

Definition of Services provided by Tsunami Service Providers of the IOTWMS

1 December 2022

Contents

| | |
|--|-----|
| Document Control Page | 2 |
| Glossary of Terms | 6 |
| Introduction | 7 |
| Services to be Provided | 8 |
| Commencement of Services | 9 |
| Exchange Products | 10 |
| Public Products | 12 |
| Finalisation of Services | 14 |
| Issue of False or Incorrect Messages | 14 |
| Communication and Interoperability between TSPs | 15 |
| Detailed TSP Services to NTWCs | 16 |
| TSP Key Performance Indicators (KPIs) | 18 |
| Event Assessments | 19 |
| Procedure for Naming Tsunamigenic Earthquakes | 19 |
| Procedure for Handling Non-Worst-Case Earthquake Events | 20 |
| Procedure for Handling Multiple Earthquakes in Quick Succession | 20 |
| Regular IOTWMS Tests | 21 |
| Annexure-1: IOTWMS TSP Area of Service (AOS) Map | 22 |
| Annexure-1A: Global Area of Service Map of ICGs | 23 |
| Annexure-2: IOTWMS Earthquake Source Zone (ESZ) Map | 24 |
| Annexure-3: TSP Performance Reporting Template Example and Target Definition | 25 |
| Annexure-4: Post - Event Assessment Template | 26 |
| Annexure-5: TSP Exchange Bulletin Templates | 46 |
| Annexure-6: TSP Public Bulletin Templates | 71 |
| Annexure-7: TSP NAVAREA Templates and Examples | 99 |
| Annexure-8: NTWC and TSP Roles and Responsibilities | 103 |

Document Control Page

Governance / Ownership:

This document defines the advisory services to be provided by Tsunami Service Providers (TSPs) in the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS). It is an official document of the Intergovernmental Coordination Group for the IOTWMS (ICG/IOTWMS).

Changes to this document can only be authorised by the ICG/IOTWMS or by its Steering Group (SG).

Version Control:

| Version | Date | Authors | Comments | Authorising Group |
|----------------|-------------|---|--|---|
| 1 | 2/12/09 | Steering Group | Original definition | SG Meeting, Perth, 2 December 2009 |
| 2 | 26/03/15 | Steering Group, Peter Coburn, Srinivasa Kumar | <p>Many additions/updates, including:</p> <ul style="list-style-type: none"> • Document control/governance • Maps defining AOR and Earthquake Source Zones. • Earthquake source zones for Service Level 2 products reduced to IO, Pacific and South Atlantic. • Specification of Exchange and Public Bulletin formats • Specification of WMO GTS headers for bulletins • Specification of 100km maximum earthquake depth for Service Level 2 products. • Specification of 200km maximum inland distance for coastal earthquakes. • TSP Key Performance Indicators and Reporting • Procedures for: <ul style="list-style-type: none"> ○ Reporting performance ○ Event assessments ○ Naming of tsunamigenic earthquakes ○ Handling simultaneous events | <p>SG Meetings:</p> <p>Perth, 10-11 December 2013</p> <p>Jakarta, 26 November 2014</p> <p>ICG/IOTWS-X Meeting, Muscat, 24-26 March 2015</p> |

IOTWMS: TSP Service Definition Document
Version 5 (1 December 2022)

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|---|----------|---|---|---|
| | | | <ul style="list-style-type: none"> ○ Regular tests <p>Also incorporated recommendations of TTTWO & TOWS-WG VIII meetings of March 11-13, 2015 (Pending recommendations of the IOC Assembly)</p> <ul style="list-style-type: none"> ● AoS and ESZ Maps ● Event Assessment Template ● Post-event assessment threshold revisions ● Reporting of Water Levels ● Introduction Section ● Annexure-7 comprising definition, roles & responsibilities of NTWCs/TSPs, capability requirements of TSPs and procedure for achieving TSP status | |
| 3 | 20/04/17 | Peter Coburn, Srinivasa Kumar, Mohammad Mokhtari | <p>Addition of requirement for TSPs to give at least 3 months' notice to NTWCs of TSP service changes</p> <p>Changes to Exchange and Public Bulletin Templates:</p> <ul style="list-style-type: none"> ● Addition of "REVISED" for changed earthquake details ● Addition of bulletin-type indicator (e.g. "TYPE-II") to Exchange bulletin header <p>Clarification that Earthquake Bulletins are not to be issued once Service Level 2 Bulletins have begun to be issued.</p> <p>Changed threshold earthquake magnitude for KPI 2 "Probability of detection of Indian Ocean earthquakes" from 6.5 to 6.8, to allow for the 0.3 magnitude accuracy target specified in KPI 3.</p> <p>Inclusion of procedures for handling multiple earthquakes in quick succession, as contained in the draft Global Service Definition Document (GSDD) developed by the TOWS-WG Task Team on Tsunami Watch Operations.</p> | <p>Steering Group Meetings:</p> <p>Perth, 19-20 August 2015</p> <p>Perth, 17-18 January 2017</p> <p>ICG/IOTWMS-XI Meeting, Kuala Lumpur, 18-20 April 2017</p> |

IOTWMS: TSP Service Definition Document
Version 5 (1 December 2022)

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| | | | <p>Update of specification for reporting sea-levels, for consistency with Global Service Definition Document (GSDD).</p> <p>Addition of KPIs related to “Functional Status” of TSPs, from GSDD, and removal of redundant TSP Performance KPI 15.</p> <p>Replacement of IOTWS acronym with IOTWMS.</p> <p>Revised Area of Service (AOS) Map (Annexure-1) and introduced Global Area of Responsibility Map of the ICGs (Annexure-1A) consistent with the decision of the TOWS-WG (February, 2016) and adopted by the IOC EC (June 2016). It may be noted that these latest revisions do not affect the IOTWMS TSP service as defined in Version 2 of this document, but provide clarification of the service for the Banda / Java Sea areas.</p> | |
| 4 | 25/02/19 | Peter Coburn | <p>Whole document: Replaced AOR (area of responsibility) with AOS (area of service)</p> <p>Paras 1, 39: Addition of 1 month's notice for TSP service changes not affecting NTWC operations.</p> <p>Paras 13, 22: Addition of GTS centre identifier “CCCC” in GTS headers for Exchange and Public Bulletins.</p> <p>Para 22: Addition of explanatory note about Public Bulletins not having associated Notification Messages.</p> <p>Para 27: New procedure following issue of false or incorrect TSP messages.</p> <p>Para 38: Swapped numbering of KPIs 3 and 5, and KPIs 7 and 8, to be consistent with Performance Reporting Template in Annex 3 and with previous reporting practice.</p> <p>Annexes 1, 1A: Updated IOTWMS and Global Area of Service maps.</p> <p>Annex 3: Addition of KPI 9 False / Incorrect Bulletins Issued</p> <p>Annexes 5, 6: Dates in all bulletin headings now upper-case.</p> <p>Annexes 5, 6: Addition of Final Bulletin – No Tsunami Observed templates</p> <p>Annexes 5, 6: Addition of templates for Cancellation Messages</p> | |

IOTWMS: TSP Service Definition Document
Version 5 (1 December 2022)

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| | | | <p>Annex 6: Correction to heading in Public Earthquake Bulletin (replace “INDIAN OCEAN” with “PUBLIC”)</p> <p>Annex 7: Addition to NTCW Roles and Responsibilities specifying when national warning status is to be reported.</p> | |
| 5 | 1/12/22 | Yuelong Miao, Robert Greenwood | <p>Glossary of terms: Added IHO</p> <p>Para 3: Added guidance regarding issuing of NAVAREA products</p> <p>Para 10: added clarification that SL-2 bulletins may be issued for earthquakes less than magnitude 8.0 that have been assessed as causing threat to the IOTWMS CFZs</p> <p>Para 11: Added guidance regarding issuing of service level 2 products for non-seismic and complex source events</p> <p>Para 40: Modified KPI 2 and added explanatory note to KPIs 1,3,4,5,6</p> <p>Annexure 1: Updated Global Area of Service Map to 2020 version.</p> <p>Annexure 3: Added target definitions</p> <p>Annexure 5 and 6: changed “Revised” to “Updated” for earthquake magnitude in IOTWMS TSP bulletin templates</p> <p>Annexure 5-7: Added new highlighting scheme to indicate sections that would change for non-seismic and complex source events.</p> <p>Annexure 7: added a new bulletin category: TSP NAVAREA products with template and examples.</p> <p>Moved Annexure 7 to Annexure 8</p> | |

Glossary of Terms

| | |
|--------------|---|
| AOS: | Area of Service of a Tsunami Warning System |
| BMKG: | Badang Meteorologi Klimatologi dan Geofisika (Indonesia) |
| CFZ: | Coastal Forecast Zone in the Indian Ocean |
| GIS: | Geographic Information System |
| GSDD: | Global Service Definition Document of TOWS-WG |
| GTS: | Global Telecommunications System (WMO) |
| ICG/IOTWMS: | Intergovernmental Coordination Group for the IOTWMS |
| IHO: | International Hydrographic Organization |
| InaTEWS: | Indonesian Tsunami Early Warning System |
| INCOIS: | Indian Centre of Ocean Information Services |
| IOC: | Intergovernmental Oceanographic Commission |
| IOTWMS: | Indian Ocean Tsunami Warning and Mitigation System |
| ITWEC: | Indian Tsunami Early Warning Centre |
| JATWC: | Joint Australian Tsunami Warning Centre |
| NTWC: | National Tsunami Warning Centre |
| PTWS: | Pacific Tsunami Warning and Mitigation System |
| SG | Steering Group for the ICG/IOTWMS |
| TOWS-WG: | Tsunami and Other Ocean Hazards Warning and Mitigation Systems Working Group |
| TOWS-WG TT: | TOWS-WG Inter-ICG Task Team on Tsunami Watch Operations |
| TSP: | Tsunami Service Provider |
| Tsunamieter: | Tsunami-detection and measurement devices (typically a deep- ocean buoy with a bottom pressure sensor and a surface comms buoy) |
| USGS: | United States Geological Survey |
| UNESCO: | United Nations Educational, Scientific and Cultural Organisation |
| WMO: | World Meteorological Organisation |

Introduction

The IOTWMS is a “system-of-systems” with operational robustness achieved through multiple Tsunami Service Providers (TSPs), each of which has implemented an Indian Ocean tsunami threat assessment system providing real-time information to the NTWCs of Indian Ocean countries during tsunami events.

The ICG/IOTWMS has specified that there must be at least two TSPs covering all parts of the Indian Ocean, to ensure redundancy and robust operations during tsunami events. This “system-of-systems” approach requires all seismic, sea level, and tsunami threat information provided by TSPs to be interoperable, i.e. TSPs are to use common and agreed formats for data and information exchange, are to meet agreed TSP Service Definition requirements, and are to share information on procedures and processes. Currently the TSPs of Australia, India and Indonesia are operational and providing SL-1 and SL-2 services for the IOTWMS Area of Service (AOS). Each TSP provides services for the whole of the IOTWMS AOS – see Annexure-1 for the Area of Service (AOS) map for all three TSPs. Also see Annexure-1A for the Global AOS Map for all ICGs.

The definitions of NTWC and TSPs, their roles & responsibilities, TSP capability requirement and procedure for achieving TSP status are described in Annexure-8.

In general, there are three Service Levels defined for TSPs to provide to NTWCs:

Service Level 1: TSPs provide initial earthquake source information for potentially tsunamigenic earthquakes occurring in the IOTWMS Earthquake Source Zone (ESZ), plus a qualitative tsunami threat assessment.

Service Level 2: TSPs provide detailed quantitative tsunami threat assessments for all Indian Ocean coastal zones, including:

- Estimated Wave Amplitude (offshore/coastline)
- Estimated Time of Arrival (coastline)
- Potential threat zones
- Sea level verification information

Service Level 3: NTWCs under bilateral agreements with TSPs will develop and implement enhanced tsunami warning information systems utilising:

- Inundation mapping
- Risk and hazard assessments

The following section details the services to be provided by the IOTWMS TSPs to the NTWCs.

Services to be Provided

1. TSP services shall consist of TWO types of products (i) Exchange products for NTWCs and (ii) Public products for the general public. TSP services shall be treated as **Information** to NTWCs. National Warnings shall remain the responsibility of NTWCs unless bilateral arrangements are established between an NTWC and a TSP. TSPs shall give at least three (3) months' notice to NTWCs of any TSP service changes affecting NTWC operations, or one (1) month's notice for other changes.
2. TSP **exchange products** shall consist of a combination of textual bulletins, emails, graphics, password-protected web sites and data files in agreed formats. The availability of exchange products on password-protected TSP websites is made known by sending notification messages to NTWC contacts through GTS, email, fax and SMS. The passwords on TSP websites shall be changed at least annually.
3. Through bilateral agreements, NTWCs may request TSPs to directly send TSP exchange products to them.
4. Through agreement with IHO, TSPs are asked to provide NAVAREA products each time Potential Threat, Confirmed Threat, and Final bulletins are issued in the agreed format as per Annexure 7.
5. TSP **public products** shall consist of a combination of textual bulletins, graphics and public web sites.
6. TSP public bulletins and exchange bulletins shall follow standard formats. In addition, bulletins should clearly indicate intended audience and provide reference to other authoritative centres responsible for issuing bulletins within the Indian Ocean Area of Service. Wherever applicable, appropriate statements should be included in bulletins for recipients to understand that the bulletins issued refer to a main shock, aftershock or a new event. Standard terminology is to be followed to report sea level observations. Example bulletins are given in Annexure-5 (exchange bulletins) and Annexure-6 (public bulletins).

7. A map of the Area of Service (AOS) depicting the coastal areas for which IOTWMS TSPs are the authoritative centres for the issuing of tsunami bulletins under the IOTWMS framework is given as Annexure-1. This map is derived from the Global AOS Map of the ICGs (Annexure-1A) finalised by the TOWS-WG and adopted by the IOC Executive Council or the IOC Assembly.
8. A map of the Earthquake Source Zones to be used by IOTWMS TSPs for differentiating earthquakes occurring within and outside the Indian Ocean is given as Annexure-2.

Commencement of Services

9. Service Level 1: TSP services for an earthquake event shall commence whenever an undersea or coastal (up to 200 km inland and regardless of depth) earthquake is recorded in the Indian Ocean, Pacific Ocean or South Atlantic source zones (refer Annexure 2) with a magnitude ≥ 6.5 . The first exchange and public bulletins issued shall be Type 1 Earthquake Bulletin (Service Level 1 product).
10. Service Level 2: If the earthquake is within 100km depth and:
 - occurred in the Indian Ocean source zone, or
 - has a magnitude ≥ 8.0 and occurred in the Pacific Ocean or South Atlantic Ocean source zones. This does not preclude TSPs from issuing SL-2 bulletins for earthquakes less than magnitude 8.0 that they have assessed as causing threat to the IOTWMS CFZs.

a TSP threat assessment shall be carried out followed by the issuing of exchange bulletins of Type 2 No Threat / Potential Threat, Type 3 Confirmed Threat and Type 4 Final Bulletin as the situation mandates (Service Level 2 products), plus the corresponding public bulletins.
11. Service Level 2 products may also be issued for non-seismic and complex source events if a regional or ocean wide scale tsunami has been generated or there is reason to believe one may have been generated. This is an area for future development and is not a current requirement. Due to the nature of non-seismic and complex source events and the limitations of current

operational setups there it is high likelihood that many of them will not be detected in a timely manner. If a TSP chooses to respond to a non-seismic and complex source event, they should modify the standard templates as per Annexure-5.

12. TSP threat assessments shall only be modified during an event if new seismic data becomes available or if observations compared to model forecasts changes the threat assessment.

Exchange Products

13. “**Exchange**” products are intended for NTWC use only and contain predicted tsunami wave amplitudes and arrival times based on tsunami models run by each TSP, together with a simple threat/no threat status for each of the IOTWMS Coastal Forecast Zones, based on an agreed wave-height threshold.
14. The agreed wave-height threshold for considering a country under threat shall be a predicted positive wave amplitude ≥ 0.5 metre at any Coastal Forecast Zone (CFZ) in that country. This shall be known as the **Threat Threshold**. The amplitude shall be that occurring on the shore-line. For TSPs using the Green’s Law approximation from deep water values, the shore-line shall be taken to be at 1 metre depth. If NTWCs nominate a different threshold for their country, TSPs shall use that.
15. TSPs shall:
 - Display exchange products on TSP password-protected websites and send notification messages to NTWCs when these products are updated. Notification messages sent via the GTS shall use the following “TTAAii CCCC” header identifiers:
 - TSP India: WEIO20 DEMS
 - TSP Indonesia: WEIO22 WIIX
 - TSP Australia: WEIO24 AMMC
 - Only send exchange products directly to NTWCs by bi-lateral agreement between an NTWC and a TSP, as specified in paragraph 3.

16. TSP exchange bulletins can be categorised into **FOUR** types:
- Type 1: Earthquake Bulletin** containing earthquake parameters and a qualitative statement on tsunamigenic potential based on earthquake location, magnitude and depth.
- Type 2: Threat Assessment Bulletin** containing earthquake parameters and in one of the following two formats based on a quantitative threat assessment using model predictions:
- **No Threat Bulletin** if no CFZ in the Indian Ocean AOS is above the threat threshold, or
 - **Potential Threat Bulletin** if one or more CFZs in the Indian Ocean AOS are above the threat threshold. Potential Threat Bulletins shall also list every above-threshold CFZ, the predicted arrival time of its first wave above threshold, and the predicted height of its largest wave.
- Type 3: Confirmed Threat Bulletin** containing earthquake parameters, the quantitative threat information for each above-threshold CFZ (as for Potential Threat Bulletins), and real-time sea level observations confirming tsunami generation.
- Type 4: Final Bulletin** issued when water levels from multiple gauges confirm that either no tsunami waves above threat threshold were generated, or at 120 minutes after the **last forecast exceedance of the 0.5 metre threat threshold** at the last Indian Ocean member state, as long as above-threshold waves are not being reported.
17. The exchange bulletins issued for an event by each TSP shall be sequentially numbered regardless of the bulletin type.
18. Multiple Type 1 Earthquake Bulletins may be issued for a single event, but only if earthquake parameters are revised, and only until the first Service Level 2 (Type 2 or 3) Bulletin is issued. Thereafter revised earthquake parameters shall be included in the Service Level 2 Bulletins.
19. Multiple Type 2 No Threat or Potential Threat Bulletins may be issued. Conditions which shall trigger an additional bulletin issue are hourly updates or when the threat assessment has changed. An additional Type 2

Bulletin may also be issued when earthquake parameters have been revised, and if the revision leads to a change in threat assessment.

20. Multiple Type 3 Confirmed Threat Bulletins may be issued. The first bulletin should be issued when the first observations confirming tsunami generation are received. Conditions which shall trigger an additional bulletin issue are hourly updates, when higher-than-expected tsunami wave observations are received, or when the threat assessment has changed. “Higher-than-expected” tsunami wave observations are those whose amplitude is so far above the expected maximum for that location that the TSP may conduct a re-assessment of the tsunami threat level. An additional Type 3 Bulletin may also be issued when earthquake parameters have been revised, and if the revision leads to a change in threat assessment.
21. Only one Type 4 Final Bulletin will be normally issued for each event. However, a supplementary final bulletin may be issued if significant additional information becomes available.
22. The formats of TSP exchange bulletins and notification messages are specified in Annexure 5.

Public Products

23. “**Public**” products shall only contain earthquake information, a qualitative tsunami-genesis statement, tsunami wave observations and a summary of national warning statuses issued by NTWCs. Tsunameters shall only be listed as having observed a tsunami, but no numerical height values shall be provided. **NTWCs shall provide current warning status summaries to TSPs during an event using a web-based feedback form.** The summary may take the form of a category scale and will be reflected in the TSP public pages:
 - 0: No Threat
 - 1: Watch
 - 2: Warning
 - 3: All Clear or Cancellation

24. TSPs shall:
- Display public products on TSP Public Websites
 - Send public bulletins in text format to the GTS and as an email to the IOC Public List Server for all events of magnitude ≥ 6.5 in the Indian Ocean and ≥ 8.0 in the Pacific or South Atlantic Oceans. For events from Magnitude 6.5 to 7.9 outside the Indian Ocean earthquake source zone (Annexure-2), no public bulletins shall be sent to the GTS or to the IOC Public List Server. Public bulletins messages sent via the GTS shall use the following “TTAAii CCCC” header identifiers:
 - TSP India: WEIO21 DEMS
 - TSP Indonesia: WEIO23 WIIX
 - TSP Australia: WEIO25 AMMC

Note: For Exchange Bulletins, an associated Notification Message is sent on the GTS and to the IOC public email list server, not the Exchange Bulletin itself. However Public Bulletins do not have an associated Notification Message – the Public Bulletin itself is sent on the GTS and to the IOC public email list server.

25. TSP Public bulletins are categorised into **FOUR** types, corresponding to the four types of Exchange bulletins:

Type 1: Earthquake Bulletin containing earthquake parameters and a qualitative statement of tsunamigenic potential based on earthquake location, magnitude and depth.

Type 2: Threat Assessment Bulletin containing earthquake parameters and in one of the following two formats:

- **No Threat Bulletin** if an exchange No Threat Bulletin has been issued for this event, or
- **Potential Threat Bulletin** if an exchange Potential Threat Bulletin has been issued for this event. The public Potential Threat Bulletin shall not contain any quantitative threat assessment information, but shall contain a summary of the national warning statuses reported by NTECs.

Type 3: Confirmed Threat Bulletin if an exchange Confirmed Threat Bulletin has been issued for this event. The public Confirmed Threat Bulletin shall not contain any quantitative threat assessment information, but shall contain earthquake parameters, a summary of the national warning statuses reported by NTWCs and real-time sea level observations confirming tsunami generation.

Type 4: Final Bulletin if an exchange Final Bulletin has been issued for this event. The public Final Bulletin shall contain earthquake parameters, a summary of the national warning statuses reported by NTWCs and real-time sea level observations of the generated tsunami waves, if any.

26. The public bulletins issued for an event by each TSP shall be sequentially numbered regardless of the bulletin type. Public bulletins shall be issued immediately following the issuing of the corresponding type of Exchange bulletin, or when the national warning status reported by any NTWC changes.
27. The formats of TSP public bulletins are specified in Annexure 6.

Finalisation of Services

28. TSP services shall conclude for a specific event when the expected time for the last predicted above-threshold wave of all Indian Ocean CFZs has passed, plus 2 hours, as long as above-threshold waves are not being reported. Within 24 hours of the services concluding for an event, all TSP web pages for NTWCs shall indicate no threats are in place. Old event bulletins shall be placed into an online archive.

Issue of False or Incorrect Messages

29. If a TSP issues a false or incorrect TSP Notification Message and its associated TSP Public Bulletin, the TSP shall immediately issue cancellation messages to all the recipients of both types of message indicating that the original message or bulletin was issued incorrectly and should be ignored. The cancellation message formats are specified in Annexures 5 and 6.

Communication and Interoperability between TSPs

30. **There shall be minimal manual inter-TSP contact during an event.** The arrangements for this contact are yet to be determined. Post-event comparisons of TSP products shall be carried out by the TSPs. As well as operational differences, the comparisons shall focus on the differences between the zones selected to be under threat and the maximum shore-line wave amplitudes.
31. TSPs will use common spatial data sets to define the CFZs. This will ensure interoperability between the TSPs and NTWCs. Feedback from NTWCs shall be used to fine tune the data.
32. The primary aim of interoperability is to simplify inter-TSP comparisons through having a common spatial data set. The spatial data defines the specific CFZs for which forecasts are to be made. The data is in the form of an industry standard ESRI GIS shape file.
33. The shape file format consists of a series of files in binary format. Most of these files should only change on an occasional basis as NTWCs provide input as to preferred CFZs and their names, or if there is a change in the IOTWMS AOS. The 'static' data defining the zones shall be made available to TSPs and NTWCs via the password-protected web sites.
34. The dynamic components of the shape file are contained inside a DBF format file. This file lists the attributes for each zone. During an event, the DBF format file shall be updated with the TSP forecasts and placed in the password-protected web site.
35. Any proposed changes to the spatial data shall be documented to ensure consistency. Any changes required to this spatial dataset are to be carried out by a GIS qualified person at one TSP and shared with the other TSPs, and in consultation and agreement with affected NTWCs.

Detailed TSP Services to NTWCs

36. Detailed TSP services to NTWCs shall be at the highest level of spatial resolution that can be supported. Every CFZ in the spatial data shall be provided with a unique set of data.
37. Fields provided shall include:
- **Maximum positive wave amplitude at the shore-line.** This field shall be known as '*max_beach*'. For TSPs using a deep water forecast and an approximation method to derive *max_beach* the shore-line value shall be taken to be the value approximated at 1 metre depth. The unit shall be metres.
 - **Maximum positive wave amplitude in deep water in each coastal zone.** This field shall be known as '*max_deep*'. This field shall be provided if an approximation method (e.g. Green's Law) is used to approximate *max_beach* from deep water values. The unit shall be metres.
 - **If *max_deep* is provided, the depth of the water where the *max_deep* occurs shall be provided.** This field shall be known as '*depth*'. The unit shall be metres.
 - **Threat Category** based on the maximum wave height at the shore-line. This shall be a "No Threat/Threat" category system.
 - **Four model-based times.** The times shall be given as the number of whole minutes after the earthquake. The times shall be:
 - i. T1: Estimated time of arrival of first tsunami wave with positive or negative amplitude as calculated by forecast model.
 - ii. T2: Estimated time of arrival of first tsunami wave amplitude over basin-specific threat threshold with positive or negative amplitude as calculated by forecast model.
 - iii. T3: Estimated time of arrival of maximum tsunami wave with positive amplitude as calculated by forecast model.

- iv. T4: Estimated time of arrival of last tsunami wave with positive amplitude over basin-specific threat threshold as calculated by forecast model.
 - **Observed sea levels.** In accordance with the Global Service Definition Document (GSDD) of the TOWS-WG, the observed sea levels shall be reported in UTC and shall include O3 defined below as recorded at sea-level stations at the time of reporting. Other possible observed sea-levels that could be reported are also described below:
 - i. O1: Observed time of arrival of first distinguishable tsunami wave with positive or negative amplitude as measured by sea level stations
 - i. O2: Observed time of arrival of first tsunami wave with positive or negative amplitude over basin-specific threat threshold as measured by sea level stations.
 - ii. O3: Observed time of arrival of maximum tsunami wave with positive amplitude as measured by sea level stations.
 - iii. O4: Observed time of arrival of last tsunami wave with positive amplitude over basin-specific threat threshold as measured by sea level stations.
38. Amplitude relative to sea level to be used as the common measure of a tsunami and should be defined in the message. All TSPs to report forecast and observations as amplitude relative to sea level at the time of the forecast or observation. Amplitude is measured as
- i. The absolute value of the difference between a particular peak or trough of the tsunami and sea level at that time, or
 - ii. Half the difference between an adjacent trough and peak and can be corrected for the change of tide between that trough and peak.

TSP Key Performance Indicators (KPIs)

39. Each TSP shall record its performance during the inter-sessional period against the listed Key Performance Indicators in a common format that follows the example in Annexure 3. The performance shall be presented by individual TSPs during the ICG. A comparison of the performance of all the TSPs during the inter-sessional period shall be presented by the ICG Working Group 2 and also made available via the TSP websites.
40. Key Performance Indicators – TSP Performance:

| No. | Key Performance Indicator | Target Value |
|------------|---|----------------------------|
| 1 | Elapsed time from earthquake to issuance of first Earthquake Bulletin | 10 minutes [^] |
| 2 | Probability of detection of earthquakes with Mw \geq 6.8 (USGS final value) in the IOTWMS ESZ | 100% |
| 3 | Accuracy of earthquake magnitude | 0.3 * [^] |
| 4 | Accuracy of earthquake hypocenter depth | 30 km * [^] |
| 5 | Accuracy of earthquake hypocenter location | 30 km * [^] |
| 6 | Elapsed time from earthquake to issuance of first Threat Assessment Bulletin | 20 minutes [^] |
| 7 | Probability of detection of tsunami above threat threshold | 100% |
| 8 | Accuracy of the tsunami forecast amplitude/height | Factor of 2 |
| 9 | Number of false or incorrect bulletins issued | 0 |
| 10 | Accuracy of time arrival of tsunami (0.02m amplitude) | Within 5% of travel time # |
| 11 | Accuracy of time of arrival of 1st significant wave (0.1m) | Within 5% of travel time |
| 12 | Accuracy of threat threshold exceedance | Within 5% # |
| 13 | Percent of IO countries issued a timely product as defined above | 100% |
| 14 | Elapsed time from any product issuance to potential receipt by NTWC Contact | 5 minutes ## |
| 15 | Percent of regular Comms Tests participated in | 100% |

Notes:

** In comparison with final USGS parameters for the earthquake (at 1 month after the earthquake). TSP earthquake parameters used are the final parameters issued by TSPs during the event, noting that for earthquakes with magnitude \geq 8.5 the elapsed time for an accurate magnitude is 15 to 30 minutes. Magnitudes given in the first Earthquake Bulletins for large earthquakes can therefore be inaccurate.*

ICG Working Group 2 to further review these target figures after a detailed study to confirm achievable values.

Some communications issues are outside the control of the TSPs.

[^] Only earthquakes where the USGS final value is $>$ M6.8 are considered for reporting purposes

41. Key Performance Indicators – TSP Functional Status:

| No. | Key Performance Indicator | Target Value |
|-----|---|--------------|
| 1 | Operational 24 hours/day, seven days /week (24/7) | 99.5% |
| 2 | Notify TWFPs and NTWCs of planned major service changes | > 3 months |
| 3 | Notify TWFPs and NTWCs of planned minor service changes (not affecting NTWC operations) | > 1 month |
| 4 | Notify TWFPs and NTWCs of planned major interruptions | > 3 months |
| 5 | Return to service after planned interruptions | < 1 day |
| 6 | Return to service after unplanned interruptions in an event | <30 minutes |

Event Assessments

42. Post-event assessments and questionnaires are valuable. TSPs, in conjunction with the IOTWMS Secretariat and IOTIC, shall conduct post-event assessments when any of the following conditions are met:

- One or more TSPs predicted tsunami waves of at least 1 metre amplitude for one or more countries, or
- Waves of at least 1 metre amplitude were observed but not predicted by any TSP.
- Over and above this trigger level, the final decision to implement a survey should be decided by the regional Tsunami Information Centre (TIC) in consultation with the ICG Steering Group and Secretariat taking into consideration whether the tsunami resulted in a national response in 1 or more countries.

43. The TOWS-WG Task Teams on Tsunami Watch Operations and Disaster management and Preparedness jointly have come up with a standard set of questions which was recommended by the TOWS WG VIII which can be used in post-event assessments. The template is shown in Annexure-4.

Procedure for Naming Tsunamigenic Earthquakes

44. In accordance with the Global Service Definition Document (GSDD) of the TOWS-WG, potentially tsunamigenic earthquakes (i.e. those requiring the issuing of Service Level 2 products) may be named by TSPs using a scheme based on the Flinn-Engdahl geographic designator plus the year of the event, plus a sequence number to allow for multiple events in the region within a calendar year. An example would be "Banda Sea-2013-1".

A subsequent Banda Sea event in 2013 would be designated "Banda Sea-2013-2".

45. If an event proves to be significant, the final name could be decided in consultation with the country in which it occurred. Procedure for Handling Multiple Earthquakes in Quick Succession.
46. Details are to be defined. However, in general, if multiple tsunamigenic earthquakes occur in quick succession and within the same earthquake source zone, TSPs should include mention of the subsequent event in the bulletins they are already issuing for the first event, rather than commencing the issuing of a new series of bulletins, to avoid confusion at the NTWCs.

Procedure for Handling Non-Worst-Case Earthquake Events

47. Details to be defined. Background: The 11 April 2012 magnitude 8.6 earthquake off the West Coast of North Sumatra was a largely "strike-slip" event without the large vertical displacement of the sea floor typical of "subductive" or "thrust" events which can generate large tsunamis. The largest tsunami waves recorded for this event were around 1 metre, in comparison with TSP predictions (from models assuming subductive earthquake geometry) of around 8, 15 and 17 metres. TSPs should examine procedures for handling non-worst-case events such as these.

Procedure for Handling Multiple Earthquakes in Quick Succession

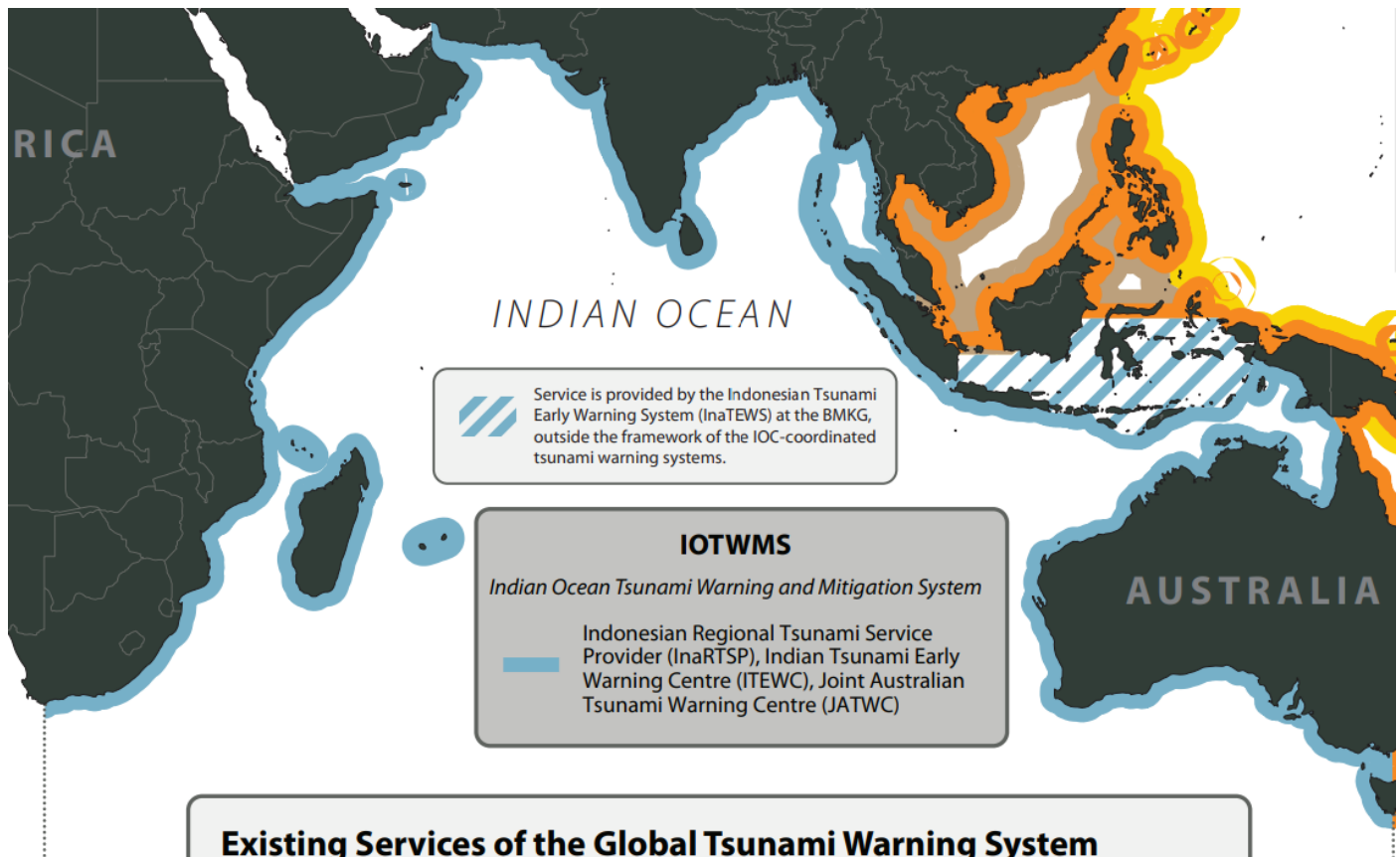
48. In accordance with the Global Service Definition Document (GSDD) of the TOWS-WG, if multiple tsunamigenic earthquakes occur in quick succession and within the same earthquake source zone, TSPs shall include mention of the subsequent event in the Exchange Bulletins and Public Bulletins they are already issuing for the first event, rather than commencing the issuing of a new series of bulletins, to avoid confusion at the NTWCs. It is important to take into consideration the time and spatial extent between the events. When successive tsunamigenic earthquakes are referred to in one bulletin, it should be made very clear in the initial part of

the bulletin, so that the receiving centre understands that the bulletin is for a main shock, aftershock or a new event. Terminology in update bulletins should make clear reference to the subject of the update (earthquake parameters, aftershock, sea-level observations, threat levels and/or area of threat).

Regular IOTWMS Tests

49. TSPs shall conduct regular Communication Tests, at least twice a year, in which TSPs send test notification messages to NTWCs and NTWCs access TSP websites, including the lodging of test NTWC warning status reports. TSPs shall collaborate with the IOTWMS Secretariat in the preparation and issuing of a Communication Test Manual at least one month before the test, and in the production of a Test Report within 3 months of the test.
50. TSPs shall participate in regular IOTWMS "IOWave" exercises, and are encouraged to make their representatives available to join Task Teams set up by the ICG or SG to coordinate, conduct and report on IOWave exercises.

Annexure-1: IOTWMS TSP Area of Service (AOS) Map



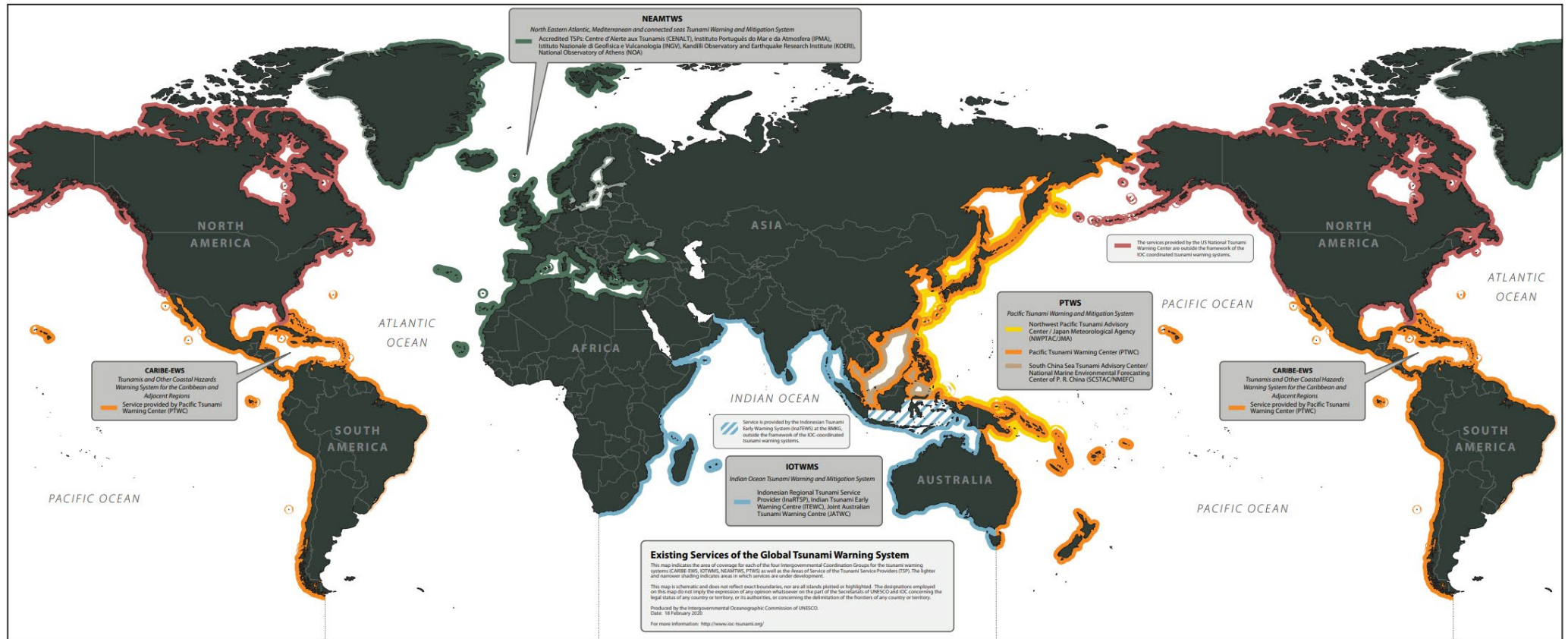
IOTWMS TSP Area of Service (AOS) Map: Defines the coastal areas (shown in blue) for which TSPs are the authoritative centres for the issuing of tsunami bulletins under the IOTWMS framework. This is a subset of the Global Area of Service Map of ICGs shown in Annexure-1A.

NOTES:

- Indonesia has indicated (TOWS-WG Inter ICG Task Team on Tsunami Watch Operations Meeting, October 2014) that it no longer requires IOTWMS-provided services for the Java Sea / Banda Sea. A further update was received from Indonesia (TOWS-WG Inter ICG Task Team on Tsunami Watch Operations Meeting, February 2016) that BMKG as an NTWC is now able to provide tsunami threat information for events originating in the Banda and Java Sea regions and no longer requires a backup service for these events. Hence this area is shown as not being covered by any IOTWMS TSP and is a part of the domestic service of BMKG.*
- The AOS map is maintained by the TOWS-WG and changes may be proposed from time to time. Any changes require the formal agreement of the IOC (Assembly or Executive Council).*
- This version of the AOS map was generated on 15 February 2018 by the TOWS-WG Task Team on Tsunami Watch Operations and was accepted at the TOWS WG-XI meeting on 17 February 2018.*

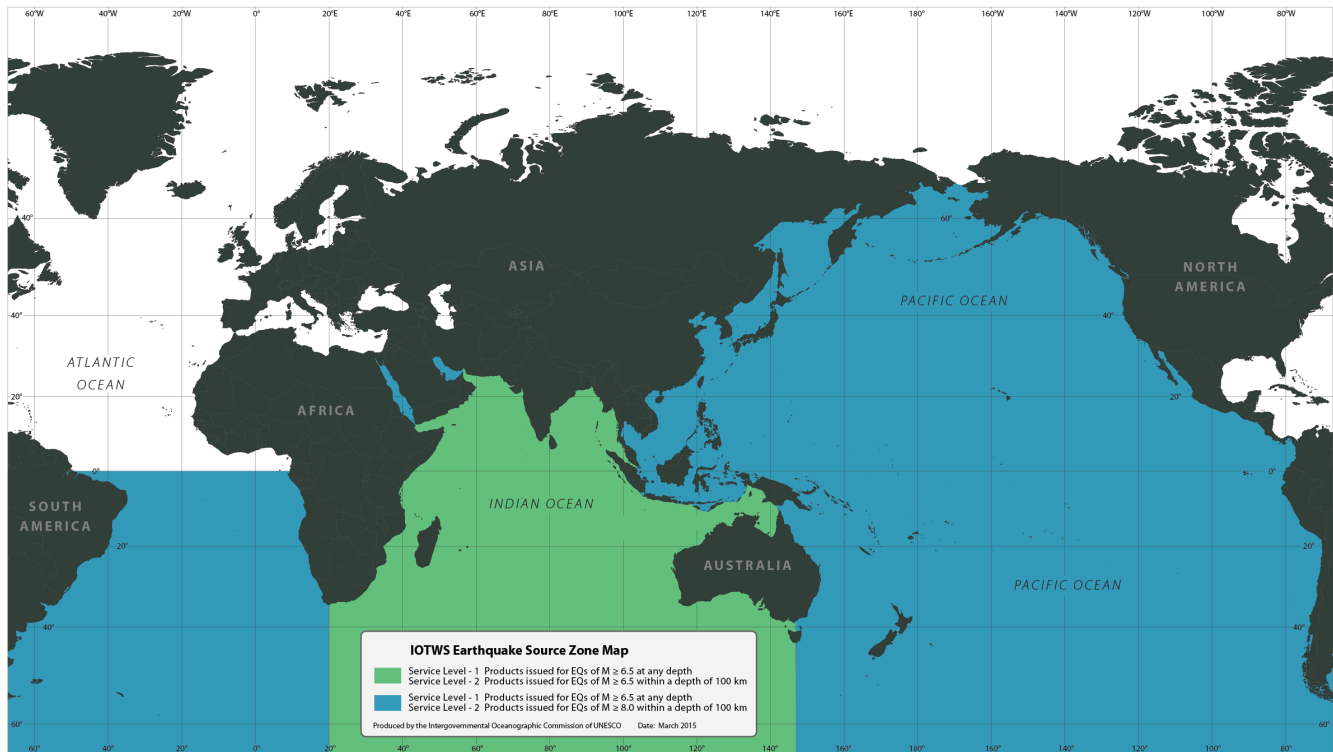
Annexure-1A: IOTWMS AOS Map

Annexure-1A: Global Area of Service Map of ICGs



Global Area of Service (AOS) Map of the ICGs, accepted by the TOWS-WG (Thirteenth Meeting; Paris, France; 20-21 February 2020)

Annexure-2: IOTWMS Earthquake Source Zone (ESZ) Map



IOTWMS Earthquake Source Zone (ESZ) Map:

- Service Level 1 products (Earthquake Bulletins) are issued for all magnitude ≥ 6.5 earthquakes occurring in **any** of the shaded zones.
- In addition, Service Level 2 products (No Threat, Potential Threat, Confirmed Threat, Final Bulletin) are issued for all earthquakes **within 100km depth** and of **magnitude ≥ 6.5 occurring in the green-shaded Indian Ocean zone or magnitude ≥ 8.0 in the blue-shaded Pacific or South Atlantic zones.**
- For earthquakes from magnitude 6.5 to 7.9 outside the Indian Ocean earthquake source zone (blue Pacific or South Atlantic zones), no Service Level 1 bulletins shall be sent to the GTS or to the IOC Public List Server.

NOTES:

1. *The ESZ map is maintained by the TOWS-WG and changes may be proposed from time to time. Any changes require the formal agreement of the IOC (Assembly or Executive Council).*
2. *This version of the Map was generated in March 2015 by the Task Team on Tsunami Watch Operations and the TOWS WG-VIII, and approved by the IOC Assembly in June 2015.*

Annexure-3: TSP Performance Reporting Template

Annexure-3: TSP Performance Reporting Template Example and Target Definition

TSP Performance Against KPIs for Calendar Year 2017

| TSP | Service Level 1 EQ Bulletins | | | | | Service Level 2 Threat / No Threat Bulletins | | | General |
|-----------|---|---|---|---|--|--|---|--|---|
| | KPI 1 ET First EQ Bull Target: 10 mins (% met) | KPI 2 POD IO EQs ≥ M6.8 Target: 100% | KPI 3 EQ Mag Target: 0.3 (% met) | KPI 4 EQ Depth Target: 30 km (% met) | KPI 5 EQ Location Target: 30 km (% met) | KPI 6 ET First Threat Bull Target: 20 mins (% met) | KPI 7 POD Tsunami Waves Target: 100% | KPI 8 Tsunami Height Accuracy Target: Factor of 2 | KPI 9 False / Incorrect Bulletins Issued Target: 0 |
| Australia | 12.7 min (22.5%) | n/a* | 0.20 (90.6%) | 17.2 (78.6%) | 25.1 (73.8%) | 15.5 min (75.0%)** | n/a*** | n/a*** | - |
| India | 10.7min (46.7%) | n/a* | 0.15 (96.0%) | 12.72 (95.2%) | 12.7 (100.0%) | 27.7 min (0.0%)** | n/a*** | n/a*** | - |
| Indonesia | 19.9 min (40.7%) | n/a* | 0.18 (82.1%) | 15.94 (89.3%) | 29.76 (82.1%) | 27.4 min (62.5%)* | n/a*** | n/a*** | - |

* KPI 2: No IO events >= M6.8

** KPI 6:

Australia issued 4 No Threat Bulletins

India issued 3 No Threat Bulletins

Indonesia issued 8 No Threat Bulletins

*** KPI 7,8: No events caused threat-level tsunami waves

| | | |
|-----------------|----------------|------------------|
| Meets Target | Near Target | Misses Target |
|-----------------|----------------|------------------|

| TSP | Service Level 1 EQ Bulletins | | | | | Service Level 2 Threat / No Threat Bulletins | | | General |
|---|-------------------------------------|---|--|---|---|---|--|---|---------|
| KPI 1 ET First EQ Bull Target: 10 mins (% met) | KPI 2 POD EQs Target: 100% | KPI 3 EQ Mag Target: 0.3 (% met) | KPI 4 EQ Depth Target: 30 km (% met) | KPI 5 EQ Location Target: 30 km (% met) | KPI 6 ET First Threat Bull Target: 20 mins (% met) | KPI 7 POD Tsunami Waves Target: 100% | KPI 8 Tsunami Height Accuracy Target: Factor of 2 | KPI 9 False / Incorrect Bulletins Issued Target: 0 | |
| Meets Target | <10 min | 100% | <0.3 | <30 km | <30 km | <20 min | 100% | 50-200% | 0 |
| Near Target | 10-15min | 90-100% | 0.3-0.45 | 30-45 km | 30-45 km | 20-30 min | | 25-50% or 200-400% | 1 |
| Misses Target | >15 min | <90% | >0.45 | >45 km | >45 km | >30 min | <100% | >400% or <25% | 2+ |



Annexure-4: Post - Event Assessment Template

[EVENT NAME] POST-EVENT ASSESSMENT QUESTIONNAIRE

COUNTRY: _____

Contact Details

| | | |
|---|--|------|
| Contact Name: | | |
| Name of Organisation | | |
| | | |
| Address | | |
| | | |
| Phone | | Fax: |
| Email | | |
| Name of National Tsunami Warning Centre (NTWC) | | |
| NTWC Contact Email | | |
| Name of National Disaster Management Office or equivalent (NDMO) | | |
| NDMO Contact Email | | |

Instructions

This is an electronic form which can be filled out in several ways:

- 1) If you use Microsoft Word software you can fill out the form electronically. To tick checkboxes (yes/no answers), you can either use the tab button or the mouse to move to the required answer. Written answers can be typed in the grey area next to the questions, and the area will expand to fit longer answers.
- 2) If the form fields don't work, then you can type your answers next to the relevant question.
- 3) **Please give all times in UTC, not local time.**
- 4) Please include as much information as possible in your answers. If there is not enough room on the questionnaire form, then please send extra information in a separate document.
- 5) Where multiple answers are possible, please feel free to tick more than one box.

You may also print the questionnaire and fill out by hand, then scan/email or fax it back to us.



We may need to contact you to clarify your answers, so please include a contact phone number where we can reach you.



EVENT NAME
POST-EVENT ASSESSMENT QUESTIONNAIRE

SECTION A –TSUNAMI SERVICE PROVIDER (to be completed by NTWC)

- 1) How (through what information source) and at what time (UTC) did you learn that a big earthquake had taken place?**

How (Information Source): Time (UTC):

- 2) Did you receive the first notification message from TSP 1 (0000 UTC), TSP 2 (0000 UTC), or TSP 3 (0000 UTC)?**

Yes No

If YES to either or all, at what time was the message received (UTC)?

TSP 1: TSP 2: TSP 3 :

- 3) If yes, how did you receive the messages (cross more than one box if appropriate)?**

Email: Fax: GTS:

Phone: SMS Other

- 4) Were subsequent messages received from TSP 1, 2 and 3?**

Yes No

If YES, please complete the tables on the following pages (all times in UTC please).



1. TSP 1 Messages

| Notification Message | Time Received (UTC) | How Received | TSP Website Accessible? (Y/N) | Reported NTWC Status to TSP (via web/email/fax/other)? | Comments |
|------------------------|---------------------|--------------|-------------------------------|--|----------|
| xxxx UTC Message 1 | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Message xx | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Message xx | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Final Message | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |

Footnote: TICs in association with the ICG Secretariats in each basin will incorporate finer changes to the tables based on the number of TSPs operating in the basin, messages issued by each TSP for the event being reviewed, modes of communication being used in the ICG, etc



2. TSP 2Messages

| Notification Message | Time Received (UTC) | How Received | TSP Website Accessible? (Y/N) | Reported NTWC Status to TSP (via web/email/fax/other)? | Comments |
|------------------------|---------------------|--------------|-------------------------------|--|----------|
| xxxx UTC Message 1 | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Message xx | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Message xx | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Final Message | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |

Annexure-4: Event Assessment Template

3. TSP 3 Messages

| Notification Message | Time Received (UTC) | How Received | TSP Website Accessible? (Y/N) | Reported NTWC Status to TSP (via web/email/fax/other)? | Comments |
|------------------------|---------------------|--------------|-------------------------------|--|----------|
| xxxx UTC Message 1 | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Message xx | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Message xx | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | Other | | | |
| xxxx UTC Final Message | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |

4). Was information received from any other sources? If so, please fill out the tables below:

| Notification Message | Time Received (UTC) | How Received | TSP Website Accessible? (Y/N) | Reported NTWC Status to TSP (via web/email/fax/other)? | Comments |
|----------------------|---------------------|--------------|-------------------------------|--|----------|
| xxxx UTC Message 1 | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| xxxx UTC Message x | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| | | GTS | | | |

Annexure-4: Event Assessment Template

| | | | | | |
|-------------------------------|--|--------------|--|--|--|
| xxxx UTC Message x | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |
| xxxx UTC Message x | | GTS | | | |
| | | Fax | | | |
| | | Email | | | |
| | | SMS | | | |

Annexure-4: Event Assessment Template

5) Was information about the earthquake received from other sources?

Yes

No

If YES, please provide details:

6) Did you receive notification messages from the TSPs about aftershocks ?

Yes

No

If so, please provide details in the table below:

| RTSP 1 | Time UTC | RTSP 2 | Time UTC | RTSP 3 | Time UTC |
|---------------|-----------------|---------------|-----------------|---------------|-----------------|
| No 1 | | No 1 | | No 1 | |
| No 2 | | No 2 | | No 2 | |
| No 3 | | No 3 | | | |
| No 4 | | No 4 | | | |
| No 5 | | | | | |

Annexure-4: Event Assessment Template

SECTION B – NATIONAL ACTIONS

The purpose of this section is to find out what actions were taken by National Tsunami Warning Centres, including independent analysis of the event, notification of relevant organisations, issuing and cancellation of warnings.

7) Were any earthquake parameters calculated at the national level?

Yes No

If YES, please specify:

| | Origin Time (UTC) | Location (Lat and Long) | Depth | Magnitude | Type of Mag. | Time UTC |
|---------------------|--------------------------|--------------------------------|--------------|------------------|---------------------|-----------------|
| 1st estimate | | | | | | |
| 2nd estimate | | | | | | |
| | | | | | | |

8) Was any action taken BEFORE receiving the TSP messages?

Yes No

If YES, please give details:

9) What action was taken AFTER receiving the first message? Please list times (UTC) as well as actions. Include details of organisations or government agencies contacted.

| Action Taken | Time (UTC) |
|---------------------|-------------------|
| | |
| | |
| | |
| | |
| | |

(Add more rows if necessary)

Annexure-4: Event Assessment Template

10) Did your National Tsunami Warning Centre issue a tsunami warning and tsunami related information to other agencies and/or the public?

Yes:

No:

If NO, then please go to Section C

If YES, please specify:

| Type of information released, and to which agencies | Time (UTC) |
|---|------------|
| | |
| | |
| | |
| | |
| | |

11) How was the warning issued to agencies?

| Method used to communicate information with agencies | Yes/No |
|--|--------|
| Phone (indicate whether by commercial or dedicated line) | |
| SMS | |
| Email | |
| Fax | |
| Other | |

12) Was a tsunami warning and tsunami related information issued to the public?

Yes:

No:

| Type of information released to the public | Issued by | Time (UTC) |
|--|-----------|------------|
| | | |
| | | |
| | | |
| | | |

Annexure-4: Event Assessment Template

| | | |
|--|--|--|
| | | |
|--|--|--|

13) Was the decision to issue or not to issue a tsunami warning to the public based on messages from the RTSPs or on messages from other sources, or on information determined by your National Tsunami Warning Centre?

TSP 1: TSP 2: TSP 3:

Other Source (Specify): National TWC:

14) If a tsunami warning was issued to the public, was a tsunami wave height forecast provided?

Yes No

15) How was the warning/information communicated with the public?

| Method used to communicate information with the public | Yes/No |
|--|--------|
| Telephone | |
| SMS | |
| Cell/mobile phone broadcast | |
| Public Radio | |
| Public TV | |
| Twitter | |
| Facebook | |
| RSS | |
| Websites | |
| Sirens | |
| Public announcement systems | |
| Public call centre | |
| Police | |
| Door-to-door announcements | |
| Other (specify) | |

Annexure-4: Event Assessment Template

16) Who is responsible for communicating with the national Media?

NTWC/TWFP

NDMO

Both

17) Did your National Tsunami Warning Centre or Disaster Management Organisation send tsunami warning information to the national media?

Yes

No

If YES, please specify:

Type of electronic media (TV, radio):

Please mention the radio and TV stations:

Mode of communication used to send information to media (email, fax, SMS etc):

Type of information broadcast by national media (breaking news, running text etc):

Time of first broadcast (UTC):

18) If a warning was issued, at what time was the warning cancelled (UTC)? What was the reason for cancellation? How was this information communicated to the public?

Time of Cancellation:

Reason for Cancellation:

Communication method:

Annexure-4: Event Assessment Template

19) Were there any communication problems with distributing the tsunami warning or cancellation information? (e.g., mobile phone network or websites overload or broken, people not answering phones, etc).

Yes

No

If YES, please provide details:

Annexure-4: Event Assessment Template

SECTION C – NATIONAL RESPONSE

The purpose of this section is to find out what the national and local response was to the event after the tsunami warning had been issued by the National Tsunami Warning Centre.

20) Do you have a formal national Standard Operating Procedure (SOP) or plan for tsunami response?

Yes: No:

21) Were any actions taken by the National Disaster Management Organisation (or equivalent national response organisation)?

Yes: No:

If YES, provide details:

| Action taken by National Disaster Management Organisation | Time (UTC) |
|---|------------|
| | |
| | |
| | |
| | |
| | |

(Add more rows if necessary)

22) Did the National Disaster Management Organisation (or equivalent) maintain communication with the National Tsunami Warning Centre throughout the event?

Yes: No:

If YES, provide details:

23) Did the National Disaster Management Organisation (or equivalent) maintain communication with local/regional disaster management organisations (or equivalent)?

Yes: No:

If YES, provide details:

Conveying:

Conveying and guidance/instructions:

Annexure-4: Event Assessment Template

24) Were any actions taken by the local/regional disaster management organisations (or equivalent)?

Yes:

No:

If YES, provide details:

| Action taken by local/regional disaster management organisations | Time (UTC) |
|--|------------|
| | |
| | |
| | |
| | |
| | |

(Add more rows if necessary)

25) Were any areas evacuated?

Yes:

No:

If YES, please provide details in the following table:

| Area Evacuated | Time (UTC) | Estimated No. People Evacuated |
|----------------|------------|--------------------------------|
| | | |
| | | |
| | | |
| | | |
| | | |

(Add more rows if necessary)

26) Were Tsunami inundation maps available for evacuated areas?

Yes:

No:

If YES, please provide details:

27) If an evacuation occurred, did the process happen smoothly?

Annexure-4: Event Assessment Template

Yes:

No:

If NO, please provide details of problems encountered:

28) Did people in some areas self-evacuate before a warning was issued?

Yes:

No:

If YES, please provide details in the following table:

| Area | Time (UTC) | Estimated No. People who Self-Evacuated |
|------|------------|---|
| | | |
| | | |
| | | |
| | | |
| | | |

(Add more rows if necessary)

Annexure-4: Event Assessment Template

SECTION D – MONITORING AND MODELLING

29) Were sea level data monitored during the event?

Yes

No

If YES, which stations were monitored and how where they monitored?

| Sea Level station | Monitoring method |
|-------------------|---|
| | GTS <input type="checkbox"/> Tide Tool <input type="checkbox"/> IOC Sea Level Station Monitoring Facility <input type="checkbox"/> Other <input type="checkbox"/> |
| | GTS <input type="checkbox"/> Tide Tool <input type="checkbox"/> IOC Sea Level Station Monitoring Facility <input type="checkbox"/> Other <input type="checkbox"/> |
| | GTS <input type="checkbox"/> Tide Tool <input type="checkbox"/> IOC Sea Level Station Monitoring Facility <input type="checkbox"/> Other <input type="checkbox"/> |
| | GTS <input type="checkbox"/> Tide Tool <input checked="" type="checkbox"/> IOC Sea Level Station Monitoring Facility <input type="checkbox"/> Other <input type="checkbox"/> |
| | GTS <input type="checkbox"/> Tide Tool <input type="checkbox"/> IOC Sea Level Station Monitoring Facility <input type="checkbox"/> Other <input type="checkbox"/> |

(Add more rows if necessary)

If “Other” please specify:

30) If the answer to question 30 is NO, does your National Tsunami Warning Centre know how to access sea level data over the GTS, on the IOC Sea Level Station Monitoring Facility, Tide Tool, or other sources?

GTS: Yes No

IOC Sea Level Facility: Yes No

Tide Tool: Yes No

Other: Yes No

31) Did your National Tsunami Warning Centre use any numerical model tsunami scenarios during the event (deep-ocean propagation and/or coastal inundation models)?

Yes:

No:

If “Yes” please specify:

Annexure-4: Event Assessment Template

SECTION E – COMMUNITY PREPAREDNESS

32) From 0 (none) to 4 (very high) please rank the scientifically assessed level of tsunami hazard, the level of community awareness of that hazard, and the level of pre-existing community tsunami preparedness in 5 of the main communities affected by this event

Scientifically known tsunami hazard (please write the name of the community):

| Community | 0 | 1 | 2 | 3 | 4 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| No 1: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 2: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 3: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 4: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 5: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Level of community awareness of the known tsunami hazard for the same communities:

| Community | 0 | 1 | 2 | 3 | 4 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| No 1: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 2: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 3: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 4: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 5: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Level of tsunami preparedness before the event (for the same communities above):

| Community | 0 | 1 | 2 | 3 | 4 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| No 1: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 2: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 3: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 4: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 5: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

33) Have there been any community preparedness activities prior to the event?

Yes:

No:

If Yes:

Annexure-4: Event Assessment Template

| Community | Tsunami Exercise (when) | Tsunami Education in schools | Participatory evacuation planning | Evacuation maps | Shelter facilities |
|-------------|--------------------------------|------------------------------|-----------------------------------|--------------------------|--------------------------|
| No 1: _____ | <input type="checkbox"/> _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 2: _____ | <input type="checkbox"/> _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 3: _____ | <input type="checkbox"/> _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 4: _____ | <input type="checkbox"/> _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 5: _____ | <input type="checkbox"/> _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

34) Has there been any government support with regards to the following prior to the event?

| Community | Tsunami signage | Vertical evacuation | Hazard mapping | Evacuation route mapping |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|
| No 1: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 2: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 3: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 4: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No 5: _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

SECTION F – CAPACITY DEVELOPMENT REQUIREMENTS

Capacity development is a fundamental component of all IOC UNESCO programmes. To assist us to prioritise and plan our future training activities within our limited resources, please indicate the training needs you consider to be high priority for your country.

35) What sort of training events or other assistance from IOC would be useful for your NTWC, NDMO and other response organisations in the next 12 months?

- Seismic training
- Sea Level training
- Risk Assessment training
- Standard Operating Procedures training
- Inundation modelling training
- Media awareness training
- Community awareness and preparedness training

Annexure-4: Event Assessment Template

Exercises and drills training

Other – please specify:

SECTION G – OTHER INFORMATION

Please feel free to provide any further information you would like to be included in the report. This could include comments which you can type below, or attachments such as photographs, or any other documents you consider relevant. We would particularly welcome copies of any national post-event assessment reports that are available

Annexure-5: TSP Exchange Bulletin Templates

Contents - Templates and Examples for:

- A) EXCHANGE BULLETIN NOTIFICATION MESSAGE
- B) Type 1 EXCHANGE EARTHQUAKE BULLETIN
- C) Type 2 EXCHANGE NO THREAT BULLETIN
- D) Type 2 EXCHANGE POTENTIAL THREAT BULLETIN
- E) Type 3 EXCHANGE CONFIRMED THREAT BULLETIN
- F) Type 4 EXCHANGE FINAL BULLETIN – Tsunami Observed
- G) Type 4 EXCHANGE FINAL BULLETIN – No Tsunami Observed
- H) EXCHANGE BULLETIN CANCELLATION MESSAGE

NOTE:

Exchange TSP Bulletins are made available to NTWCs only (via the TSP websites), to provide specific advice to them of predicted tsunami threats to their coastal territories. The specific threat advice provided (predicted wave heights and arrival times) requires expert interpretation and is intended for use by NTWCs in formulating their national tsunami warnings – it is not provided to the public in Public TSP Bulletins, to avoid them being misinterpreted as TSP-issued warnings for Indian Ocean countries.

Annexure-5: TSP Exchange Bulletin Templates

A) EXCHANGE BULLETIN NOTIFICATION MESSAGE Template:

(Variable fields in **red**; explanatory comments in /* blue */; modification required for non-seismic and complex source events highlighted in **yellow**)

```
WEIO20 DEMS 090515 /* WMO GTS header */
-----
TSUNAMI BULLETIN NOTIFICATION MESSAGE NUMBER 2 /* message issue number */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----
```

```
TO: INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES (NTWC)
FROM: IOTWMS-TSP INDIA
```

NOTIFICATION:

IOTWMS-TSP INDIA HAS JUST ISSUED TSUNAMI BULLETIN NUMBER 2 FOR THE INDIAN OCEAN, BASED ON THE FOLLOWING EARTHQUAKE EVENT:

```
/* (UPDATED) to be added only after a magnitude change since previous message */
MAGNITUDE: 9.0 MWP (UPDATED) /* EQ magnitude and type */
DEPTH: 10 KM /* EQ depth */
DATE: 09 FEB 2011 /* EQ date UTC */
ORIGIN TIME: 0500 UTC /* EQ time UTC */
LATITUDE: 7.20N /* EQ latitude */
LONGITUDE: 92.90E /* EQ longitude */
LOCATION: NICOBAR, INDIA /* EQ location */
```

TO VIEW THE BULLETIN GO TO THE IOTWMS-TSP INDIA WEBSITE AT:

<http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

NOTE: THIS IS A RESTRICTED-ACCESS WEBSITE CONTAINING TECHNICAL DATA FOR INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES ONLY. IT IS NOT FOR GENERAL PUBLIC ACCESS.

GENERAL PUBLIC INFORMATION FOR THIS EVENT IS AVAILABLE FROM:

```
INDIAN TSUNAMI EARLY WARNING CENTRE (ITEWC)
INDIAN NATIONAL CENTRE FOR OCEAN INFORMATION SERVICES (INCOIS)
ADDRESS:"OCEAN VALLEY", PRAGATHI NAGAR (BO), NIZAMPET (SO),
HYDERABAD - 500 090, INDIA
PHONE: 91-40-23895011
FAX: 91-40-23895012
EMAIL: tsunami@incois.gov.in
WEB: www.incois.gov.in
```

END OF NOTIFICATION MESSAGE

NOTE: This message is sent by TSPs to NTWCs via the GTS, and by email and fax. It has a maximum line length of 69 characters and uses upper-case letters (except for case-sensitive web links), in accordance with specifications for the GTS (WMO) and AFTN (ICAO) communication networks. An abbreviated version of this message is sent by TSPs via mobile phone SMS messaging to NTWCs.

Annexure-5: TSP Exchange Bulletin Templates

EXCHANGE BULLETIN NOTIFICATION MESSAGE Example:

WEIO20 DEMS 090515

TSUNAMI BULLETIN NOTIFICATION MESSAGE NUMBER 2
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011

TO: INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES (NTWC)
FROM: IOTWMS-TSP INDIA

NOTIFICATION:

IOTWMS-TSP INDIA HAS JUST ISSUED TSUNAMI BULLETIN NUMBER 2 FOR
THE INDIAN OCEAN, BASED ON THE FOLLOWING EARTHQUAKE EVENT:

MAGNITUDE: 9.0 MWP (UPDATED)
DEPTH: 10 KM
DATE: 09 FEB 2011
ORIGIN TIME: 0500 UTC
LATITUDE: 7.20N
LONGITUDE: 92.90E
LOCATION: NICOBAR, INDIA

TO VIEW THE BULLETIN GO TO THE IOTWMS-TSP INDIA WEBSITE AT:

<http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

NOTE: THIS IS A RESTRICTED-ACCESS WEBSITE CONTAINING TECHNICAL DATA
FOR INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES ONLY. IT IS NOT
FOR GENERAL PUBLIC ACCESS.

GENERAL PUBLIC INFORMATION FOR THIS EVENT IS AVAILABLE FROM:

INDIAN TSUNAMI EARLY WARNING CENTRE (ITEWC)
INDIAN NATIONAL CENTRE FOR OCEAN INFORMATION SERVICES (INCOIS)
ADDRESS:"OCEAN VALLEY", PRAGATHI NAGAR (BO), NIZAMPET (SO),
HYDERABAD - 500 090, INDIA
PHONE: 91-40-23895011
FAX: 91-40-23895012
EMAIL: tsunami@incois.gov.in
WEB: www.incois.gov.in

END OF NOTIFICATION MESSAGE

Annexure-5: TSP Exchange Bulletin Templates

B) Type 1 EXCHANGE EARTHQUAKE BULLETIN Template:

(Variable fields in **red**; explanatory comments in /* blue */)

```
-----  
TSUNAMI BULLETIN NUMBER 1 (TYPE-I EARTHQUAKE BULLETIN) /* bulletin issue number */  
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS) /* TSP name */  
ISSUED AT 0505 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */  
-----
```

... EARTHQUAKE BULLETIN ...

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 **INDONESIA** has detected an earthquake with the following preliminary information:

```
/* (UPDATED) to be added only after a magnitude change since previous message */  
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */  
Depth: 10 km /* EQ depth */  
Date: 09 Feb 2011 /* EQ date UTC */  
Origin Time: 0500 UTC /* EQ time UTC */  
Latitude: 7.20N /* EQ latitude */  
Longitude: 92.90E /* EQ longitude */  
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

/* EQ mag between 6.5 and 7.9 in Pacific or South Atlantic source zones only */
Although this earthquake may be capable of generating a tsunami in the Pacific or South Atlantic Ocean, based on historical data and tsunami modelling it is not capable of generating a tsunami affecting the Indian Ocean region. However IOTWMS-TSP **INDONESIA** will monitor the situation and may issue further bulletins if new information becomes available.

OR

/* EQ mag ≥ 6.5 in IO, or ≥ 8.0 in Pacific or South Atlantic source zones */
Based on historical data and tsunami modelling, this earthquake may be capable of generating a tsunami affecting the Indian Ocean region. IOTWMS-TSP **INDONESIA** will monitor sea level gauges near the earthquake to determine if a tsunami was generated and will issue further bulletins for this event.

Further information on this event will be available at:

<http://inatews.bmkg.gov.id>

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS:

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

5. CONTACT INFORMATION

IOTWMS-TSP **INDONESIA**:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Annexure-5: TSP Exchange Bulletin Templates

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

Type 1 EXCHANGE EARTHQUAKE BULLETIN Example:

TSUNAMI BULLETIN NUMBER 1 (TYPE-I EARTHQUAKE BULLETIN)
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InATEWS)
ISSUED AT 0505 UTC WEDNESDAY 09 FEBRUARY 2011

... EARTHQUAKE BULLETIN ...

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 INDONESIA has detected an earthquake with the following preliminary information:

Magnitude: 9.0 Mwp (UPDATED)
Depth: 10 km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Based on historical data and tsunami modelling, this earthquake may be capable of generating a tsunami affecting the Indian Ocean region. IOTWMS-TSP INDONESIA will monitor sea level gauges near the earthquake to determine if a tsunami was generated and will issue further bulletins for this event.

Further information on this event will be available at:
<http://inatews.bmkg.gov.id>

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS:

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

5. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:
METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)
Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720
Tel.: +62 (21) 4246321/6546316
Fax: +62 (21) 6546316/4246703
P.O. Box 3540 Jakarta
Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

C) Type 2 EXCHANGE NO THREAT BULLETIN Template:

(Variable fields in **red**; explanatory comments in **/* blue */**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
-----  
TSUNAMI BULLETIN NUMBER 2 (TYPE-II THREAT ASSESSMENT BULLETIN) /* bulletin issue number */  
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS) /* TSP name */  
ISSUED AT 0415 UTC MONDAY 07 FEBRUARY 2011 /* issue date/time */  
-----
```

... NO 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 (preliminary) /* may delete (preliminary) */
IOTWMS-TSP **INDONESIA** has detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */  
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */  
Depth: 20km /* EQ depth */  
Date: 07 Feb 2011 /* EQ date UTC */  
Origin Time: 0400 UTC /* EQ time UTC */  
Latitude: 7.28S /* EQ latitude */  
Longitude: 104.30E /* EQ longitude */  
Location: Jabar, Indonesia /* EQ location */
```

2. EVALUATION

Based on **pre-run model scenarios**, there is NO THREAT to countries in the Indian Ocean. /* describes type of assessment */

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

4. UPDATES

No further bulletins will be issued by IOTWMS-TSP **INDONESIA** for this event unless other information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

5. CONTACT INFORMATION

IOTWMS-TSP **INDONESIA**:
METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)
Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720
Tel.: +62 (21) 4246321/6546316
Fax: +62 (21) 6546316/4246703
P.O. Box 3540 Jakarta
Website: <http://www.bmg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

Type 2 EXCHANGE NO THREAT BULLETIN Example:

TSUNAMI BULLETIN NUMBER 2 (TYPE-II THREAT ASSESSMENT BULLETIN)
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS)
ISSUED AT 0415 UTC MONDAY 07 FEBRUARY 2011

... NO 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 INDONESIA has detected an earthquake with the following details:

Magnitude: 7.3 Mwp
Depth: 20km
Date: 07 Feb 2011
Origin Time: 0400 UTC
Latitude: 7.28S
Longitude: 104.30E
Location: Jabar, Indonesia

2. EVALUATION

Based on pre-run model scenarios, there is NO THREAT to countries in the Indian Ocean.

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

4. UPDATES

No further bulletins will be issued by IOTWMS-TSP INDONESIA for this event unless other information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

5. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

D) Type 2 EXCHANGE POTENTIAL THREAT BULLETIN Template:

(Variable fields in **red**; explanatory comments in **/* blue */**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
-----  
TSUNAMI BULLETIN NUMBER 2 (TYPE-II THREAT ASSESSMENT BULLETIN) /* bulletin issue number */  
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS) /* TSP name */  
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */  
-----
```

... **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 (**preliminary**) /* may delete (**preliminary**) */
TSP **INDONESIA** has detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */  
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */  
Depth: 10km /* EQ depth */  
Date: 09 Feb 2011 /* EQ date UTC */  
Origin Time: 0500 UTC /* EQ time UTC */  
Latitude: 7.20N /* EQ latitude */  
Longitude: 92.90E /* EQ longitude */  
Location: Nicobar, India /* EQ location */
```

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. /* describes type of assessment */

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.

Please be aware that actual wave arrival times may differ from those below, and the initial wave may not be the largest. A tsunami is a series of waves and the time between successive waves can be five minutes to one hour.

The threat is deemed to have passed two hours after the forecast time for last exceedance of the 0.5m threat threshold for a zone. As local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities.

/* Country */

AUSTRALIA

```
/* Coastal Zone Name          T2 Time/Date      max_beach "Threat Passed" if T4+2  */  
/*                               (UTC)              (m)      hours has passed for CFZ */  
COCOS ISLAND                 0718Z 09 Feb 2011  1.3m  Threat Passed  
CHRISTMAS ISLAND             0755Z 09 Feb 2011  0.9m  Threat Passed
```

Annexure-5: TSP Exchange Bulletin Templates

KALBARRI TO NORTH CAPE 1005Z 09 Feb 2011 2.4m
...

BANGLADESH
KUTUBDIA ISLAND 0752Z 09 Feb 2011 0.9m Threat Passed
BARISAL 0816Z 09 Feb 2011 1.3m
...

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

Additional bulletins will be issued by TSP **INDONESIA** for this event as more information becomes available.

Other TSPs may issue additional information at:

TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

6. CONTACT INFORMATION

TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

Type 2 EXCHANGE POTENTIAL THREAT BULLETIN Example:

TSUNAMI BULLETIN NUMBER 2 (TYPE-II THREAT ASSESSMENT BULLETIN)
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InATEWS)
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011

... 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 INDONESIA has detected an earthquake with the following details:

Magnitude: 9.0 Mwp (UPDATED)
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

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.

Please be aware that actual wave arrival times may differ from those below, and the initial wave may not be the largest. A tsunami is a series of waves and the time between successive waves can be five minutes to one hour.

The threat is deemed to have passed two hours after the forecast time for last exceedance of the 0.5m threat threshold for a zone. As local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities.

AUSTRALIA

| | | | |
|------------------------|-------------------|------|---------------|
| COCOS ISLAND | 0718Z 09 Feb 2011 | 1.3m | Threat Passed |
| CHRISTMAS ISLAND | 0755Z 09 Feb 2011 | 0.9m | Threat Passed |
| KALBARRI TO NORTH CAPE | 1005Z 09 Feb 2011 | 2.4m | |

BANGLADESH

| | | | |
|-----------------|-------------------|------|---------------|
| KUTUBDIA ISLAND | 0752Z 09 Feb 2011 | 0.9m | Threat Passed |
| BARISAL | 0816Z 09 Feb 2011 | 1.3m | |

4. ADVICE

Annexure-5: TSP Exchange Bulletin Templates

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

Additional bulletins will be issued by IOTWMS-TSP INDONESIA for this event as more information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

E) Type 3 EXCHANGE CONFIRMED THREAT BULLETIN Template:

(Variable fields in **red**; explanatory comments in /* blue */; modification required for non-seismic and complex source events highlighted in **yellow**)

```
-----  
TSUNAMI BULLETIN NUMBER 4 (TYPE-III CONFIRMED THREAT BULLETIN) /* bulletin issue number  
*/IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS) /* TSP name */  
ISSUED AT 0555 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */  
-----
```

... CONFIRMED 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 (preliminary) /* may delete (preliminary) */
IOTWMS-TSP **INDONESIA** has detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */  
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */  
Depth: 10km /* EQ depth */  
Date: 09 Feb 2011 /* EQ date UTC */  
Origin Time: 0500 UTC /* EQ time UTC */  
Latitude: 7.20N /* EQ latitude */  
Longitude: 92.90E /* EQ longitude */  
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

Sea level observations have confirmed that a TSUNAMI WAS GENERATED.
Maximum wave amplitudes observed so far:

```
Nicobar (India) 12.34N 91.65E 0520Z 09 Feb 2011 2.7m  
Padang (Indonesia) 3.34S 93.42E 0550Z 09 Feb 2011 1.3m  
/* Station (Country) Long Lat OT3 Time/Date UTC Max Amplitude (m) */  
Based on pre-run model scenarios, the zones listed below are POTENTIALLY  
UNDER THREAT. /* describes type of assessment */
```

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 NTCW), 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.

Please be aware that actual wave arrival times may differ from those below, and the initial wave may not be the largest. A tsunami is a series of waves and the time between successive waves can be five minutes to one hour.

The threat is deemed to have passed two hours after the forecast time for last exceedance of the 0.5m threat threshold for a zone. As local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities.

```
/* Country */  
AUSTRALIA  
/* Coastal Zone Name T2 Time/Date max_beach "Threat Passed" if T4+2 /*  
/* (UTC) (m) hours has passed for CFZ */  
COCOS ISLAND 0718Z 09 Feb 2011 1.3m Threat Passed  
CHRISTMAS ISLAND 0755Z 09 Feb 2011 0.9m Threat Passed
```

Annexure-5: TSP Exchange Bulletin Templates

KALBARRI TO NORTH CAPE 1005Z 09 Feb 2011 2.4m
...

BANGLADESH
KUTUBDIA ISLAND 0752Z 09 Feb 2011 0.9m Threat Passed
BARISAL 0816Z 09 Feb 2011 1.3m
...

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

Additional bulletins will be issued by IOTWMS-TSP **INDONESIA** for this event as more information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP **INDONESIA**:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

Type 3 EXCHANGE CONFIRMED THREAT BULLETIN Example:

TSUNAMI BULLETIN NUMBER 4 (TYPE-III CONFIRMED THREAT BULLETIN)
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS)
ISSUED AT 0555 UTC WEDNESDAY 09 FEBRUARY 2011

... CONFIRMED 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 INDONESIA has detected an earthquake with the following details:

Magnitude: 9.0 Mwp
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Sea level observations have confirmed that a TSUNAMI WAS GENERATED.
Maximum wave amplitudes observed so far:

| | | | | | |
|--------------------|--------|--------|-------|-------------|------|
| Nicobar (India) | 12.34N | 91.65E | 0520Z | 09 Feb 2011 | 2.7m |
| Padang (Indonesia) | 3.34S | 93.42E | 0550Z | 09 Feb 2011 | 1.3m |

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.

Please be aware that actual wave arrival times may differ from those below, and the initial wave may not be the largest. A tsunami is a series of waves and the time between successive waves can be five minutes to one hour.

The threat is deemed to have passed two hours after the forecast time for last exceedance of the 0.5m threat threshold for a zone. As local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities.

| | | | | | |
|------------------------|-------|-------------|------|---------------|--|
| AUSTRALIA | | | | | |
| COCOS ISLAND | 0718Z | 09 Feb 2011 | 1.3m | Threat Passed | |
| CHRISTMAS ISLAND | 0755Z | 09 Feb 2011 | 0.9m | Threat Passed | |
| KALBARRI TO NORTH CAPE | 1005Z | 09 Feb 2011 | 2.4m | | |

| | | | | | |
|-----------------|-------|-------------|------|---------------|--|
| BANGLADESH | | | | | |
| KUTUBDIA ISLAND | 0752Z | 09 Feb 2011 | 0.9m | Threat Passed | |
| BARISAL | 0816Z | 09 Feb 2011 | 1.3m | | |

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities

Annexure-5: TSP Exchange Bulletin Templates

and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

Additional bulletins will be issued by IOTWMS-TSP INDONESIA for this event as more information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

F) Type 4 EXCHANGE FINAL BULLETIN Template – Tsunami Observed:

(Variable fields in **red**; explanatory comments in **/* blue */**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
-----  
TSUNAMI BULLETIN NUMBER 9 (TYPE-IV FINAL BULLETIN) /* bulletin issue number */  
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS) /* TSP name */  
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */  
-----
```

... FINAL TSUNAMI BULLETIN FOR 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 **INDONESIA** detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */  
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */  
Depth: 10km /* EQ depth */  
Date: 09 Feb 2011 /* EQ date UTC */  
Origin Time: 0500 UTC /* EQ time UTC */  
Latitude: 7.20N /* EQ latitude */  
Longitude: 92.90E /* EQ longitude */  
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

Data from sea-level gauges confirmed that a tsunami was generated.

The expected period of significant tsunami waves is now over for all threatened Indian Ocean countries, based on IOTWMS-TSP **INDONESIA** modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

/* This Section is OPTIONAL */

Listed below are maximum wave amplitudes recorded at the specified locations. Note that wave amplitude is measured relative to normal sea level; it is NOT the crest-to-trough wave height.

| LOCATION | LAT | LON | TIME | DATE | AMPL |
|------------------------|--------|--------|-------|---------------|---------------------|
| /* Station (Country) | Lat | Long | OT3 | Time/Date UTC | Max Amplitude(m) */ |
| Campbell Bay (Nicobar) | 6.90N | 93.74E | 0504Z | 09 Feb 2011 | 11.0m |
| Nancowry (Nicobar) | 7.96N | 93.53E | 0515Z | 09 Feb 2011 | 10.0m |
| Port Blair (Nicobar) | 11.66N | 92.76E | 0557Z | 09 Feb 2011 | 6.0m |
| Chennai (India) | 13.10N | 80.30E | 0714Z | 09 Feb 2011 | 4.0m |
| Pondicherry (India) | 11.76N | 79.79E | 0717Z | 09 Feb 2011 | 4.3m |

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP **INDONESIA** for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

Annexure-5: TSP Exchange Bulletin Templates

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

Type 4 EXCHANGE FINAL BULLETIN Example – Tsunami Observed:

TSUNAMI BULLETIN NUMBER 9 (TYPE-IV FINAL BULLETIN)
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS)
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011

... FINAL TSUNAMI BULLETIN FOR 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 INDONESIA detected an earthquake with the following details:

Magnitude: 9.0 Mwp
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Data from sea-level gauges confirmed that a tsunami was generated.

The expected period of significant tsunami waves is now over for all threatened Indian Ocean countries, based on IOTWMS-TSP INDONESIA modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

Listed below are maximum wave amplitudes recorded at the specified locations. Note that wave amplitude is measured relative to normal sea level: it is NOT the crest-to-trough wave height.

| LOCATION | LAT | LON | TIME | DATE | AMPL |
|------------------------|--------|--------|-------|-------------|-------|
| Campbell Bay (Nicobar) | 6.90N | 93.74E | 0504Z | 09 Feb 2011 | 11.0m |
| Nancowry (Nicobar) | 7.96N | 93.53E | 0515Z | 09 Feb 2011 | 10.0m |
| Port Blair (Nicobar) | 11.66N | 92.76E | 0557Z | 09 Feb 2011 | 6.0m |
| Chennai (India) | 13.10N | 80.30E | 0714Z | 09 Feb 2011 | 4.0m |
| Pondicherry (India) | 11.76N | 79.79E | 0717Z | 09 Feb 2011 | 4.3m |

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP INDONESIA for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Annexure-5: TSP Exchange Bulletin Templates

Tel.: +62 (21) 4246321/6546316
Fax: +62 (21) 6546316/4246703
P.O. Box 3540 Jakarta
Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

G) Type 4 EXCHANGE FINAL BULLETIN Template – No Tsunami Observed:

(Variable fields in **red**; explanatory comments in **/* blue */**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
-----  
TSUNAMI BULLETIN NUMBER 9 (TYPE-IV FINAL BULLETIN)           /* bulletin issue number */  
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS)          /* TSP name */  
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011                /* issue date/time */  
-----
```

... FINAL TSUNAMI BULLETIN FOR 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 **INDONESIA** detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */  
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */  
Depth: 10km /* EQ depth */  
Date: 09 Feb 2011 /* EQ date UTC */  
Origin Time: 0500 UTC /* EQ time UTC */  
Latitude: 7.20N /* EQ latitude */  
Longitude: 92.90E /* EQ longitude */  
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

No tsunami wave observations were recorded for this event.

The expected period of significant tsunami waves is now over for all potentially-threatened Indian Ocean countries, based on IOTWMS-TSP **INDONESIA** modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

/* This Section is OPTIONAL */

No tsunami wave observations.

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP **INDONESIA** for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP **INDONESIA**:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

Annexure-5: TSP Exchange Bulletin Templates

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

Type 4 EXCHANGE FINAL BULLETIN Example – No Tsunami Observed:

TSUNAMI BULLETIN NUMBER 9 (TYPE-IV FINAL BULLETIN)
IOTWMS TSUNAMI SERVICE PROVIDER INDONESIA (InaTEWS)
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011

... FINAL TSUNAMI BULLETIN FOR 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 INDONESIA detected an earthquake with the following details:

Magnitude: 9.0 Mwp
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

No tsunami wave observations were recorded for this event.

The expected period of significant tsunami waves is now over for all threatened Indian Ocean countries, based on IOTWMS-TSP INDONESIA modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

No tsunami wave observations.

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP INDONESIA for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://reg.bom.gov.au/tsunami/rtsp/>

IOTWMS-TSP INDIA: <http://www.incois.gov.in/Incois/tsunami/egevents.jsp>

6. CONTACT INFORMATION

IOTWMS-TSP INDONESIA:

METEOROLOGICAL CLIMATOLOGICAL AND GEOPHYSICAL AGENCY (BMKG)

Address: Jl. Angkasa I no.2 Kemayoran, Jakarta, Indonesia, 10720

Tel.: +62 (21) 4246321/6546316

Fax: +62 (21) 6546316/4246703

P.O. Box 3540 Jakarta

Website: <http://www.bmkg.go.id>

END OF BULLETIN

Annexure-5: TSP Exchange Bulletin Templates

H) EXCHANGE BULLETIN CANCELLATION MESSAGE Template:

(Variable fields in **red**; explanatory comments in /* **blue** */)

```
WEIO20 DEMS 090529                                     /* WMO GTS header */
-----
TSUNAMI BULLETIN CANCELLATION MESSAGE
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)          /* TSP name */
ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011        /* issue date/time */
-----
TO:    INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES (NTWC)
FROM:  IOTWMS-TSP INDIA
CANCELLATION MESSAGE ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011:

THE TSUNAMI BULLETIN NOTIFICATION MESSAGE LISTED BELOW WAS ISSUED
IN ERROR AND IS CANCELLED. PLEASE IGNORE THE MESSAGE.

ORIGINAL MESSAGE:

... Copy Original Message Here ...                     /* Full copy of false or incorrect message */
```

NOTE: This message is sent by TSPs to NTWCs via the GTS, and by email and fax. It has a maximum line length of 69 characters and uses upper-case letters (except for case-sensitive web links), in accordance with specifications for the GTS (WMO) and AFTN (ICAO) communication networks. An abbreviated version of this message is sent by TSPs via mobile phone SMS messaging to NTWCs.

Annexure-5: TSP Exchange Bulletin Templates

EXCHANGE BULLETIN CANCELLATION MESSAGE Example:

WEIO20 DEMS 090529

TSUNAMI BULLETIN CANCELLATION MESSAGE
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011

TO: INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES (NTWC)
FROM: IOTWMS-TSP INDIA

CANCELLATION MESSAGE ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011:

THE TSUNAMI BULLETIN NOTIFICATION MESSAGE LISTED BELOW WAS ISSUED
IN ERROR AND IS CANCELLED. PLEASE IGNORE THE MESSAGE.

ORIGINAL MESSAGE:

WEIO20 DEMS 090515

TSUNAMI BULLETIN NOTIFICATION MESSAGE NUMBER 2
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011

TO: INDIAN OCEAN NATIONAL TSUNAMI WARNING CENTRES (NTWC)
FROM: IOTWMS-TSP INDIA

NOTIFICATION:

IOTWMS-TSP INDIA HAS JUST ISSUED TSUNAMI BULLETIN NUMBER 2 FOR
THE INDIAN OCEAN, BASED ON THE FOLLOWING EARTHQUAKE EVENT:

MAGNITUDE: 9.0 MWP (UPDATED)
DEPTH: 10 KM
DATE: 09 FEB 2011
ORIGIN TIME: 0500 UTC
LATITUDE: 7.20N
LONGITUDE: 92.90E
LOCATION: NICOBAR, INDIA

TO VIEW THE BULLETIN GO TO THE IOTWMS-TSP INDIA WEBSITE AT:

<http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

INDIAN TSUNAMI EARLY WARNING CENTRE (ITEWC)
INDIAN NATIONAL CENTRE FOR OCEAN INFORMATION SERVICES (INCOIS)
ADDRESS:"OCEAN VALLEY", PRAGATHI NAGAR (BO), NIZAMPET (SO),
HYDERABAD - 500 090, INDIA
PHONE: 91-40-23895011
FAX: 91-40-23895012
EMAIL: tsunami@incois.gov.in
WEB: www.incois.gov.in

END OF NOTIFICATION MESSAGE

Annexure-6: TSP Public Bulletin Templates

Contents - Templates and Examples for:

- A) Type 1 PUBLIC EARTHQUAKE BULLETIN
- B) Type 2 PUBLIC NO THREAT BULLETIN
- C) Type 2 PUBLIC POTENTIAL THREAT BULLETIN
- D) Type 3 PUBLIC CONFIRMED THREAT BULLETIN
- E) Type 4 PUBLIC FINAL TSUNAMI BULLETIN – Tsunami Observed
- F) Type 4 PUBLIC FINAL TSUNAMI BULLETIN – No Tsunami Observed
- G) PUBLIC BULLETIN CANCELLATION MESSAGE

NOTE:

Public TSP Bulletins are issued to provide advice to the general public of earthquakes and tsunamis affecting the Indian Ocean, and of the national warning statuses reported by NTWCs, but they **do not** contain the specific threat advice (predicted wave heights and arrival times) that is provided to NTWCs in the TSP Exchange Bulletins.

Annexure-6: TSP Public Bulletin Templates

Type 1 PUBLIC EARTHQUAKE BULLETIN Template:

(Variable fields in red; explanatory comments in blue)

```
WEIO21 DEMS 090505 /* WMO GTS header */
-----
PUBLIC TSUNAMI BULLETIN NUMBER 1 /* bulletin seq no */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 0505 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----
```

... EARTHQUAKE BULLETIN ...

This bulletin applies to areas within and bordering the Indian Ocean and is issued by Tsunami Service Provider INDIA in support of the UNESCO/IOC Indian Ocean Tsunami Warning and Mitigation System (IOTWMS).

For information applying to areas outside the Indian Ocean refer to the relevant Tsunami Warning and Mitigation Systems listed in section 6 below.

1. EARTHQUAKE INFORMATION

IOTWMS-TSP INDIA has detected an earthquake with the following preliminary information:

```
/* (UPDATED) to be added only after a magnitude change since previous message */
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */
Depth: 10km /* EQ depth */
Date: 09 Feb 2011 /* EQ date UTC */
Origin Time: 0500 UTC /* EQ time UTC */
Latitude: 7.20N /* EQ latitude */
Longitude: 92.90E /* EQ longitude */
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

```
/* EQ mag between 6.5 and 7.9 in Pacific or South Atlantic source zones only */
Based on historical data and tsunami modelling, this earthquake is not capable of generating a tsunami affecting the Indian Ocean region. No further bulletins will be issued unless the situation changes.
```

OR

```
/* EQ mag ≥ 6.5 in IO, or ≥ 8.0 in Pacific or South Atlantic source zones */
Based on historical data and tsunami modelling, this earthquake may be capable of generating a tsunami affecting the Indian Ocean region. IOTWMS-TSP INDIA will monitor the situation to determine if a tsunami was generated and will issue further bulletins as information becomes available.
```

Further information on this event will be available at:

<http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of Indian Ocean countries. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS

Annexure-6: TSP Public Bulletin Templates

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/IOTWMS/>

IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

5. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)

Indian National Centre for Ocean Information Services (INCOIS)

Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India

Tel: 91-40-23895011

Fax: 91-40-23895012

Email: tsunami@incois.gov.in

Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)

<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)

<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)

<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)

<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens

<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey

<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

Type 1 PUBLIC EARTHQUAKE BULLETIN Example:

WEIO21 DEMS 090505

PUBLIC TSUNAMI BULLETIN NUMBER 1
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0505 UTC WEDNESDAY 09 FEBRUARY

... EARTHQUAKE BULLETIN ...

This bulletin applies to areas within and bordering the Indian Ocean and is issued by Tsunami Service Provider INDIA in support of the UNESCO/IOC Indian Ocean Tsunami Warning and Mitigation System (IOTWMS).

For information applying to areas outside the Indian Ocean refer to the relevant Tsunami Warning and Mitigation Systems listed in section 6 below.

1. EARTHQUAKE INFORMATION

IOTWMS-TSP INDIA has detected an earthquake with the following preliminary information:

Magnitude: 9.0 Mwp (UPDATED)
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Based on historical data and tsunami modelling, this earthquake may be capable of generating a tsunami affecting the Indian Ocean region. IOTWMS-TSP INDIA will monitor the situation to determine if a tsunami was generated and will issue further bulletins as information becomes available.

Further information on this event will be available at:
<http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS

Other IOTWMS-TSPs may issue additional information at:
IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>
IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

5. CONTACT INFORMATION

IOTWMS-TSP INDIA:
Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India

Annexure-6: TSP Public Bulletin Templates

Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens
<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey
<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

B) Type 2 PUBLIC NO THREAT BULLETIN Template:

(Variable fields in **red**; explanatory comments in **blue**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
WEIO21 DEMS 090515 /* WMO GTS header */
-----
PUBLIC TSUNAMI BULLETIN NUMBER 2 /* bulletin seq no */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----

... NO 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 (preliminary) /* may delete (preliminary) */
IOTWMS-TSP INDIA has detected an earthquake with the following details:

/* (UPDATED) to be added only after a magnitude change since previous message */
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */
Depth: 20km /* EQ depth */
Date: 07 Feb 2011 /* EQ date UTC */
Origin Time: 0400 UTC /* EQ time UTC */
Latitude: 7.28S /* EQ latitude */
Longitude: 104.30E /* EQ longitude */
Location: Jabar, Indonesia /* EQ location */

2. EVALUATION
Based on pre-run model scenarios, there is NO THREAT to countries in
the Indian Ocean. No further bulletins will be issued unless the
situation changes.

3. ADVICE
This bulletin is being issued as advice. Only national/state/local
authorities and disaster management officers have the authority to
make decisions regarding the official threat and warning status in
their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory
bulletins issued by the National Tsunami Warning Centres (NTWCs) of
IOTWMS member states. The tsunami warning status reported by NTWCs for
their countries can be found at:
http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS
Other IOTWMS-TSPs may issue additional information at:
IOTWMS-TSP AUSTRALIA: http://www.bom.gov.au/tsunami/iotws/
IOTWMS-TSP INDONESIA: http://rtsp.bmkg.go.id

5. CONTACT INFORMATION
IOTWMS-TSP INDIA:
Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India
Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN
```

Annexure-6: TSP Public Bulletin Templates

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)

<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)

<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)

<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)

<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens

<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey

<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

Type 2 PUBLIC NO THREAT BULLETIN Example:

WEIO21 DEMS 090515

PUBLIC TSUNAMI BULLETIN NUMBER 2
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011

... NO 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 INDONESIA has detected an earthquake with the following details:

Magnitude: 7.3 Mwp
Depth: 20km
Date: 07 Feb 2011
Origin Time: 0400 UTC
Latitude: 7.28S
Longitude: 104.30E
Location: Jabar, Indonesia

2. EVALUATION

Based on pre-run model scenarios, there is NO THREAT to countries in the Indian Ocean. No further bulletins will be issued unless the situation changes.

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS

Other IOTWMS-TSPs may issue additional information at:
IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>
IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

5. CONTACT INFORMATION

IOTWMS-TSP INDIA:
Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India
Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

Annexure-6: TSP Public Bulletin Templates

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens
<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey
<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

C) Type 2 PUBLIC POTENTIAL THREAT BULLETIN Template:

(Variable fields in **red**; explanatory comments in **blue**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
WEIO21 DEMS 090515 /* WMO GTS header */
-----
PUBLIC TSUNAMI BULLETIN NUMBER 2 /* bulletin seq no */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----

... 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 (preliminary) /* may delete (preliminary) */
IOTWMS-TSP INDIA has detected an earthquake with the following details:

/* (UPDATED) to be added only after a magnitude change since previous message */
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */
Depth: 10km /* EQ depth */
Date: 09 Feb 2011 /* EQ date UTC */
Origin Time: 0500 UTC /* EQ time UTC */
Latitude: 7.20N /* EQ latitude */
Longitude: 92.90E /* EQ longitude */
Location: Nicobar, India /* EQ location */

2. EVALUATION
Based on pre-run model scenarios, there is a POTENTIAL TSUNAMI THREAT
to countries in the Indian Ocean.

IOTWMS-TSP INDIA will monitor sea level gauges and report if any tsunami
wave activity has occurred.

3. ADVICE
This bulletin is being issued as advice. Only national/state/local
authorities and disaster management officers have the authority to
make decisions regarding the official threat and warning status in
their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory
bulletins issued by the National Tsunami Warning Centres (NTWCs) of
IOTWMS member states. The tsunami warning status reported by NTWCs for
their countries can be found at:
http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp

4. UPDATES
Additional bulletins will be issued by IOTWMS-TSP INDIA for this event as
more information becomes available.

Other IOTWMS-TSPs may issue additional information at:
IOTWMS-TSP AUSTRALIA: http://www.bom.gov.au/tsunami/iotws/
IOTWMS-TSP INDONESIA: http://rtsp.bmkg.go.id

5. CONTACT INFORMATION
IOTWMS-TSP INDIA:
Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India
Tel: 91-40-23895011
```


Annexure-6: TSP Public Bulletin Templates

Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens
<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey
<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

Type 2 PUBLIC POTENTIAL THREAT BULLETIN Example:

WEIO21 DEMS 090515

PUBLIC TSUNAMI BULLETIN NUMBER 2
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0515 UTC WEDNESDAY 09 FEBRUARY 2011

... 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 details:

Magnitude: 9.0 Mwp (UPDATED)
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Based on pre-run model scenarios, there is a POTENTIAL TSUNAMI THREAT
to countries in the Indian Ocean.

IOTWMS-TSP INDIA will monitor sea level gauges and report if any tsunami
wave activity has occurred.

3. ADVICE

This bulletin is being issued as advice. Only national/state/local
authorities and disaster management officers have the authority to
make decisions regarding the official threat and warning status in
their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory
bulletins issued by the National Tsunami Warning Centres (NTWCs) of
IOTWMS member states. The tsunami warning status reported by NTWCs for
their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

4. UPDATES

Additional bulletins will be issued by IOTWMS-TSP INDIA for this event as
more information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>

IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

5. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India
Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

Annexure-6: TSP Public Bulletin Templates

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

D) Type 3 PUBLIC CONFIRMED THREAT BULLETIN Template:

(Variable fields in **red**; explanatory comments in **blue**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
WEIO21 DEMS 090555 /* WMO GTS header */
-----
PUBLIC TSUNAMI BULLETIN NUMBER 3 /* bulletin seq no */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 0555 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----

... CONFIRMED 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 (preliminary) /* may delete (preliminary) */
IOTWMS-TSP INDIA has detected an earthquake with the following details:

/* (UPDATED) to be added only after a magnitude change since previous message */
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */
Depth: 10km /* EQ depth */
Date: 09 Feb 2011 /* EQ date UTC */
Origin Time: 0500 UTC /* EQ time UTC */
Latitude: 7.20N /* EQ latitude */
Longitude: 92.90E /* EQ longitude */
Location: Nicobar, India /* EQ location */

2. EVALUATION
Sea level observations have confirmed that a TSUNAMI WAS GENERATED and
there MAY BE A THREAT TO SOME INDIAN OCEAN COUNTRIES.

Maximum wave amplitudes observed so far:

Nicobar (India) 12.34N 91.65E 0520Z 09 Feb 2011 2.7m
Padang (Indonesia) 3.34S 93.42E 0550Z 09 Feb 2011 1.3m

3. ADVICE
This bulletin is being issued as advice. Only national/state/local
authorities and disaster management officers have the authority to
make decisions regarding the official threat and warning status in
their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory
bulletins issued by the National Tsunami Warning Centres (NTWCs) of
IOTWMS member states. The tsunami warning status reported by NTWCs for
their countries can be found at:
http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp

4. UPDATES
Additional bulletins will be issued by IOTWMS-TSP INDIA for this event as
more information becomes available.

Other IOTWMS-TSPs may issue additional information at:
IOTWMS-TSP AUSTRALIA: http://www.bom.gov.au/tsunami/iotws/
IOTWMS-TSP INDONESIA: http://rtsp.bmkg.go.id

5. CONTACT INFORMATION
IOTWMS-TSP INDIA:
Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
```

Annexure-6: TSP Public Bulletin Templates

Hyderabad - 500 090, India
Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens
<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey
<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

Type 3 PUBLIC CONFIRMED THREAT BULLETIN Example:

WEIO21 DEMS 090555

PUBLIC TSUNAMI BULLETIN NUMBER 3
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0555 UTC WEDNESDAY 09 FEBRUARY 2011

... CONFIRMED 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 details:

Magnitude: 9.0 Mwp
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Sea level observations have confirmed that a TSUNAMI WAS GENERATED. Maximum wave amplitudes observed so far:

| | | | | |
|--------------------|--------|--------|-------------------|------|
| Nicobar (India) | 12.34N | 91.65E | 0520Z 09 Feb 2011 | 2.7m |
| Padang (Indonesia) | 3.34S | 93.42E | 0550Z 09 Feb 2011 | 1.3m |

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

4. UPDATES

Additional bulletins will be issued by IOTWMS-TSP INDIA for this event as more information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>

IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

5. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India
Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

Annexure-6: TSP Public Bulletin Templates

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens
<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey
<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

E) Type 4 PUBLIC FINAL TSUNAMI BULLETIN Template – Tsunami Observed:

(Variable fields in **red**; explanatory comments in **blue**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
WEIO21 DEMS 091220 /* WMO GTS header */
-----
PUBLIC TSUNAMI BULLETIN NUMBER 9 /* bulletin seq no */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----
```

... FINAL TSUNAMI BULLETIN FOR 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** detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */
Depth: 10km /* EQ depth */
Date: 09 Feb 2011 /* EQ date UTC */
Origin Time: 0500 UTC /* EQ time UTC */
Latitude: 7.20N /* EQ latitude */
Longitude: 92.90E /* EQ longitude */
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

Data from sea-level gauges confirmed that a tsunami was generated.

The expected period of significant tsunami waves is now over for all Threatened Indian Ocean countries, based on IOTWMS-TSP **INDIA** modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. The tsunami warning status reported by National Tsunami Warning Centres (NTWCs) of IOTWMS member states for their countries can be found at: <http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

/* This Section is OPTIONAL */

Listed below are maximum wave amplitudes recorded at the specified locations. Note that wave amplitude is measured relative to normal sea level; it is NOT the crest-to-trough wave height.

| LOCATION | LAT | LON | TIME | DATE | AMPL |
|------------------------|--------|--------|-------|-------------|-------|
| Campbell Bay (Nicobar) | 6.90N | 93.74E | 0504Z | 09 Feb 2011 | 11.0m |
| Nancowry (Nicobar) | 7.96N | 93.53E | 0515Z | 09 Feb 2011 | 10.0m |
| Port Blair (Nicobar) | 11.66N | 92.76E | 0557Z | 09 Feb 2011 | 6.0m |
| Chennai (India) | 13.10N | 80.30E | 0714Z | 09 Feb 2011 | 4.0m |
| Pondicherry (India) | 11.76N | 79.79E | 0717Z | 09 Feb 2011 | 4.3m |

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to

Annexure-6: TSP Public Bulletin Templates

make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP **INDIA** for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>

IOTWMS- TSP INDONESIA: <http://rtsp.bmkg.go.id>

6. CONTACT INFORMATION

IOTWMS-TSP **INDIA**:

Indian Tsunami Early Warning Centre (ITEWC)

Indian National Centre for Ocean Information Services (INCOIS)

Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),

Hyderabad - 500 090, India

Tel: 91-40-23895011

Fax: 91-40-23895012

Email: tsunami@incois.gov.in

Website: www.incois.gov.in

7. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)

<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)

<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)

<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)

<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens

<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey

<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

Type 4 PUBLIC FINAL TSUNAMI BULLETIN Example – Tsunami Observed:

WEIO21 DEMS 091220

PUBLIC TSUNAMI BULLETIN NUMBER 9
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011

... FINAL TSUNAMI BULLETIN FOR 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 detected an earthquake with the following details:

Magnitude: 9.0 Mwp
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Data from sea-level gauges confirmed that a tsunami was generated.

The expected period of significant tsunami waves is now over for all Threatened Indian Ocean countries, based on IOTWMS-TSP INDIA modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. The tsunami warning status reported by National Tsunami Warning Centres (NTWCs) of IOTWMS member states for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

Listed below are maximum wave amplitudes recorded at the specified locations. Note that wave amplitude is measured relative to normal sea level; it is NOT the crest-to-trough wave height.

| LOCATION | LAT | LON | TIME | DATE | AMPL |
|------------------------|--------|--------|-------|-------------|-------|
| Campbell Bay (Nicobar) | 6.90N | 93.74E | 0504Z | 09 Feb 2011 | 11.0m |
| Nancowry (Nicobar) | 7.96N | 93.53E | 0515Z | 09 Feb 2011 | 10.0m |
| Port Blair (Nicobar) | 11.66N | 92.76E | 0557Z | 09 Feb 2011 | 6.0m |
| Chennai (India) | 13.10N | 80.30E | 0714Z | 09 Feb 2011 | 4.0m |
| Pondicherry (India) | 11.76N | 79.79E | 0717Z | 09 Feb 2011 | 4.3m |

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of

Annexure-6: TSP Public Bulletin Templates

IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP INDIA for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>

IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

6. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)

Indian National Centre for Ocean Information Services (INCOIS)

Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),

Hyderabad - 500 090, India

Tel: 91-40-23895011

Fax: 91-40-23895012

Email: tsunami@incois.gov.in

Website: www.incois.gov.in

7. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)

<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)

<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)

<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)

<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens

<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey

<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):-----

-

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

F) Type 4 PUBLIC FINAL TSUNAMI BULLETIN Template – No Tsunami Observed:

(Variable fields in **red**; explanatory comments in **blue**; modification required for non-seismic and complex source events highlighted in **yellow**)

```
WEIO21 DEMS 091220 /* WMO GTS header */
-----
PUBLIC TSUNAMI BULLETIN NUMBER 9 /* bulletin seq no */
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC) /* TSP name */
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011 /* issue date/time */
-----
```

... FINAL TSUNAMI BULLETIN FOR 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 detected an earthquake with the following details:

```
/* (UPDATED) to be added only after a magnitude change since previous message */
Magnitude: 9.0 MWP (UPDATED) /* EQ magnitude and type */
Depth: 10km /* EQ depth */
Date: 09 Feb 2011 /* EQ date UTC */
Origin Time: 0500 UTC /* EQ time UTC */
Latitude: 7.20N /* EQ latitude */
Longitude: 92.90E /* EQ longitude */
Location: Nicobar, India /* EQ location */
```

2. EVALUATION

No tsunami wave observations were recorded for this event.

The expected period of significant tsunami waves is now over for all potentially-threatened Indian Ocean countries, based on IOTWMS-TSP INDIA modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. The tsunami warning status reported by National Tsunami Warning Centres (NTWCs) of IOTWMS member states for their countries can be found at:
<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

/* This Section is OPTIONAL */

No tsunami wave observations.

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:
<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

Annexure-6: TSP Public Bulletin Templates

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP **INDIA** for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>

IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

6. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)

Indian National Centre for Ocean Information Services (INCOIS)

Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),

Hyderabad - 500 090, India

Tel: 91-40-23895011

Fax: 91-40-23895012

Email: tsunami@incois.gov.in

Website: www.incois.gov.in

7. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)

<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)

<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)

<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)

<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens

<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey

<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

Type 4 PUBLIC FINAL TSUNAMI BULLETIN Example – No Tsunami Observed:

WEIO21 DEMS 091220

PUBLIC TSUNAMI BULLETIN NUMBER 9
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 1220 UTC WEDNESDAY 09 FEBRUARY 2011

... FINAL TSUNAMI BULLETIN FOR 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 detected an earthquake with the following details:

Magnitude: 9.0 Mwp
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

No tsunami wave observations were recorded for this event.

The expected period of significant tsunami waves is now over for all potentially-threatened Indian Ocean countries, based on IOTWMS-TSP INDIA modelling.

Because local conditions can cause a wide variation in tsunami wave action, CANCELLATION of national warnings and ALL CLEAR determination must be made by national/state/local authorities. The tsunami warning status reported by National Tsunami Warning Centres (NTWCs) of IOTWMS member states for their countries can be found at:
<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

Please be aware that dangerous currents can continue for several hours after the main tsunami waves have passed.

3. TSUNAMI WAVE OBSERVATIONS

No tsunami wave observations.

4. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:
<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

5. UPDATES

No further bulletins will be issued by IOTWMS-TSP INDIA for this event unless additional information becomes available.

Other IOTWMS-TSPs may issue additional information at:

Annexure-6: TSP Public Bulletin Templates

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>
IOTWMS- TSP INDONESIA: <http://rtsp.bmkg.go.id>

6. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)
Indian National Centre for Ocean Information Services (INCOIS)
Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),
Hyderabad - 500 090, India
Tel: 91-40-23895011
Fax: 91-40-23895012
Email: tsunami@incois.gov.in
Website: www.incois.gov.in

7. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)
<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)
<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)
<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)
<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens
<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey
<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)
<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-6: TSP Public Bulletin Templates

G) PUBLIC BULLETIN CANCELLATION MESSAGE Template:

(Variable fields in **red**; explanatory comments in **blue**)

```
WEIO21 DEMS 090529                                     /* WMO GTS header */
-----
TSUNAMI BULLETIN CANCELLATION MESSAGE
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)          /* TSP name */
ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011         /* issue date/time */
-----

CANCELLATION MESSAGE ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011:

THE TSUNAMI BULLETIN MESSAGE LISTED BELOW WAS ISSUED IN ERROR AND
IS CANCELLED. PLEASE IGNORE THE MESSAGE.

ORIGINAL MESSAGE:

... Copy Original Message Here ...                     /* Full copy of false or incorrect message */
```

NOTE: This message is sent by TSPs to NTWCs via the GTS, and by email and fax. It has a maximum line length of 69 characters and uses upper-case letters (except for case-sensitive web links), in accordance with specifications for the GTS (WMO) and AFTN (ICAO) communication networks. An abbreviated version of this message is sent by TSPs via mobile phone SMS messaging to NTWCs.

Annexure-6: TSP Public Bulletin Templates

PUBLIC BULLETIN CANCELLATION MESSAGE Example:

WEIO21 DEMS 090529

TSUNAMI BULLETIN CANCELLATION MESSAGE
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011

FROM: IOTWMS-TSP INDIA

CANCELLATION MESSAGE ISSUED AT 0529 UTC WEDNESDAY 09 FEBRUARY 2011:

THE TSUNAMI BULLETIN MESSAGE LISTED BELOW WAS ISSUED IN ERROR
AND IS CANCELLED. PLEASE IGNORE THE MESSAGE.

ORIGINAL MESSAGE:

WEIO21 DEMS 090505

PUBLIC TSUNAMI BULLETIN NUMBER 1
IOTWMS TSUNAMI SERVICE PROVIDER INDIA (ITEWC)
ISSUED AT 0505 UTC WEDNESDAY 09 FEBRUARY

... EARTHQUAKE BULLETIN ...

This bulletin applies to areas within and bordering the Indian Ocean and is issued by Tsunami Service Provider INDIA in support of the UNESCO/IOC Indian Ocean Tsunami Warning and Mitigation System (IOTWMS).

For information applying to areas outside the Indian Ocean refer to the relevant Tsunami Warning and Mitigation Systems listed in section 6 below.

1. EARTHQUAKE INFORMATION

IOTWMS-TSP INDIA has detected an earthquake with the following preliminary information:

Magnitude: 9.0 Mwp (UPDATED)
Depth: 10km
Date: 09 Feb 2011
Origin Time: 0500 UTC
Latitude: 7.20N
Longitude: 92.90E
Location: Nicobar, India

2. EVALUATION

Based on historical data and tsunami modelling, this earthquake may be capable of generating a tsunami affecting the Indian Ocean region. IOTWMS-TSP INDIA will monitor the situation to determine if a tsunami was generated and will issue further bulletins as information becomes available.

Further information on this event will be available at:
<http://www.incois.gov.in/Incois/tsunami/eqevents.jsp>

3. ADVICE

This bulletin is being issued as advice. Only national/state/local authorities and disaster management officers have the authority to make decisions regarding the official threat and warning status in their coastal areas and any action to be taken in response.

Annexure-6: TSP Public Bulletin Templates

For more detailed information, please refer to the tsunami advisory bulletins issued by the National Tsunami Warning Centres (NTWCs) of IOTWMS member states. The tsunami warning status reported by NTWCs for their countries can be found at:

<http://www.incois.gov.in/Incois/tsunami/NTWCFeedbackStatus.jsp>

4. OTHER INDIAN OCEAN TSUNAMI SERVICE PROVIDERS

Other IOTWMS-TSPs may issue additional information at:

IOTWMS-TSP AUSTRALIA: <http://www.bom.gov.au/tsunami/iotws/>

IOTWMS-TSP INDONESIA: <http://rtsp.bmkg.go.id>

5. CONTACT INFORMATION

IOTWMS-TSP INDIA:

Indian Tsunami Early Warning Centre (ITEWC)

Indian National Centre for Ocean Information Services (INCOIS)

Address: "Ocean Valley", Pragathi Nagar (BO), Nizampet (SO),

Hyderabad - 500 090, India

Tel: 91-40-23895011

Fax: 91-40-23895012

Email: tsunami@incois.gov.in

Website: www.incois.gov.in

6. TSUNAMI WARNING SYSTEMS OUTSIDE THE INDIAN OCEAN

Pacific Tsunami Warning and Mitigation System (PTWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

North West Pacific Tsunami Advisory Centre (NWPTAC)

<http://www.jma.go.jp/en/tsunami/>

US National Tsunami Warning Centre (US NTWC)

<http://wcatwc.arh.noaa.gov/>

Joint Australian Tsunami Warning Centre (JATWC)

<http://www.bom.gov.au/tsunami/>

Northeast Atlantic, Mediterranean and Connected Seas (NEAMTWS):

French National Tsunami Warning Centre (CENALT)

<http://www.info-tsunami.fr>

Institute of Geodynamics, National Observatory of Athens

<http://www.gein.noa.gr/en/>

Kandilli Observatory and Earthquake Research Institute, Turkey

<http://www.koeri.boun.edu.tr/2/en/>

Caribbean and Adjacent Regions (CARIBE EWS):

Pacific Tsunami Warning Centre (PTWC)

<http://ptwc.weather.gov/>

END OF BULLETIN

Annexure-7: TSP NAVAREA Templates and Examples

Contents - Templates and Examples for:

- A) Type 2 NAVAREA POTENTIAL THREAT BULLETIN
- B) Type 3 NAVAREA CONFIRMED THREAT BULLETIN
- C) Type 4 NAVAREA FINAL BULLETIN – Tsunami Observed
- D) Type 4 NAVAREA FINAL BULLETIN – No Tsunami Observed
- E) NAVAREA BULLETIN CANCELLATION MESSAGE

NOTE:

NAVAREA TSP Bulletins are made available to NAVAREA Coordinators by subscription to aid in issuing their NAVWarnings within their areas of responsibility.

Annexure-7: NTWC and TSP Roles and Responsibilities

A) Type 2 NAVAREA POTENTIAL THREAT BULLETIN Template:

(Variable fields in red; modification required for non-seismic and complex source events highlighted in yellow)

TSP AUSTRALIA TSUNAMI BULLETIN NUMBER 1 FOR

NAVAREA VII, NAVAREA VIII, NAVAREA X, NAVAREA XI

EAST INDIAN OCEAN, NORTH INDIAN OCEAN, SOUTHWEST INDIAN OCEAN, WEST INDIAN OCEAN

TSUNAMI THREAT MESSAGE ISSUED BY TSUNAMI SERVICE PROVIDER AUSTRALIA IN SUPPORT OF THE UNESCO/IOC INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM AT 0016 UTC Monday 01 May 2015.

A TSUNAMI IS POSSIBLE TO BE GENERATED BY A MAGNITUDE 8.9 EARTHQUAKE THAT OCCURRED NEAR SOUTH OF BALI, INDONESIA [10.00S, 115.97E] AT 0000 UTC 01 May 2015.

HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS OF AUSTRALIA, FRANCE (INDIAN OCEAN TERRITORIES), INDONESIA, MADAGASCAR, MAURITIUS, SOUTH AFRICA, SRI LANKA, TIMOR-LESTE

TSUNAMI WAVES ARE NOT A HAZARD TO SHIPS IN DEEP WATER BUT CAN CAUSE STRONG CURRENTS AND RAPID SEA LEVEL CHANGES IN SHALLOW WATER, AS WELL AS INUNDATION OF THE COAST. SHIPS APPROACHING THE COAST SHOULD CONSULT LOCAL AUTHORITIES REGARDING LOCAL CONDITIONS AND ADVICES.

B) Type 3 NAVAREA CONFIRMED THREAT BULLETIN Template:

(Variable fields in red; modification required for non-seismic and complex source events highlighted in yellow)

TSP AUSTRALIA TSUNAMI BULLETIN NUMBER 2 FOR

NAVAREA VII, NAVAREA VIII, NAVAREA X, NAVAREA XI

EAST INDIAN OCEAN, NORTH INDIAN OCEAN, SOUTHWEST INDIAN OCEAN, WEST INDIAN OCEAN

TSUNAMI CONFIRMED THREAT MESSAGE ISSUED BY TSUNAMI SERVICE PROVIDER AUSTRALIA IN SUPPORT OF THE UNESCO/IOC INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM AT 0016 UTC Monday 01 May 2015.

A TSUNAMI HAS BEEN GENERATED BY A MAGNITUDE 8.9 EARTHQUAKE THAT OCCURRED NEAR SOUTH OF BALI, INDONESIA [10.00S, 115.97E] AT 0000 UTC 01 May 2015.

HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS OF AUSTRALIA, FRANCE (INDIAN OCEAN TERRITORIES), INDONESIA, MADAGASCAR, MAURITIUS, SOUTH AFRICA, SRI LANKA, TIMOR-LESTE

TSUNAMI WAVES ARE NOT A HAZARD TO SHIPS IN DEEP WATER BUT CAN CAUSE STRONG CURRENTS AND RAPID SEA LEVEL CHANGES IN SHALLOW WATER, AS WELL AS INUNDATION OF THE COAST. SHIPS APPROACHING THE COAST SHOULD CONSULT LOCAL AUTHORITIES REGARDING LOCAL CONDITIONS AND ADVICES.

Annexure-7: NTWC and TSP Roles and Responsibilities

C) Type 4 NAVAREA FINAL BULLETIN Template – Tsunami Observed:

(Variable fields in red; modification required for non-seismic and complex source events highlighted in yellow)

TSP AUSTRALIA TSUNAMI BULLETIN NUMBER 13 FOR

NAVAREA VII, NAVAREA VIII, NAVAREA X, NAVAREA XI

EAST INDIAN OCEAN, NORTH INDIAN OCEAN, SOUTHWEST INDIAN OCEAN, WEST INDIAN OCEAN

TSUNAMI CANCELLATION MESSAGE ISSUED BY TSUNAMI SERVICE PROVIDER AUSTRALIA IN SUPPORT OF THE UNESCO/IOC INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM AT 0000 UTC 01 May 2015.

THE THREAT HAS NOW LARGELY PASSED FOR THE TSUNAMI GENERATED BY A MAGNITUDE 8.9 EARTHQUAKE THAT OCCURRED NEAR SOUTH OF BALI, INDONESIA [10.00S, 115.97E] AT 0000 UTC 01 May 2015.

HOWEVER, SHIPS APPROACHING THE COAST SHOULD STILL CONSULT LOCAL AUTHORITIES REGARDING LOCAL CONDITIONS AND ADVICES.

D) Type 4 NAVAREA FINAL BULLETIN Template – No Tsunami Observed:

(Variable fields in red; modification required for non-seismic and complex source events highlighted in yellow)

TSP AUSTRALIA TSUNAMI BULLETIN NUMBER 13 FOR

NAVAREA VII, NAVAREA VIII, NAVAREA X, NAVAREA XI

EAST INDIAN OCEAN, NORTH INDIAN OCEAN, SOUTHWEST INDIAN OCEAN, WEST INDIAN OCEAN

TSUNAMI CANCELLATION MESSAGE ISSUED BY TSUNAMI SERVICE PROVIDER AUSTRALIA IN SUPPORT OF THE UNESCO/IOC INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM AT 0000 UTC 01 May 2015.

NO TSUNAMI WAS OBSERVED FROM A MAGNITUDE 8.9 EARTHQUAKE THAT OCCURRED NEAR SOUTH OF BALI, INDONESIA [10.00S, 115.97E] AT 0000 UTC 01 May 2015.

HOWEVER, SHIPS APPROACHING THE COAST SHOULD STILL CONSULT LOCAL AUTHORITIES REGARDING LOCAL CONDITIONS AND ADVICES.

Annexure-7: NTWC and TSP Roles and Responsibilities

E) NAVAREA BULLETIN CANCELLATION MESSAGE Template:

Variable fields in red

TSUNAMI BULLETIN CANCELLATION MESSAGE
IOTWMS TSUNAMI SERVICE PROVIDER AUSTRALIA (JATWC)
ISSUED AT 1235 UTC WEDNESDAY 16 NOVEMBER 2022

TO: NAVAREA COORDINATORS

THE TSUNAMI BULLETIN NOTIFICATION MESSAGE LISTED BELOW WAS ISSUED
IN ERROR AND IS CANCELLED. PLEASE IGNORE THE MESSAGE.

ORIGINAL MESSAGE:

... Copy Original Message Here ...

Annexure-8: NTWC and TSP Roles and Responsibilities

National Tsunami Warning Centre: A centre officially designated by the government to monitor and issue tsunami warnings and other related statements within their country according to established national Standard Operating Procedures.

Roles and responsibilities of a NTWC:

- Responsible for making decisions, using TSP advice of their choice, and issuing all tsunami warnings to its communities.
- Report their national warning status on the TSP status reporting page the first time a national warning is issued and subsequently every time the national warning status changes.
- Consult with and provide information to TSPs on coastal forecast zones.
- Bilateral arrangements may be developed with TSPs for advice on how to utilise TSP products to determine local impacts/threats.
- Utilise TSP products for initialising inundation model output/selecting inundation scenarios.
- Conduct hazard mapping and risk assessments using source hazard information (e.g. historic/potential earthquakes, volcanoes) inundation models/maps and vulnerability assessment.
- Provide information/warnings and work with emergency management authorities on how to determine threat zones and develop/select appropriate evacuation maps.

Tsunami Service Provider: Centre that monitors seismic and sea level activity and issues timely tsunami threat information within an ICG framework to National Tsunami Warning Centres/Tsunami Warning Focal Points and other TSPs operating within an ocean basin. The NTWCs/TWFPs may use these products to develop and issue tsunami warning for their countries. TSPs may also issue Public messages for an ocean basin and act as National Tsunami Warning Centres providing tsunami warnings for their own countries.

Roles and Responsibilities of a TSP:

- Determine and provide timely initial earthquake information (magnitude, location, depth, time, confidence levels).

Annexure-7: NTWC and TSP Roles and Responsibilities

- Determine more specific threat information using output from scenario databases produced by tsunami models, using earthquake source information and verified by sea level information.
- Provide timely tsunami watch information for use in preparation and issuing of national tsunami warnings by NTWCs.
- Provide timely standardised Situation Reports (SitReps) for use by other TSPs and NTWCs.
- Share information with other TSPs and NTWCs via, for example, GTS, web sites, RSS feeds, fax, emails, etc, in standard formats.
- Coordinate updates, cancellation and finalisation advice with TSPs.
- Regular testing and exercising to determine system performance (including communication channels to NTWCs, decision tools, etc)
- Perform calibration and validation of detection and forecasting tools and models
- Define their own region for provision of service, which may include the whole Indian Ocean, a sub-region of the Indian Ocean, or a single country (mainly useful for other TSPs).

TSP Capability Requirements:

- Access to real time data sources and production of standardised seismic and sea level parameters, e.g. all centres use the same magnitude scale (M_w) for inter-comparison of earthquake information regionally. (Note: TSPs and NTWCs may use different scales nationally, e.g. when dealing with local events because they are faster to calculate.).
- Maintain or have access to numerical model scenarios consistent with the benchmarks recommended by Working Group 2 for their area of coverage to enable the provision of a deep-ocean tsunami amplitude to determine countries that may be affected based on agreed thresholds.
- Revise their watch and threat information in light of additional seismic and sea level data.
- Provide products in globally standard formats.
- Issue products in a timely manner.
- Exchange warnings freely and timely on the GTS and Internet (including bilateral agreements for tailored services).

Annexure-7: NTWC and TSP Roles and Responsibilities

- Adequate trained and experienced staff, utilities, and resources to operate functionally 24 hours per day, seven days per week (24/7).
- Adequate infrastructure and back-up facilities to continue operating during power cuts and national emergencies, such as:
 - all critical equipment on 30-min UPS
 - generator or alternative power backup, with 1 day of back-up capability
 - all critical equipment operating in duplicate
 - all critical communications circuits with backup

Procedure for achieving TSP status:

- Adopt the common Coastal Forecast Zones (CFZs), harmonized web page layout, and bulletin formats and content as established by WG2.
- Make a presentation to WG2 demonstrating the attainment of capability requirements as agreed by ICG
- Begin exchange bulletins with other TSPs
- Participate in Comms Tests/ IOWave Exercises
- Have performance reviewed by WG2 and presented to ICG
- Begin providing TSP threat information to NTWCs upon agreement of the ICG