



## **First Intergovernmental Session of the IOC Sub-Commission for the Central Indian Ocean (IOCINDIO-1)**

Emirate of Ras Al Khaimah, UAE.

## **Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS)**

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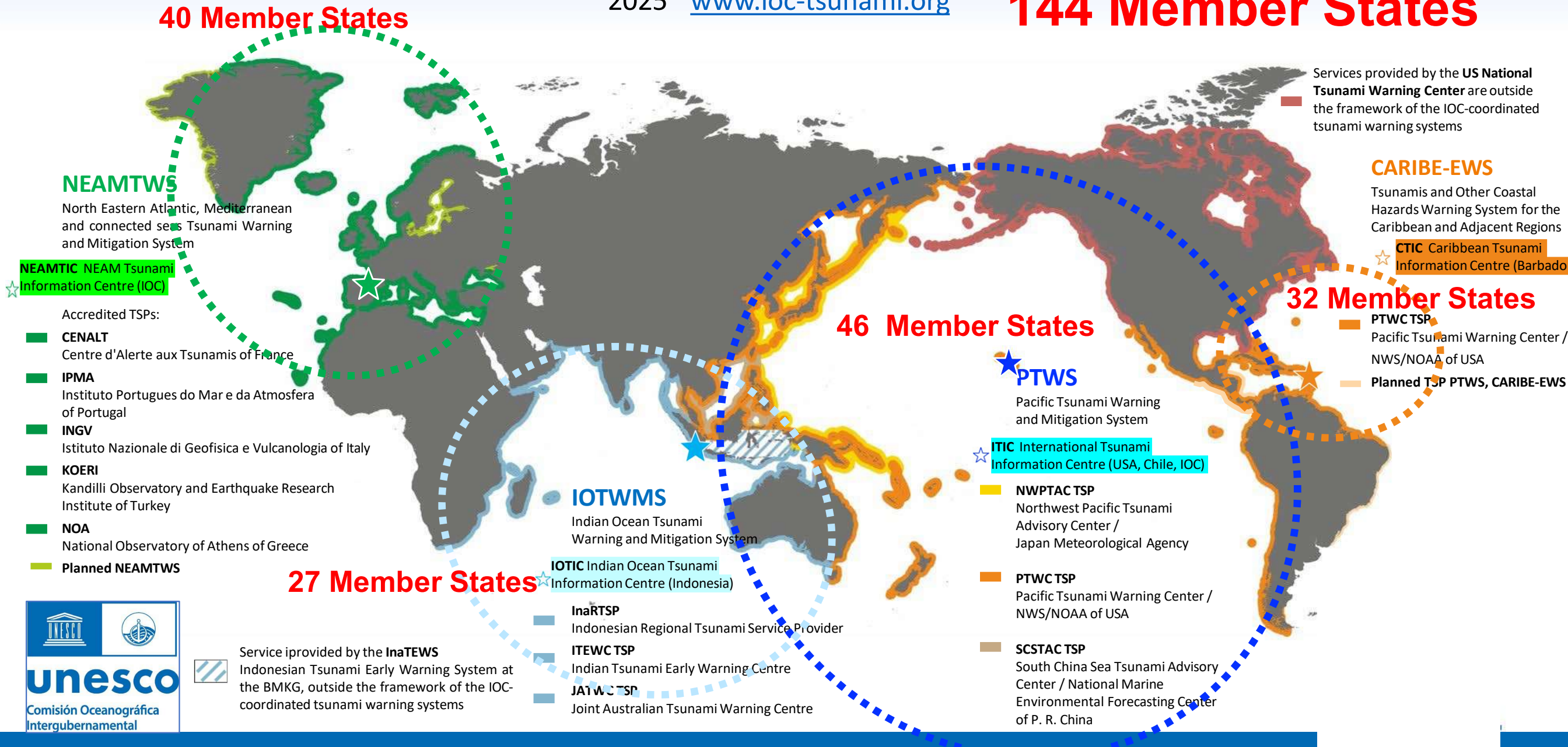
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# GLOBAL TSUNAMI WARNING AND MITIGATION SYSTEM

Intergovernmental Oceanographic Commission of UNESCO

2025 [www.ioc-tsunami.org](http://www.ioc-tsunami.org)

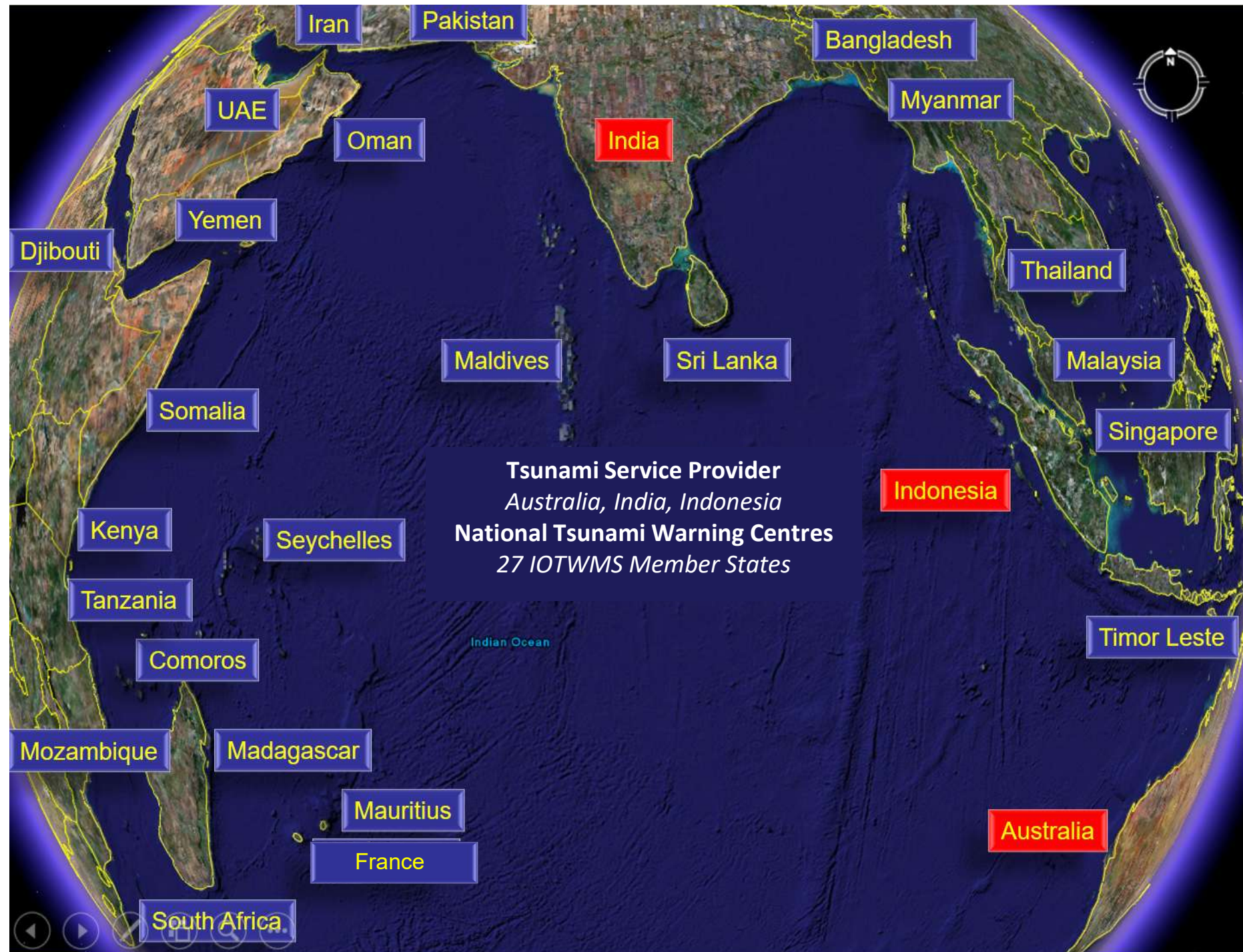
144 Member States





# ICG/IOTWMS Member States

27 MS







# IOTWMS – The Three Strategic Pillars-Effective EWS

People  
centered  
and end to  
end in  
design



## **Risk Assessment and Reduction**

Systematically collect data and undertake risk assessments

## **Detection, Warning and Dissemination**

Develop hazard detection, monitoring and early warning services

Communicate threat information and early warnings

## **Awareness and Response**

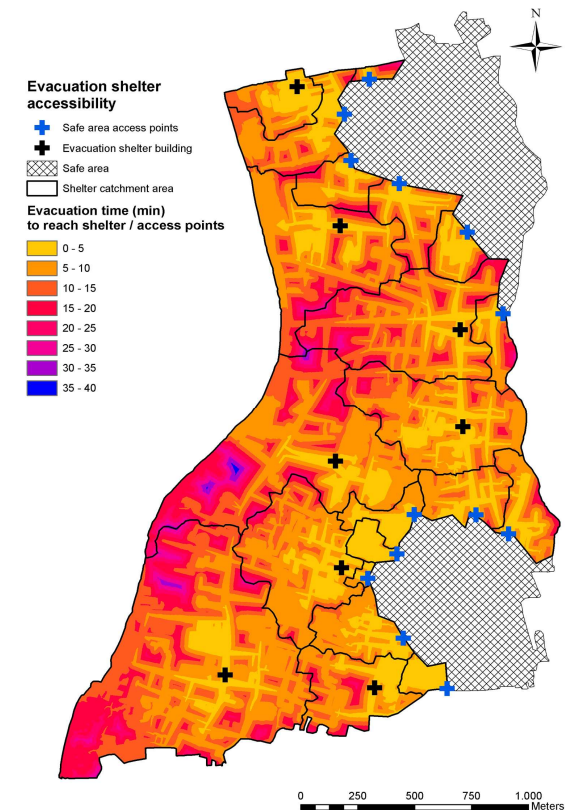
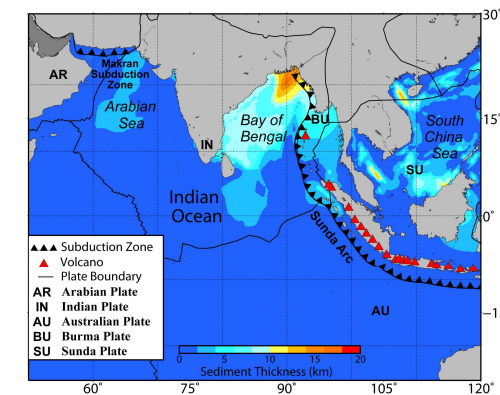
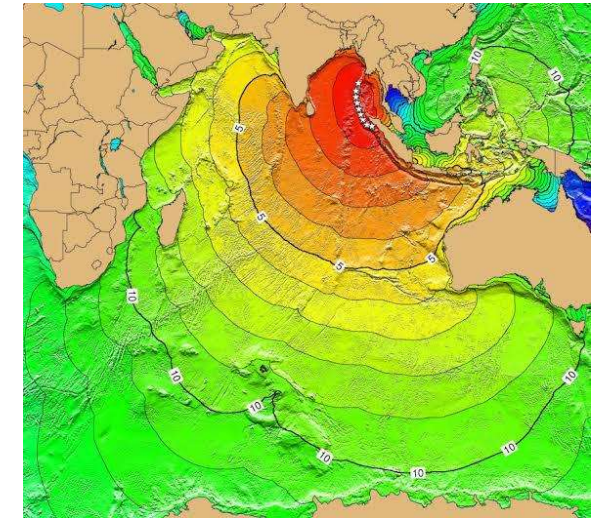
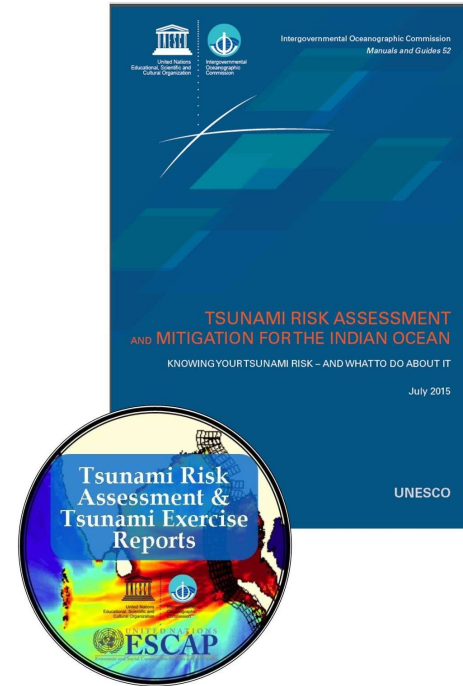
Build national and community response capabilities

# Pillar 1: Risk Assessment and Reduction

The fundamental first step in DRR is to scientifically assess the tsunami hazard and potential risk

## Activities

- Indian Ocean Probabilistic Regional **Tsunami Hazard Maps** published
- Assessment and Awareness of **Makran Tsunami Hazards**
- Regional **Workshops** on Tsunami Risk Assessment and Modelling
- **PTHA - UNESCAP Makran & UKRI PC-TWIN Projects**
- **Tools, Methods & Guidelines** for Tsunami Risk Assessment published
- Enhancing Tsunami Risk Assessment and Management, **Strengthening Policy Support** and Developing Guidelines for Tsunami Exercises in Indian Ocean Countries





# Pillar 2: Detection, Warning and Dissemination

## Activities

- Greatly **expanded and improved seismic and sea level monitoring networks**
- Tsunami **Service Framework**
  - 3 inter-operable Tsunami Service Providers (Australia, India, Indonesia)
  - **Network of NTWCs, TNCs, TWFPs**
- **Harmonised threat information** by TSPs
- National warnings **Sovereign responsibility** of authorized national agencies
- Handling **several tsunami events**
- **Yearly performance assessments** against Key Performance Indicators
- Ongoing Work on **Non-Seismic Tsunami SOPs & Maritime Products**



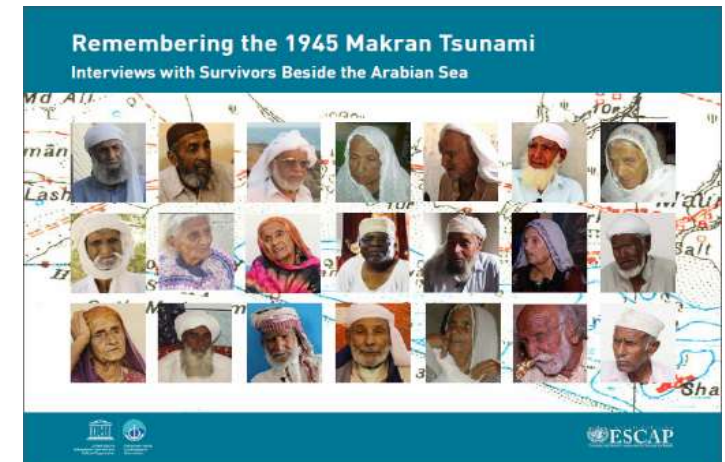


# Pillar 3: Awareness and Response



## Activities

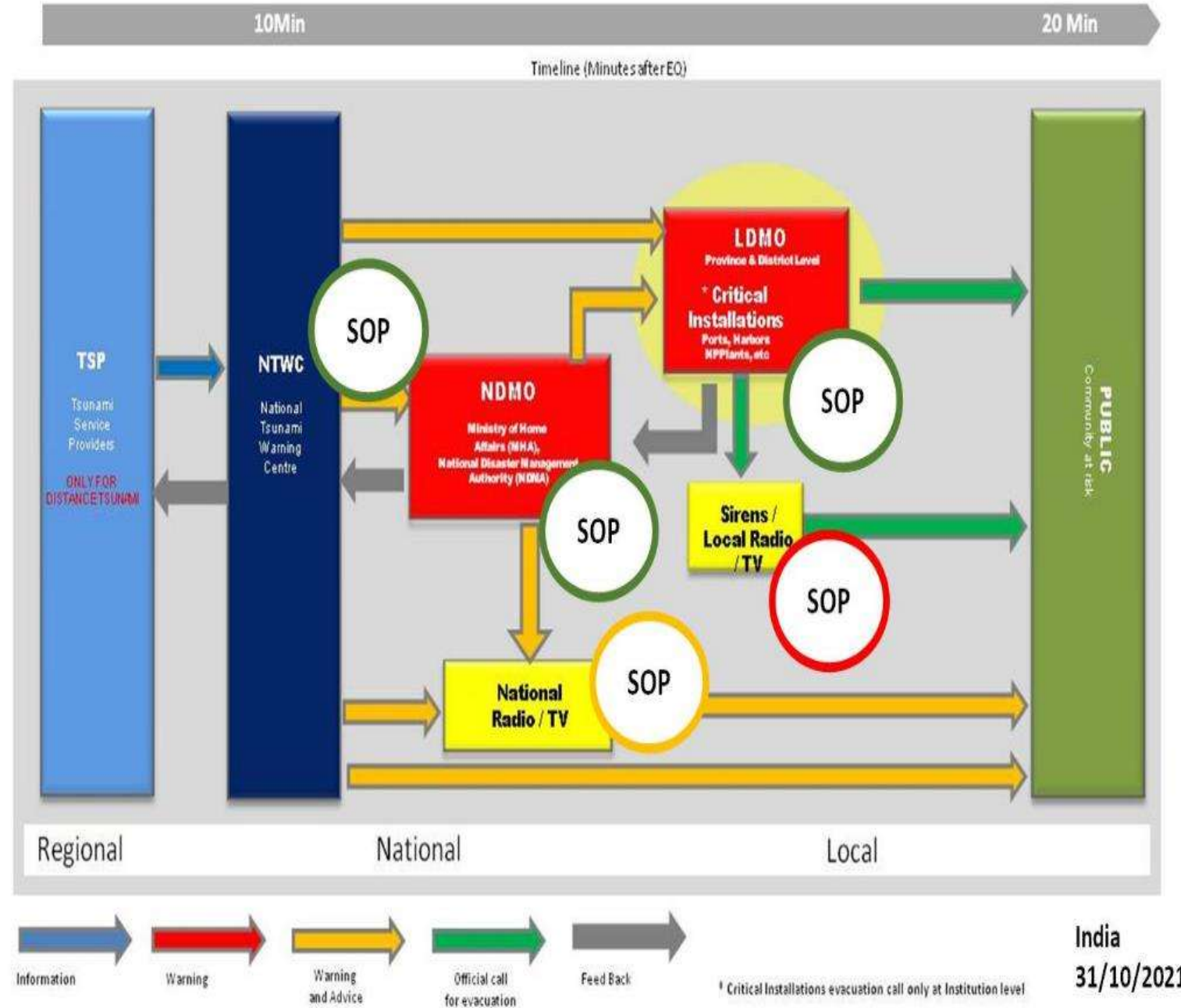
- **Indian Ocean Tsunami Information Center (IOTIC)** supported by BMKG, Indonesia through MoU Agreement
- Education Material in multiple languages
- **Indian Ocean-wide (IOWave) exercises** held every two years
- 4 Trainings on Tsunami Emergency Maps, Plans and Procedures (TEMPP) for NTWC and DMO staff
- **Over 100 CD workshops on SOP** for NTWC, DMO, staff and/or Media
- Documenting the impacts of past Tsunamis - Makran, Ambon, etc.
- **20th Anniversary of 2004 Indian Ocean (Aceh) Tsunami**
- 70<sup>th</sup> Anniversary of 1945 Makran Tsunami commemorative events
- **World Tsunami Awareness Day (WTAD)** – 05 November
- **UNESCO-IOC Tsunami Ready Recognition Programme (TTRP)**





# Training Workshops on Standard Operating Procedures (SOPs)

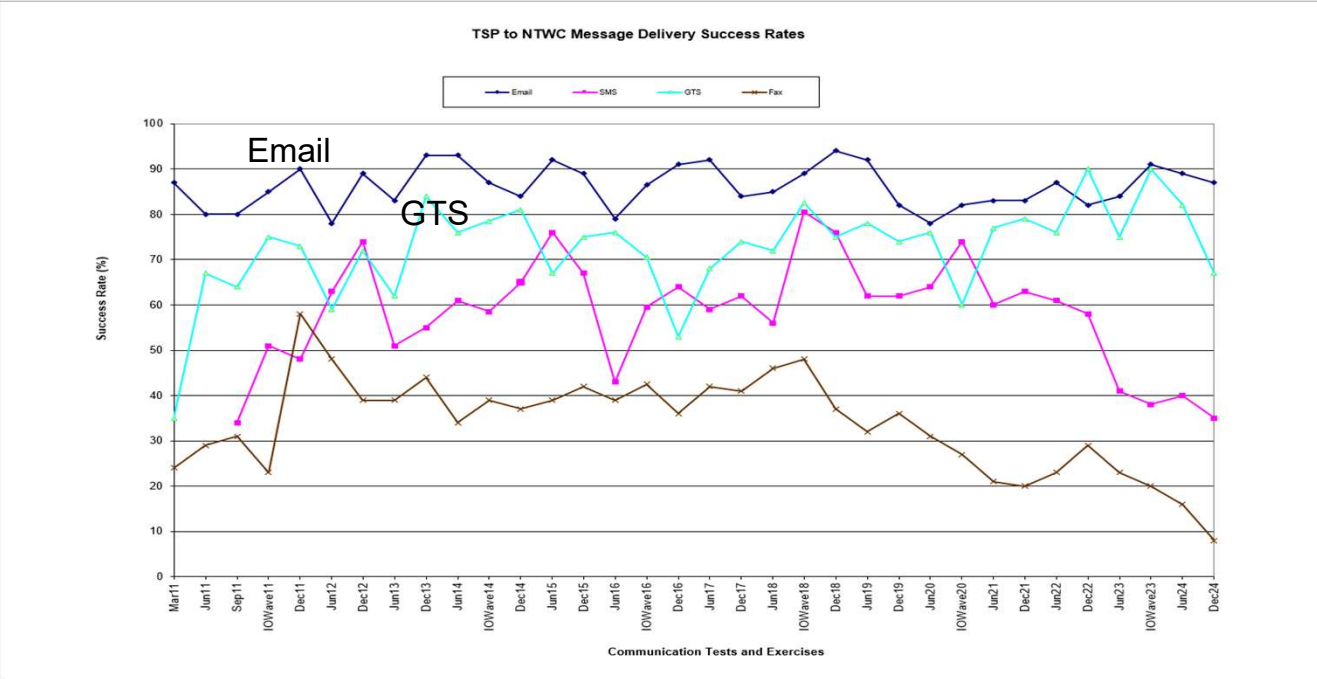
- **Three workshops** were organised in the western, eastern, and north-west Indian Ocean regions between July and August 2023 on SOPs:
- Participants were **briefed on IOWave23 exercise** and sensitized to the new IOTWMS Tsunami Service Provider Australia products for non-seismic tsunami sources.
- The Training Workshops helped countries to **refine their tsunami SOPs** in the lead-up to Exercise IOWave23



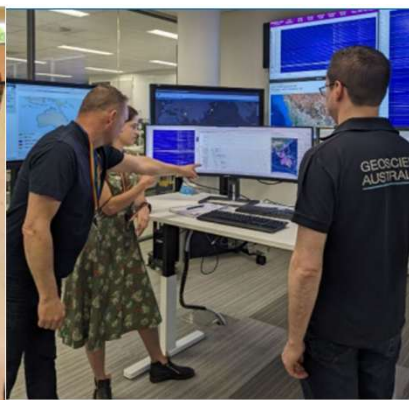
# IOWave & COMMs Tests

Scenario	1. Andaman Trench	2. Makran Trench	3. Heard Island Volcano	4. Java Trench
Date	4 October 2023 (Wednesday)	11 October 2023 (Wednesday)	18 October 2023 (Wednesday)	25 October 2023 (Wednesday)
Time	04:00 UTC	06:00 UTC	06:00 UTC	02:00 UTC
Magnitude	~M9	~M9	n/a	~M9
Depth	10 km	10 km	n/a	10 km
Latitude	7.20N	24.80N	53.10S	10.40S
Longitude	92.90E	58.20E	73.52E	112.80E
Location	Off west coast of Nicobar Islands, India	North-West Indian Ocean	Kerguelen Islands Region, Southern Ocean	South of Java, Indonesia

- 20 countries participated in IOWave 23
- Community evacuations held in 8 Member States with ~45,000 people evacuating
- Tsunami Ready indicators tested in 7 Member States
- IOWave 23 Lessons Learnt Webinar, 12-13 Dec 2023



- IOWave25
  - September / October 2025
  - Consider performing exercises outside of working hours, in particular during the night or weekend
  - Encourage the Member States to ensure the participation of TR recognised communities





# Tsunami Evacuation Maps, Plans and Procedures (TEMPP)



- 4 Regional TEMPP Trainings in India and Indonesia held since 2017.
- Most recent held at INCOIS, Hyderabad during 15 – 23 April 2025 with 35 Participants from 17 countries and 14 trainers from UNESCO-IOC, India, and Indonesia.
- 1 Sub-regional TEMPP Training in Oman
- 3 National Trainings held in Maldives, Seychelles & Timor Leste
- Focus on a) Tsunami Inundation Modelling, b) Tsunami Evacuation Maps, Plans and Procedures & c) the UNESCO-IOC Tsunami Ready Recognition Programme





# UNESCO-IOC Tsunami Ready Recognition Programme



- **National Tsunami Ready Focal Points** have been established for 19 Indian Ocean Member States (IOC Circular Letter No 2978).
- **48 UNESCO-IOC Tsunami Ready Recognition** (26 in India and 22 in Indonesia)
- In 2025, IOTIC plans to conduct one **National Tsunami Ready Training**.

I ASSESSMENT (ASSESS)	
1	ASSESS-1. Tsunami hazard zones are mapped and designated
2	ASSESS-2. The number of people at risk in the tsunami hazard zone is estimated
3	ASSESS-3. Economic, infrastructural, political, and social resources are identified
II PREPAREDNESS (PREP)	
4	PREP-1. Easily understood tsunami evacuation maps are approved.
5	PREP-2. Tsunami information including signage is publicly displayed.
6	PREP-3. Outreach and public awareness and education resources are available and distributed.
7	PREP-4. Outreach or educational activities are held at least 3 times a year.
8	PREP-5. A community tsunami exercise is conducted at least every two years
III RESPONSE (RESP)	
9	RESP-1. A community tsunami emergency response plan is approved.
10	RESP-2. The capacity to manage emergency response operations during a tsunami is in place.
11	RESP-3. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place.
12	RESP-4. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place.



National Tsunami Ready Training  
in Timor Leste, July 2023



National Tsunami Ready Training in  
Seychelles, November 2023



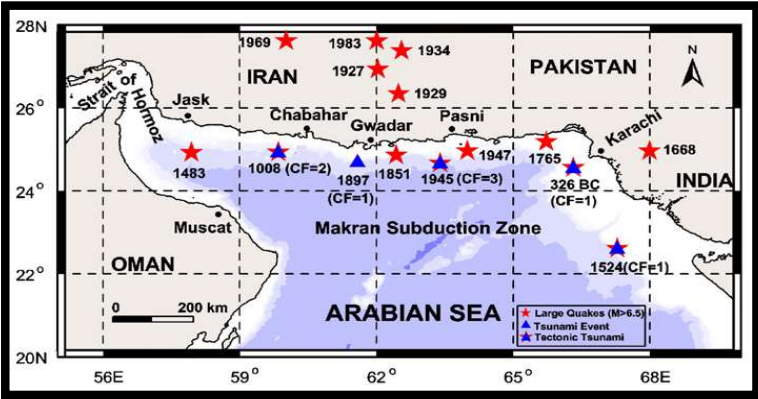
National Tsunami Ready Training  
in Maldives, August 2024



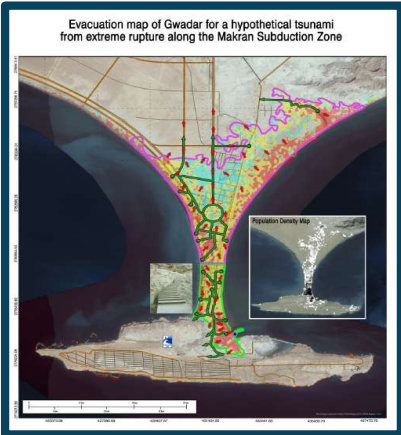
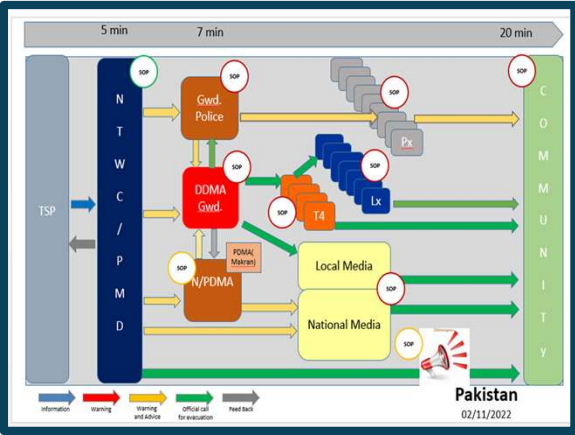
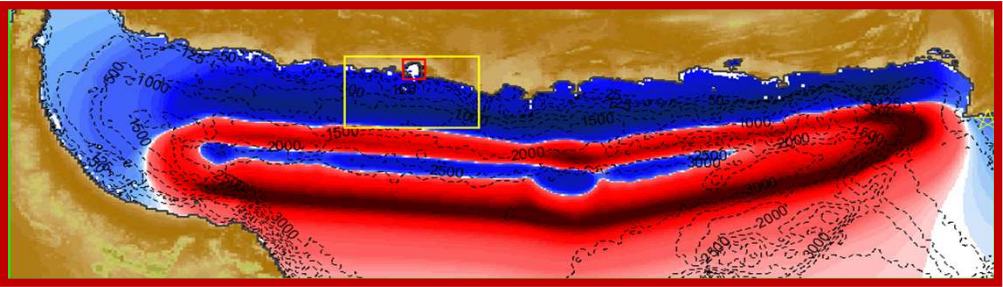
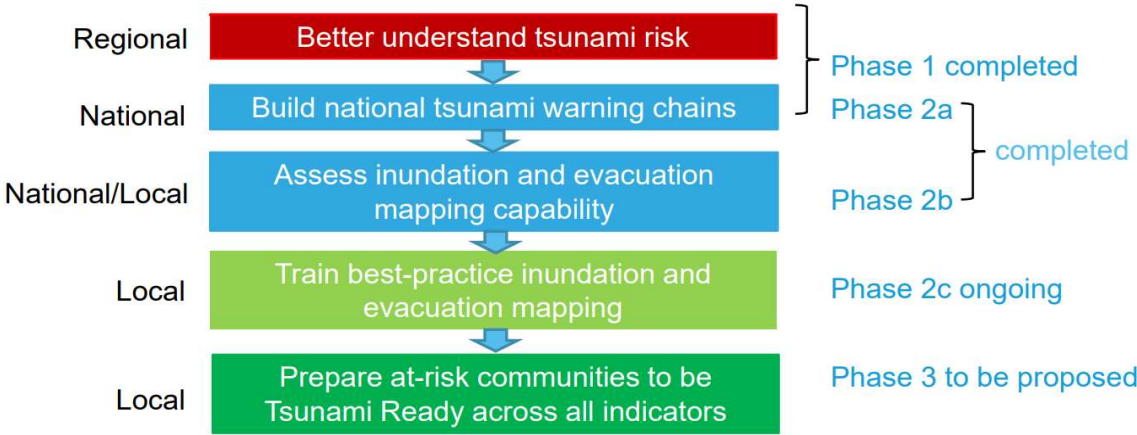


# Strengthening Tsunami Warning in the North-West Indian Ocean Through Regional Cooperation

✓ The UNESCO Multi-Donor Trust Fund project produced a **unified Makran assessment**, **updated national tsunami warning chains**, **translated guidelines**, and **inundation & evacuation maps** in 5 North West Indian Ocean Countries (India, Iran, Pakistan, Oman, UAE)



Programmatic Approach



Tsunami Ready Implementation in Pilot Sites  
Phase 3: Proposed for (2025-2027)



# 2024 Capacity Assessment of Tsunami Preparedness in the Indian Ocean

*Significant progress in tsunami warning systems has been achieved since 2004.*

*In the last 5 years there has been significant progress in downstream community awareness and preparedness initiatives while the upstream warning and detection system has plateaued.*

## Risk Assessment & Reduction

- Almost all countries have undertaken both hazard and risk assessment to understand the tsunami threats.
- Understanding of tsunamis generated by non-seismic and complex sources is required
- Utilise international expertise and collaboration to provide an updated good-practice on PTHA across the entire Indian Ocean, including tsunamis generated by non-seismic and complex sources.

## Detection, Warning & Dissemination

- The upstream tsunami warning system components have plateaued since 2018.
- Adoption of new technologies such as SMART cables and GNSS networks and exchange of real-time data is required
- Design optimal observing systems (seismic & sea level) to improve the timelines and accuracy of tsunami warnings.

## Public awareness, Preparedness & Response

- IOWave exercises have more evacuations in 2024 when compared to 2018.
- Evacuation signage and vertical evacuation shelters are at a similar level to 2018.
- Establish regular programmes of tsunami exercises in cities, villages, communities and schools in addition to the biennial IOWave exercises.

## Tsunami Ready Recognition Programme

- 48 communities have received UNESCO-IOC TRRP
- Only two Indian Ocean Member States (India & Indonesia) have TRRP Communities
- Provide Training, both regionally and nationally with priority for SIDS, LDCs and Africa on the implementation of UNESCO-IOC TRRP

## Policies, Plans & Guidelines

- Increase in availability of national tsunami guidelines.
- Policies and plans have remained at similar levels between 2018 and 2024.
- Provide training in development of integrated national MHEWS and stand-alone tsunami policies and plans for authorities and stakeholders



# UNESCO-IOC 2nd Global Tsunami Symposium Banda Aceh, Indonesia (10-14 Nov 2024)

## Participants

Engaged many parties including Scientists, Policy Makers, Academia, Professionals, Practitioners, Private Sector, Schools, Communities, Youth, NGOs, UN Organizations

- **682 participants**
- 170 online participants
- 1200 viewers of Youtube
- From about **32 countries**

## Banda Aceh Statement

Global Tsunami Warning and Mitigation: Building Sustainability for The next decade through Transformation and Innovation.

**UNESCO and its partners call on States and civil society to drastically step up their investments and efforts to achieve 100% of Tsunami Ready Communities across the world by 2030.**

# 14<sup>th</sup> Session of ICG/IOTWMS Banten, Indonesia (17-19 Nov 2024)

## Decisions

- Establish new intersessional **Task Teams on a) Indian Ocean Wave 25 Exercise (IOWave25), b) New/Emerging Technologies for Observations and Forecasting, and c) Mid-Term Strategy**
- Continue the **capacity development initiatives related to SOPs, TEMPP, TRRP and on-the-job training** for warning center operators
- **Consider the recommendations of the ODTP RDIP, IOWave23, 2024 Capacity Assessment and 2<sup>nd</sup> Global Tsunami Symposium** into work plans
- Design optimal sea level and seismic networks for the Area of Service and work with Member States to fill identified gaps
- **Extend the TSP services to include tsunamis generated by non-seismic and complex sources**



# Messages /Actions to IOCINDIO

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**Noting** with appreciation the strong engagement of IOCINDIO Member States in the IOTWMS activities including Wave Exercises, Capacity Assessment Surveys and Capacity Development Initiatives

**Also noting** the UN Ocean Decade Tsunami Programme (ODTP) and its two primary goals of 1) Improved accuracy and timelines of the tsunami warnings through enhance and new observing systems, and 2) 100% of at-risk Communities resilient and prepared for the tsunami threat by 2030

**Also noting** 2nd UNESCO-IOC Global Tsunami Symposium Banda Aceh Statement on Global Tsunami Warning and Mitigation System: Building Sustainability for the next decade through Transformation and Innovation (IOC/BRO/2025/1), UNESCO and its partners call on States and civil society to drastically step up their investments and efforts to strengthen Tsunami Early Warning Systems and achieve 100% of Tsunami Ready Communities across the world by 2030,



# Messages /Actions to IOCINDIO

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**Requests** the IOCINDIO Member States to:

- continue strong engagement with the UNESCO-IOC Tsunami Programme through the ICG/IOTWMS and the Ocean Decade Tsunami Programme to strengthen the end-to-end tsunami early warning and mitigation system
- consider recommendations of the IOWave23, 2024 IOTWMS Capacity Assessment of Tsunami Preparedness and the 14th session of the Intergovernmental Coordination of the IOTWMS-XIV into their work plans
- strengthen tsunami observing networks in gap areas, increase the exchange of real-time data, and take necessary steps for implementation of the UNESCO-IOC Tsunami Ready Recognition Programme (TRRP) within their vulnerable coastal communities, including the setting up of National Tsunami Ready Boards.
- consider the adoption of emerging technologies such as SMART cables and GNSS(Global Navigation Satellite System) networks



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**THANK YOU**