



## Exercise IOWave23 – Report Task Team

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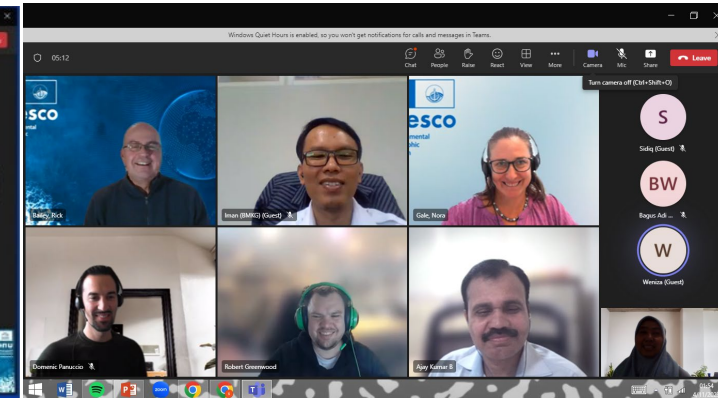
*Acknowledgements:*

*Nora Gale (Secretariat of ICG/IOTWMS UNESCO-IOC)*

# IOWave23 Task Team

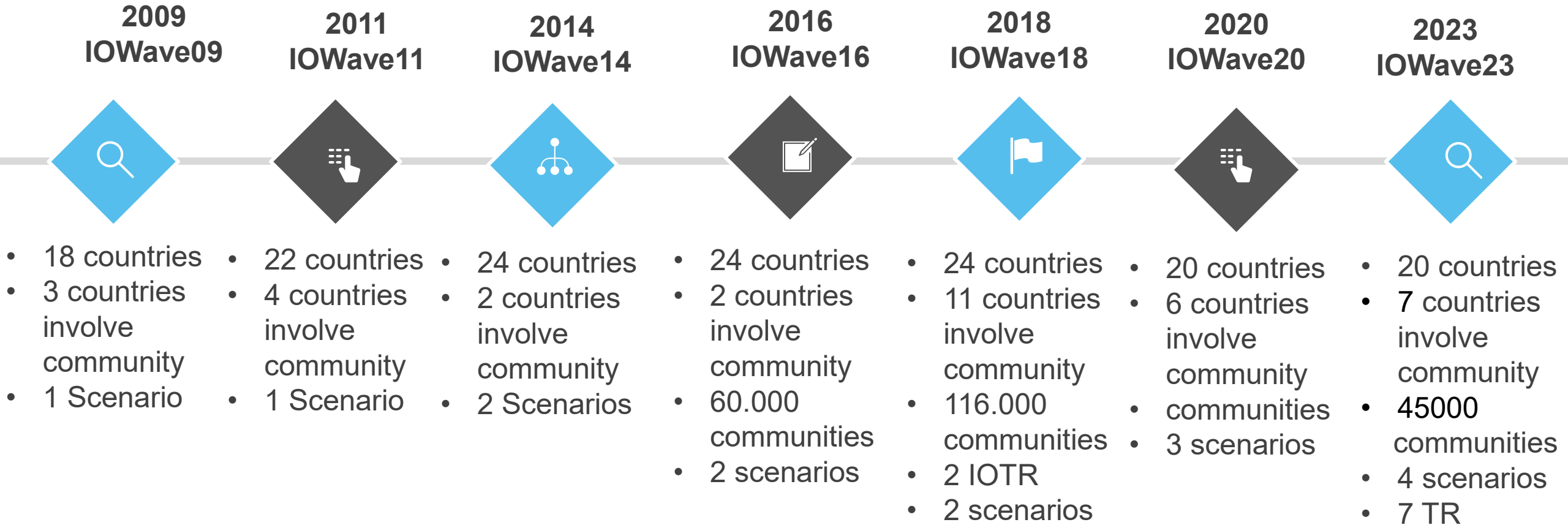


- **Ms. Weniza**, BMKG, Indonesia – Chair
- **Dr. Ajay Kumar**, INCOIS, India – Vice Chair
- **Ms. Kate Parkey**, Australia – Member
- **Mr. Domenic Panuccio**, Australia – Member
- **Mr. Khalid Al-Wahaibi**, Oman
- **Mr. Ameer Hyder**, Pakistan - Member
- **Mr. Tariq Ibrahim**, Pakistan - Member
- **Dr. Ali Khoshkholgh**, Iran - Member
- **Mr. Sidiq Hargo**, Indonesia - Member
- **Ms. Gloria Simangunsong**, Indonesia – Member
- **Mr. Bagus Adi Wibowo**, Indonesia – Member
- **Mr. Ardito**, IOTIC - Member



- **TT Meeting** – 4 April, 15 June 2023
- **Meeting with TSP**– 12, 18, 25 April, 30 June 2023

# Milestone of IOWave



# IOWave23 Exercise Purpose

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## Purpose:

- To evaluate and improve **the effectiveness of the IOTWMS**, through its operational TSPs, NTWCs, NDMOs and LDMOs, in responding to a potentially destructive tsunami.
- To test their **operational lines of communications**, to **review their tsunami warning and emergency response SOPs**, and to **promote emergency and community preparedness**.

# IOWave23 Objectives are to validate:

## Objectives 1 and 2 survey question are to be completed with input from DMO and/or NTWC :

1. Procedures in place to ensure tsunami warnings get to all in the community, including those with disabilities, all genders, elderly, and youth.
2. Level of community awareness, preparedness, and response.

## Objective 3 and 4 survey question are to be completed with input from DMO and/or NTWC depending on how tsunami response role are structure in country:

3. SOPs within countries for generating and disseminating tsunami warnings to their relevant emergency response agencies, other authorities, media, and the public.
4. SOPs within countries for the issuing of public safety messages, ordering evacuations and where possible issuing all-clear messages.

## Objectives 5 to 8 survey question are to be completed with input from NTWC :

5. Dissemination by TSPs of Tsunami Bulletin Notification Messages to NTWCs via Tsunami Warning Focal Points (TWFPs) of Indian Ocean countries and the reception by NTWCs of the TSP messages.
6. Access by NTWCs to the tsunami bulletins and other products on the TSP websites, and the use of that information to produce national warnings. Validate the reporting by NTWCs to the TSPs of their National Tsunami Warning Status.
7. Reporting by NTWCs to the TSPs of their National Tsunami Warning Status.
8. Receipt and understanding by NTWCs of new TSP service for tsunamis generated by non-seismic and complex

# Exercise Involvement



The following organisations were involved in the Exercise:

- Tsunami Service Providers (TSPs)
- National Tsunami Warning Centres (NTWCs)
- National Disaster Management Organisations (NDMOs)
- Local Disaster Management Organisations (LDMOs)
- Media Organisations
- Local Communities

## Participation Level

- Member States are invited **to participate in at least one scenario** or all **scenarios** (if country fall under threat);
- Member States are encouraged **to conduct community evacuations**;
- All Member States, particularly those piloting the Programme, are encouraged **to use the UNESCO-IOC Tsunami Ready guidelines** and **indicators to guide their community preparation for IOWave23 exercise.**

# IOWave23 Scenario

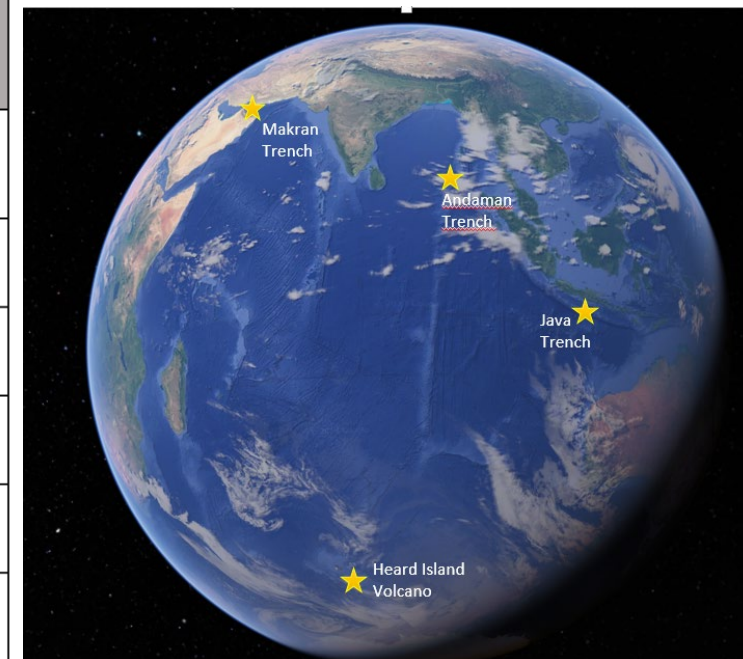
25 countries under threat

20 countries under threat

20 countries under threat

19 countries under threat

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



# IOWave23 Check List & Timelines




• <a href="#">1. Announcement by IOC Circular Letter 2945</a>	May 2023
• Set up IOWave23 Exercise National Coordination Committee involving NTWC, LDMOs, NDMOs, and all other important stakeholders including private industry participants.	May 2023
• Decide on level of participation and identify communities for evacuation (where applicable).	May 2023
• Assign agency roles including exercise controller, key participants, and observers.	May 2023
• <a href="#">2. Nominate a National Contact for IOWave23.</a>	May 2023
• <a href="#">3. Issue of IOWave23 Exercise Manual by the Secretariat.</a>	May 2023
• Secure funding and support for community activities.	Ongoing
• Develop a National IOWave23 Exercise Manual to plan/guide activities, including those at community level.	May 2023
• Address indicators of UNESCO-IOC Tsunami Ready Recognition Programme or similar national initiative (where appropriate).	Ongoing
• Share IOWave23 Exercise in-country participation plans with the ICG/IOTWMS Secretariat.	June 2023
• <a href="#">4. UNESCO-IOC Standard Operating Procedure (SOP) Training Workshops (regionally online and nationally face-to-face).</a>	July - August 2023
• Organise and hold pre-exercise national workshop(s) and meeting(s) with key stakeholders including media.	August – September 2023
• Ensure Standard Operating Procedures are in place and up to date.	August – September 2023
• Prepare a media press release.	One week before the Exercise
• <a href="#">5. Participate in IOWave23 Exercise.</a>	4 / 11 / 18 / 25 Oct. 2023
• Hold post-exercise hot and cold debriefs.	After the Exercise
• Complete the IOWave23 online post-exercise evaluation.	November 2023
• Revise and improve SOPs in accordance with lessons learnt during the Exercise.	After the Exercise
• <a href="#">6. IOC-UNESCO Post-IOWave23 Exercise Lessons Learnt Workshop (online).</a>	December 2023



# 1/2. IOC Circular Letter 2945: Announcement of the Indian Ocean Tsunami Exercise (IOWave23) on 4, 11, 18, and 25 October 2023



 INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION  
COMMISSION OCÉANOGRAPHIQUE INTERGOUVERNEMENTALE  
COMISIÓN OCEANOGRÁFICA INTERGUBERNAMENTAL  
МЕЖПРАВИТЕЛЬСТВЕННАЯ ОКЕАНОГРАФИЧЕСКАЯ КОМИССИЯ  
اللجنة الدولية الحكومية لعلوم المحيطات  
政府間海洋学委员会

UNESCO - 7 Place de Fontenay - 75352 Paris Cedex 07 SP, France  
http://ioc.unesco.org - contact phone: +33 (0)1 45 68 03 18  
E-mail: ioyabin@unesco.org

**IOC Circular Letter No 2945**  
(Available in English only)

IOC/VR/BA/RB/ah  
4 May 2023

**To :** ICG/IOTWMS<sup>1</sup> Tsunami National Contacts

**cc :** Official National Coordinating Bodies for liaison with the IOC  
Permanent Delegates/Observer Missions to UNESCO and National Commissions  
for UNESCO in ICG/IOTWMS Member States  
UNESCO Offices in Doha, Islamabad, Jakarta, New Delhi, and Tehran  
ICG/IOTWMS Chair and Vice-Chairs  
ICG/IOTWMS Working Group Chairs and Vice-Chairs  
ICG/IOTWMS Task Team IOWave23  
ICG/IOTWMS Tsunami Warning Focal Points  
ICG/IOTWMS National Tsunami Warning Centres

**Subject: Announcement of the Indian Ocean Tsunami Exercise (IOWave23)  
on 4, 11, 18, and 25 October 2023**

The IOC Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS) at its 13<sup>th</sup> session (Bali, Indonesia, 28 November–1 December 2022, decided to organise an Indian Ocean Wave Exercise in 2023 (IOWave23) and established a Task Team to plan and conduct the exercise. At its most recent intersessional meeting, held online on 4 April, and after consultation with key stakeholders, the Task Team IOWave23 decided to conduct IOWave23 with four different scenarios on 8, 11, 18, and 25 October 2023. The four scenarios will allow individual Member States to decide the type and number of exercise scenarios to participate in. This letter provides background information and details of the IOWave23 in which all ICG/IOTWMS Member States are encouraged to participate.

To date six IOWave exercises have been conducted (2009, 2011, 2014, 2016, 2018 and 2020). The exercises have been designed to test the receipt and dissemination of tsunami notifications along national tsunami warning chains, as well as test appropriate responses aligned with pre-established Standard Operating Procedures (SOPs). Throughout the IOWave Exercises, the engagement of coastal communities in tsunami education campaigns, preparedness measures, and evacuation

<sup>1</sup> ICG/IOTWMS Member States include Australia, Bangladesh, Comoros, Djibouti, France, India, Indonesia, Iran (Islamic Republic of), Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Singapore, Somalia, South Africa, Sri Lanka, Tanzania, Thailand, Timor Leste, United Arab Emirates and Yemen.

Chairperson	Vice-Chairpersons		
Mr Anel Heman TROISI Technical Secretary Navy Hydrographic Service Av. Maires de Dca 2124 C1370ABV Buenos Aires ARGENTINA	Dr Marie-Alexandrine SICRE Directrice de Recherche Centre national de la recherche scientifique (CNRS) 3 rue Michel Ange 75016 Paris FRANCE	Mr Frederico Antonio SARAVIA NOGUEIRA Navy Captain (Rt) Directorate of Hydrography and Navigation Rua Barão de Jusséqui S/N 24048-900 Niterói BRAZIL	Dr Karim HILM Directeur de Recherche Institut National de Recherche Halieutique (INRH) 02, Boulevard Sid Abderrahmane An Dab 20180 Casablanca MOROCCO
Dr Vladimir RYABININ Intergovernmental Oceanographic Commission — UNESCO 7 Place de Fontenay 75352 Paris Cedex 07 SP FRANCE	Dr Alexander FROLOV Assistant to the President National Research Center "Kurchatov Institute" Akademika Kurchatova pl. 1 123182 Moscow RUSSIAN FEDERATION	Dr Sriwissa Kumar TUMMALA Director Indian National Centre for Ocean Information Services (INCOIS) Pragathi Nagar (SO), Nizampet (SO) Hyderabad 500099 INDIA	

The Circular Letter announcing Exercise IOWave23 was issued on 4 May 2023.

It requested all Tsunami National Contacts to nominate one **National Contact to IOWave23** to oversee completion of **post-exercise evaluation**.

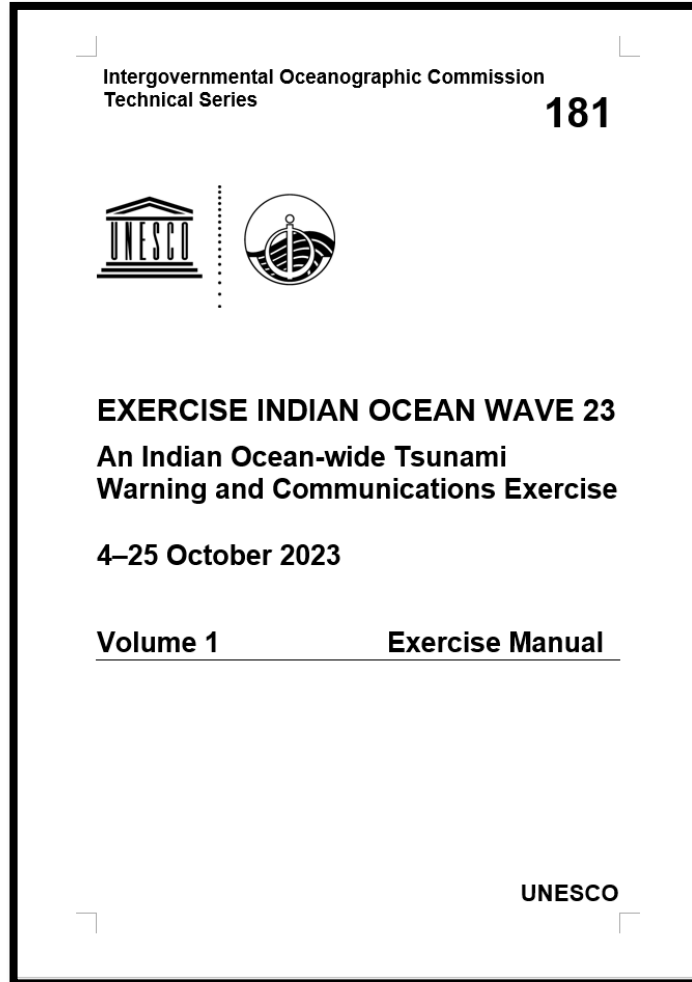
## Nominations received from:

Australia, Bangladesh, France, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Singapore, South Africa, Sri Lanka, Tanzania, Timor-Leste, and United Arab Emirates (23 Countries)

## Nominations not received from:

Comoros and Yemen (2 Countries).

# 3. IOWave23 Manual & Supplements



- The IOWave23 **Exercise manual** was completed in July and the **Supplements (4)** were completed in August 2023.
- The **manual** provides an overview *Purpose, Objectives, Scope, Exercise Success Criteria, Types of Exercise, Scenarios, Dates, Checklist of Activities for Member States, Exercise Evaluation, Exercise Observers*
- The **supplements** contain all TSP bulletins and products
- All information and documents was **be made available on the exercise website**: <https://oceanexpert.org/event/3916>

## 4. Pre-IOWave23 Briefs for Member States

Exercise IOWave23 briefs were provided to all Member States as part of the Standard Operating Procedure workshops in July and August 2023 -- Training Workshop on Standard Operating Procedures for National Tsunami Warning Centres and Disaster Management Organisations (online),

**Western Indian  
Ocean Member  
States**

3-6- July 2023



**Eastern Indian  
Ocean Member  
States**

10-13- July 2023



**Northwest Indian  
Ocean Member**

7-8 August 2023

The workshops included information on:

- Exercise IOWave23 and scenarios
- New TSP Products for tsunamis generated by tsunami and complex sources
- Accessing products on TSP websites
- Participation of DMOs and communities in Exercise IOWave23
- How to plan, conduct and evaluate exercises

## 5. Exercise IOWave23

- Exercise IOWave23 was successfully conducted on **4, 11, 18, and 25 October 2023**.
- The 3 IOTWMS **Tsunami Service Providers of Australia, India, and Indonesia** issued tsunami bulletins in real-time.
- 20 IOTWMS Member States completed the online survey: **Australia, Bangladesh, France (Indian Ocean Territories), India, Indonesia, Iran, Madagascar, Malaysia, Maldives, Mauritius, Myanmar, Oman, Pakistan, Seychelles, Singapore, South Africa, Sri Lanka, Tanzania, Thailand, and United Arab Emirates**.



# Participation

*IOTWMS Member States participation in the scenarios included:*

## 1. Andaman Trench Scenario

Bangladesh, India, Indonesia, Madagascar, Malaysia, Myanmar, Seychelles, Singapore, Sri Lanka, and Thailand (10 Member States)

## 2. Makran Trench Scenario

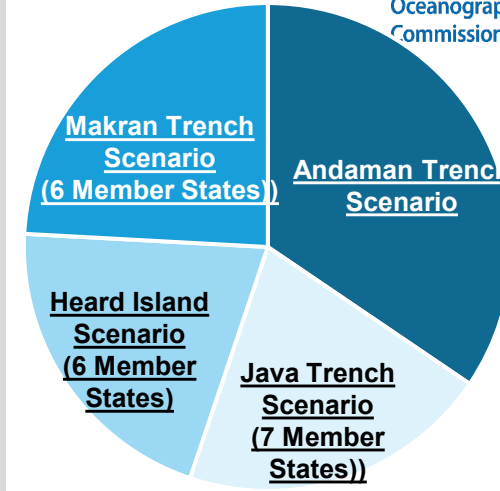
India, Iran, Malaysia, Oman, Pakistan, and United Arab Emirates.  
(6 Member States)

## 3. Heard Island Scenario

Australia, India, Malaysia, Seychelles, South Africa, and Tanzania.  
(6 Member States)

## 4. Java Trench Scenario

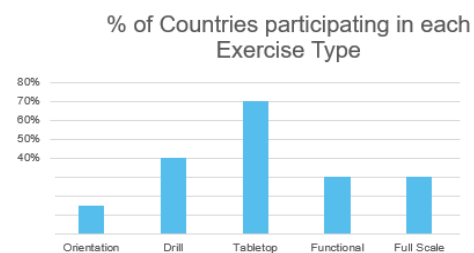
Australia, France (Indian Ocean Territories), India, Indonesia, Maldives, Maldives, and Mauritius. (7 Member States)



**Stakeholder Involvement**



**Types of Exercises Conducted**



# Receipt of TSP notification messages

TSP Notification Messages		Received in Time	Received Late	Not Received	Total MS Reporting
TSP-Australia	GTS	95%	0%	5%	20
	Fax	17%	17%	67%	18
	Email	90%	5%	5%	20
	SMS	63%	0%	37%	19
TSP-India	GTS	88%	6%	6%	16
	Fax	50%	0%	50%	14
	Email	94%	0%	6%	16
	SMS	47%	0%	53%	15
TSP-Indonesia	GTS	94%	0%	6%	16
	Fax	27%	13%	60%	15
	Email	88%	6%	6%	16
	SMS	43%	14%	43%	14

GTS and Email showed high rates of receipt while fax while SMS showed low rates of receipt across all Tsunami Service Providers.

These results are consistent with the June 2023 communications test.

*Member State contact details for receipt of TSP notification messages should be verified (Secretariat).*



# Inclusive Tsunami Warning & Mitigation

## “Early Warnings for All”

At least nine (9) IOTWMS Member States have **procedures in place to ensure tsunami warnings** get to all in the community including those with disabilities, all genders, elderly, and youth.

Of the eight (8) countries that held **pre-exercise awareness activities**, 75% (6) reported that the activities catered for people with disabilities, all genders, elderly, and youth.

Of the nine (9) countries with **evacuation maps**, 78% (7) reported the maps account for evacuation of disabled persons, all genders, elderly, and youth.



# Evacuations

*At least seven (7) IOTWMS Member States held community evacuations including India, Indonesia, Iran, Maldives, Mauritius, Sri Lanka, and the United Arab Emirates*

- 1. India:** Over **40,000** people from around **42** coastal villages, including community members, school students, and the elderly, were evacuated to shelters/safe places during the Andaman trench scenario.
- 2. Indonesia:** 11 coastal provinces participated in the Java trench scenario with the evacuation of over **1,650** community members.
- 3. Iran:** About **500** people in Chabahar and Jask undertook community evacuations during the Makran trench scenario.





## Evacuations cont.

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- 4. Maldives:** In Baa Kendhoo evacuations of **60** community members including vulnerable groups took place during the Java scenario.
- 5. Mauritius:** Evacuations were carried out at Quatres Soeur and Riviere Des Galets where about **100** people including adults, children, elderly, and disabled people moved to higher ground. In Rodrigues, about 200 people were evacuated from Gravier, St Francois, and Pointes Coton.
- 6. Sri Lanka:** Nearly **2,000** people participated in community and school evacuations. The communities of Pudawaikkadu Village, Maruthankudah Village, and Sagarapura Village (Trincomalee District) included persons with disabilities, pregnant and lactating mothers, elderly, and children in the drill.
- 7. United Arab Emirates:** An evacuation exercise was held in Al Righailat area in the Emirate of Fujairah. In total, approximately **500** people participated including residents, visitors, local authorities, and non-governmental organisations. Participation included all community categories: men, women, children, elders, youth, and people with disabilities.

# Community Evaluation of Tsunami Ready Indicators

*At least seven (7) IOTWMS Member States used Exercise IOWave23 as an opportunity to evaluate the UNESCO-IOC Tsunami Ready indicators in communities.*

- 1. India:** 32 communities in Odisha
- 2. Indonesia:** 7 communities: 1) Serangan Bali, 2) Cikakak Jawa Barat, 3) Pangarangan Banten, 4) Glagah Yogyakarta, 5) Kemadang Yogyakarta, 6) Sidaurip Jawa Tengah, 7) Tambakrejo Jawa Timur
- 3. Iran:** Jask
- 4. Maldives:** B. Kendhoo
- 5. Sri Lanka:** 1) Senthooor Grama Niladari and 2) Jayanara Grama Niladari
- 6. Thailand:** 1) Banaownang Tambon Aow Nang Meung District, Krabi Province and 2) Bannamkem, Tambon Bangnuang, Takua Pa District, Phang Nga Province
- 7. United Arab Emirates:** Al Righailiat



# Media Engagement

ERABAD

## EDITORIAL

Tuesday, October 3, 2023 **2**

### IOWAVE23 TSUNAMI MOCK EXERCISE



The Indian National Centre for Ocean Information Services (INCOIS) is all set to participate in a major Indian Ocean-wide tsunami mock exercise on 4 October. India, along with several other Indian Ocean Nations, is participating in this tsunami mock exercise. During the mock exercise, the Indian Tsunami Early Warning Centre (ITEWC) at INCOIS will issue test tsunami bulletins to both national and regional stakeholders through Global Telecommunication System (GTS), email, fax, SMS as well as share the bulletin on INCOIS website. Due care will be taken to ensure the public is not inadvertently alarmed. The purpose of mock exercise is to increase tsunami preparedness, evaluate response capabilities in each state and improve coor-

ordination throughout the region. The drill will facilitate exercising the standard operating procedures (SOPs) of the emergency services and evaluating their state of readiness to handle tsunami like emergency situations. The aim is to exercise all levels of the tsunami warning and response chain, with a primary focus on the local coastal community level.

#### IOWave23

The Exercise, known as IOWave23, is coordinated by the Indian Ocean Tsunami Warning and Mitigation System

(IOTWMS) of Intergovernmental Oceanographic Commission (IOC-UNESCO). In India, the IOWave23 mock exercise is being coordinated INCOIS in close association with the National Disaster Management Authority (NDMA).

All the Disaster Management Organisations (DMOs) of coastal States/Union Territories, Navy, Coast Guard, and National Disaster Response Force (NDRF), personnel from Critical Installations such as Nuclear Power Plants, Port and Harbours will participate in the

exercise. These exercises will provide a great opportunity for all stakeholders to test their tsunami warning procedures and enhance public awareness and preparedness.

It will help us identify and fix any gaps in warning chains and be fully prepared for future events" said Dr. T. Srinivasa Kumar, Director, INCOIS.

The IOWave23 mock exercise will comprise four scenarios:

1. Simulate an earthquake with a magnitude of 9.0 in Andaman Trench of India on 4 October at 0900 IST
2. Simulate an earthquake with a magnitude of 9.0 in Makran Trench off coast of Iran on 11 October at 1130 IST
3. Simulate a volcanic eruption at Kerguelen Islands region,

Southern Ocean on 18 October 2023 at 1130 IST

4. Simulate an earthquake with a magnitude 9.1 in Java Region, Indonesia on 25th October 2023 at 0730 IST.

Each scenario will run in real-time for a period of 12 hours. Out of the four scenarios, India is participating at the national level with Scenario-1 & Scenario-2. DMOs of East coast of India and Andaman & Nicobar Islands will participate in Scenario-1, and DMOs of West coast of India and Lakshadweep Islands will participate in Scenario-2. Feedback from the participants after the exercise is expected to improve the SOPs of all stakeholders.

(PIB)



# Summary

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- ✓ Good participation of Member States, with **many positive outcomes and identification of national issues** for urgent correction in case real event happens soon.
- ✓ Encouraging to see **community level engagement in 8 Member States**.
- ✓ Extensive **national stakeholder engagement, including with media**, helped with successful exercise outcomes and greater government and community awareness of the tsunami threat and what to do.
- ✓ New **non-seismic products by TSP-Australia very useful and encourage further development**, including MS tailoring of national SOPs to be able to utilize
- ✓ **Implementation of Tsunami Ready Recognition Programme**, or similar national initiatives, urgently required to ensure communities receive warnings and know what to do to meet goals of **UN Ocean Decade Tsunami Programme of 100% at-risk communities** prepared and resilient to tsunami threat by 2030, plus **UN goals of "Early Warnings For All" by 2027**

## Recommendation

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- Recommendations for the upstream components of the tsunami warning system, including the TSPs and NTWCs:
  1. Member States should **regularly review, update, and test contact information on national warning dissemination lists.**
  2. National Tsunami Warning Centers should **review and update Standard Operating Procedures (SOPs) based on lessons learnt during Exercise IOWave23.**
  3. All IOTWMS TSPs should **develop and implement products for tsunamis generated by non-seismic sources.**
  4. As well as the workshops **organized before the exercise to review and update the national tsunami warning chains and SOPs for each link in those chains for each Member States, further detailed training is required for NTWCs on TSP products, including how to deal with differences in predicted wave heights and how to best utilize the new non-seismic generated tsunami products.**

# Recommendation

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- Recommendations for the downstream tsunami warning system, including DMOs, communities, and media:
  1. Further **implementation of UNESCO-IOC Tsunami Ready Recognition Programme, or similar national initiatives**, supported by appropriate resources is urgently required to ensure communities receive warnings and know what to do to meet the goal of UN Ocean Decade Tsunami Programme of 100% at-risk communities prepared and resilient to tsunami threat by 2030, plus UN goal of "Early Warnings for All" by 2027.
  2. Community tsunami awareness and preparedness activities should be **regularly conducted and accommodate all in the community, including all genders, all ages, and those with disabilities**.
  3. Ensure communication between **stakeholders in the national tsunami warning chains is effective**.
  4. DMOs, communities, and media should review and update SOPs based on lessons learnt during Exercise IOWave23.

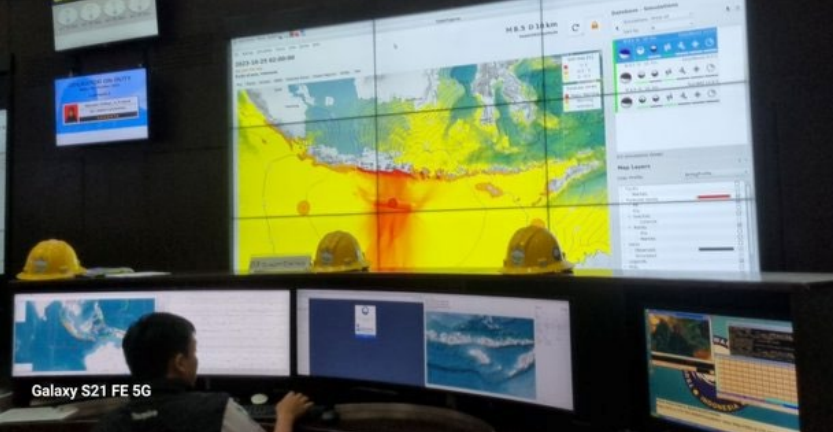
# Recommendation

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1. In terms of exercise planning → to conduct future biennial IOWave exercises at alternative times of the year to allow the full participation of Member States that are occupied with other hazards during the September and October period.
2. Member States were encouraged to undertake national exercises and drills in the alternate years, so that exercises of some form are at least undertaken annually.

Work to finalize a full and extensive exercise report will be undertaken by the Task Team on Exercise IOWave23. This report and further information on IOWave23 will be made available on the IOWave23 portal ([www.iowave.org](http://www.iowave.org))




# THANK YOU



GLADI LAPANG ( DRILL ) & TABLE TOP EXERCISE / 771  
BENCANA TSUNAMI Kabupaten Bantul

**INDIAN OCEAN WAVE 23 (IOWave23)  
EXERCISE**

25 Oktober 2023




RAYMOND NYAMWIHULA

JENISTA MHAGAMA

UTAYARI WA NCHI KUKABILIANA NA ATHARI ZA EL-NINO

NAULI - JELA MIKA THELATHINI KWA KUKUTWA NA H

