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TSP INDIA Products Demonstration

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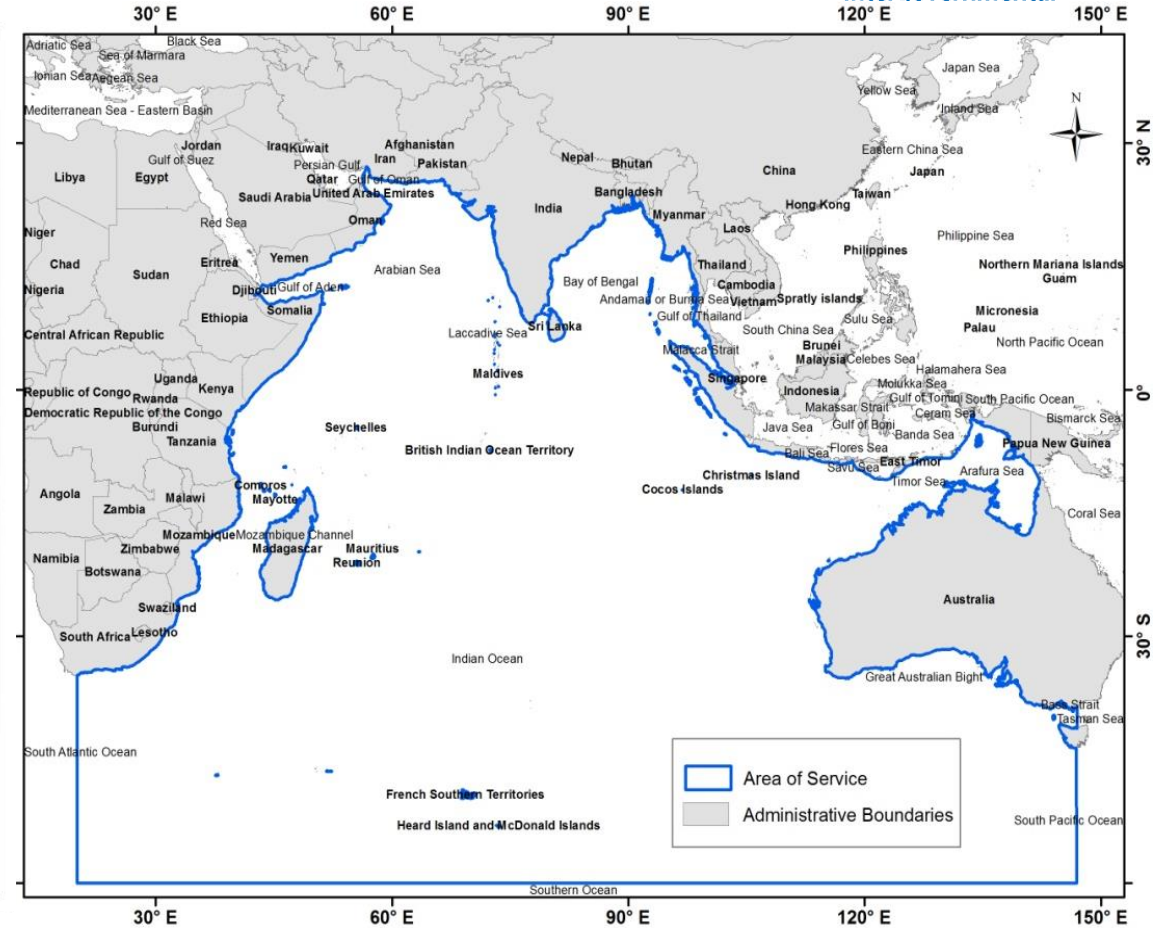
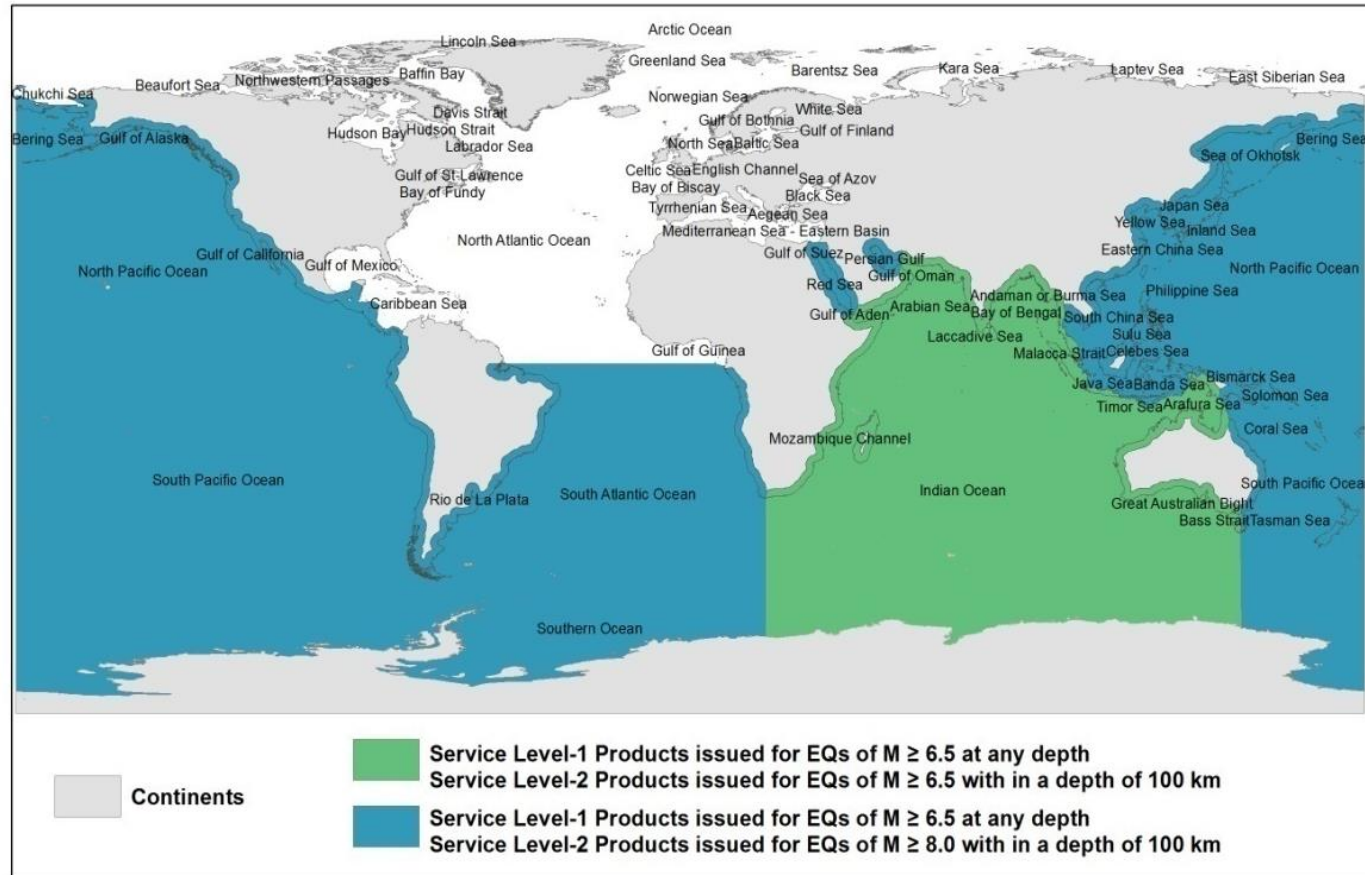
ICG Indian Ocean Tsunami Warning & Mitigation System SOP Workshops July 2023:
*Standard Operating Procedures (SOPs) for
National Tsunami Warning Centres (NTWCs) and
Disaster Management Organisations (DMOs)*

IOTWMS Earthquake Source zone and Area of Service



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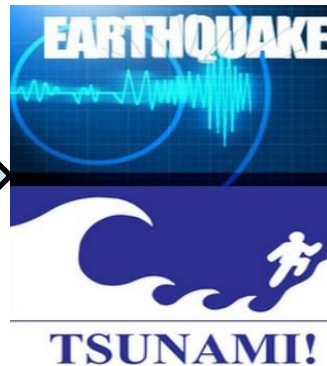
TSP Service Levels for IOTWMS



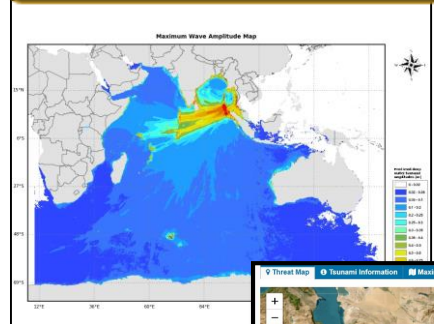
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- Service Level 1 – Earthquake Bulletins (in operation since 2009)
- Service Level 2 – Tsunami Threat Bulletins and Threat Maps (in operation since 2011)
- Service Level 3 – Inundation Mapping (not yet in operation)

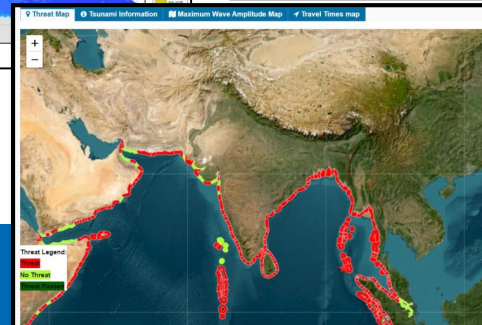


Travel Time & Energy Maps

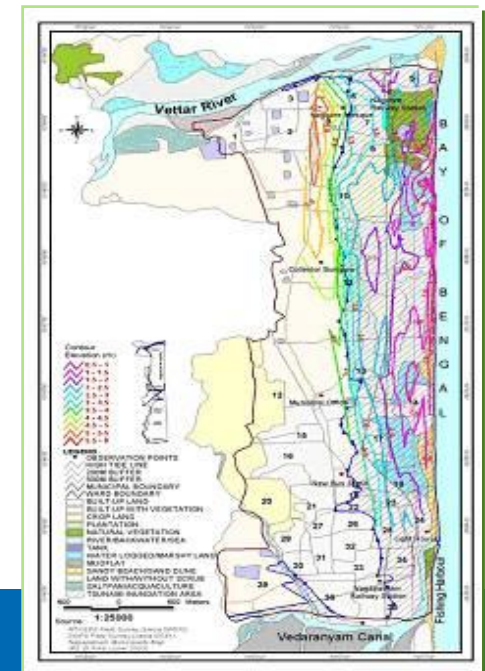


Coastal Zone Threat Table

Country	State/Territory	Zone	T1(MT)	T2(MT)	T3(MT)	T4(MT)	Amplitude(m)	ThreatLevel
INDIA	ANDAMAN AND NICOBAR	INDIRA POINT	07-Jan-2023	07-Jun-2023	07-Jan-2023	08-Jun-2023	12.5	High
INDIA	ANDAMAN AND NICOBAR	KOMATRA & KATCHAL ISLAND	06-02	06-02	06-08	06-08	9.6	High
INDIA	ANDAMAN AND NICOBAR	CAR NICOBAR	06-02	06-02	06-02	07-05	6.9	High
INDONESIA	NANGGIRAE ACEH	NAD ACEH-LAJA	06-04	06-04	06-17	06-54	6.1	High
INDONESIA	DARUSSALAM	NAD ACEH-BESAR PIREUEH	06-19	06-25	06-07	07-05	10.1	High
INDONESIA	NANGGIRAE ACEH	NAD ACEH-BESAR B	07-Jan-2023	07-Jan-2023	07-Jan-2023	08-Jun-2023	7.6	High
INDONESIA	DARUSSALAM	NAD ACEH-BESAR B	06-20	06-21	06-26	06-40	10.1	High
INDONESIA	NANGGIRAE ACEH	NAD ACEH-BESAR B	06-22	06-22	06-32	07-05	10.1	High
INDONESIA	NANGGIRAE ACEH	NAD KOTABANGSA-ACEH	07-Jan-2023	07-Jan-2023	07-Jan-2023	08-Jun-2023	9.4	High
INDONESIA	DARUSSALAM	NAD KOTABANGSA-ACEH	06-20	06-21	06-47	07-05	9.9	High
INDONESIA	NANGGIRAE ACEH	NAD KOTABANGSA-PIWEH	06-24	06-27	06-31	06-38	9.9	High
INDONESIA	NANGGIRAE ACEH	NAD KOTABANGSA-PIWEH	06-24	06-27	06-31	06-38	9.9	High
INDONESIA	NANGGIRAE ACEH	NAD KOTABANGSA-PIWENI	07-Jan-2023	07-Jan-2023	07-Jan-2023	08-Jun-2023	9.6	High
INDONESIA	DARUSSALAM	NAD KOTABANGSA-PIWENI	06-27	06-28	06-32	06-38	9.6	High
INDIA	ANDAMAN AND NICOBAR	LITTLE ANDAMAN	07-Jan-2023	07-Jun-2023	07-Jan-2023	08-Jun-2023	3	Low
INDONESIA	NANGGIRAE ACEH	NAD ACEH-SARAT	06-29	06-33	06-40	07-05	9.6	High
INDONESIA	DARUSSALAM	NAD ACEH-SARAT	06-32	06-38	10-33	06-40	9.6	High
INDONESIA	NANGGIRAE ACEH	NAD SAMBULUE PISAMBULUE	07-Jan-2023	07-Jun-2023	07-Jan-2023	08-Jun-2023	3	Low
INDONESIA	DARUSSALAM	NAD SAMBULUE PISAMBULUE	06-36	06-41	06-54	07-05	3.4	Low



Coastal Zone Threat Map



Commencement of TSP bulletins



❑ Issue SL-1 (earthquake information) bulletin for all IOTWMS Earthquake Source Zone (Indian Ocean, Pacific Ocean, South Atlantic) events of magnitude ≥ 6.5

❑ SL-2 (threat assessment) bulletins

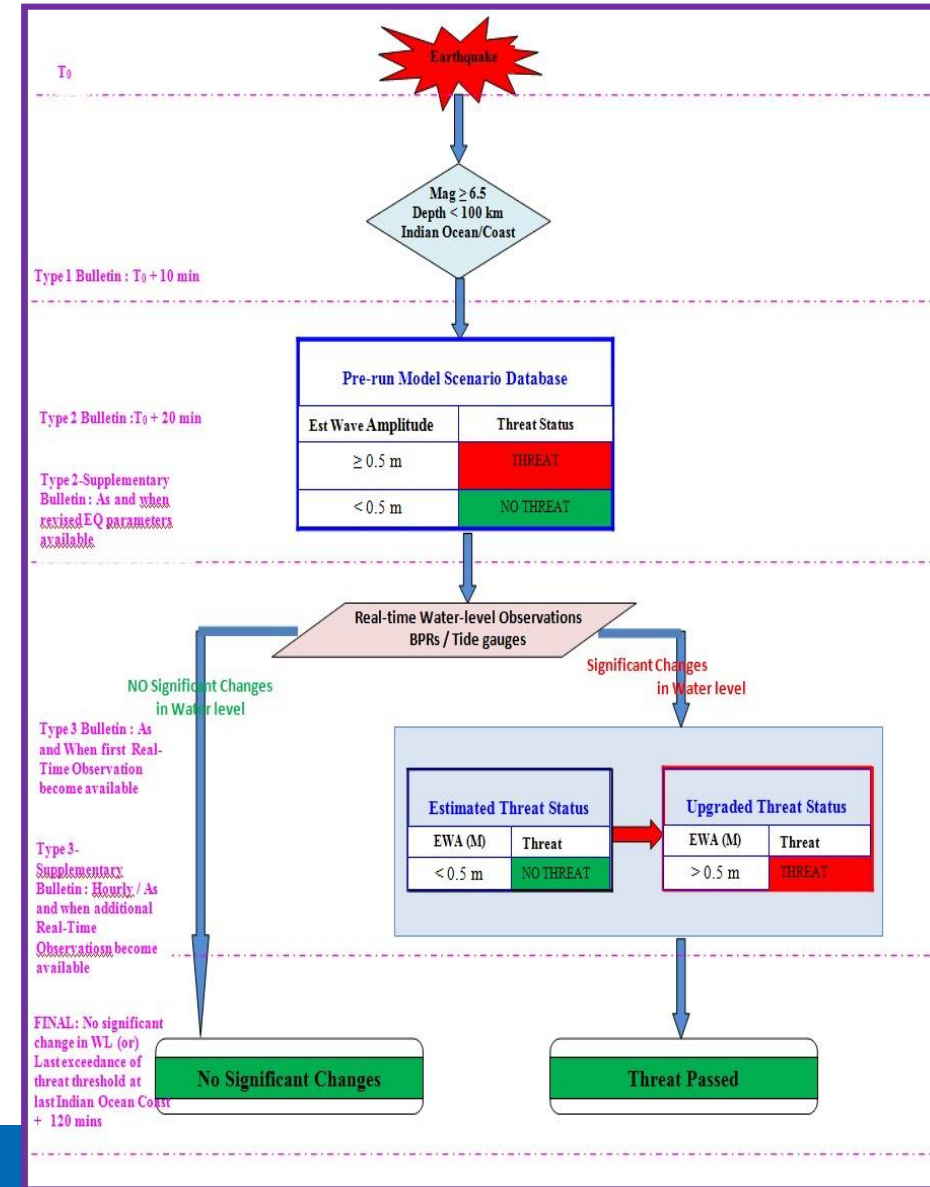
$M \geq 6.5$ in the Indian Ocean

[or]

$M \geq 8.0$ in the Pacific and South Atlantic Oceans

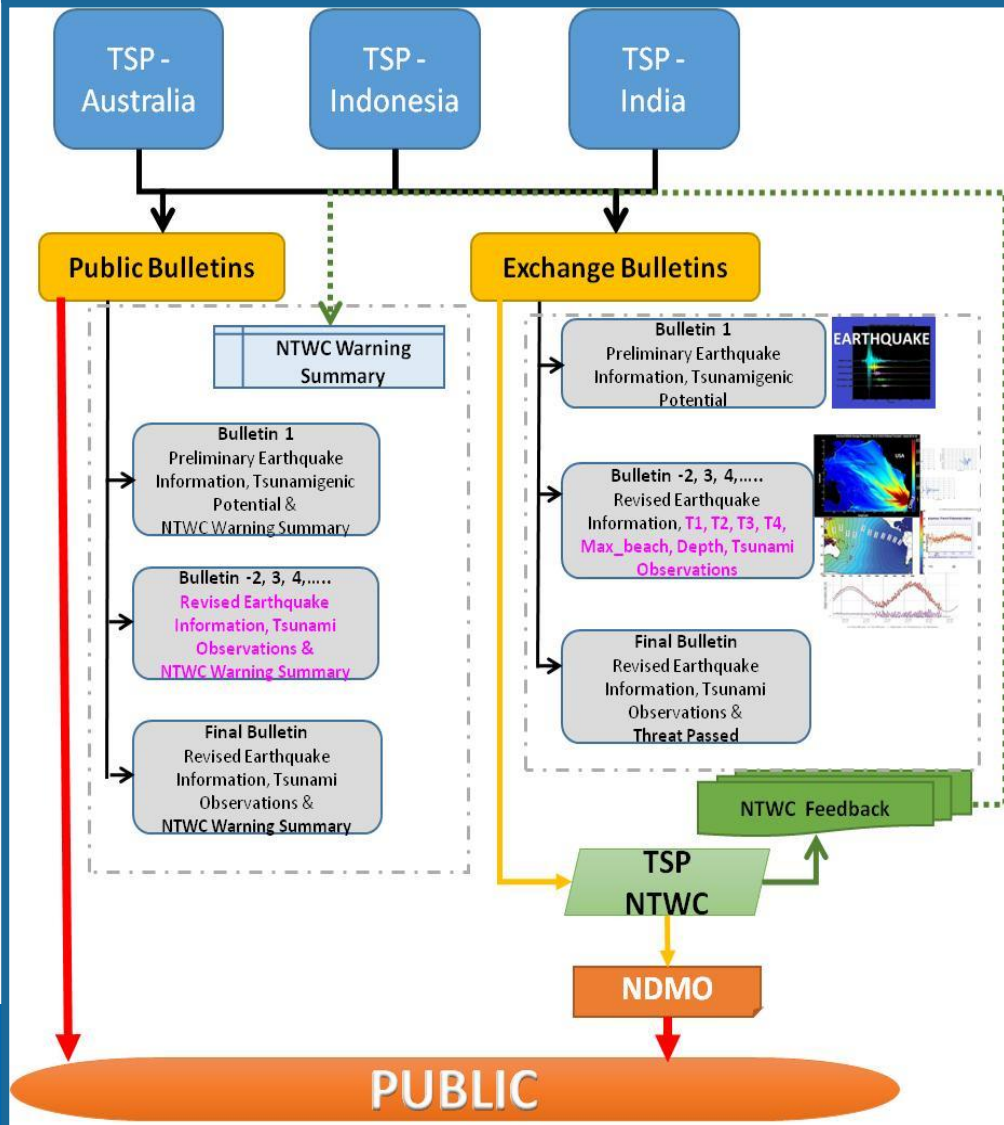
[or]

Any tsunamigenic event that may have probability to generate tsunami in the Indian Ocean Basin



Types of TSP Bulletins

Sequence of Bulletins

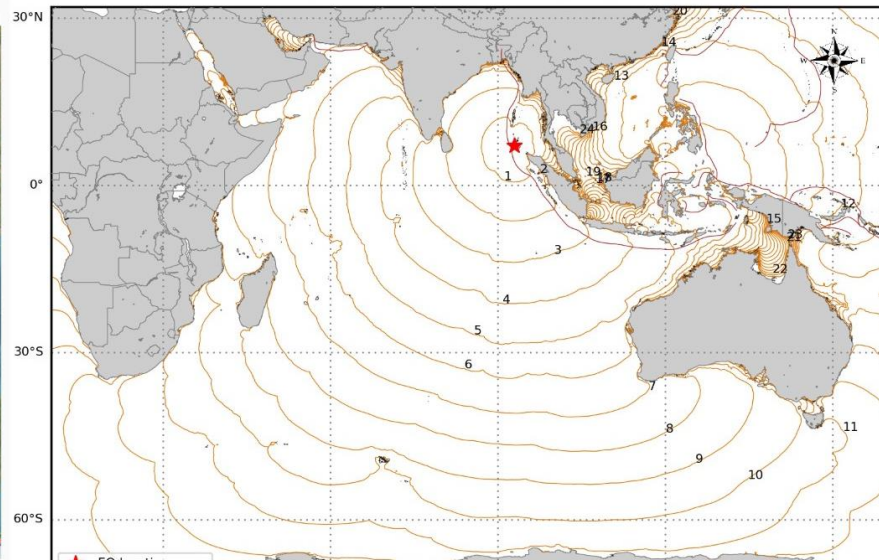
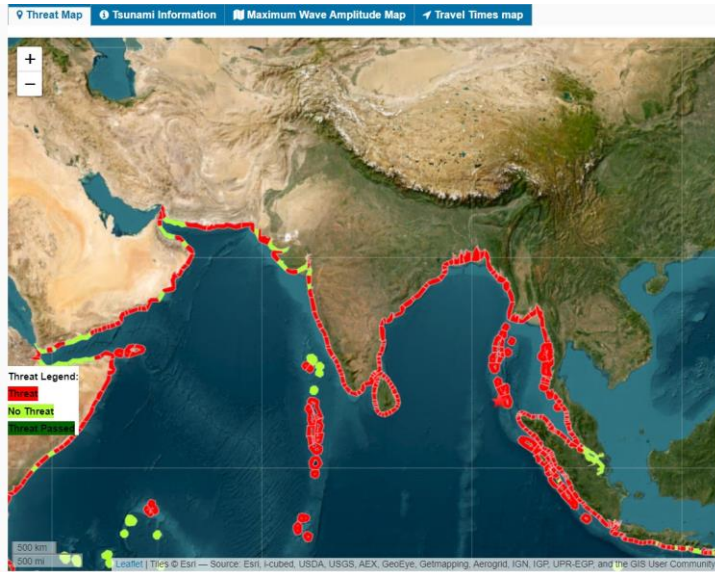


Bulletin type	Information	Time of issue
TYPE I Earthquake Bulletin	Earthquake Information , plus a qualitative threat assessment (e.g. “,,,this earthquake may be capable of generating a tsunami...”)	Target: within 10 minutes
TYPE II Threat Assessment Bulletin	No Threat Bulletin , based on assessment using model scenarios	Target: within 20 minutes
	Potential Threat Bulletin , based on assessment using wave models. Contains specific threat information for each Indian Ocean coastal zone.	
TYPE III Threat Confirmation Bulletin	Confirmed Threat Bulletin , based on real-time sea-level observations confirming a tsunami was generated . Contains specific threat information for each coastal zone.	<ul style="list-style-type: none"> When the first real-time sea level observation confirming tsunami waves is available Then hourly updates, or when significant new real-time sea level observations are available
TYPE IV Final Bulletin	THREAT PASSED – all zones.	120 mins after the last exceedance of 0.5 M threat threshold at last IO country

Model Output Parameters (Dynamic)

- T1 = Time of arrival of first detectable tsunami wave (amplitude $\geq 0.02\text{m}$)
- T2 = Time of arrival of first wave over $+0.5\text{m}$ amplitude on the beach
- T3 = Time of arrival of largest wave (“max beach”)
- T4 = Time of arrival of last wave over $+0.5\text{m}$ amplitude
- max_beach (Maximum Positive wave amplitude at the shoreline)

Sample Product Formats



TSUNAMI BULLETIN NUMBER 2 (TYPE-II THREAT ASSESSMENT BULLETIN)
 IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWS)
 ISSUED AT 0615 UTC Wednesday 07 June 2023

... POTENTIAL TSUNAMI THREAT IN THE INDIAN OCEAN ...
 This bulletin applies to areas within and bordering the Indian Ocean.
 It is issued in support of the UNESCO/IOC Indian Ocean Tsunami Warning and Mitigation System (IOTWMS).

1. EARTHQUAKE INFORMATION

IOTWMS-TSP INDIA has detected an earthquake with the following preliminary information:
 Magnitude: 9 M
 Depth: 10 km
 Date: 07 JUN 2023
 Origin Time: 0600 UTC
 Latitude: 7.2 N
 Longitude: 92.9 E
 Location: NICOBAR ISLANDS, INDIA REGION

2. EVALUATION

Earthquakes of this size are capable of generating tsunamis. However, so far there is no confirmation about the triggering of a tsunami. An investigation is under way to determine if a tsunami has been triggered. This TSP will monitor sea level gauges and report if any tsunami wave activity has occurred.

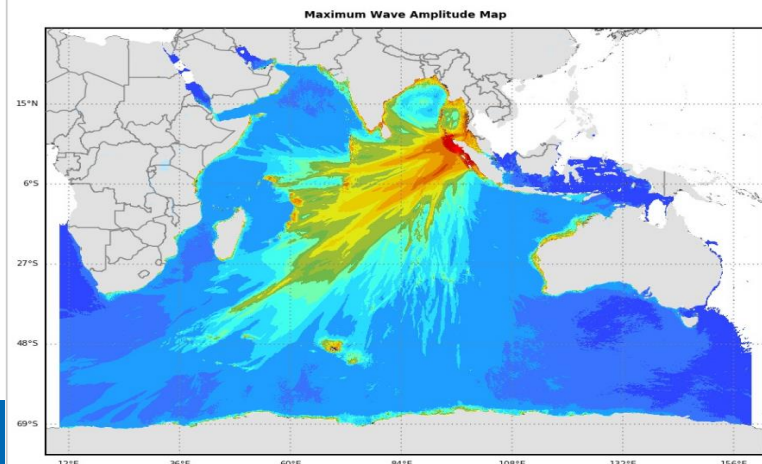
Based on pre-run model scenarios, the zones listed below are POTENTIALLY UNDER THREAT.

3. TSUNAMI THREAT FOR THE INDIAN OCEAN

The list below shows the forecast arrival time of the first wave estimated to exceed 0.5m amplitude at the beach in each zone (or a different threshold nominated by an NTWC), and the amplitude of the maximum beach wave predicted for the zone. Zones where the estimated wave amplitudes are less than the threshold amplitude at the beach are not shown.

The list is grouped by country (alphabetic order) and ordered according to the earliest estimated times of arrival at the beach.

Threat Map Tsunami Information Maximum Wave Amplitude Map Travel Times map



AUSTRALIA

PILBARA COAST WEST	1237z	07 Jun 2023	0.8m	Threat
GASCOYNE COAST	1641z	07 Jun 2023	0.9m	Threat
HEARD ISLAND AND MCDONALD ISLANDS	1646z	07 Jun 2023	1.1m	Threat
PILBARA COAST EAST	1701z	07 Jun 2023	0.9m	Threat
GERALDTON COAST	1717z	07 Jun 2023	1.0m	Threat
BUNBURY GEOGRAPHE COAST	1718z	07 Jun 2023	0.8m	Threat
NINGALOO COAST	1809z	07 Jun 2023	0.6m	Threat
LEEUEW COAST	1842z	07 Jun 2023	0.8m	Threat
LANCELIN COAST	0101z	08 Jun 2023	0.6m	Threat
ALBANY COAST	0421z	08 Jun 2023	0.6m	Threat

Country	State/Territory	Zone	T1(UTC)	T2(UTC)	T3(UTC)	T4(UTC)	Amplitude(m)	ThreatStatus
INDIA	ANDAMAN AND NICOBAR	INDIRA POINT	07-Jun-2023 06:02	07-Jun-2023 06:09	07-Jun-2023 06:09	08-Jun-2023 06:58	12.5	Threat
INDIA	ANDAMAN AND NICOBAR	KOMATRA & KATCHAL ISLAND	07-Jun-2023 06:02	07-Jun-2023 06:02	07-Jun-2023 06:02	08-Jun-2023 07:00	9.6	Threat
INDIA	ANDAMAN AND NICOBAR	CAR NICOBAR	07-Jun-2023 06:04	07-Jun-2023 06:04	07-Jun-2023 06:17	08-Jun-2023 06:54	6.9	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD ACEH-JAYA	07-Jun-2023 06:18	07-Jun-2023 06:20	07-Jun-2023 08:07	08-Jun-2023 07:00	6.1	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD ACEH-BESAR P.BREUEH	07-Jun-2023 06:20	07-Jun-2023 06:21	07-Jun-2023 06:25	08-Jun-2023 06:40	7.6	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD ACEH-BESAR B	07-Jun-2023 06:22	07-Jun-2023 06:23	07-Jun-2023 06:32	08-Jun-2023 07:00	10.1	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD KOTA-BANDA-ACEH	07-Jun-2023 06:20	07-Jun-2023 06:23	07-Jun-2023 06:47	08-Jun-2023 07:00	9.4	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD KOTA-SABANG P.WEH	07-Jun-2023 06:24	07-Jun-2023 06:27	07-Jun-2023 06:31	08-Jun-2023 06:28	3.9	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD ACEH-BESAR P.PENASI	07-Jun-2023 06:27	07-Jun-2023 06:29	07-Jun-2023 06:32	08-Jun-2023 06:10	5.9	Threat
INDIA	ANDAMAN AND NICOBAR	LITTLE ANDAMAN	07-Jun-2023 06:29	07-Jun-2023 06:33	07-Jun-2023 06:40	08-Jun-2023 07:00	9.6	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD ACEH-BARAT	07-Jun-2023 06:32	07-Jun-2023 06:39	07-Jun-2023 10:33	08-Jun-2023 06:40	3	Threat
INDONESIA	NANGGROE ACEH DARUSSALAM	NAD SIMEULUE P.SIMEULUE	07-Jun-2023 06:35	07-Jun-2023 06:41	07-Jun-2023 06:54	08-Jun-2023 07:00	3.4	Threat

NTWC Feedback reporting and Summary



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Feedback – Status Reporting Page

Mon Jul 03 2023 11:01:32 IST Mon, 03 Jul 2023 05:31:32 UTC

Indian Tsunami Early Warning System
Ministry of Earth Sciences - Government of India

Home / Tsunami Early Warnings / NTWC Warning Status Reporting Form

IOTWMS-TSP India - Tsunami Service Provider for the Indian Ocean
NTWC WARNING STATUS REPORTING FORM

This page is to be used by Indian Ocean National Tsunami Warning Centres (NTWCs) to advise TSPs of their current warning status. It should be used every time an NTWC issues a new or updated tsunami warning (or cancellation) for their country. The information will be placed on TSP public websites to enable the public, media and other NTWCs to be aware of the warning status of each country.

EARTHQUAKE INFORMATION

Magnitude (Preferred):	9.0
Depth:	10
Date:	07 Jun 2023
Origin Time:	0600 UTC
Latitude:	7.20
Longitude:	92.90
Location:	Nicobar Islands, India Region
Land/ Ocean:	IO
Water Level Depth (if Ocean):	1970 m

COUNTRY'S CURRENT WARNING STATUS

- Select your Country from the list at left
- Select your Country's Current Warning Status (Threat Level 0, 1, 2 or 3) from the list below
- Type Additional Information About The Warning Status in the text box below, such as the time and locations for which the warning has been issued, and the type of warning issued.
- Type your name in the "Sender Name" box.
- Refresh your browser to update the current time.
- Type your email in the "Sender Email" box.
- Press "Submit".

1. Select Your Country:

- Australia
- Bangladesh
- Comoros
- Djibouti
- France (Indian Ocean Territories)
- India
- Indonesia
- Iran
- Kenya
- Madagascar
- Malaysia
- Maldives
- Mauritius
- Mozambique
- Myanmar
- Oman
- Pakistan
- Seychelles
- Singapore
- Somalia
- South Africa
- Sri Lanka
- Tanzania
- Thailand
- Timor-Leste
- UAE
- UK (Indian Ocean Territories)
- Yemen

2. Select Your Country's Current Warning Status:

- Threat Level 0: No impact expected, no flooding, no currents.
- Threat Level 1: There is a potential for tsunami impact, but given the travel time, no response of the public is necessary at the moment.
- Threat Level 2: Threat to coastal marine areas due to strong currents and oscillations in sea level.
- Threat Level 3: Threat of tsunami inundation to land areas.
- Cancellation/All Clear

3. Type Additional Information About The Warning Status:

4. Type Sender Name:

5. Time of Feedback Submission: Mon Jul 03 2023 11:01:34 GMT+0530 (India Standard Time)

6. Type Sender E-mail:

7. Click Here to Submit Your Details:

<https://tsunami.incois.gov.in/TEWS/NTWCReportingForm.jsp>

Feedback – Warning Summary Page

Wed Jun 07 2023 12:02:16 IST Wed, 07 Jun 2023 06:32:16 UTC

Indian Tsunami Early Warning System
Ministry of Earth Sciences - Government of India

Home / Tsunami Early Warnings / NTWCs Feedback Summary

Summary of the Current Threat Status as reported by the NTWCs

This page displays the summary of feedback received from individual NTWCs regarding the Threat Status in their area of responsibility. Within 24 hrs of the current event ending (issue of FINAL bulletin by RTSPs), if no further NTWC feedback is received, this page will be cleared to indicate no warnings.

Legend

- Threat Level 0: No impact expected, no flooding, no currents
- Threat Level 1: There is a potential for tsunami impact, but given the travel time, no response of the public is necessary at the moment.
- Threat Level 2: Threat to coastal marine areas due to strong currents and oscillations in sea level.
- Threat Level 3: Threat of tsunami inundation to land areas.
- Cancellation/All Clear

Show 50 rows entries Search:

Country	Threat Status	Comments	Sender	Sender Time
Australia	Threat Level 2	Confirmed threat bulletin issued at 06:30UTC, due to observation at Nancoury India, with marine threat continuing for the Cocos Islands, Western Australia, Casey, Mawson and Davis.	Glen Perrin	Wed Jun 07 2023 16:30:28 GMT+1000 (Australian Eastern Standard Time)
Bangladesh	-	-	-	-
Comoros	-	-	-	-
Djibouti	-	-	-	-
France (Indian Ocean Territories)	-	-	-	-
India	Threat Level 3	Tsunami threat issued to East Coast of India. Andaman and Nicobar Islands being inundated. Evacuations initiated.	ITEWC	Wed Jun 07 2023 11:52:02 GMT+0530 (India Standard Time)
Indonesia	Threat Level 2	People in Sumatra are currently reporting felt earthquake. The BMKG issued tsunami early warnings in several affected areas, so that people could carry out self evacuations to safe places.	Sigit	Wed Jun 07 2023 13:19:34 GMT+0700 (Western Indonesia Time)
Iran	-	-	-	-
Kenya	-	-	-	-
Madagascar	-	-	-	-
Malaysia	Threat Level 2	Malaysia NTWC issued a tsunami warning for west coast state of Peninsular Malaysia	NTWC, Malaysia - Mazri	Wed Jun 07 2023 14:24:59 GMT+0800 (Malaysia Time)
Maldives	-	-	-	-
Mauritius	-	-	-	-
Mozambique	-	-	-	-
Myanmar	Threat Level 2	NTWC, Myanmar will issue the Tsunami information for Myanmar coastal areas based on the RTSPs information.	NTWC	Wed Jun 07 2023 13:01:21 GMT+0630 (Myanmar Time)
Oman	-	-	-	-
Pakistan	Threat Level 0	No Threat	NTWC, Karachi, Pakistan	Wed Jun 07 2023 11:15:41 GMT+0500 (Pakistan Standard Time)
Seychelles	Threat Level 0	-	S. Adam	Wed Jun 07 2023 16:30:22 GMT+0400 (Gulf Standard Time)
Singapore	-	-	-	-
Somalia	-	-	-	-
South Africa	-	-	-	-
Sri Lanka	-	-	-	-
Tanzania	-	-	-	-
Thailand	-	-	-	-
Timor-Leste	-	-	-	-
UAE	-	-	-	-
UK (Indian Ocean Territories)	-	-	-	-
Yemen	-	-	-	-

<https://tsunami.incois.gov.in/TEWS/NTWCStatusSummary.jsp>

Showing 1 to 28 of 28 entries Previous 1 Next

Within 24 hours of the current event ending (issue of FINAL bulletin by TSPs), if no further NTWC feedback is received, this page will be cleared to indicate no warnings.

Mon Jul 03 2023 10:08:30 IST Mon, 03 Jul 2023 04:38:30 UTC


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Indian Tsunami Early Warning System
Ministry of Earth Sciences - Government of India

Home About TSP Archived Events COMMS TEST

Home / Seismic/Tsunami Events

Seismic Activity for past 90 days with magnitude ≥ 6.5M



Origin Time(UTC)	Region Name	Latitude(Deg)	Longitude(Deg)	Depth(km)	Magnitude	Regional Bulletins
02 Jul 2023 10:27:00	Tonga Islands	17.79S	175.17W	243.0	6.5M	Public Exchange
15 Jun 2023 18:06:00	South of Fiji Islands	23.09S	176.96W	193.0	6.6M	Public Exchange
20 May 2023 01:50:00	Southeast of Loyalty Islands	22.94S	170.51E	10.0	7.0M	Public Exchange
19 May 2023 02:57:00	Southeast of Loyalty Islands	23.17S	170.75E	10.0	7.4M	Public Exchange
10 May 2023 16:02:00	Tonga Islands	15.85S	174.56W	220.0	7.1M	Public Exchange
24 Apr 2023 20:00:00	Southern Sumatra, Indonesia	.69S	98.71E	10.0	6.8M	Public Exchange

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Contact Us: Indian National Center for Ocean Information Services(INCOIS), "Ocean Valley", Pragathi nagar(BO), Nizampet(SO) Hyderabad-500090, Telangana.

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- **Bulletins** are generated in both **text** and **HTML formats** on the websites
- **Graphics** are generated in jpg or png format on the websites

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❑ TSP-INDIA Website :

<https://tsunami.incois.gov.in/TEWS/TSP>

❑ For IOTWMS Communication Test:

<https://tsunami.incois.gov.in/TEWS/commreg.jsp>

❑ For IOTWMS – NTWC Feedback Summary Page:

<https://tsunami.incois.gov.in/TEWS/NTWCStatusSummary.jsp>

❑ NTWC WARNING STATUS REPORTING FORM:

<https://tsunami.incois.gov.in/TEWS/NTWCReportingForm.jsp>

TSP-INDIA Website - Demo



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