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**Chair's Report to  
Intersessional Meeting of the  
Intergovernmental  
Coordination Group for  
Indian Ocean Tsunami  
Warning & Mitigation System  
(ICG/IOTWMS)**

23 – 24 November 2021

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Chair ICG/IOTWMS  
Head of BMKG, Indonesia**

# The landscape in Indian Ocean 2004



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- Tsunami risk considered low
- Very limited seismic observations to detect
- Very limited real-time sea level observations to verify
- No tsunami warning system to forecast
- No national tsunami warning contact points to inform
- Community unaware and not prepared



# 26<sup>th</sup> December 2004

- The Indian Ocean Tsunami (IOT) of 2004 changed the lives of many
- Sadly, more than 230,000 people lost their lives
- Thousands more were listed as missing
- More than 1 million people were displaced and homeless



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# IOTWMS begins to be developed

- In early 2005 the Intergovernmental Oceanographic Commission (IOC) of UNESCO was given the **mandate** by the United Nations to establish the Indian Ocean Tsunami Warning & Mitigation System (IOTWMS)
- **In June 2005 the ICG/IOTWMS was established** by Resolution XXIII-12 of the IOC-UNESCO General Assembly
- In August 2005 the **IOC Secretariat for the ICG/IOTWMS** is established in Perth, Australia (Australia continues to provide AUD\$420k/yr in support)
- **28 countries** around the Indian Ocean become Member States of the IOC-UNESCO IOTWMS
- The **ICG/IOTWMS meets for the first time in Aug 2005** in Perth, Australia.
- The Member States begin working together through regional cooperation to develop the IOTWMS



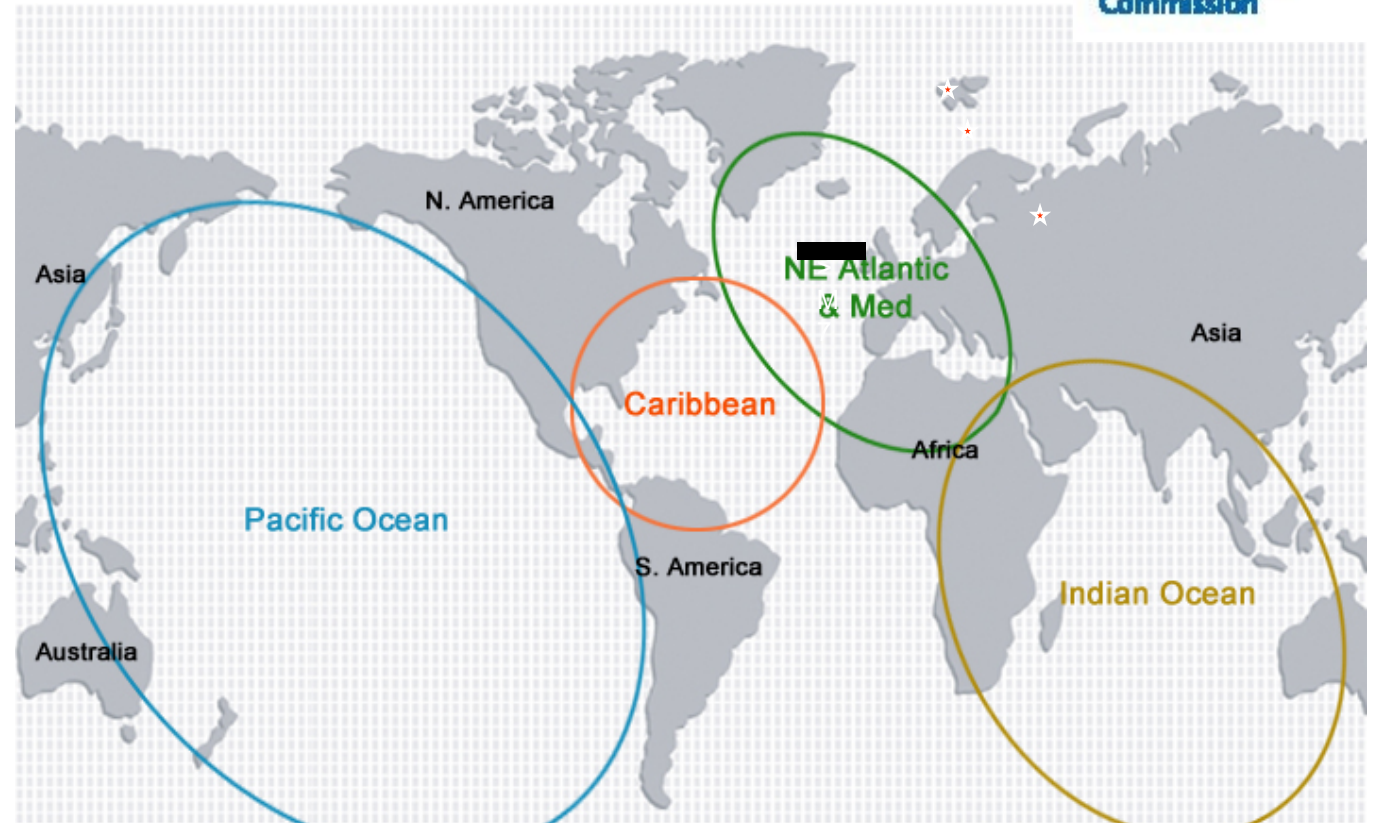
# IOC Global Tsunami Warning System



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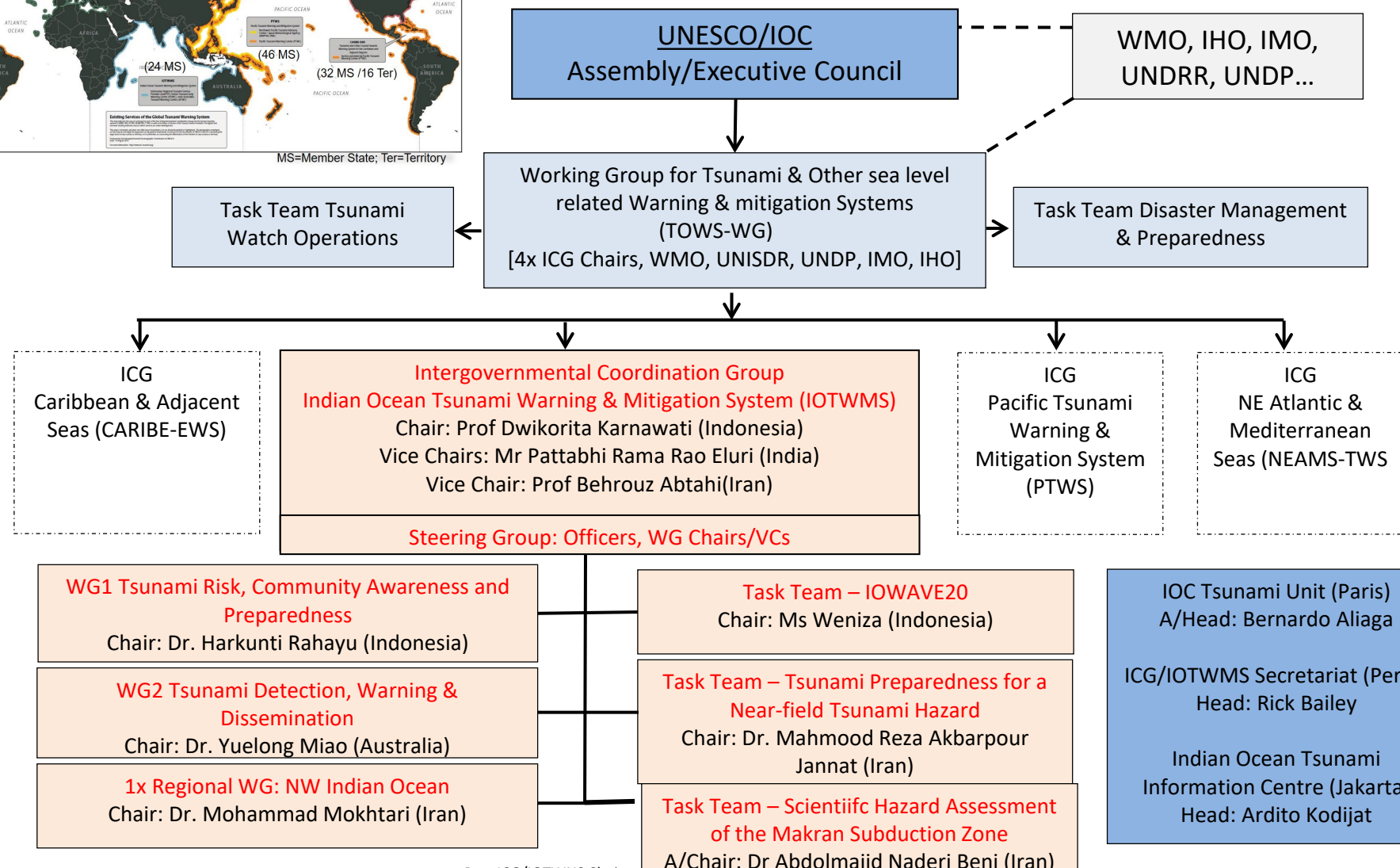
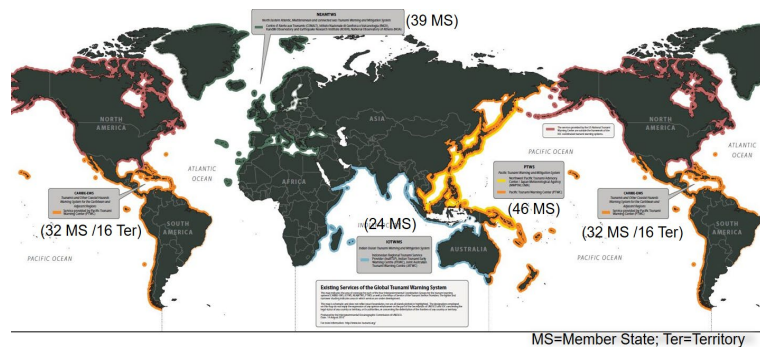
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- Pacific since 1965
- 2004 tsunami in Indian Ocean illustrated need for more
- In 2005, the IOC was mandated to establish three more TWS
  - ICG IOTWMS
  - ICG CARIBE EWS
  - ICG NEAMTWS





# Governance



IOC Secretariat, Tsunami Unit

Past ICG/IOTWMS Chairs  
 2017 - 2019: Dr Andi Eka Sayka (Indonesia)  
 2015 – 2017: Srinivasa Kumar Tummala (India)  
 2010 – 2015: Rick Bailey (Australia)  
 2007 – 2010: Jan Sopaheluwakan (Indonesia)  
 2005 – 2007: P. S. Goel (India)

# Interim IOTWMS

- In the meantime, and as a mark of Indian Ocean – Pacific Ocean cooperation, the USA and Japan in 2005 establish the Interim Alert System (IAS) for the Indian Ocean.
- The IAS brings the experience and expertise of providing tsunami threat information to countries around the Pacific, as part of a contribution to the IOC-UNESCO Pacific Tsunami Warning System (PTWS) since 1965.



# IOTWMS is fully implemented

- After many years of collaboration by the Indian Ocean Member States and support from other countries outside of the Indian Ocean, such as Germany, in 2011 the newly developed IOTWMS becomes operational.
- After two years of dual operation with the IAS to demonstrate its new and extensive capability, the IOTWMS becomes fully operational and the IAS ceases operation.







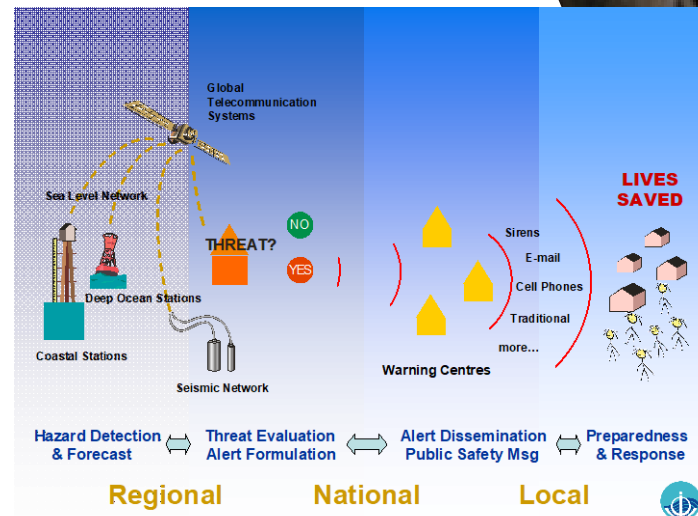
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# The three pillars

The IOTWMS has been built on three “pillars”:

1. Risk assessment
2. Tsunami detection, warning, and dissemination
3. Community awareness and preparedness



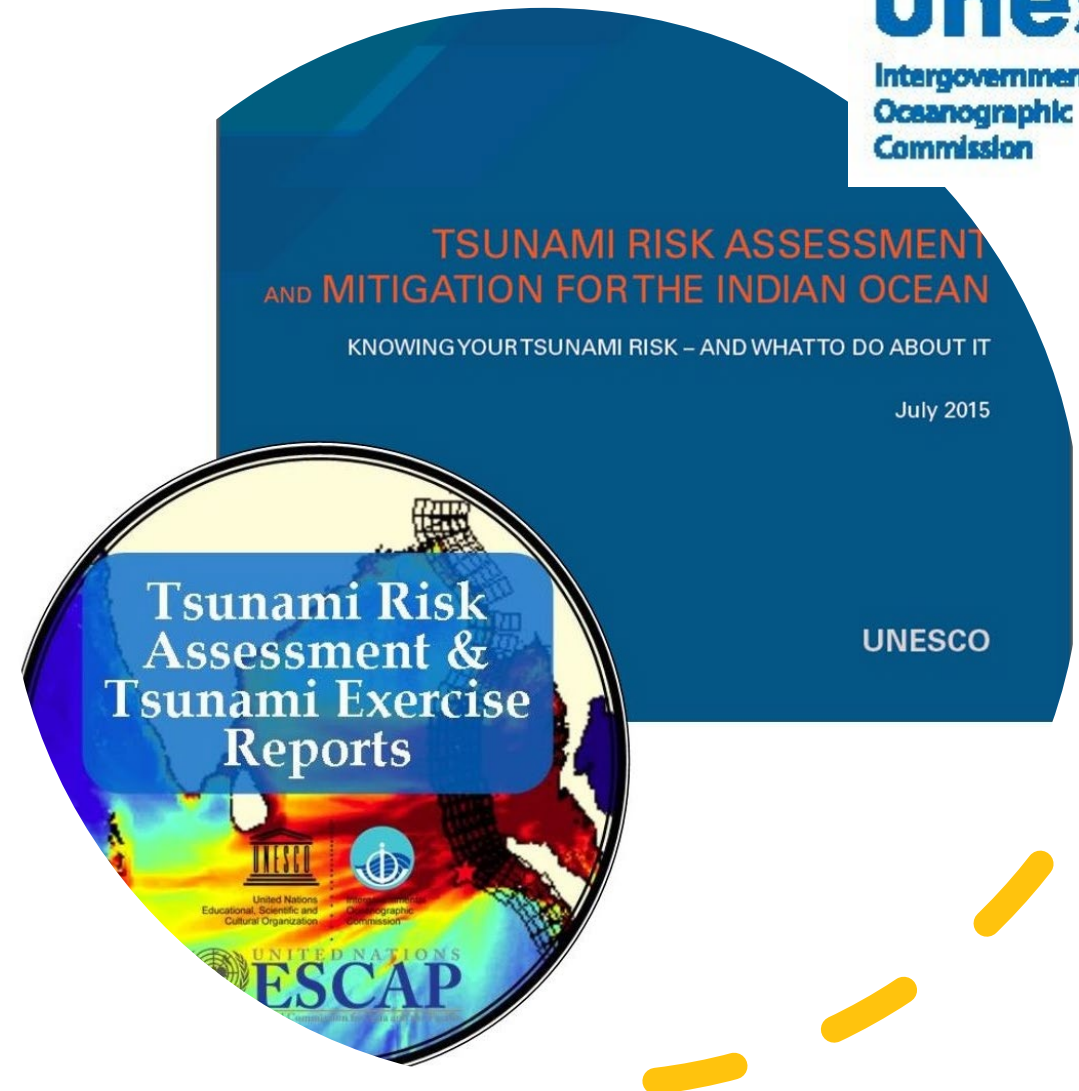
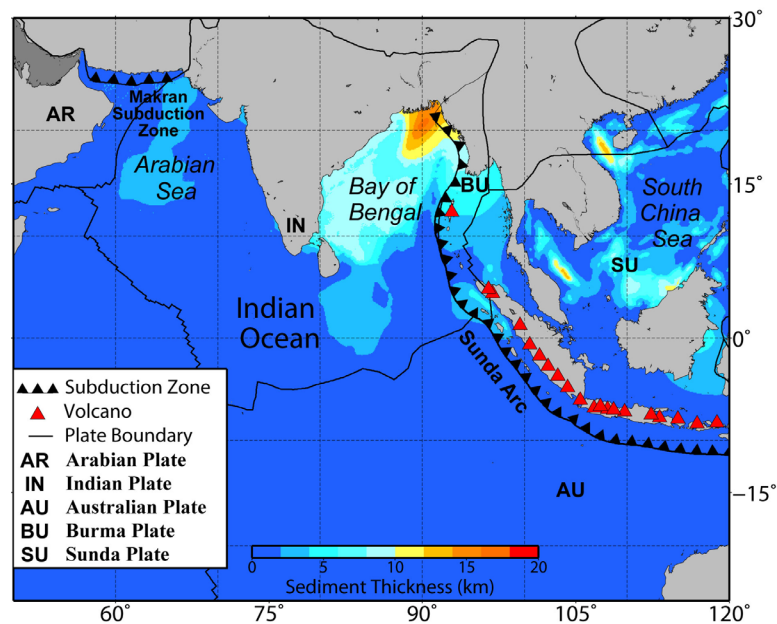


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# Risk assessment

- The first step is to scientifically assess the tsunami hazard and potential risk
- This helps inform governments and communities about what they must prepare for



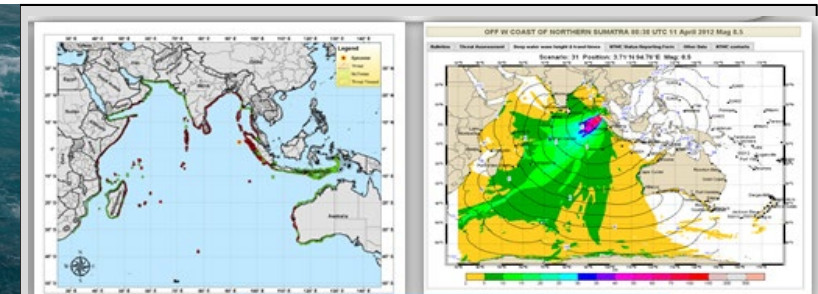
# Tsunami detection, warning and dissemination



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- An effective tsunami warning system **requires seismic and sea level data to be exchanged between all countries freely and instantly**
- This information is then used by Tsunami Service Providers (TSPs)(Australia, India, Indonesia) to provide tsunami threat information to National Tsunami Warning Centres (NTWCs) established in each country
- NTWCs then as part of their Sovereign responsibility disseminate national warnings to their at-risk communities



**Warning & Dissemination**

Zone	State/Province	Country	MinE1	MaxE1	MinE2	MaxE2	ETA	EMI	Event
CAROLINE TO CALBURN	WESTERN AUSTRALIA	AUSTRALIA	18,240	20,224	21,676	24,236	11:50 2012	1.9	Yes
ALLANBY TO JOHN BAY	WESTERN AUSTRALIA	AUSTRALIA	18,244	20,224	21,676	24,236	14:50 2012	1.9	Yes
NORFOLK ISLAND	BRITISH INDIAN OCEAN TERRITORY	BRITISH INDIAN OCEAN TERRITORY	12,560	13,200	13,200	14,724	19:50 2012	2.7	Yes
ARM SKEWET ISLAND	BRITISH INDIAN OCEAN TERRITORY	BRITISH INDIAN OCEAN TERRITORY	12,560	14,014	14,014	16,754	14:50 2012	2.8	Yes
DRESD GARCIA	INDONESIA	INDONESIA	12,480	13,200	13,200	14,814	14:50 2012	2.2	Yes
INDRA PUNY LEAF & LUTFA NAGIBAR ISLAND	INDONESIA & MALAYSIA	INDONESIA	1,840	2,202	2,202	23,286	14:50 2012	16.8	Yes
SUMATRA & NATAL ISLAND	INDONESIA & MALAYSIA	INDONESIA	2,008	2,812	2,812	19,174	14:50 2012	11	Yes
NORTH SENTRAL	INDONESIA & MALAYSIA	INDONESIA	6,274	7,482	12,014	18,872	14:50 2012	2.9	Yes



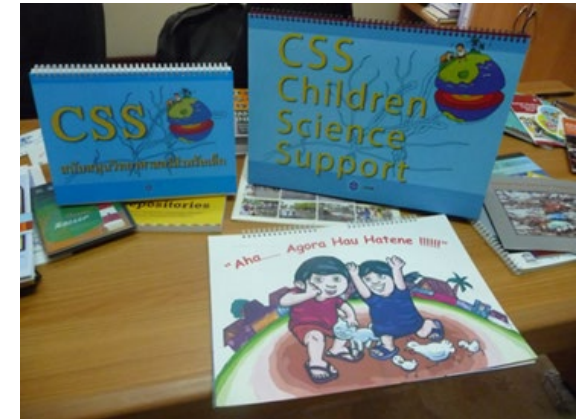
# Community awareness and preparedness

- A tsunami warning won't be effective if the at-risk communities aren't aware of the threat and don't know what to do when a warning is disseminated
- The Indian Ocean Tsunami Information Centre (IOTIC) is established in 2014 as a joint IOC-UNESCO – BMKG activity, funded by Indonesia and located in Jakarta
- Community education materials are prepared
- Training programmes established
- Capacity development projects initiated, many funded by UNESCAP
- Exercise and drills are undertaken to remind communities what actions to take
- IOWAVE Exercises are held every two years for all Member States



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Tsunami Information  
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# IOC-UNESCO Tsunami Ready Programme



1. The community has designated and mapped tsunami hazard zones.
2. The community has information of the estimate number of people that live in the tsunami hazard zone.
3. The community has an inventory of available economic, infrastructural, political and social resources to reduce tsunami risk at the community level.
4. The community has a public display of tsunami information.
5. The community has easily understood tsunami evacuation maps as determined to be appropriate by local authorities in collaboration with communities.
6. Development and distribution of outreach and public education materials
7. Hold at least three outreach or education activities annually
8. Conduct a biennial tsunami community exercise.
9. Has a tsunami emergency operations plan (EOP) for the community.
10. Has the capacity to manage emergency response operations during a tsunami.
11. Has redundant and reliable means to receive 24-hour official tsunami alerts
12. Has redundant and reliable means to disseminate 24-hour official tsunami alerts to the public.

Part of the end-to-end tsunami early warning and mitigation system with a particular **focus on community awareness and preparedness.**

A **community performance-based programme** as an active collaboration of the public (community), community leaders, local and national emergency management agencies and the national warning centre.



**Based on 12 Indicators**  
Developed from best practices and lessons learnt worldwide.



# Challenges

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- Tsunamis are fortunately rare, but this also makes it **hard to maintain awareness and preparedness**. When they do occur their impacts can be catastrophic
- **Tsunamis are “short-fuse” events and so there is not much time available to respond:**
  - **Near-field** tsunami threat... tsunami can arrive in as little as 10-20 minutes from a nearby source
  - **Even far-field** tsunamis, generated by sources on the other side of the Indian Ocean..... can arrive in hours.
- **Timeliness #1 priority** and **Accuracy #2 priority** for warnings

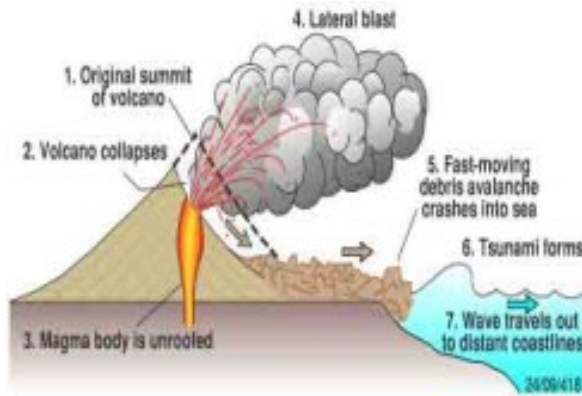




# Challenges

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Tsunamis are commonly generated by underseas earthquakes, but can also be caused by non-seismic or atypical sources, such as submarine landslides, volcano collapses, and certain atmospheric conditions. These can be even harder to detect and warn for.



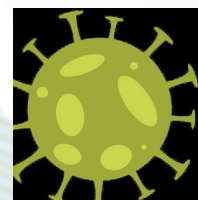
Eg Krakatoa, Indonesia (1883, 2018)



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# The Pathway



**10 years time:  
More timely warnings  
with reduced  
uncertainties delivered  
to 100% at-risk Tsunami  
Ready communities**

## Challenges along the route

- Maintaining sustainable funding, either for maintaining existing and implementing new observing systems, or for R&D on supporting the effort in implementing new technologies;
- Changes in government can result in loss of momentum
- COVID-19
- Supporting SIDS and LDCs
- Achieving 100% at-risk communities Tsunami Ready

**Today**

## Challenges along the route

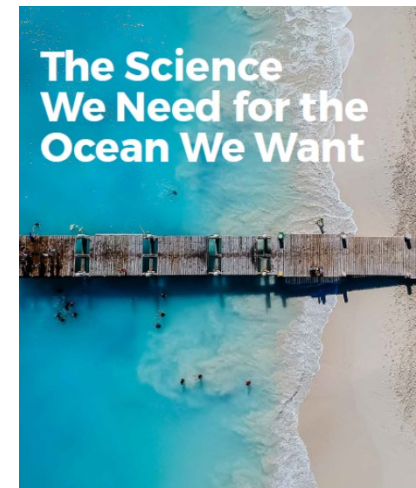
- Lack of active and consistent engagement of all relevant organizations nationally.
- Working in Silos (Upstream and Downstream).
- Establishing and maintaining effective national working chains
- Multi-hazard Vs Combination of Single Hazards  
DRR → integration of single hazards into multi-hazard framework → deliver community education in context of multi-hazard
- Maintaining commitment and awareness for low risk - high consequence hazard from penta-helix/multi entity (government, community, business entities, academia, broadcast media)





# Opportunities

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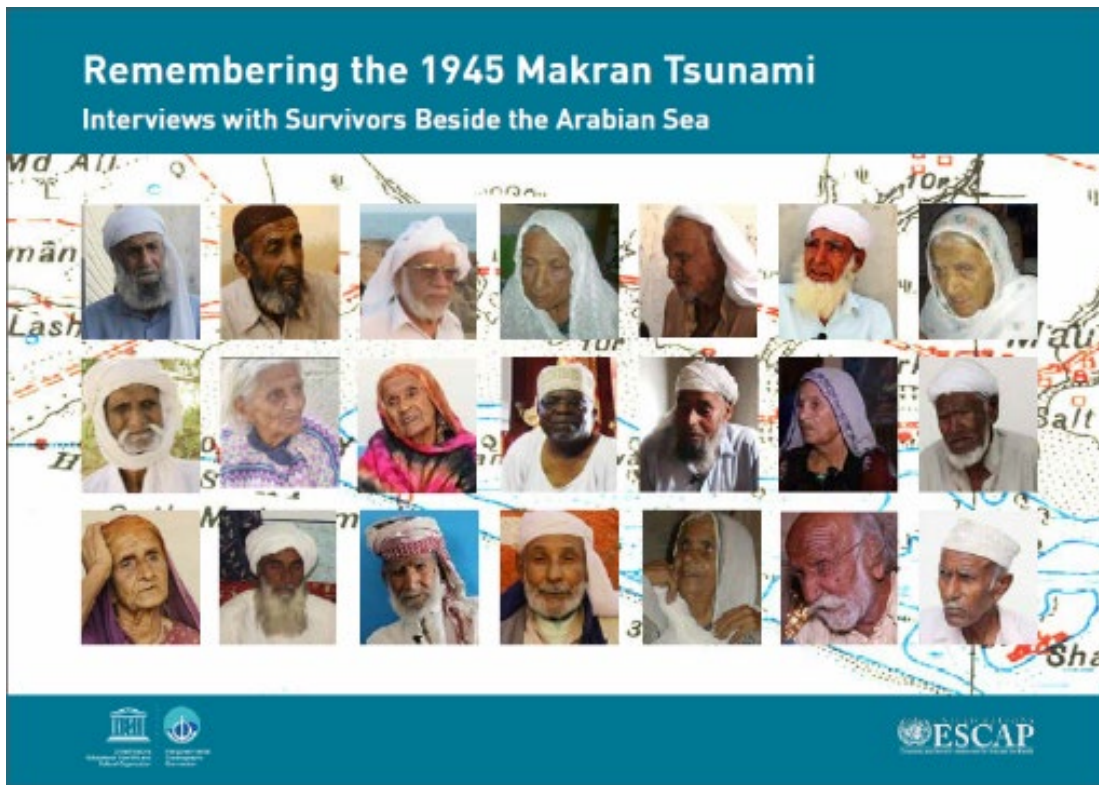
The United Nations  
Decade of Ocean Science  
for Sustainable Development  
(2021-2030)



- **UN Ocean Decade 2021 – 2030** Tsunami Programme.. includes Science Plan to be developed by TOWS-WG
- Development of Multi-hazard Framework by **WMO**
- Working closer with **UNDRR, UNDP, ...**
- Utilising the expertise of **other international activities**, such as: Kyoto Landslide Commitment 2020, Augmenting Tsunami Monitoring Steering Committee, Joint Task Force Scientific Monitoring And Reliable Telecommunications (SMART) cables, German Tsunami Risk Project, UNESCAP Project Strengthening Tsunami Warning in the North-West Indian Ocean through Regional Cooperation
- **Lessons to be Learnt** from past and future tsunami events



# National, Regional, & Global Commitment



- **National operational and R&D funding**
- Support for IOC-UNESCO Indian Ocean tsunami Information Centre (**IOTIC**) by Indonesia
- Support for IOC-UNESCO **ICG/IOTWMS Secretariat** by Australia
- Support and provision of tsunami threat information to Member States Tsunami Service Providers (**TSPs**) by Australia, India, Indonesia.
- Support of capacity building in community preparedness, such Japan's support for schools programme being developed by **UNDP**
- The UN Economic and Social Commission for Asia and the Pacific (**ESCAP**) funding of capacity building, such as in North-West Indian Ocean region
- .....



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Thank you for your continuing  
support & contributions  
to the work of the ICG/IOTWMS

