



Intersessional Meeting WG1  
Virtual, Tuesday/18 April 2023

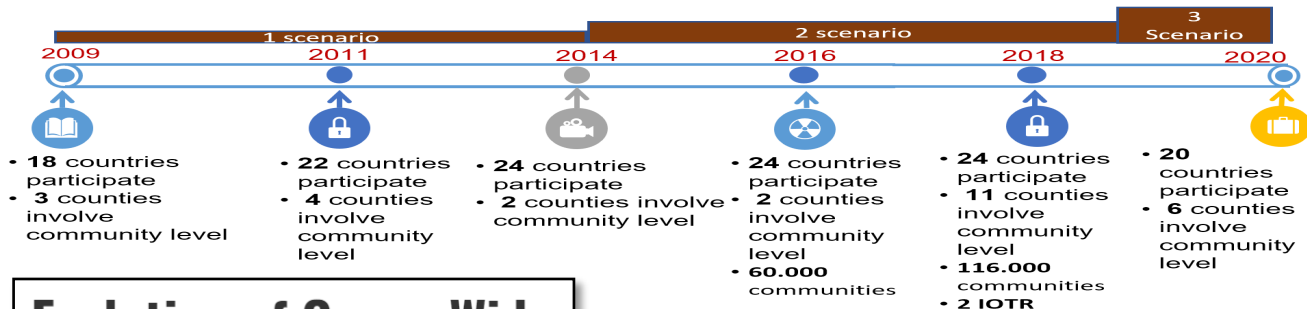


## 3.2 IOWave20 recommendation for WG1 **Indian Ocean Wave Exercise 20 (IOWave20)**

Weniza1 & Nora Gale2

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# History of Indian Ocean Exercise



## Evolution of Ocean Wide Exercises in the Indian Ocean

Nora Gale, Ardito M Kodijat, Weniza, Ali Khoshkholgh, Ajay Kumar Bandela, and Simon Allen

POSTED ON JULY 6, 2021



<https://www.ecomagazine.com/in-depth/featured-stories/evolution-of-ocean-wide-exercises-in-the-indian-ocean>

# IOWave20 Task Team

- **Ms. Weniza**, BMKG, Indonesia – Chair
- **Dr. Ali Khoshkholgh**, INIOAS, Iran – Vice Chair
- **Dr. Simon Allen**, BoM, Australia – Member
- **Mr. Ajay Kumar**, INCOIS, India – Member
- **Badar Al-Rumhi**, Oman – Member
- **Khalid Al-Wahaibi**, Oman – Member
- **Alyaqdhan Al-Siyabi**, Oman – Member
- **Ameer Hyder**, Pakistan – Member
- **Tariq Ibrahim**, Pakistan – Member



# Term of Reference (ToR) on IOWave20

- Plan and coordinate the next IOWave Exercise (IOWave20), taking on-board suggestions from **the post-IOWave18 lessons learnt workshop including an increased focus on LDMO down to community level and implementation of IOTR.**
- Prepare the Exercise Manual in accordance with the Guideline on "How to Plan, Conduct and Evaluate Tsunami Exercises" (IOC Manuals and Guides No. 58) **at least 6 months in advance of the exercise,**
- Prepare **the Exercise Report for ICG/IOTWMS-XIII.**

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The Task Team will report to **the Steering Group and be composed of members nominated by Member States and representatives from TSPs, with a chairperson and vice-chairperson to be elected.**

## Scale:

- Due to the ongoing Covid-19 pandemic, the scale of IOWave20 was **reduced in comparison with previous exercises**.
- Member States were encouraged to **test communication protocols and conduct a “virtual” table-top exercise (as a minimum)**
- Emphasis was placed on **updating organizational Standard Operating Procedures, plans and policies for tsunami warning and emergency response during a pandemic.**

## Objective:

1. Validate **the 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.
2. Validate **the access by NTWCs to the tsunami bulletins and other products on the TSP websites**, and the use of that information for the production of national warnings.
3. Validate **the reporting by NTWCs to the TSPs of their National Tsunami Warning Status.**



IOWave20

Intergovernmental Oceanographic Commission  
Technical Series

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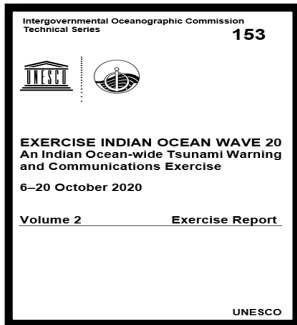


EXERCISE INDIAN OCEAN WAVE 20  
An Indian Ocean-wide Tsunami  
Warning and Communications Exercise  
6-20 October 2020

Volume 1 Exercise Manual

# Summary of Achievement

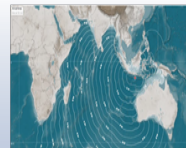
- IOWave20 was held **during the Covid-19 pandemic**, which is affecting countries around the world and in the Indian Ocean region
- Exercise Indian Ocean Wave 2020 was held over two-weeks, **6-20 October 2020 --- 1 week intervals on 6, 13 and 20 October**
- To date **20 Indian Ocean Member States** reported their participation in the IOWave20 evaluation survey.
- At least **6 active Indian Ocean Member States** involve **Communities** with health Covid-19 protocol.
- Exercise Indian Ocean Wave 2020 contained **three earthquake scenarios with all scenarios run in real-time (Java Trench, Andaman Trench and Makran Trench)**
- **For Each scenario, the TSPs issued four tsunami bulletins in real time over a 1-hour period.**
- IOC-UNESCO conducted **on online assessment** that was coordinated in country by the IOWave20 National Contacts.



# Scenarios



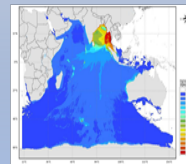
**1. Java Trench**  
6 October 2020; 03:00 UTC; M9.1; 10 Km; 10.40 S,  
112.80 E, South of Java, Indonesia



20 countries under threat



**2. Andaman Trench**  
13 October 2020; 04:00 UTC, M9.2, 10 Km, 12.65 N,  
93.50 E, Off West Coast of Andaman Islands, India



18 countries under threat



**3. Makran Trench**  
20 October 2020; 06:00 UTC, M9.0, 10 Km, 24.8 N,  
62.2 E, Off Coast of Pakistan



21 countries under threat

# Participation (1)

**20 IOTWMS active Member States** participated

✓ **12 Member States** participated in one scenario

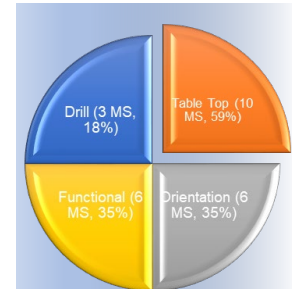
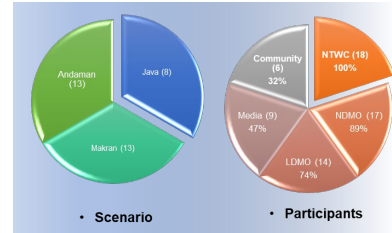
Australia, Comoros, Madagascar, Malaysia, Mauritius, Mozambique, Myanmar, Oman, Singapore, South Africa, Sri Lanka and United Arab Emirates

✓ **4 Member States** participated in two scenario

Bangladesh, India, Seychelles and Yemen

✓ **4 Member States** participated in three scenario

Indonesia, Kenya, Pakistan and Thailand





# Participation (2)

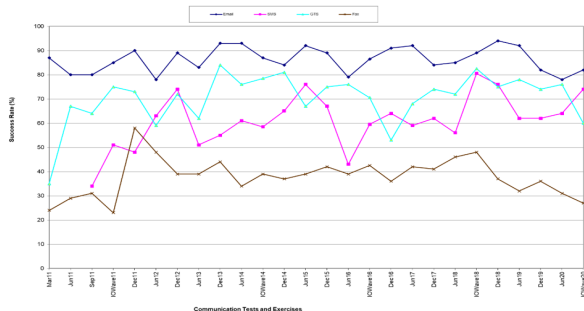


- ✓ **19 countries** (100%) included the National Tsunami Warning Center in the exercise,
- ✓ **17 countries** (89%) included national disaster management organizations;
- ✓ **14 countries** (74%) included local disaster management organizations;
- ✓ **9 countries** (47%) involved the media,
- ✓ **6 countries** (32%) involved the community but not necessarily in evacuations.

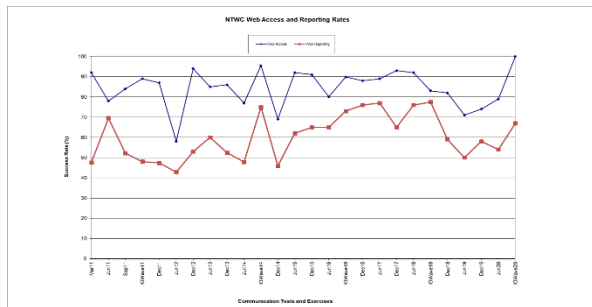
# TSP to NTWC Message Delivery, Web Access and Status Reporting

## Message Delivery

TSP to NTWC Message Delivery Success Rates



## Comparison with Previous Exercise and Tests Web access



The above findings of the relative strength of each delivery method → **averaging improvement trend across the past exercises and communication tests**, particularly with regard to the SMS delivery method

All of the reporting Member States (100%) accessed at least one TSP website → **highest access rate achieved to date when examining previous exercises and IOTWMS communication tests**

# Community Involvement



✓ **Indonesia** → evacuation drill at the New Yogyakarta International Airport involving 120 people → to practice evacuation in a tsunami emergency situation, to test the new dissemination mode WRS New Generation, and to evaluation the airport infrastructure preparedness in case of a tsunami emergency.

✓ **Kenya** → involved 3 coastal communities (Kwale, Mombasa, Kilifi). Communities were involved in tsunami → awareness activities and interviews with key community stakeholders on their tsunami response

✓ **Mauritius** → limited simulation exercise at the level of the National Disaster Risk Reduction and Management Centre for a small coastal locality

✓ **Seychelles** → community stakeholders Indian Ocean Tuna (staff residence), Eden Island (tourism, marina, commercial), Seychelles Maritime Academy and Seychelles Petroleum Company in a full scale exercise.

✓ **Mozambique** and **Thailand** responded to the survey that communities were involved, but did provide details.





IOWave20

# Social Media Engagement



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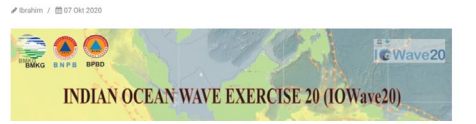


Since 1826 the Oldest Daily...  
**Daily Telegraph**  
...the Largest Circulating Daily  
Page No. 1411014 No. 174 Part Date: Wednesday, October 14, 2020

**Indian Ocean tsunami mock communication exercise -IOWave-20 successfully conducted by A&N Administration**  
Test conducted to check disaster management organization's preparedness for tsunami warning and response  
Post Date: Oct 13  
IOWave-20 Mock Communication Exercise was successfully conducted today by the A&N Administration in coordination with the State Emergency Operation Centre in coordination with Inter-governmental Oceanographic Commission and Indian Ocean Tsunami Warning and Mitigation System (IOWave20) of UNESCO and Indian National Centre for Ocean Information Services (INCOIS).  
The main focus of this exercise was primarily on monitoring and testing the ability of the Indian Ocean by simulating Earthquake and Tsunami

BADAN METEOROLOGI, KLIMATOLOGI, DAN GEOPHISIKA  
PROFIL CUACA IKLIM KUALITAS UDARA

Tingkatkan Kesiapan Hadapi Tsunami di Masa Pandemi, BMKG Gelar IOWave20



Seychelles  
**NATION**  
ELECTIONS 2020 DOMESTIC PRESIDENCY BUSINESS ENVIRONMENT TOURISM SPO

DOMESTIC

DRDM conducts tsunami exercise | 14 October 2020



Bureau of Meteorology  
6 October

In a year full of virtual events (thanks Covid), Australia has just survived a virtual tsunami  
The Joint Australian Tsunami Warning Centre (JATWC) spent yesterday simulating a full-scale tsunami in the Indian Ocean as part of UNESCO's International Indian Ocean tsunami warning exercise involving 23 countries, to test the tsunami warning and response chain.  
If a real tsunami ever threatens our shores, you'll find warnings and advice at <http://ow.ly/c49350BKvxm>... See more

Surface buoy



Malagasy Youth for Sustainable Development (MY SD)

7,7 rb soka • 8,3 rb pengikut

# Summary of Challenge and Gaps



Member States expressed the difficulty of holding the exercise during the pandemic

- Technical **guide/manual** for exercise in **pandemic situation**
- Virtual exercise proved to be **effective in maintaining the goal of IOWave20 in term of fulfilling objective** but there is no guidance on virtual table top exercise → decrease in term of number participants and technical difficulties
- Pre and post IOWave evaluation which consist of **capacity examination of each countries** → to **design the future IOWave (may refer to 12 indicators tsunami ready)**

## Recommendations for Consideration

- ❑ **To consider to use scenarios that are suitable for all Member States** to participate → 3 scenarios worked well – choose one with major impact
- ❑ **To consider the period time of exercise** → 1 week apart rather than on consecutive days and **conducted in September/October** → avoid the cyclone season [Australia; India] However, after IOWave18 it was noted that September is inconvenient for some countries due to Monsoon and Floods [Pakistan, India, Sri Lanka] and hot weather [Oman].
- ❑ **To Coordinate with PTWS** → to ensure Exercises occur in opposite years [Australia, Indonesia, Timor Leste] PTWS 2022, IOTWS 2023
- ❑ **To include International observers** → should be included in future exercises (such as IORA) and virtual observations should be utilized more widely.

## Recommendations for Consideration

- ❑ To consider informing more to **national leaders of the Exercise in addition to the Tsunami National Contacts.**
- ❑ To consider to **implement technical guide/manual** for exercise in pandemic situation.
- ❑ To consider guidelines for **conducting virtual table-top exercises.**
- ❑ To **encourage to test/verify the UNESCO-IOC Tsunami Ready** Indicators during the Exercise.
- ❑ To encourage countries to conduct **regular exercises at least every year between IOWave** → They could align with communication tests.



# The Recommendations for Consideration



## Downstream

- To update Member states SOPs for the pandemic situation with support from WG1- IOTIC.
- To encourage countries to test/verify the UNESCO-IOC Tsunami Ready Indicators during the Exercise with support WG1-WG3-IOTIC
- To evaluate of Tsunami Ready indicators in pilot villages (Odisha State, India) with support WG1-WG3-IOTIC
- To encourage countries to conduct regular exercises at least every year between IOWave (they could align with communication tests) with support WG1-WG2-WG3-IOTIC
- To provide guidelines for conducting virtual table-top exercises
- To include International observers with support WG1-WG3-IOTIC with support WG1-WG3-IOTIC
- To provide guide/manual for non tectonic scenario (related with exercise mechanism etc) with support WG1-WG3-IOTIC

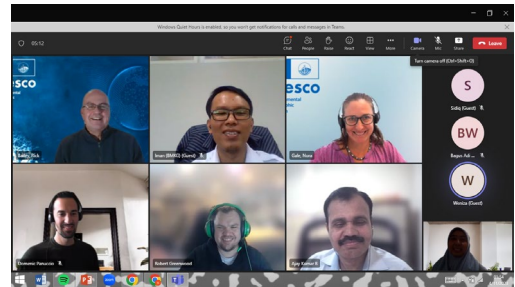


# **The planned activities and key outcomes for 2023 Indian Ocean Wave Exercise 23 (IOWave23)**

**Ms. Weniza, BMKG, Indonesia - Chair IOWave23**  
**Mr. Ajay, INCOIS, India - Vice Chair IOWave23**

# IOWave23 Task Team

- **Ms. Weniza**, BMKG, Indonesia – Chair
- **Mr. 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 2023*

*TT Meeting with TSP– 12 April 2023*

# Term of Reference (ToR) on IOWave23

Under the direction of Working Group 3 “Tsunami Ready Implementation”:

- Plan and coordinate the next IOWave Exercise (IOWave23), taking on-board suggestions from **the post-IOWave20 lessons learnt workshop including an increased focus on LDMO down to community level and implementation of IOTR.**
- Prepare the Exercise Manual in accordance with the Guideline on "How to Plan, Conduct and Evaluate Tsunami Exercises" (IOC Manuals and Guides No. 58) **at least 6 months in advance of the exercise,**
- Prepare **the Exercise Report for ICG/IOTWMS-XIV.**

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The Task Team will report to Working Group 3 and work in collaboration with Working Group 1, Working Group 2 and IOTIC and be composed of members nominated by member states and representative from TSPs, with a chairperson and vice-chairperson.

# Concept of Exercise - Objective

## Objective:

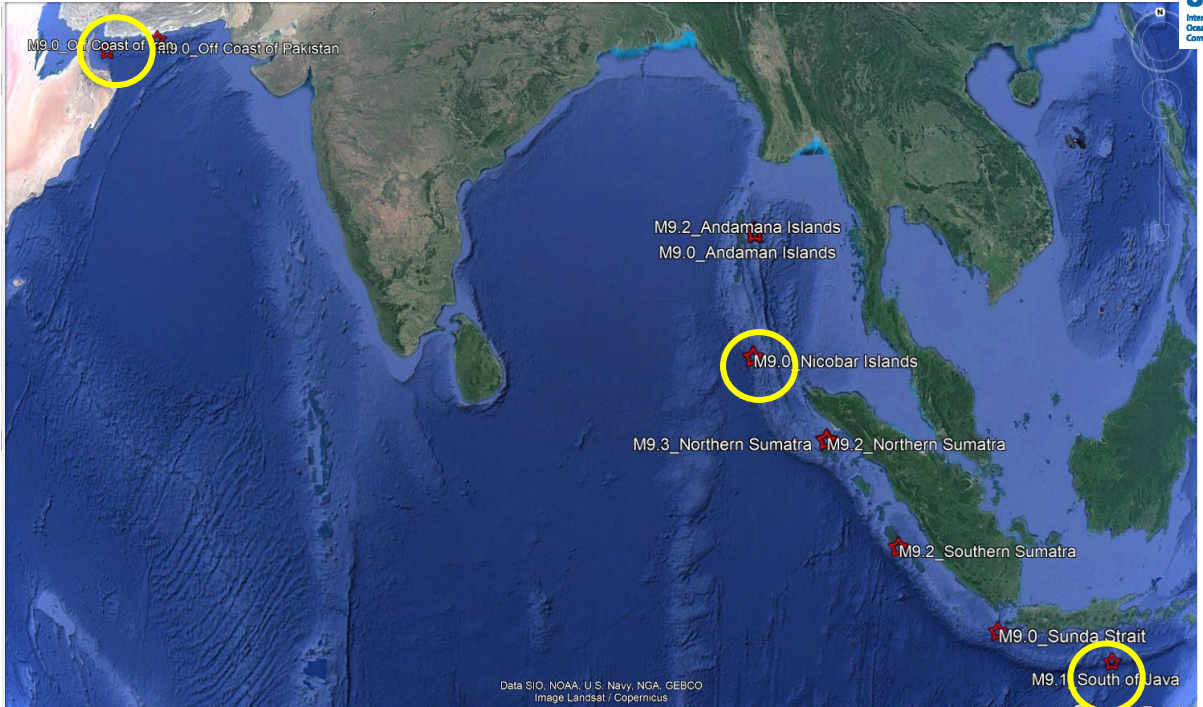
1. Validate **the dissemination by TSPs of Tsunami Bulletin Notification Messages to NTWCs** via Tsunami Warning Focal Points (TWFPs) of Indian Ocean countries and the reception by NTWCs of the TSP messages.
2. Validate **the access by NTWCs to the tsunami bulletins and other products on the TSP websites**, and the use of that information for the production of national warnings.
3. Validate **the reporting by NTWCs to the TSPs of their National Tsunami Warning Status.**
4. Validate **the SOPs within countries for generating and disseminating tsunami warnings to their relevant emergency response agencies, media and the public.**
5. Validate **the SOPs within countries for the issuing of public safety messages, ordering evacuations and where possible issuing all-clear messages.**
6. Validate **the level of community awareness, preparedness and response (including focused on Tsunami Ready Community)**
7. Within the above framework, **each country should develop its own specific objectives for the exercise.**
8. **To test the preparedness tsunami generated non seismic complex source**

# Scenarios for IOWave23

## Finalized Scenarios

Event No	Date	Origin Time	Latitude	Longitude	Depth	Magnitude	Region Name
1	04-Oct-2023	0600 UTC	24.80 N	58.20 E	10km	9.0	Off Coast of Iran
2	11-Oct-2023	0400 UTC	07.20 N	92.90 E	10km	9.0	Nicobar Islands, India
3	25-Oct-2023	0200 UTC	10.40 S	112.80 E	10km	9.1	South of Java, Indonesia
4	18-Oct-2023	0100 UTC				Non-Seismic Event	

# Exercise Scenarios



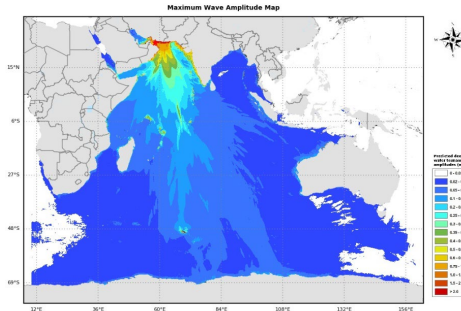
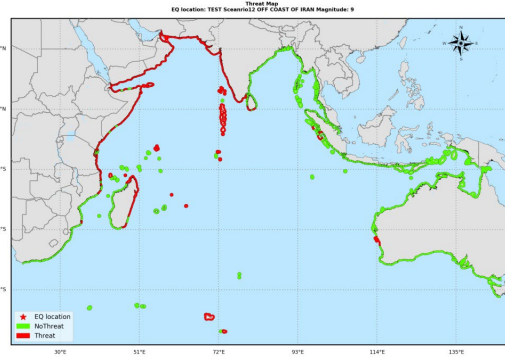
# Off Coast of Iran– M9.0

Mag 9.0 Epicentre: 24.8N 58.2E  
Off Coast of Iran

Origin Time: 0630Z

Australia	2223Z	0.5m
Comoros	1415Z	0.7m
Djibouti	1154Z	1.7m
France	1926Z	1.0m
India	0844Z	2.3m
Indonesia	1947Z	0.7m
Iran	0634Z	7.1m
Kenya	1333Z	1.7m
Madagascar	1322Z	0.9m
Maldives	0958Z	2.1m
Mauritius	1443Z	0.8m
Mozambique	1802Z	1.0m
Oman	0647Z	8.5m
Pakistan	0633Z	7.2m
Seychelles	1119Z	1.0m
Somalia	0956Z	2.3m
Sri Lanka	1159Z	0.8m
Tanzania	1315Z	1.0m
UAE	0718Z	3.7m
UK IOT	1131Z	1.4m
Yemen	0904Z	2.2m

21 countries under threat



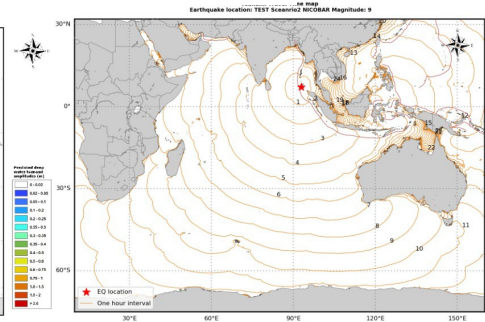
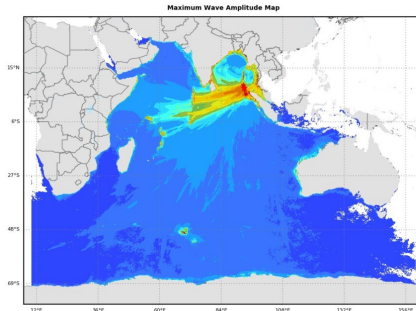
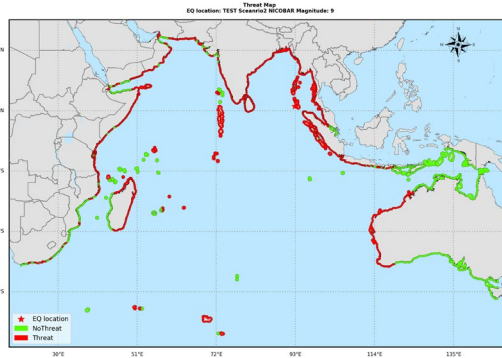
# Nicobar Islands, India – M9.0

**Mag 9.0 Epicentre: 7.2 N 92.9 E**  
**Nicobar Islands, India**

Origin Time: 0130Z

Australia	0807Z	1.1m
Bangladesh	0503Z	2.0m
Comoros	1212Z	0.7m
Djibouti	1142Z	0.7
France	1214Z	1.7m
India	0132Z	12.5m
Indonesia	0150Z	10.1m
Iran	1347Z	0.7m
Kenya	0954Z	1.4m
Madagascar	0927Z	1.1m
Malaysia	0451Z	1.5m
Maldives	0441Z	6.6m
Mauritius	0743Z	1.6m
Mozambique	1049Z	1.3m
Myanmar	0304Z	2.3m
Oman	1002Z	1.1m
Pakistan	1720Z	0.7m
Seychelles	0555Z	1.3m
Somalia	0841Z	2.5m
South Africa	1935Z	0.7m
Sri Lanka	0317Z	6.0m
Tanzania	1029Z	1.1m
Thailand	0258Z	3.4m
UAE	0056Z+1	0.7m
UK IOT	0506Z	4.2m
Yemen	0856Z	1.8m

26 countries under threat





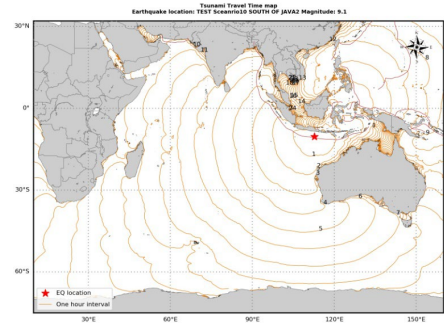
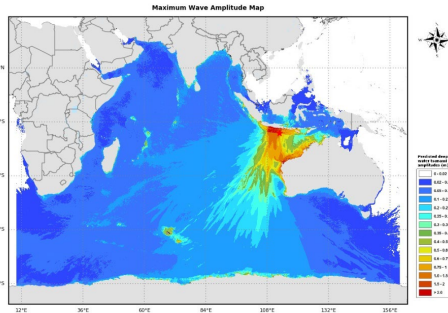
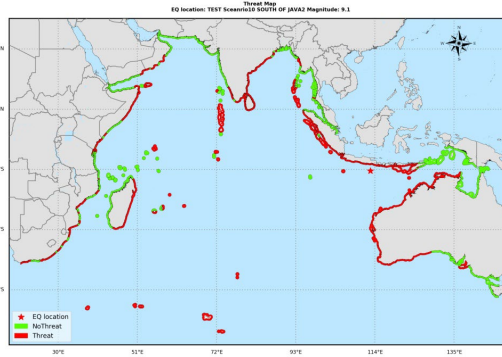
# South of Java, Indonesia– M9.1

**Mag 9.1 Epicentre: 10.4S 112.8E**  
**South of Java, Indonesia**


Origin Time: 0530Z

Australia	0559Z	8.4m
France	1259Z	2.2m
India	1333Z	1.4m
Indonesia	0532Z	11.9m
Kenya	0136Z+1	0.8m
Madagascar	1454Z	2.6m
Maldives	1126Z	1.2m
Mauritius	1454Z	0.8m
Mozambique	1959Z	0.9m
Myanmar	0146Z+1	0.5m
Oman	1813Z	0.9m
Seychelles	1724Z	0.8m
Somalia	1744Z	1.2m
South Africa	1929Z	1.1m
Sri Lanka	1246Z	1.3m
Tanzania	1958Z	0.8m
Thailand	0402Z+1	0.5m
Timor Leste	0706Z	1.0m
UK IOT	1356Z	0.6m
Yemen	1724Z	0.9m

20 countries under threat



# Provisional Timeline for IOWave23

- 
- Identify Task Team Chair and Member
  - **First TT meeting (Virtual) === 4 April 2023** → Schedule, Date, Scenario
  - **First IOC Announcement of IOwave23 === 28 April 2023** (Scenario, date, Nominate National Contact)
  - Exercise Manual drafted and to secretariat === 04 May 2023 (included manual for non-seismic scenario)



- **Exercise Manual published === 29 April 2023** (<http://www.ioc-tsunami.org>)
- **2 SOP Workshop === Hybrid, 15-18 May 2023**



- **IOwave23 === fourth week – 4, 11,25 October** (tectonic) and 18 October (non-tectonic)
- **Exercise Survey Due === 30 October 2023**
- **Post IOWave23 Lesson Learned Workshop === Virtual/Hybrid, 06 November 2023**
- **TT Meeting === 27 November 2023**



- **Exercise Evaluation completed === Jan 2024**
- **Exercise Report ready for ICG/IOTWMS XIV === 2024 (TBC)**



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**Thank you!**  
**Terimakasih!**