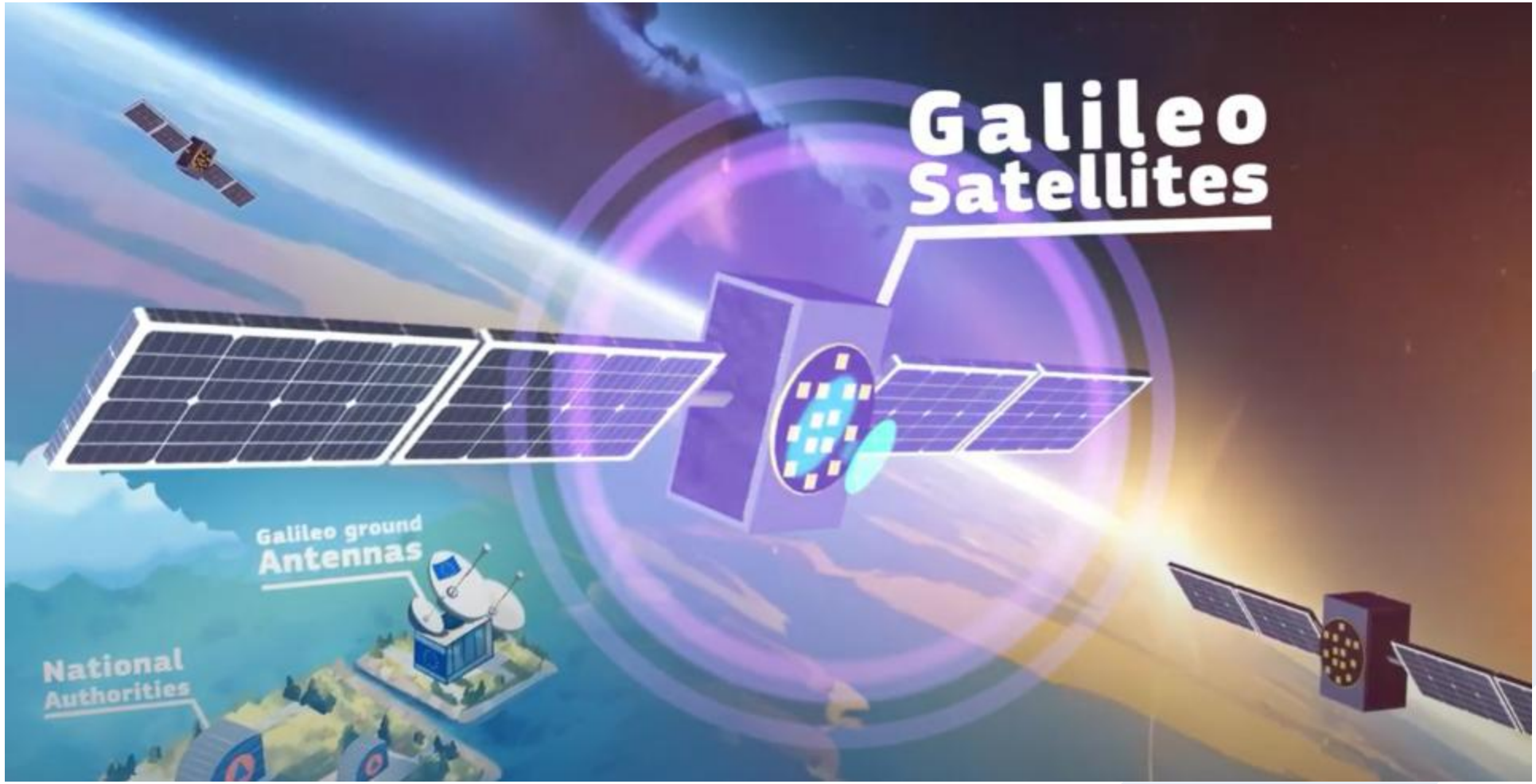
Requires efforts at national level

➢ **Regular coordination with DG ECHO and United Nations (EW4ALL)**

* https://www.gsc-europa.eu/electronic-library/programme-reference-documents#EWSS

SUMMARY

- **Service coverage:** Global
- **Robust to disasters:** no terrestrial base station
- **Multi-language alert service:** thanks to the use of libraries
- **Geofencing of the alert:**
  - end-users are alerted only if located within the affected area
  - size of alert area: diameter configurable (50 m < Ø < 5000 km)
- **Time to disseminate the alert:** ~ 1 minute
- **No dedicated, exotic equipment needed:** GNSS-enabled device with a screen is sufficient
  - Mobile (smartphone, car navigator, handheld, etc)
  - Static (billboard, digital panels, bus stop, subway station, etc)
- **By nature, a subject for international cooperation**
- **Financial support in EU MS necessary to integrate this new channel**


Galileo
Satellites
Galileo ground
Antennas
National
Authorities

THANK YOU

Modernization of the State Hydrometeorological Service of the Republic of Moldova

A Component of the

Strengthening Moldova's Disaster Risk Management And Resilience Project (SMORE) financed by the World Bank

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Country Context

- **Floods and droughts– the most important hazards**
  - High exposure to flood risks: approximately 659 settlements (42%) are at risk of flooding.
  - Likelihood of multi-year droughts to increase: if not properly managed, impacts could be devastating to the economy.
  - Combined losses over the past decade: USD 1.2 billion in damage
- **Other hazards**
  - Extreme heat: 7 out of the 10 warmest years in Moldova's history in last 20 years
  - Hail
  - Strong winds
  - High climate sensitivity: Moldova ranks among the most climate vulnerable countries in Europe and Central Asia
- **Goal:** Timely and effective hydromet services for mitigating adverse impacts of weather and climate events
- **Achieving the goal:** Through improving capabilities of the national hydromet services provider in Moldova

SMORE Project Overview

- The World Bank-financed *Strengthening Moldova's Disaster Risk Management and Resilience* (*SMORE*) Project (US$40 million) was approved September 5, 2024.
- *Project Development Objective:* To enhance Moldova's preparedness and response to natural hazards and climate-related shocks, and in case of an eligible crisis or emergency, respond promptly and effectively to it.
- Key Components:

1. Investments and Institutional Strengthening for Emergency Preparedness and Response (US$29.5 million)
2. Improving Hydrometeorological Services (US$6.5 million)
3. Policy and Regulatory Support for Risk Reduction of Critical Infrastructure and Fiscal Resilience (US$2.5 million)
4. Contingent Emergency Response Component (CERC) (US$ 0)
5. Project Management (US$1.5 million)

SMORE Component 2: Improving Hydrometeorological Services (US$6.5 million)

Objectives:

- Support the strengthening of the SHS's:
  - meteorological and hydrological monitoring networks
  - production of forecasts and warnings capacity;
  - delivery of weather, hydrological, and climate services.

- The modernization of the country's EWS is a key input to the GIES-planned Public Warning Systems being operationalized through the SMORE Project.
- The improved weather and hydrological forecasting and climate services will provide a critical value add in decision-making for a variety of public and private users, particularly farmers, in the context of increasing drought frequency and severity. A well-functioning SHS will also contribute to compliance with the EU legislation.
- The implementation of Component 2 is supported by a grant financed by the Technical Assistance Financing Facility for Disaster Prevention and Preparedness (TAFF).

Overview of SHS: Responsibilities, Structure

- SHS is the only one governmental agency in Moldova mandated by the legislation and responsible to provide weather, hydrological and climate services.
- The responsibilities of SHS include:
  - Monitoring, collecting and analysis of data and their international exchange
  - Complying with metrology and standardization regulations
  - Preparing and disseminating forecasts and warnings
  - Managing and developing the National Fund of Meteorological and Hydrological Data
- This work is done by the SHS:
  - Forecasting and Warning Centre
  - Meteorological and hydrological monitoring centre
  - Administration and technical support centre
  - Regional monitoring network

Overview of SHS: Technical Capacities

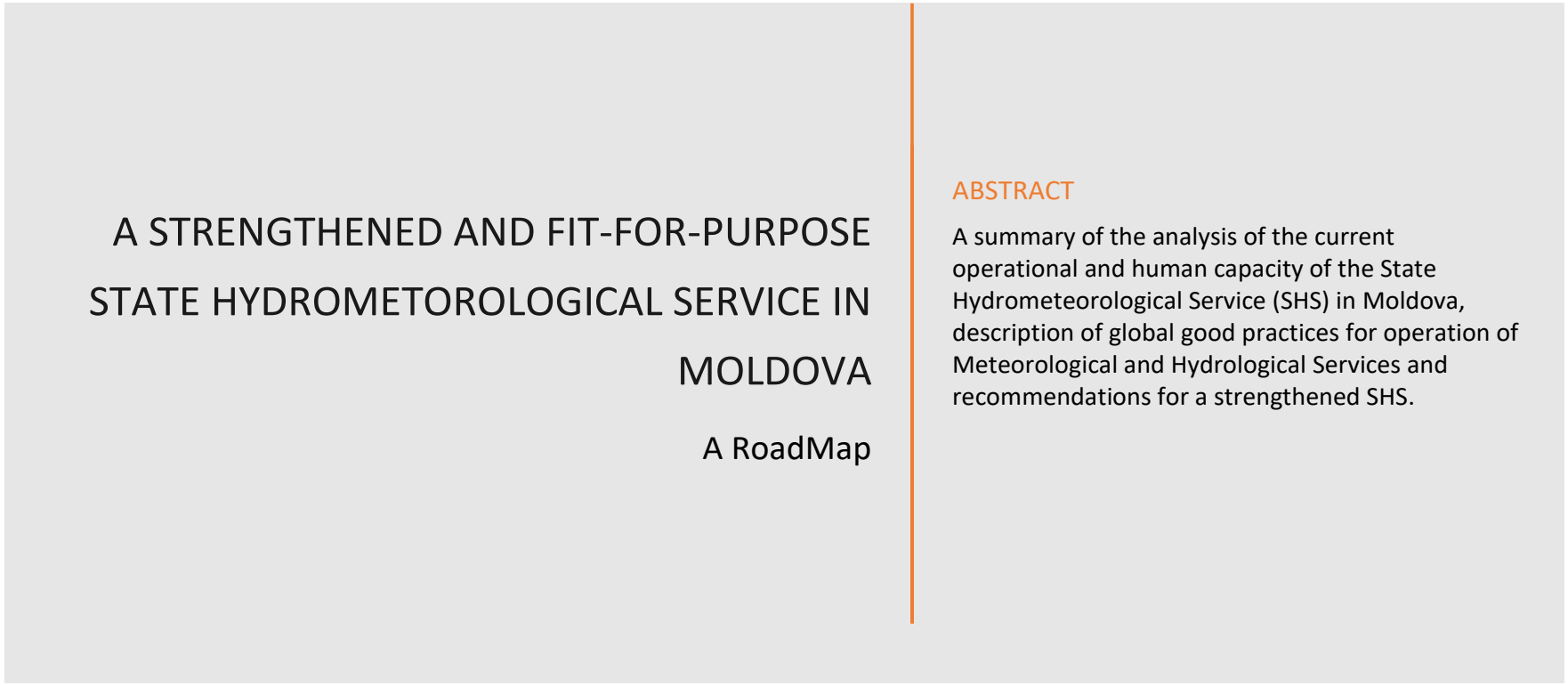
- Services:
  - *Public weather services:* Short, medium, and long-range weather forecasts and warnings.
  - *Disaster Management* : Collaboration with the GIES
  - *Agriculture:* Need for drought monitoring system, software for calculating indices, training in new techniques, and direct communication with the agricultural sector
  - *Water resources and flood forecasting*: forecasts and warnings produced
  - *Climate*: analyses, monthly and seasonal predictions, need for climate database management system and long-term climate predictions.

Overview of SHS: Technical Capacities

- Monitoring and Observation Systems:
  - *Meteorology and hydrology networks*– Need for rehabilitation, calibration, expansion, software for data conversion, nowcasting, spare parts, upper air observations, real-time quality control
- Modelling and Forecasting Systems:
  - *Global* and regional models used for weather forecasting, but hydrological models are needed, limited expertise in radar and satellite applications, outdated software, insufficient trained forecasters, need for improved user feedback mechanisms
- ICT Systems:
  - Outdated software, lack of automation, and full data integration

Key Findings or Highlights: Analytical Base

Analytical Base: SHS Modernization Roadmap (finalized in June 2025) financed under the TAFF technical assistance grant. The Roadmap is expected to be published in November.



SMORE Component 2: Improving Hydrometeorological Services

Addresses SHS capacity gaps and is based on the Roadmap financed by the TAFF grant:

Subcomponent 2.1: Modernization of Hydrometeorological Monitoring Systems and ICT Capabilities (US$4.3 million)

- construction of critical observing stations;
- rehabilitation of existing observing stations with new sensors and telemetry;
- replacement of selected accommodations at traditional observing stations with modular buildings;
- establishment of an upper air observation system
- upgrading and renovation of existing weather radar and installation of a lightning detection system;
- improvement of hydrometeorological monitoring systems;
- enhancement of ICT capabilities;
- establishment of a data archive and setting up of a Climate Data Management System; associated training packages where needed.

Subcomponent 2.2: Improving SHS Service Delivery by Enhancing SHS Forecasting Capabilities, Institutional Strengthening, and Regional Collaboration (US$2.2 million)

- acquisition and implementation of a nowcasting system,
- introduction of sectoral-based forecasting,
- development of hydrological modelling and forecasting,
- enhancement of the use and application of other regional and global meteorological models

Timeframe for Strengthening Services of the SHS

Medium-term (5 years) Objectives:

- Addressing all the gaps in *Observation Infrastructure; Modelling Capabilities; Forecasting Capabilities; Service delivery; ICT Capabilities; Human Capacity*

Short-term (2 years) High Priority Activities:

- Addressing the most immediate priorities in all technical areas to achieve improved service delivery as quickly as possible

Cost of Modernization of SHS

Over 5 years

- Overall investment of **US$ 6.5 million under WB SMORE Project**
  - **US$ 760k** for training and capacity building
  - The O&M expenditure of **US$ 478k per year** to ensure the sustainability of this investment.

Over 2 years

- High-priority activities of around **US$ 2.9 million**
  - **US$ 235k** for training and capacity building
  - The O&M expenditure of **US$ 242k per year** to ensure the sustainability of this investment.

Partnerships and Collaboration with Development Partners

- Collaboration with development partners and more advanced European NHMS is essential for support to SHS technical development
- An example: “Strengthening Hydrometeorological Capacity in Moldova (SHC Moldova)” project implemented by Swedish Meteorological and Hydrological Institute (SMHI):
  - A capacity development initiative financed by Sweden to enhance technical skills in weather, climate, and hydrological services at SHS
  - Timeframe: 2024-2029
  - Budget: SEK 30, 000, 000 (3.2 US$)
  - Focus: meteorological nowcasting, hydrological modelling, early warning, and improved data management and dissemination.

Key Lessons Learned or Take Aways

- The Project to modernize SHS operations is just getting underway–not many lessons learned yet.
- One key lesson already learned: Given complexity of hydromet modernization projects, ample time was spent to prepare the Project, including several WB missions and close collaboration between the WB and SHS to finalize the details of the Roadmap and investment plans. Technical assistance provided was key to these efforts.
- Next steps: Start the implementation of the Roadmap recommendations including procurement activities, and capacity building based on an annual workplan.
- Activities proposed in the SMORE Project are replicable in other hydromet services.

Conclusion

- Accurate, timely and actionable weather, climate, and hydrological information supports decision-making in critical sectors.
- The activities proposed in the Roadmap are essential first steps in line with the goals of *SMORE,* towards transforming SHS into a fully capable modern NMHS.
- Furthermore, the Roadmap highlights that:
  - Ensuring sustainable funding for operation and maintenance (O&M) is essential to maintain the benefits of the investments
  - Innovative approaches and public-private partnerships can help support long-term sustainability
  - Collaboration with development partners and more advanced NMHS is a highly effective way to acquiring skills and developing capacity

Thank You & Contacts

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Serviciul Hidrometeorologic de Stat

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CoastWAVE Project

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Technical Secretary (ICG-NEAMTWS & TOWS TT Disaster Management and Preparedness)
CoastWAVE Project Responsible Officer
Tsunami Resilience Section
UNESCO IOC

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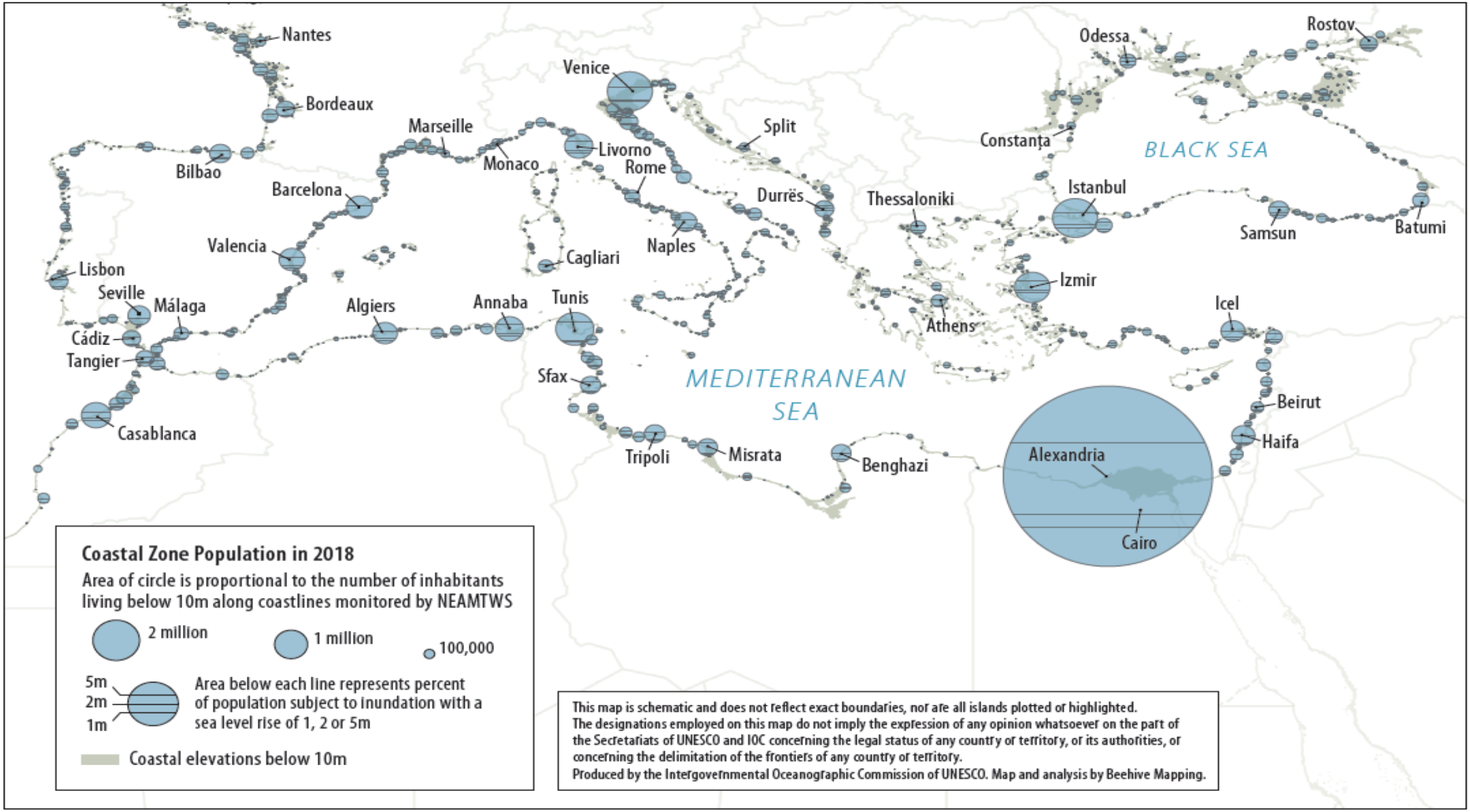
Regional Context

- **Mediterranean & Atlantic Risks:** Both regions face significant tsunami hazards from seismic activity, submarine landslides, and fault zone earthquakes, with historical events (1908 Messina, 1755 Lisbon) showing their destructive potential.

- **High Exposure:** Dense populations, vital infrastructure, and tourism-heavy economies along coasts heighten vulnerability to future events.


Nantes
Bordeaux
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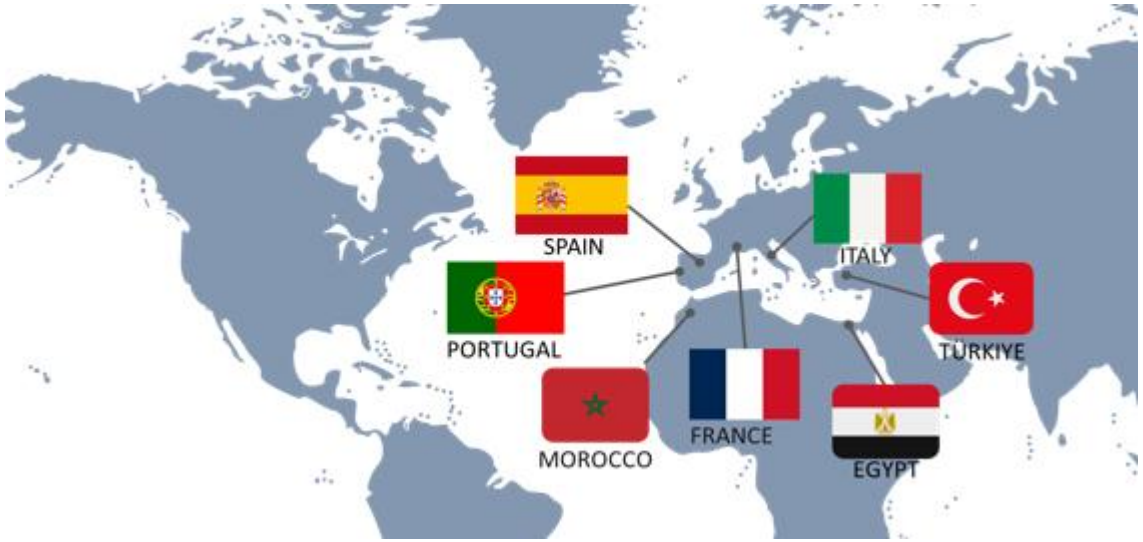
Barcelona
Valencia
Lisbon
Seville
Málaga
Cádiz
Tangier
Casablanca
Algiers
Annaba
Tunis
Sfax
Tripoli
Misrata
Benghazi
Venice
Livorno
Rome
Naples
Cagliari
Split
Durrës
Thessaloniki
Athens
Odessa
Rostov
Constanța
BLACK SEA
Istanbul
Samsun
Batumi
Izmir
Icel
Beirut
Haifa
Alexandria
Cairo
MEDITERRANEAN SEA
Coastal Zone Population in 2018
Area of circle is proportional to the number of inhabitants living below 10m along coastlines monitored by NEAMTWS
2 million
1 million
100,000
5m
2m
1m
Area below each line represents percent of population subject to inundation with a sea level rise of 1, 2 or 5m
Coastal elevations below 10m
This map is schematic and does not reflect exact boundaries, nor are all islands plotted or highlighted.
The designations employed on this map do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.
Produced by the Intergovernmental Oceanographic Commission of UNESCO. Map and analysis by Beehive Mapping.

IOC DG-ECHO Funded CoastWAVE 2.0 Project



- **Amount:** 1.2 M Euros -Phase –II
- **Start:** 1 July 2024
- **Duration :** 2 years
- **Direct Beneficiary Countries**:7

Scaling-Up and Strengthening the Resilience of Coastal Communities in the North-Eastern Atlantic and Mediterranean Regions to the Impact of Tsunamis and other Sea level-related coastal hazards.

Implemented with the ICG-NEAMTWS Framework

Objectives

i. **Strengthen collective capacities in tsunami hazard assessment and evacuation mapping**
ii. **Enhance understanding of tsunami risk** by tracking changes in awareness and risk perception.
iii. **Improve preparedness** through the installation of additional tsunami detection, monitoring, and alerting systems.
iv. **Expand the number of UNESCO-IOC Tsunami Ready Recognized Communities** in existing and new countries, while promoting synergies with other coastal resilience initiatives (e.g., Making Cities Resilient 2030).
v. **Foster inclusive engagement and dialogue** on HILP with diverse stakeholders to advance coastal resilience from a multi-hazard and multi-risk perspective.

CoastWAVE 2.0 Project Outcomes

1. Improved tsunami hazard assessments.
2. Enhanced understanding and communication of tsunami and other sea level-related risk
3. More coastal communities and countries in the NEAM region joining the Tsunami Ready
4. Increased/improved access to near real-time detection and alert technology
5. Enhanced knowledge on addressing High Impact, Low Probability tsunamis, with strategies to integrate them into MH approaches

unesco
Intergovernmental Oceanographic Commission

UNESCO IOC
CoastWAVE Project Team

Funded by European Union Humanitarian Aid

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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Tsunami Ready

TAFF

Technical Assistance Financing Facility
for Disaster Prevention and Preparedness

TAFF Workshop
Brussels 2-3 October, 2025

https://www.gfdrr.org/en/taff

Funded by the European Union

GFDRR

Administered by THE WORLD BANK

Key Findings and Highlights

	IMPLEMENTING PROJECT PARTNERS/ STAKEHOLDER ENGAGEMENT	PARTNERS AND PRIMARY SUPPORTING STAKEHOLDERS
Italy	INGV-Istituto Nazionale di Geofisica e Vulcanologia	• Municipality of Pachino. • Civil Protection of Pochino • Emergency responders of City of Marzamemi
France	University of Montpellier	• Nice Metropole • CEA-CENALT
Egypt	NIOF-National Institute of Oceanography and Fisheries	• Damietta Governorate. • Damietta Tourism Authority. • Damietta Hotels and Restaurants associations. • Information and Decision Support Center (Crisis and Disaster Management Sector, and Risk Reduction). • The Egyptian General Authority for the Protection of the Beache
Spain	FIHAC-Fundación Instituto de Hidráulica Ambiental de Cantabria	• Cadiz City Council • Civil Protection of the Cadiz City Council • DGPCE, IGN, IEO, DGEPC Junta Andalucía)
Türkiye	KOERI, AFAD-Istanbul-The Disaster and Emergency Management Authority and METU	• Metropolitan Municipality of Istanbul • Municipalities of Tuzla and Kartal • The Disaster and Emergency Management Authority/Ankara
Portugal	Municipality of **Loule-**Civil Protection Department Municipality of **Cascais**-Civil Protection Department	• Municipality of Loule-Civil Protection Department • Municipality of Cascais-Civil Protection Department • Tourism Authorities of Louile and Cascais
Morocco	CNRST-Centre National pour la Recherche Scientifique et Technique (Maroc) (CNRST)	• Municipality of Larache • Emergency responders of Larache

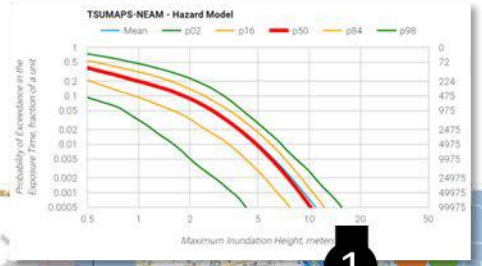
Tsunami Hazard Risk Assessments & Evacuation Mapping

Tsunami Hazard /Risk Assessments and Evacuation Mapping

SCIENCE-BASED AND PARTICIPATORY DECISION-MAKING APPROACH.

LARNACA (CYPRUS)

Multi-stakeholder development of evacuation maps based on PTHA and Evacuation models



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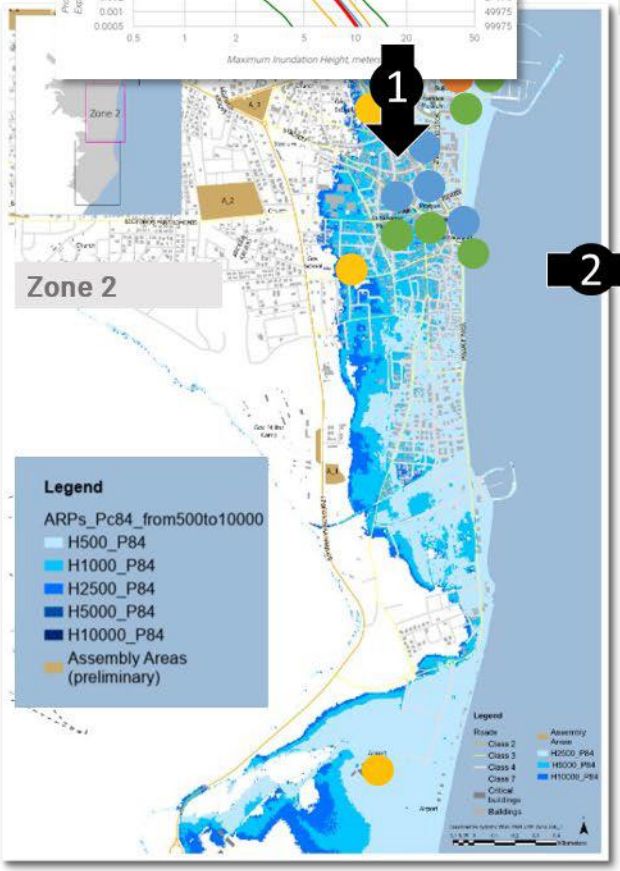
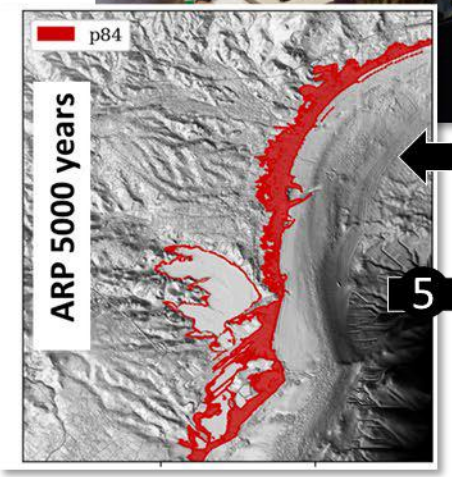


2

Perc.	ARP	Annual probability (%)	50 years probability (%)	Area (km²)	Max Inun. depth (m)	Population Exposed	Crit. Bld. Exposed
P50	500	0.2	10	1.56	2.64	736	9
P50	1000	0.1	5	3.04	3.1	1976	16
P50	2500	0.04	2	4.93	3.8	4946	33
P50	5000	0.02	1	5.77	4.1	6202	34
P50	10000	0.01	0.5	6.22	4.3	7435	35
P84	500	0.2	10	2.57	3	1474	13
P84	1000	0.1	5	4.43	3.6	4198	30
P84	2500	0.04	2	5.82	4.2	6265	34
P84	5000	0.02	1	7.84	4.5	10597	51
P84	10000	0.01	0.5	8.56	4.9	11320	77
P98	500	0.2	10	4.45	3.7	4190	30
P98	1000	0.1	5	5.13	4.1	5360	33
P98	2500	0.04	2	7.49	4.4	9623	46
P98	5000	0.02	1	8.55	4.8	11303	77
P98	10000	0.01	0.5	9.29	5	11562	86

3



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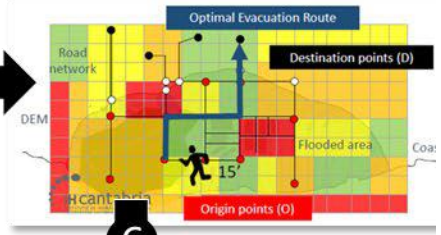
5



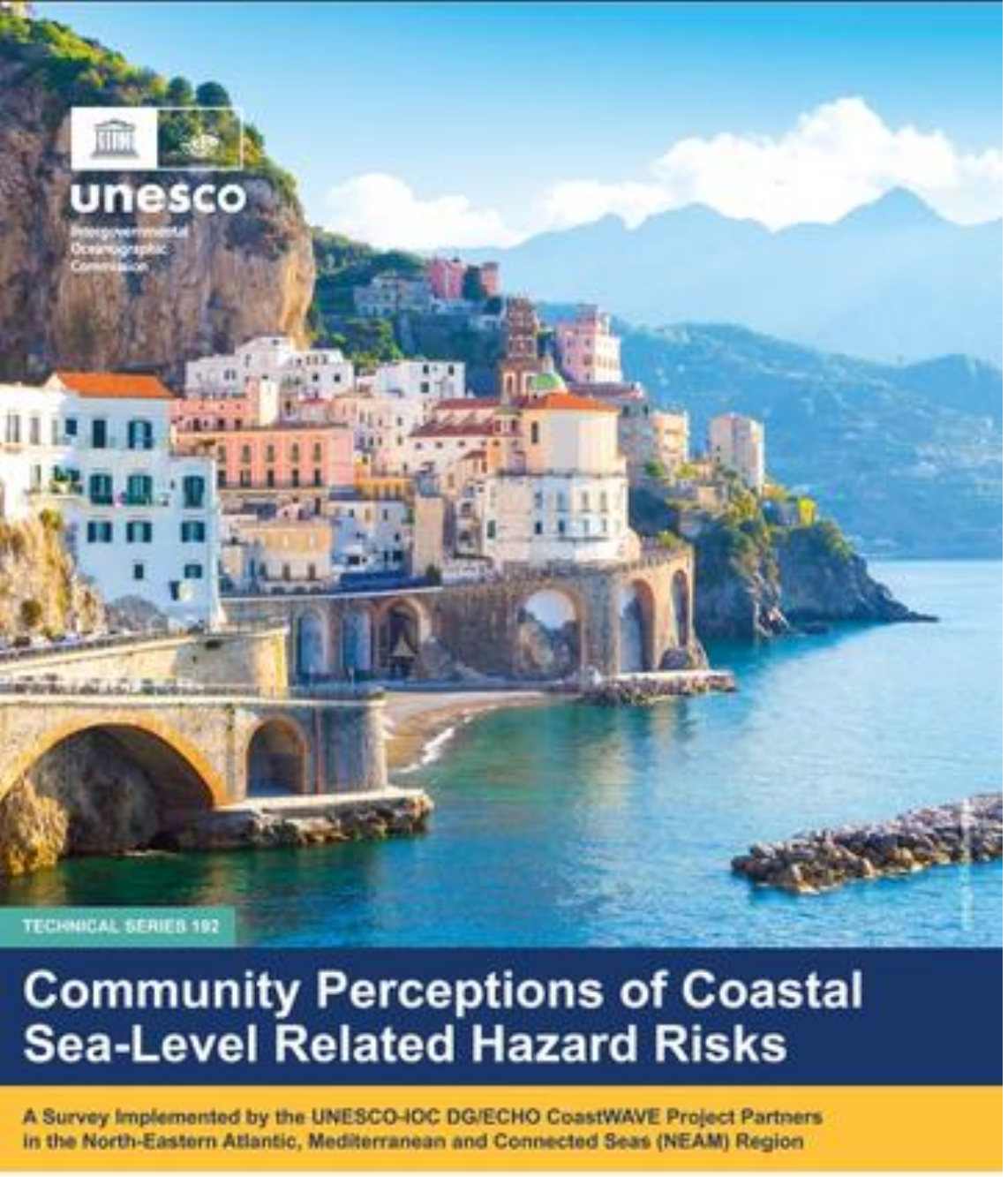
6

7

Communities Equipped with Decision Making Tools: Tsunami Inundation and Evacuation Maps

Understanding and Communication of Tsunami and other Sea Level-Related Risk

- Understanding awareness and preparedness levels
- Identifies knowledge gaps, social vulnerabilities,
- Improved risk communication, training and capacity building strategies



Risk Perceptions CoastWAVE 1.0

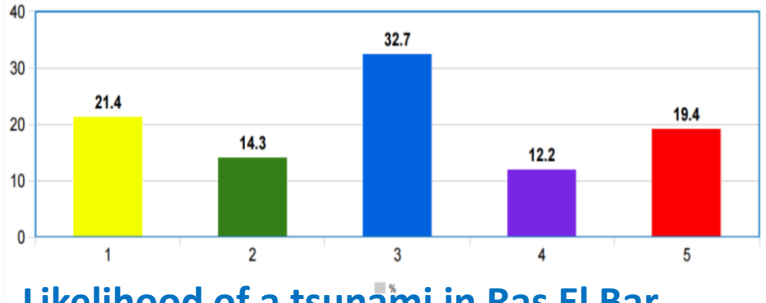
5 most important findings from the survey

(Early Phase during Project Implementation)

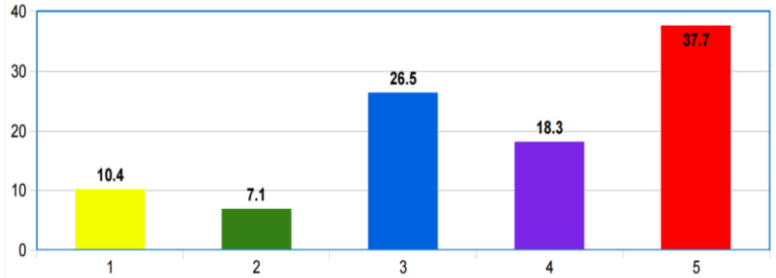
- **Strong concern, weak preparedness** – Despite increasing awareness of tsunamis and sea level rise, half of respondents take no precautionary measures, and 50% report missing evacuation signs.
- **Perceived municipal capacity gap** – Up to 40% doubt the municipality's ability to alert and inform the population, while over a quarter lack awareness of existing capacities and infrastructure.
- **Generational bias in perceptions** – Education level has little influence, with younger respondents dominating the survey and shaping results.
- **Alert communication mismatch** – Respondents prefer audible alerts, yet civil protection agencies prioritize SMS warnings, creating a disconnect.
- **Collective action mindset** – While many place responsibility on municipalities, 30% also highlight the community's role, showing openness to shared disaster management approaches.
- Surveys/ study progressing in Coast WAVE 2.0 project countries

Ras El Bar, Egypt Tsunami Risk Perception Survey Key Points

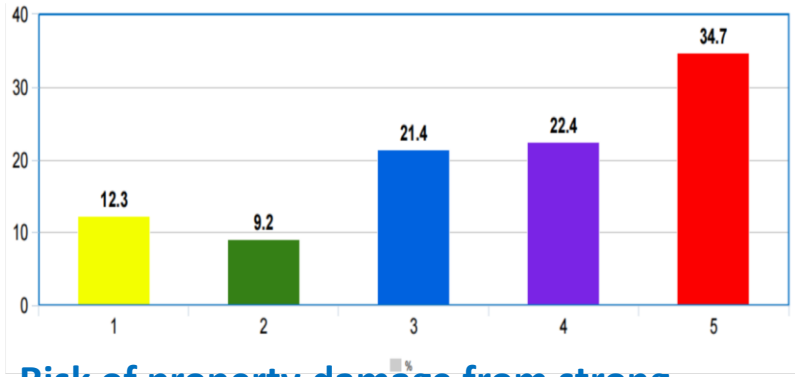
CoastWAVE 2.0 Ras El-Bar, Egypt



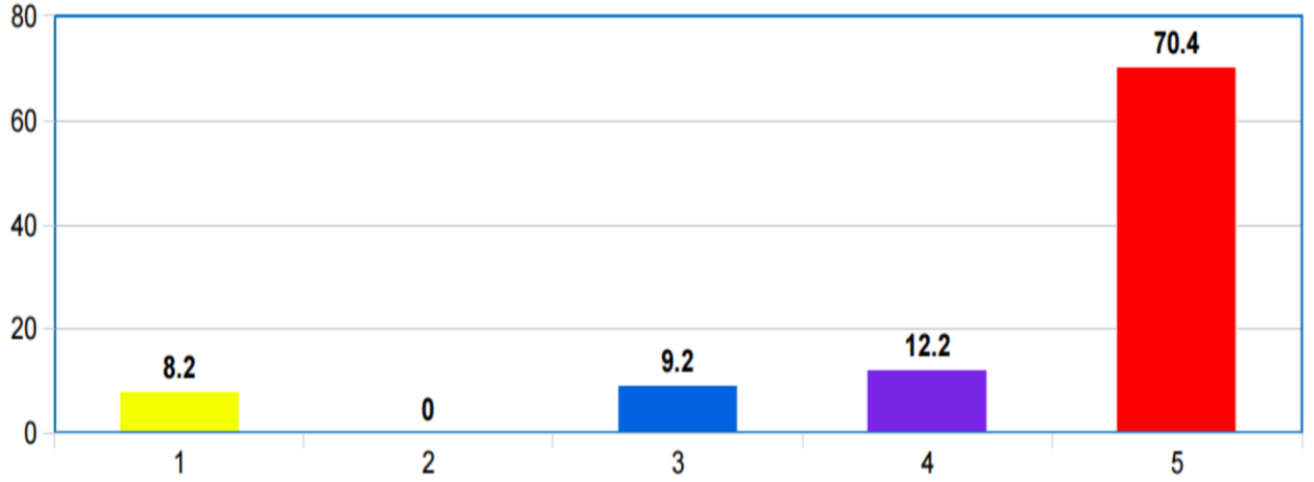
Likelihood of a tsunami in Ras El Bar within 10 years (1 = very low, 5 = very high).



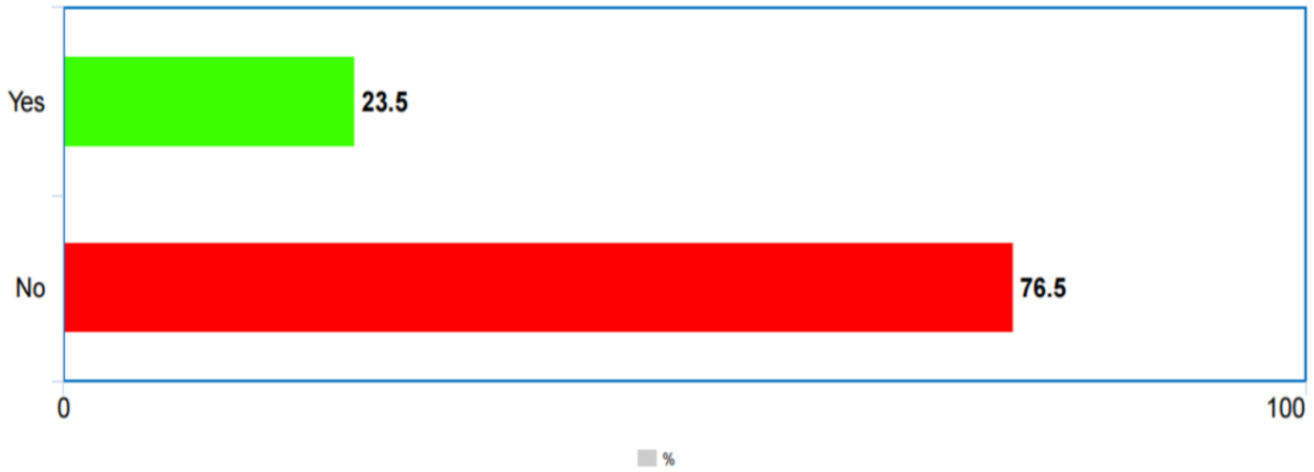
Risk to Human Lives from Marine Hazards (1 = very low, 5 = very high).



Risk of property damage from strong waves/flooding (1 = very low, 5 = very high).



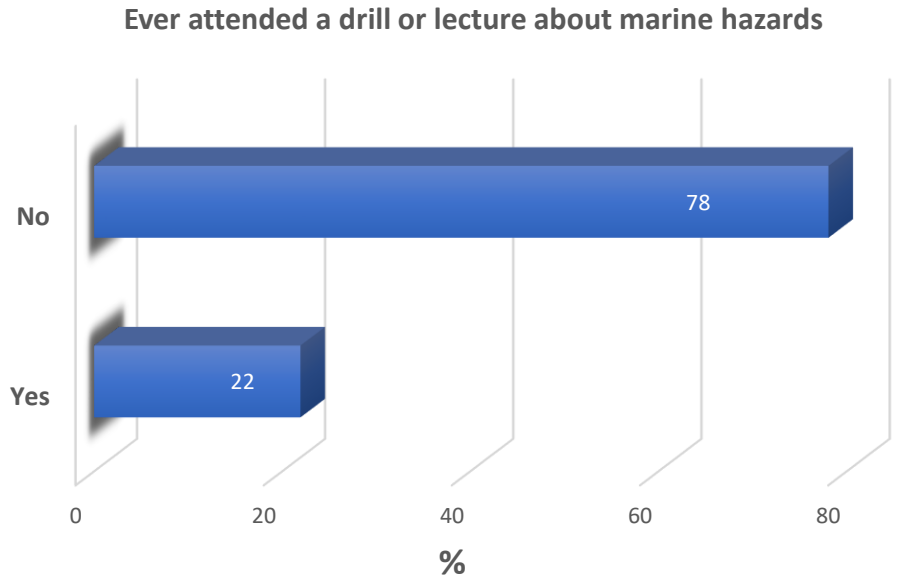
Importance of Evacuation Maps and Shelters (1 = very low, 5 = very high).

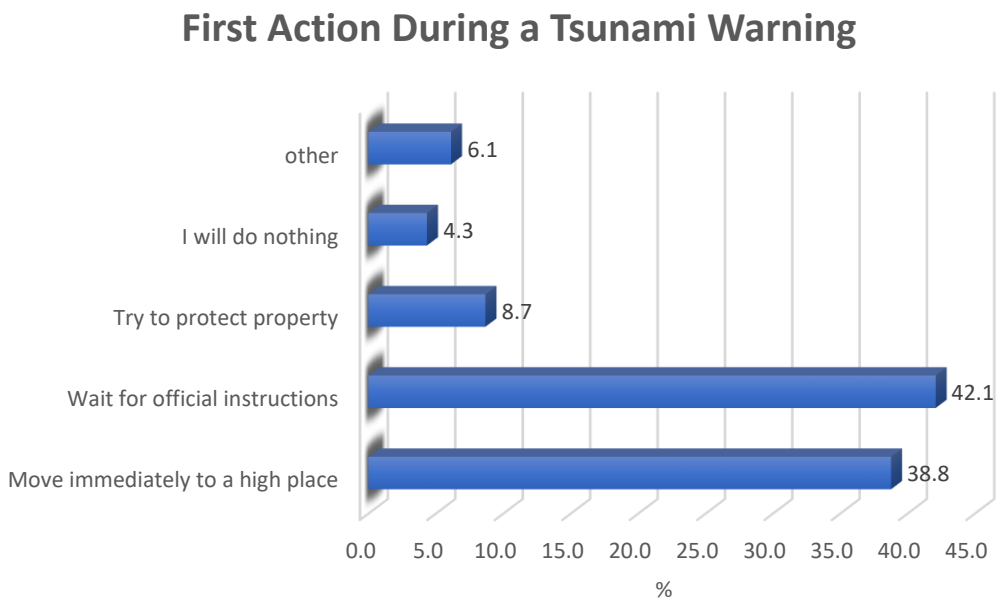


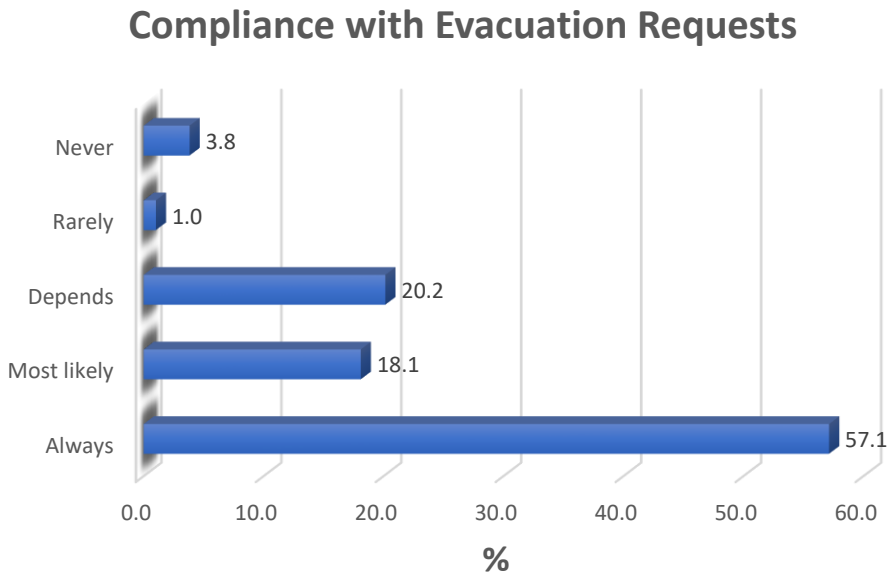
Family evacuation plan for marine emergencies

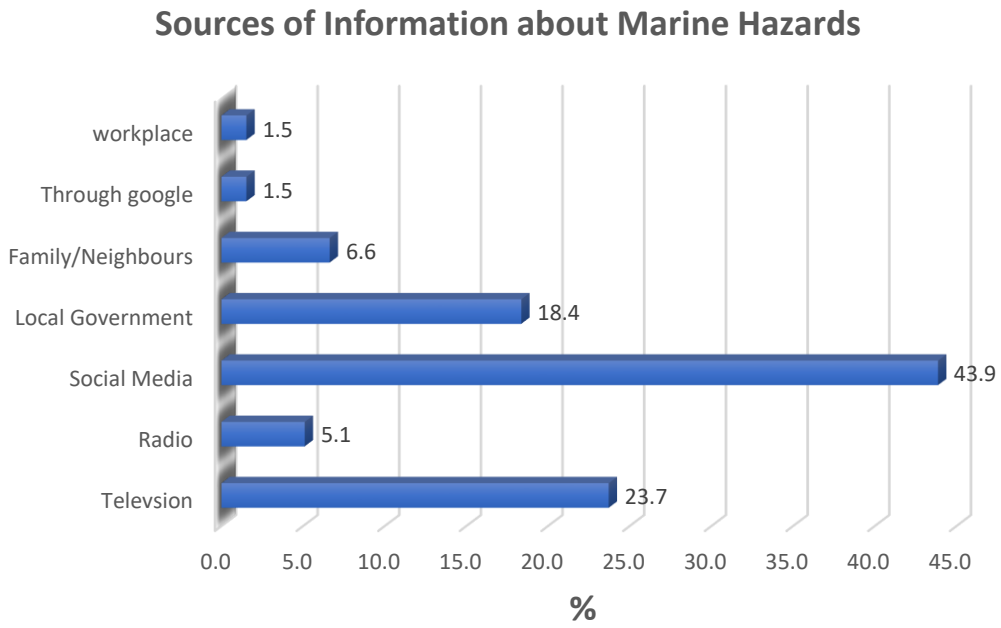
NIOF, 2025

CoastWAVE 2.0 Ras El-Bar, Egypt



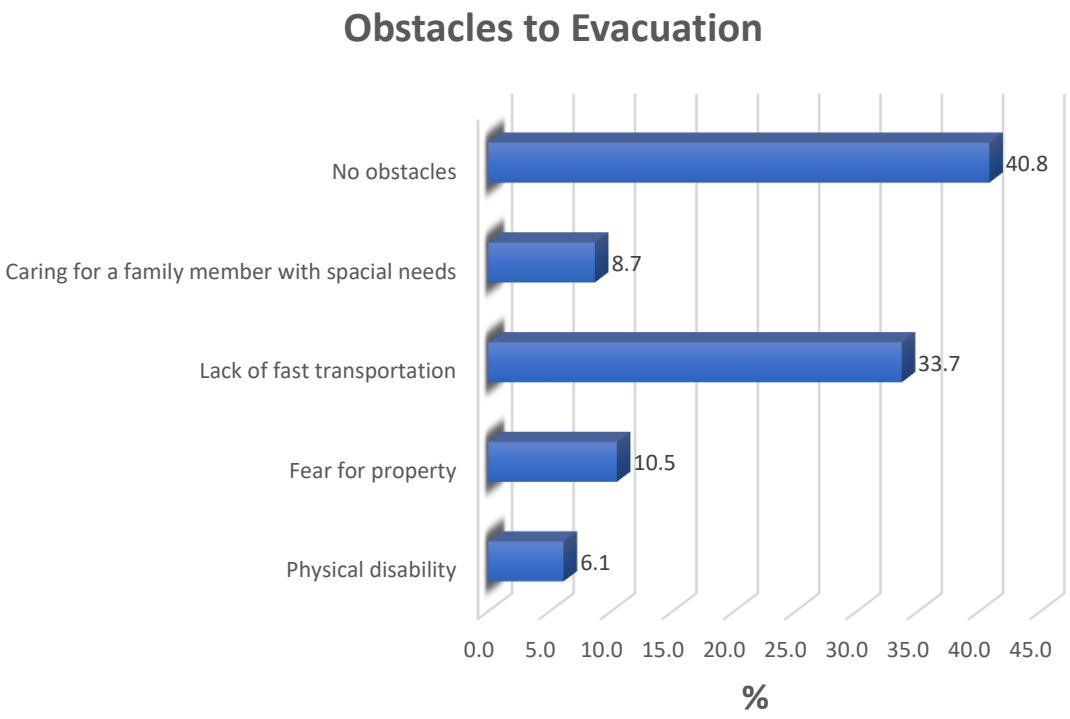


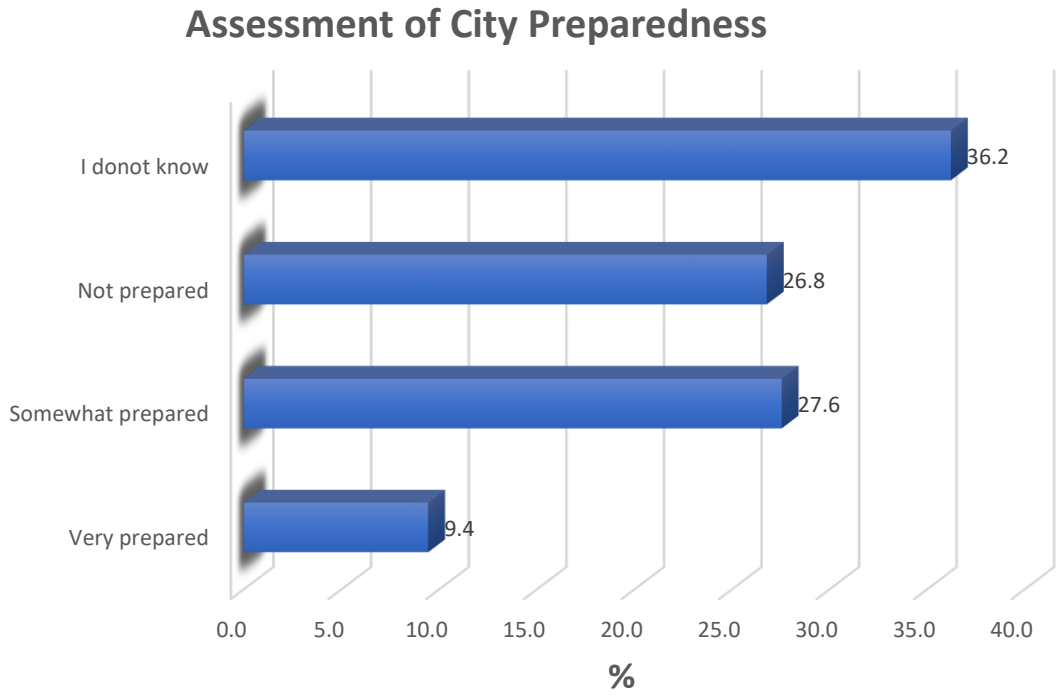




NIOF, 2025

CoastWAVE 2.0 Ras El-Bar, Egypt



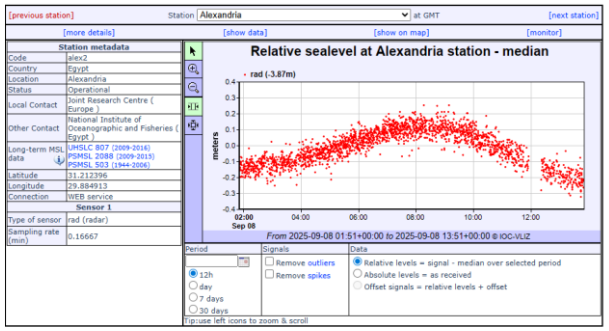


NIOF, 2025

Summary
Ras El Bar, Egypt Tsunami Risk Perception

- **High female engagement**: 75.5% of non-resident and female respondents show strong interest.
- **Immediate concerns:** Waves and flooding seen as greater threats than tsunamis.
- **Dual risks:** High concern for both human lives and property damage.
- **Clear demand:** Strong link to MHEWS and coastal resilience strategies.
- **Preparedness gap:** Evacuation maps and shelters identified as urgent needs.
- **Household shortfall**: Low levels of personal preparedness.
- **Confidence crisis**: Most respondents doubt their ability to respond effectively in a marine emergency.

Improved Access to Real-Time Detection and Alert Technology



Alexandria ATG station in the IOC VLIZ Sea-level Monitoring Facility

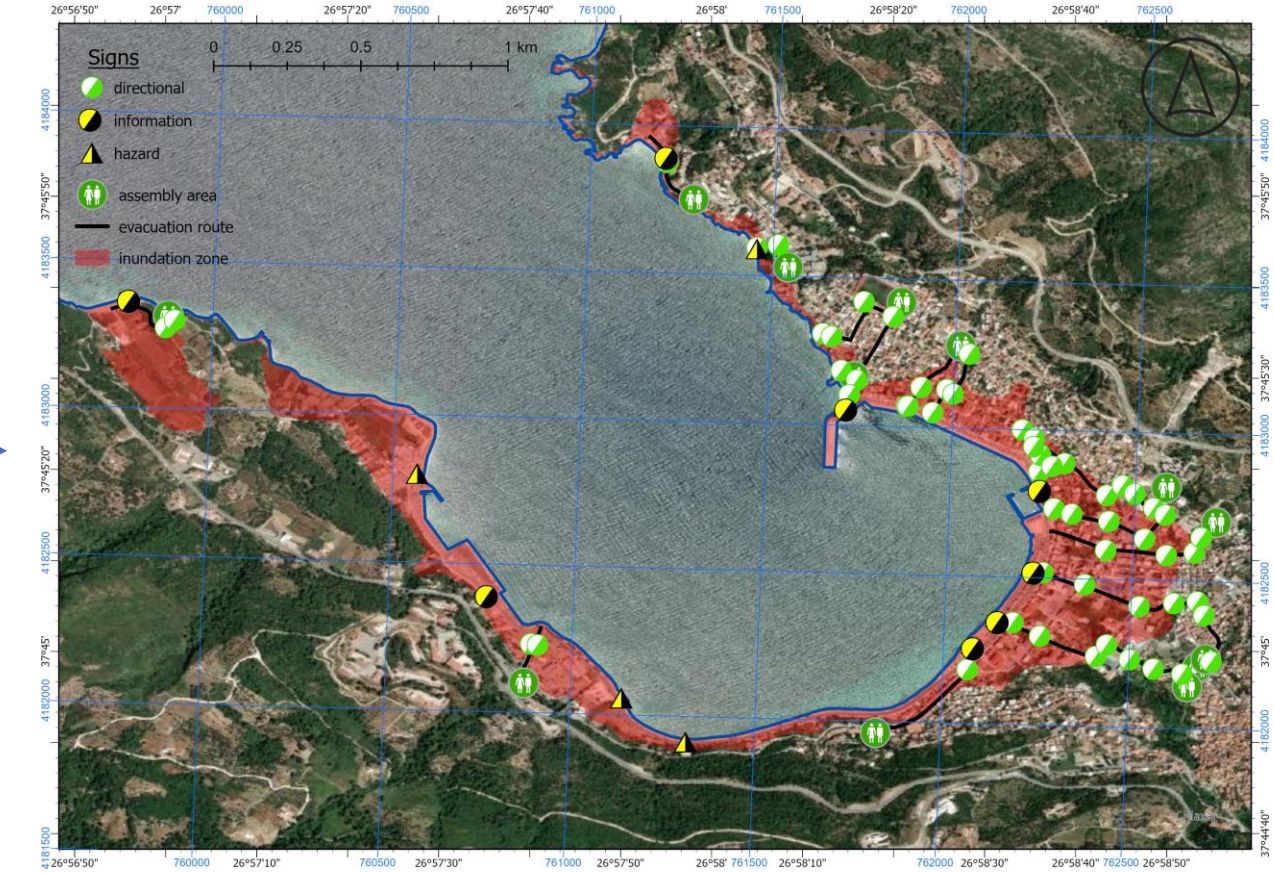
Sirens installed in Chipiona beacg, Spain

Photo Credit: IHCantabria

Tsunami Signages

Table 7. Summary of public signage needs assessment

Location	Total # of evacuation routes, assembly areas, tsunami danger zones
Cyprus, Larnaca	60 signage installed, including assembly sites, evacuation routes, informational panels, and hazard zones
Egypt, Alexandria	Temporary signages until all authorizations are taken from the relevant agencies for 20km coastline of Alexandria.
Samos, Greece	8 tsunami informational panels, 4 hazard zone signs, 61 evacuation route signs, 15 assembly area signs installed.
Malta, Marsaxlokk	In addition to what had been installed during the Last Mile Project, 2 informational panels installed
Morocco, El Jadida	17 evacuation route signs installed
Spain, Chipiona	107 Evacuation route signs, 32 assembly point signs installed for 8 designated points
Türkiye, Büyükçekmece	Had already been installed during JRC Phase-I Last Mile Project. 59 Evacuation route signs, 27 safe zone signs and 31 informational panels on the whole coastal zone of the Istanbul Metropolitan area



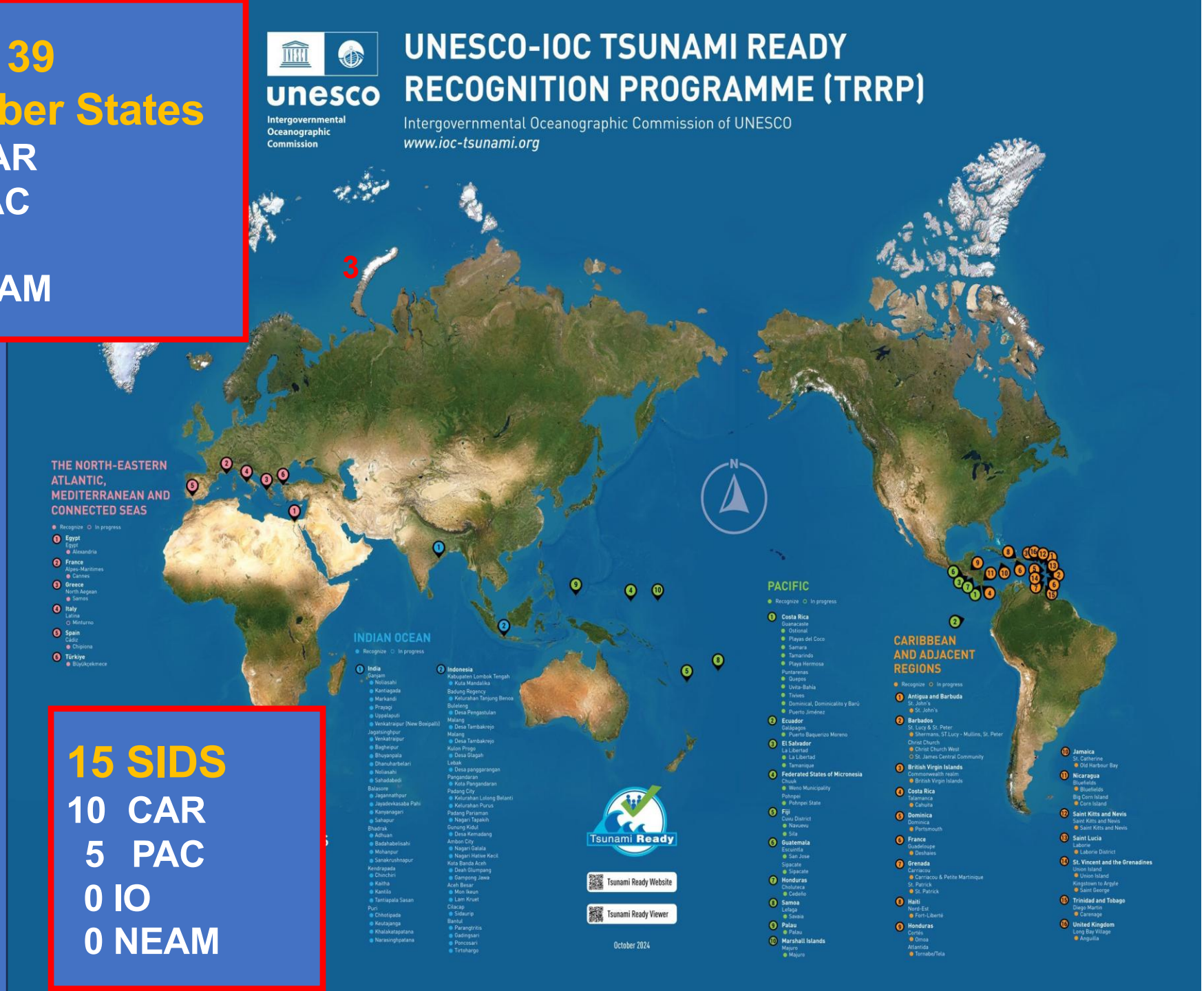
100

Tsunami Re
Communiti

30 / 139
Member States
14 CAR
18 PAC
2 IO
6 NEAM

48 INDIAN OCEAN
23 CARIBEAN & ADJACENT REGIONS
23 PACIFC
6 NORTH EASTERN ATLANTIC , MEDITERRANEAN AND CONNECTED SEAS

15 SIDS
10 CAR
5 PAC
0 IO
0 NEAM



Tsunami Ready Recognized Communities in NEAM

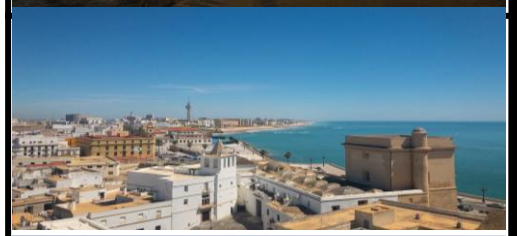
TSUNAMI READY IN NEAM

Cascais
Portugal

[Close to complete]

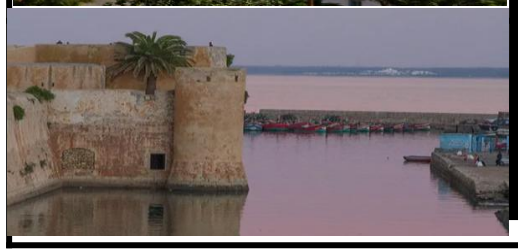
Loule
Portugal
[Close to complete]

Chipiona
Spain
[Recognized]

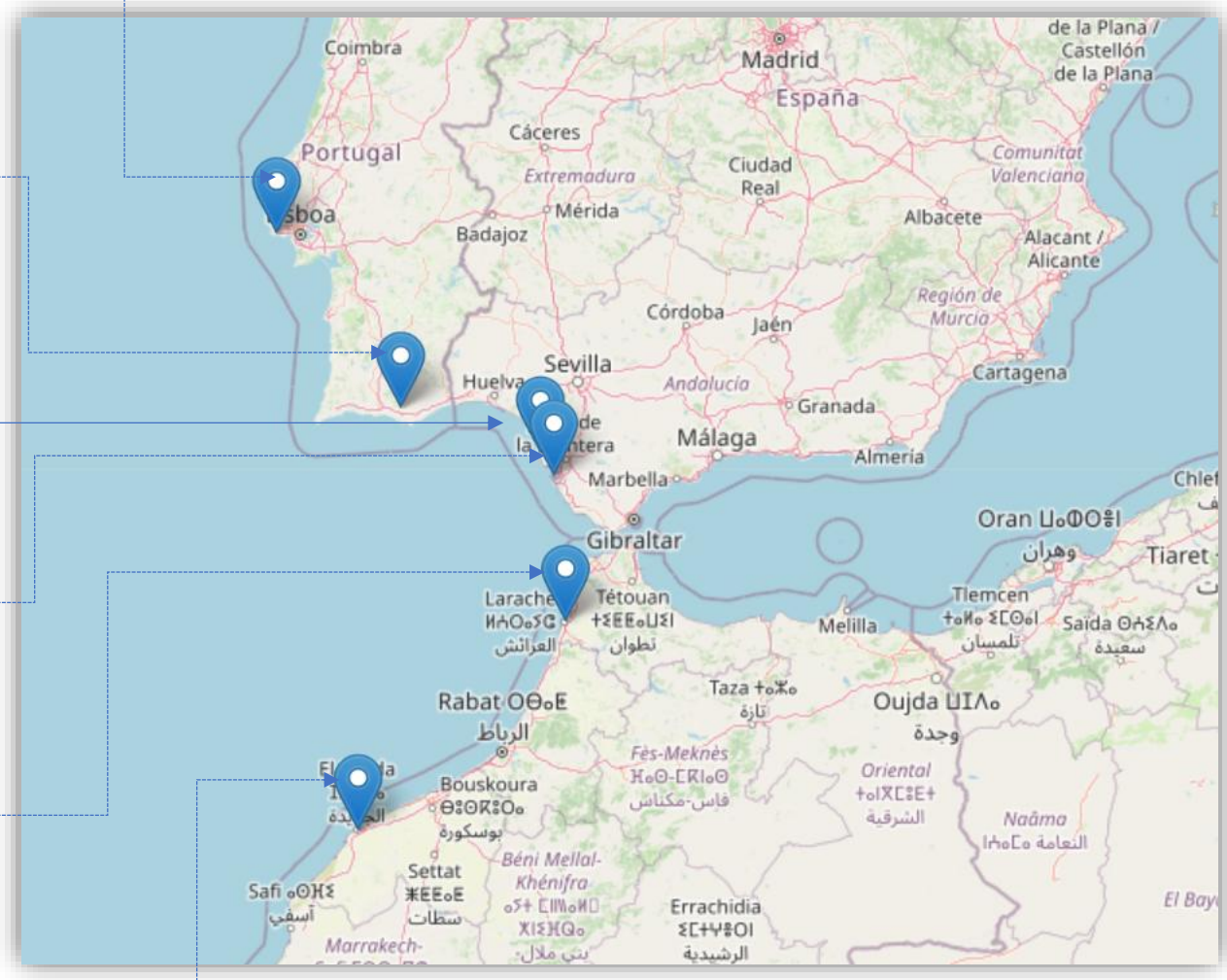


Cadiz
Spain
[Progressing]

Larache
Morocco
[Progressing]



El Jadida
Morocco
[Close to complete]



TSUNAMI READY IN NEAM

Palmi
Italy

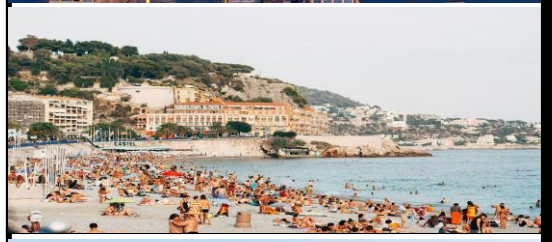
[In progress]

Minturno
Italy

[Recognized]

Marseille
France

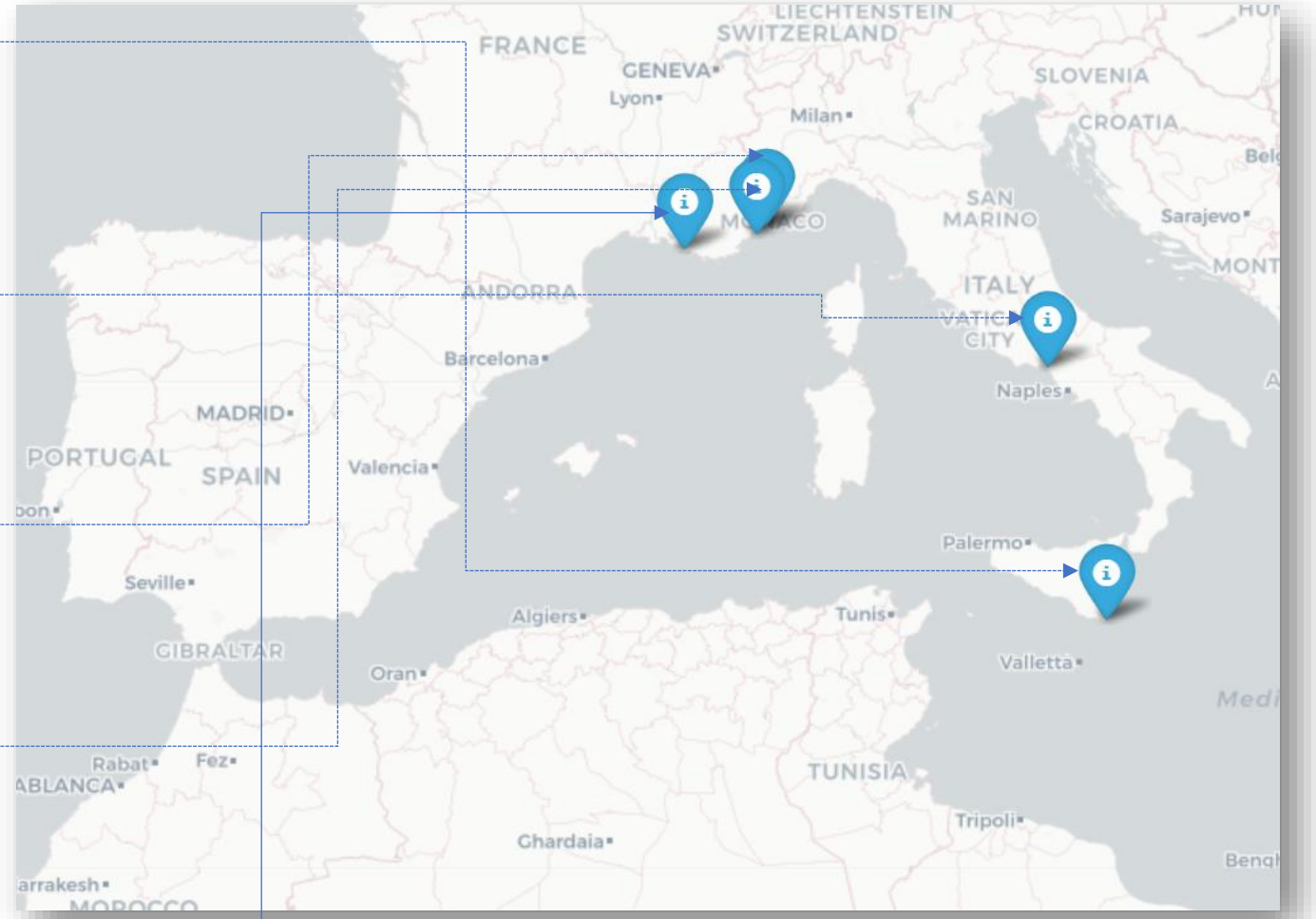
[In progress]



Nice
France

[In progress]

Cannes
France
[Recognized]



TSUNAMI READY IN NEAM

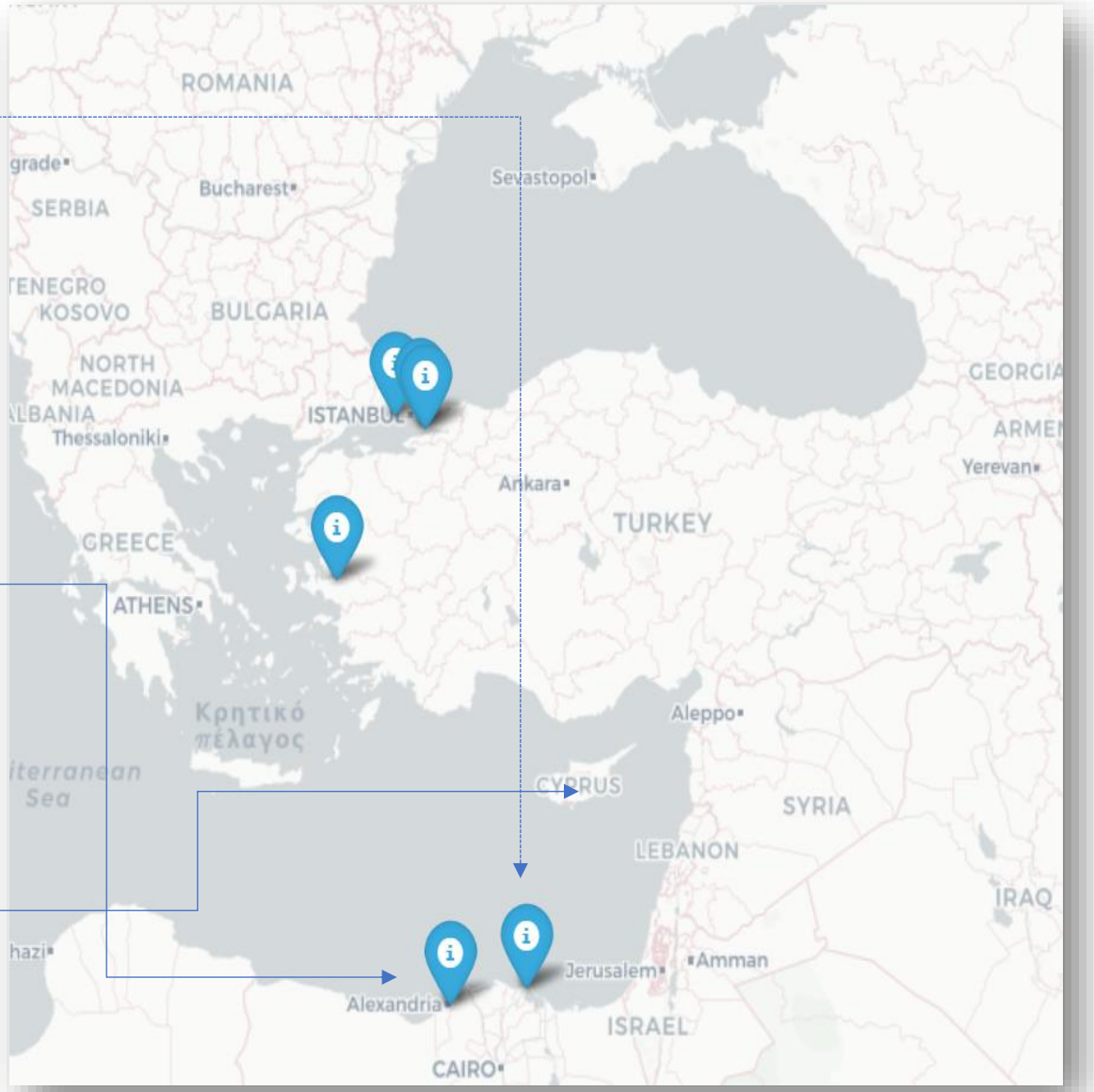
Ras El-Bar
Egypt

[In progress]

Alexandria, Egypt
[Recognized]

Larnaka

CoastWAVE 1

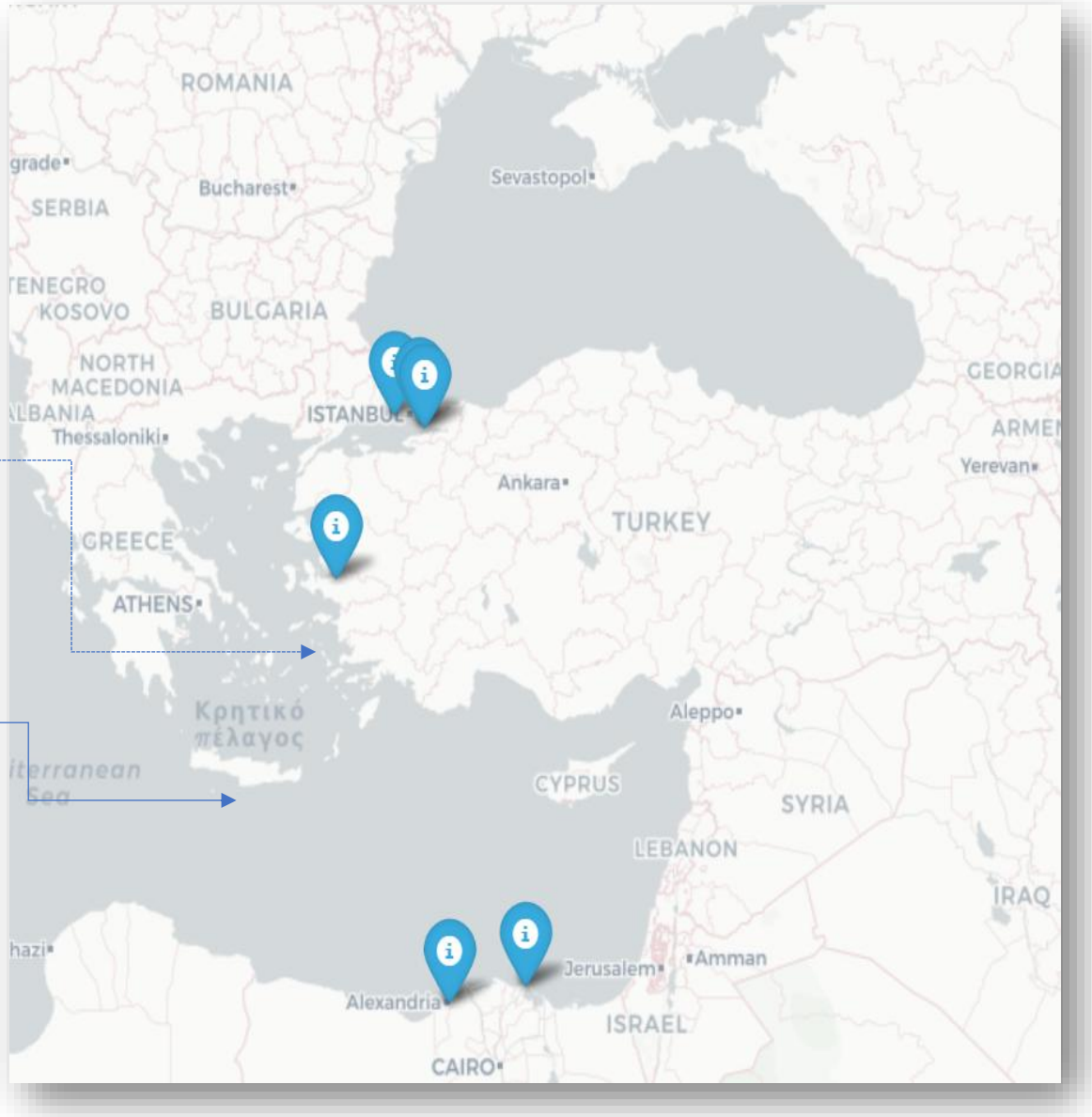


TSUNAMI READY IN NEAM

Samos
Greece
[Recognozed]

Marsaxlokk

Malta



TSUNAMI READY IN NEAM

Tuzla
Türkiye

[In progress]

Kartel
Türkiye

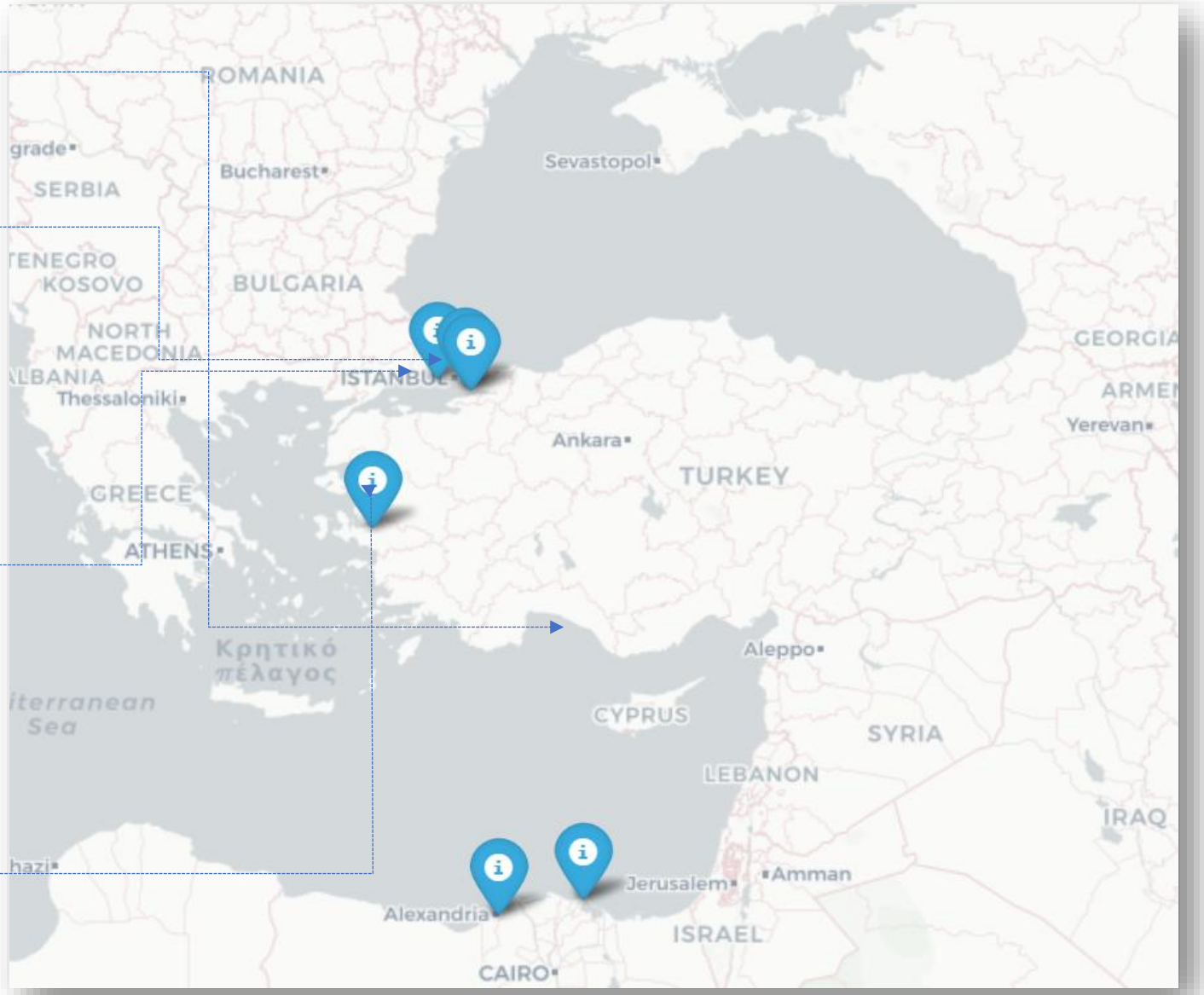
[In progress]

Büyükçekmece
Türkiye

[Recognized]

Izmir
Türkiye

[In progress]

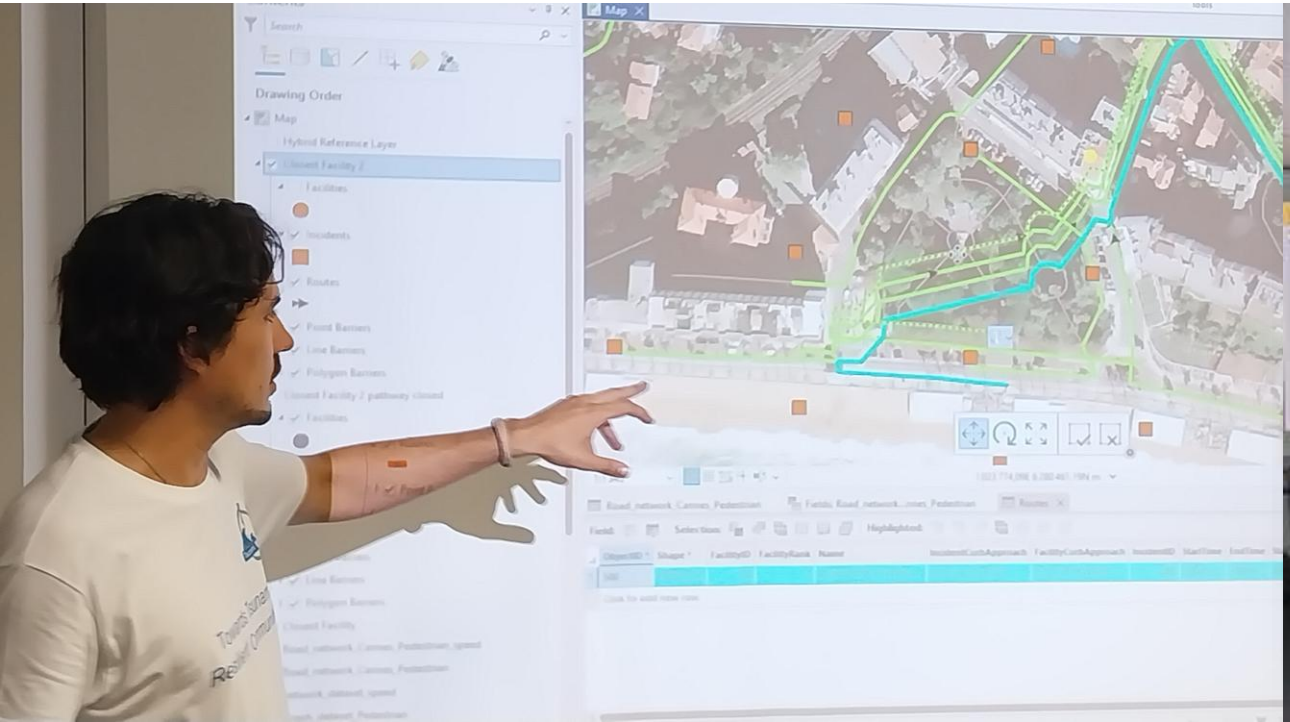


Expert Meeting of UNESCO-IOC Expert Meeting on Tsunami Sources Associated with Hellenic Arc and Azores–Gibraltar Fault Zone in the North-Eastern Atlantic, the Mediterranean, and Connected Seas (NEAM) Region
Link here

- Seismic sources
- Non-Seismic (volcano and landslide)

Evacuation Mapping Workshop Strengthens Tsunami Preparedness in the North-Eastern Atlantic and Mediterranean Region

- **Partnership:** From 30 June to 4 July 2025, the University of Montpellier Paul-Valéry, through its Geography and Spatial Planning Laboratory (LAGAM), hosted a scientific workshop on tsunami evacuation mapping as part of the CoastWAVE 2.0 project.



Upcoming Activities/Events

Regional Workshop on Tsunami Modeling and Inundation, Jan/Feb 2026

NEAMWAVE Exercise 26 with the participation of Project Countries, March 2026

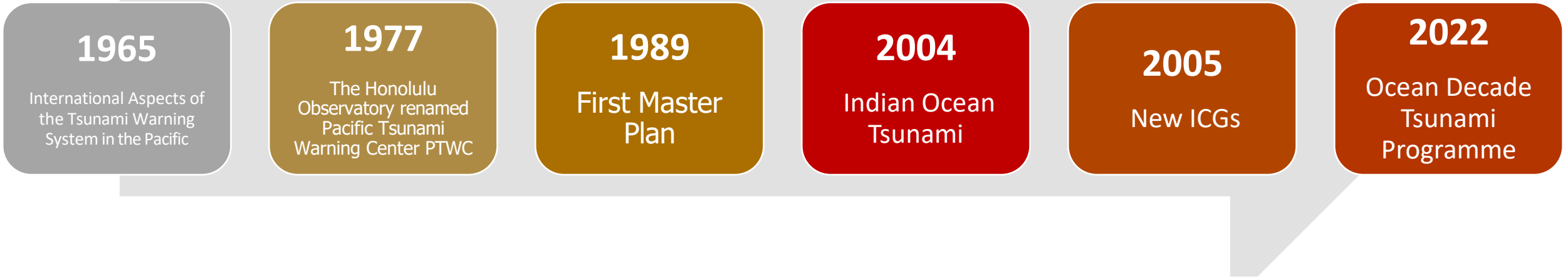
HILP /MHEWS Dialogues, April/May 2026

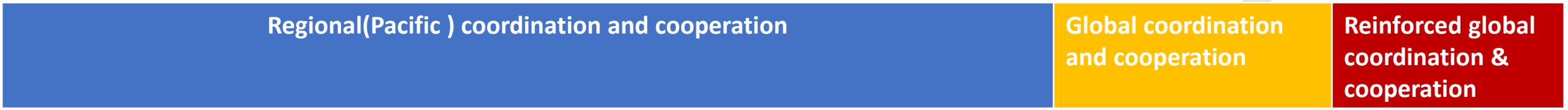
Key Lessons Learned or Take Aways

- **What worked well?**
  - i. Framed and implemented around ICG/NEAMTWS (Effectiveness and sustainability)
  - ii. IPAs (demonstrate partner commitment and contribution but also challenging process. Some local partners demonstrate genuine committed leadership
  - iii. Understanding risk (risk perception) as the basis to effective implementation of project and DRR tools
  - iv. Cross-country collaboration, expert exchange, and stakeholder engagement strengthened.
  - v. Project spearheaded exercises/drills for the first time at the local level
- **What were limitations / constraints/Challenges?**
  - i. Overall resources were limited compared to the project's ambitions/interests.
  - ii. Establishment of NTRB & Multi-partnerships challenges
  - iii. Changing political landscape at the local level
  - iv. Standardized hazard assessment e.g. Deterministic and PTHA methods, capacity differences
- **Recommendations for other countries/regions**
  - i. Activities and tools are replicable, scalable and adaptable
  - ii. Activities/TRR programme integrated within a MH and resilience context

Evolution of Global Tsunami Warning and Mitigation System

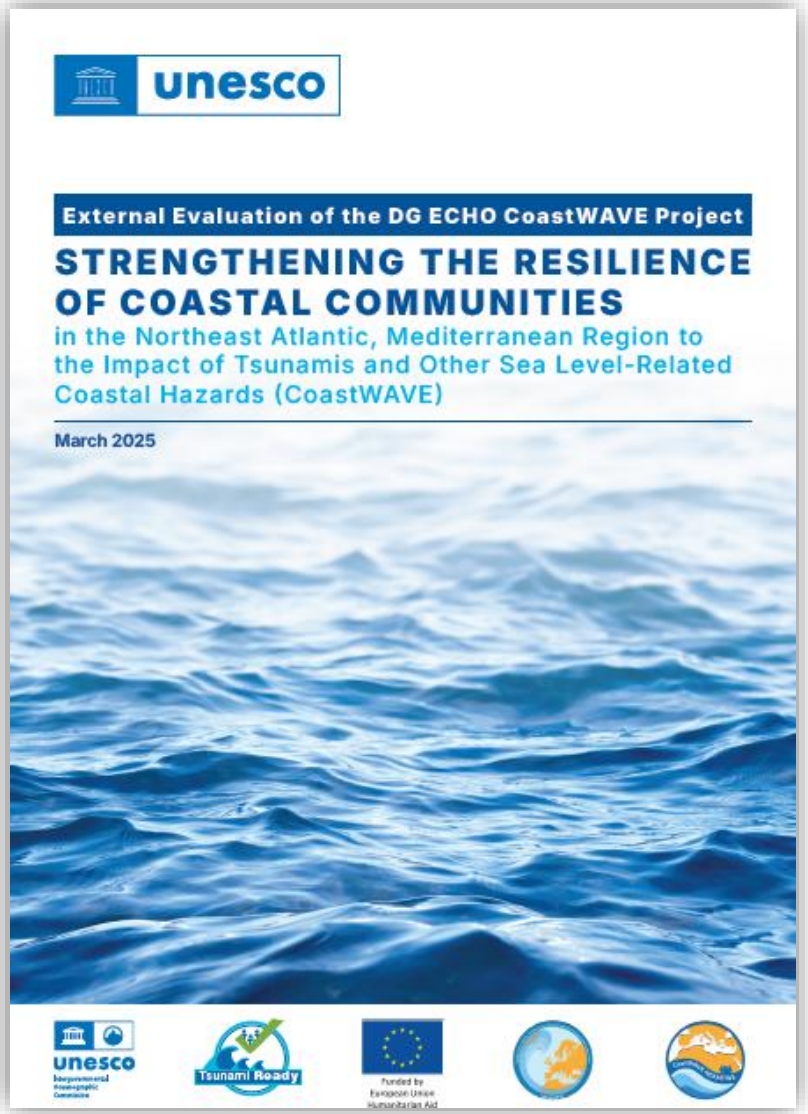
EC DG ECHO Cooperation ENDORSED OCEAN DECADE PROJECT





Regional-Global
KPI
M & T Tool

IOC DG-ECHO Funded CoastWAVE Project-I



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CoastWAVE NEAMTWS

Thank You

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Funded by European Union Humanitarian Aid

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Coast WAVE project coordinator
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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Tsunami Ready

TAFF

Technical Assistance Financing Facility
for Disaster Prevention and Preparedness

TAFF Workshop
Brussels 2-3 October, 2025

https://www.gfdrr.org/en/taff

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