United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

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Организация Объединенных Наций по вопросам образования науки и культуры

Межправительственная океанографическая комиссия

# Tsunami Service Provider (TSP) Messages for the Maritime Community

## Draft Proposal from IOC to WWNWS-SC

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IOC

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# The Intergovernmental Oceanographic Commission (IOC) Of UNESCO

- The only intergovernmental body of the UN system specializing in **ocean science**, **services**, **observations**, **data exchange,** and **capacity development**

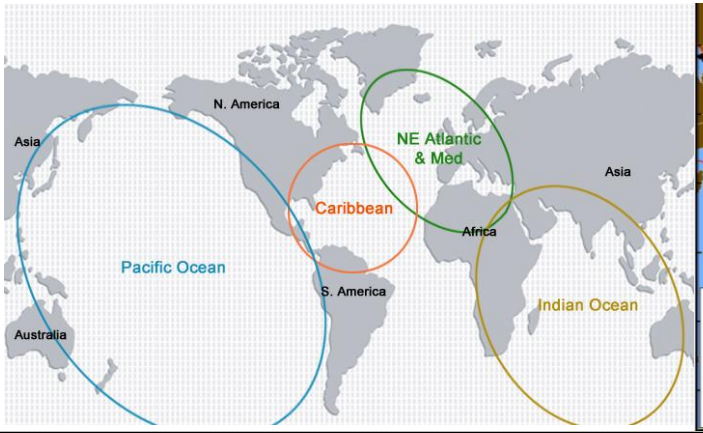
- Established 1960, **149** Member States

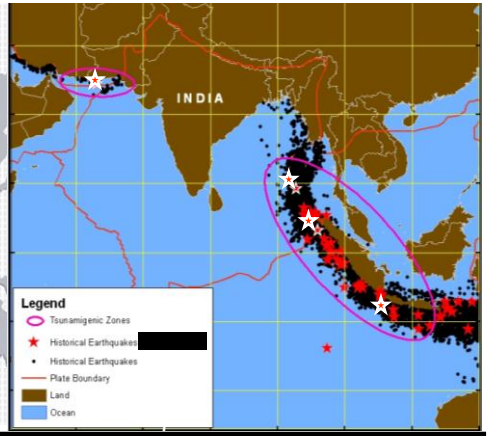
<u>High-Level Objectives 2014-2021:</u>

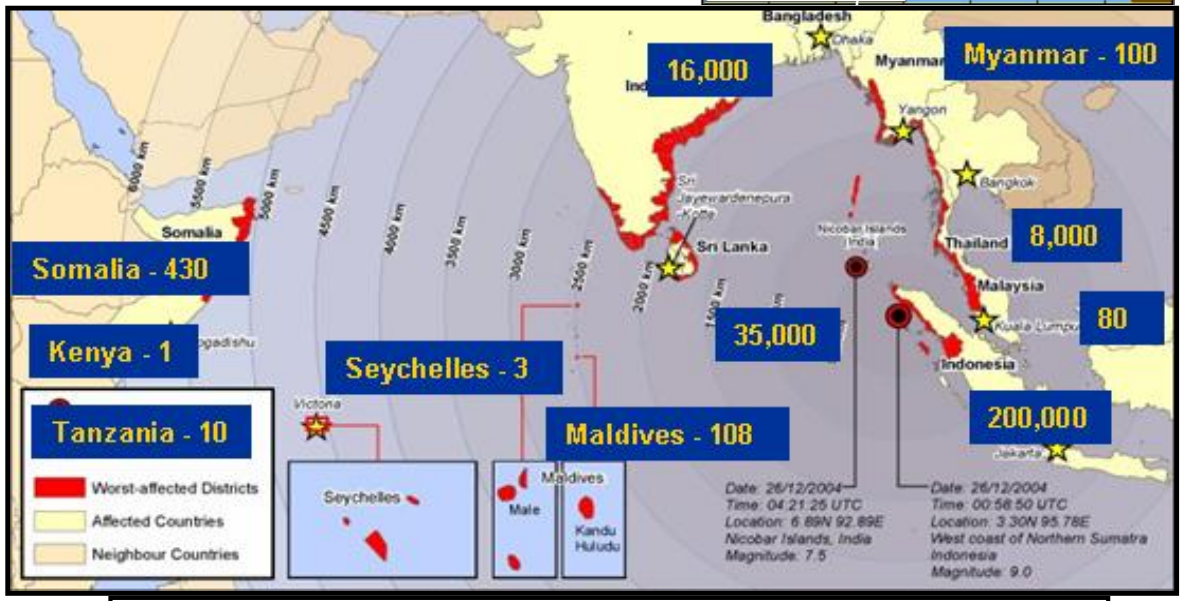
- Healthy ocean ecosystems;
- **Early warning systems (e.g. tsunami);**
- Resilience to climate change and variability by science-based services, adaptation and mitigation; and
- Emerging ocean science issues.

# Tsunami Warning Systems

- Pacific since 1965
- 2004 tsunami in Indian Ocean (M9.1) illustrated need for more
- In 2005, the IOC was mandated to establish three more TWS
  - ICG IOTWMS
  - ICG CARIBE EWS
  - ICG NEAMTWS

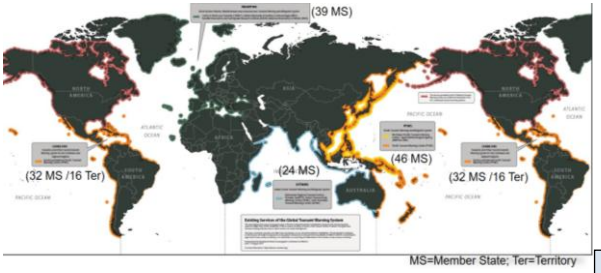



**~230,000 Causalities**
**Over 1.6 people million displaced**
**Estimated economic losses of $14 billion**

# Governance




UNESCO/IOC
Assembly/Executive Council

WMO, IHO, IMO, UNISDR, UNDP…

Working Group for Tsunami & Other sea level related Warning & mitigation Systems (TOWS-WG)
[4x ICG Chairs, WMO, UNISDR, UNDP, IMO, IHO]

Task Team Tsunami Watch Operations

Task Team Disaster Management & Preparedness

Intergovernmental Coordination Group (ICG) Caribbean & Adjacent Seas (CARIBE-EWS)

ICG Indian Ocean Tsunami Warning & Mitigation System (IOTWMS)

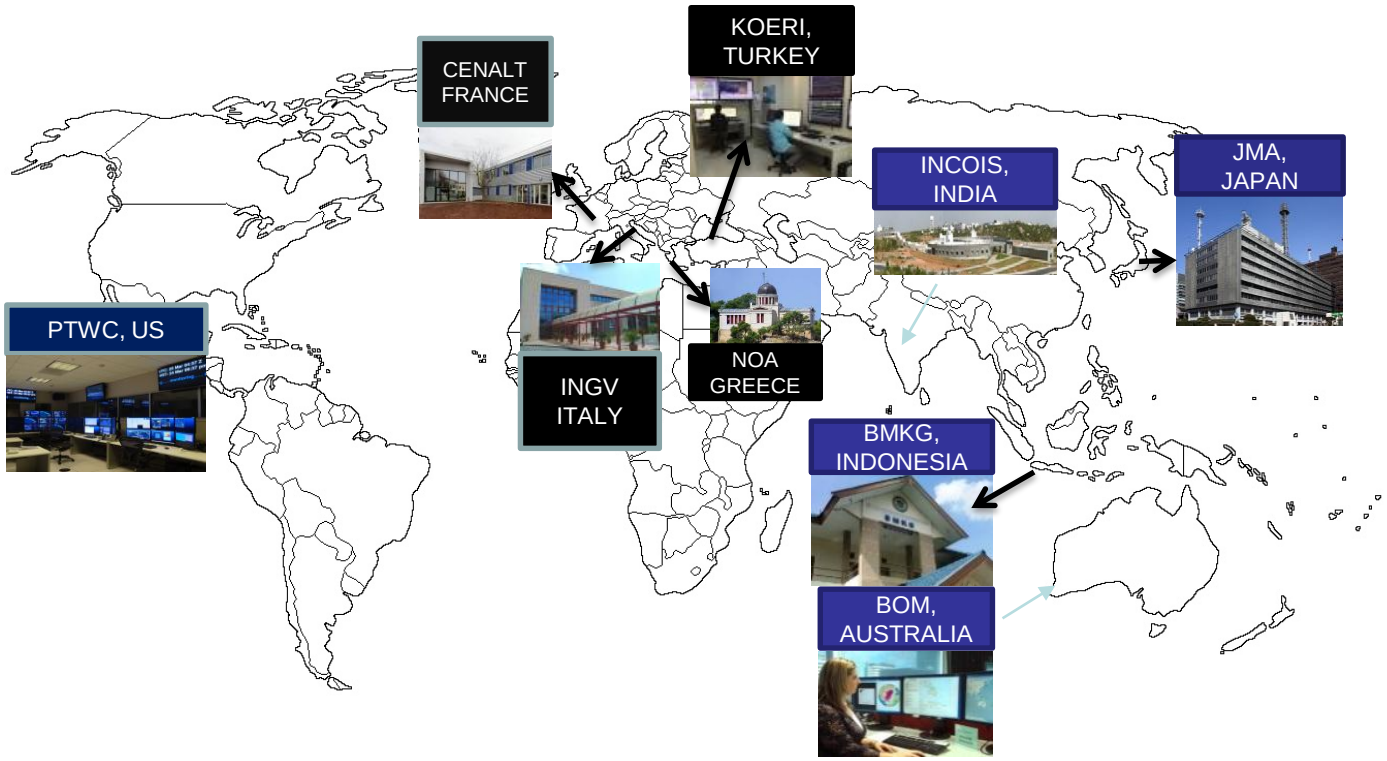
ICG Pacific Tsunami Warning & Mitigation System (PTWS)

ICG NE Atlantic & Mediterranean Seas (NEAMS-TWS

Under each ICG: Technical Working Groups and Task Teams

IOC Secretariat, Tsunami Unit

# Tsunami Service Providers




**7 New TSPs established since 2004 IO Tsunami**

# TSP Messages for Maritime Community- Chronology of Actions

- February 2014: TOWS WG TTTWO Meeting, Paris
  - Initial discussions on the need for specific TSP Messages for Maritime Community
- February 2015: TOWS WG TTTWO Meeting, Paris
  - Consulted and obtained feedback from Chair of JCOMM ETMSS
  - Decided to invite IMO, IHO and JCOMM to participate in the next TOWS-WG Meeting
- August 2015: WWNWS-SC Meeting, Monaco
  - Presentation by Thorkild Aarup (Head IOC Tsunami Unit) to the WWNWS-SC
- February 2016: TOWS WG TTTWO Meeting, Paris
  - Presentation by Chair, WWNWS-SC to TTTWO
  - IMO/IHO/WMO Manual S -53 comprises templates for NAVAREA Warnings
  - Request to share list of TSPs and example of TSP Messages with Chair WWNWS-SC for feedback
- February 2017: TOWS WG TTTWO Meeting, Paris
  - Discussed feedback received from Chair WWNWS-SC on desired format for TSP Messages and Dissemination pathways
- February 2018: TOWS WG TTTWO Meeting, Paris
  - A team comprising Dr. Yuelong Miao, BoM, Mr. Patricio Carrasco, SHOA, Mr. Carlos Zuniga Araya, SHOA, and Dr. Charles McCreery, PTWC requested to develop draft TSP messages for vessels at sea for WWNWS-SC to review and provide feedback.

# Tsunami Messages for Maritime Community - Considerations

- To be in line with the IMO/IHO/WMO joint manual on Maritime Safety Information (S-53)
- To be Concise, Clear and have Geographic Reference
- Tsunami Service Providers (TSPs) send messages to NAVAREA Coordinators for onward broadcast to Ships at Sea
- National Tsunami Warning Centres (NTWCs) to provide detailed tsunami information to Ports / Harbours within their Countries
- Preferred mode of dissemination from TSPs to NAVAREA Coordinators through SafetyNET/email

# TSP Messages for Maritime Community – Proposed Service

1. Messages would be created and disseminated only for potential and confirmed tsunami occurrences when forecast amplitudes at any coast within a TSP's service area exceed pre-defined threat threshold (typically 0.3 meters), the minimum coastal amplitude considered to be a hazard.
2. Messages would be disseminated by each TSP by email to all NAVAREA coordinators within that TSP's service area. (Note that multiple TSPs cover some NAVAREAs and each TSP covers multiple NAVAREAs. In case of multiple TSPs covering same NAVAREAs, a prior agreement need to be reached beforehand as to which TSP will be the primary source of information to the NAVAREA coordinators, which would be the backup, or, if all TSPs should provide information simultaneously).
3. The initial TSP maritime message would be issued to NAVAREA coordinators when the TSP issues its initial coastal forecast for the Member States within its IOC System. This is usually within 30 minutes of the earthquake that generated the tsunami. Note that a TSP may issue a qualitative advisory product to Member States preceding the initial coastal forecast products.
4. An additional TSP maritime message would be issued only if the forecast significantly changes.
5. One message would be issued indicating the final handling of the event by the TSP, usually when the threat has passed everywhere in the service area. However, the hazard may continue along some coasts and that status must be determined by local authorities.
6. NAVAREA coordinators would have the responsibility for turning TSP messages into maritime safety messages issued via SafetyNet to ships at sea.

# TSP Message Format and Content

| Message Element | Element Description | TSP Content | Issues |
|---|---|---|---|
| 1 | NAVAREA name | NAVAREA having coasts with tsunami forecast amplitude exceeding the pre-defined threat threshold (typically 0.3 meter) | Can one message apply to more than one NAVAREA? |
| 2 | General Area | Name of the general area forecast to be affected by the tsunami | Need to identify or create a standard area naming scheme for ocean areas. |
| 3 | Locality | Not Used | |
| 4 | Chart Number | Not Used | |
| 5 | Key Subject | A likely or confirmed tsunami, with key information about the source - usually an earthquake. | |
| 6 | Geographical Region | Names of countries in NAVAREA with coasts forecast to have hazardous tsunami waves. | Need standard list of key harbors and their names. |
| 7 | Amplifying Remarks | Tsunami impact on ships in shallow waters. Consult local authorities of destination. | |
| 8 | Cancellation Details | Indicate if final message and that continuing hazard possible. Must be evaluated locally. | |

# Example 1 - A TSP initial message for a tsunami affecting 3 NAVAREAs

NAVAREA XI

NORTHEAST PACIFIC COASTS

A TSUNAMI HAS BEEN GENERATED BY A MAGNITUDE 8.4 EARTHQUAKE THAT OCCURRED IN THE RYUKYU ISLANDS ON MARCH 9 2018 AT 1452UTC.

HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS OF JAPAN, THE PHILIPPINES, AND INDONESIA.

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.

NAVAREA XIII

NORTHEAST PACIFIC COASTS

A TSUNAMI HAS BEEN GENERATED BY A MAGNITUDE 8.4 EARTHQUAKE THAT OCCURRED IN THE RYUKYU ISLANDS ON MARCH 9 2018 AT 1452UTC.

HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS OF RUSSIA.

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.

NAVAREA X

NORTHEAST PACIFIC COASTS

A TSUNAMI HAS BEEN GENERATED BY A MAGNITUDE 8.4 EARTHQUAKE THAT OCCURRED IN THE RYUKYU ISLANDS ON MARCH 9 2018 AT 1452UTC.

HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS OF PAPUA NEW GUINEA AND THE SOLOMON ISLANDS.

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.

# Example 2 - A TSP initial message for a tsunami affecting 3 NAVAREAs

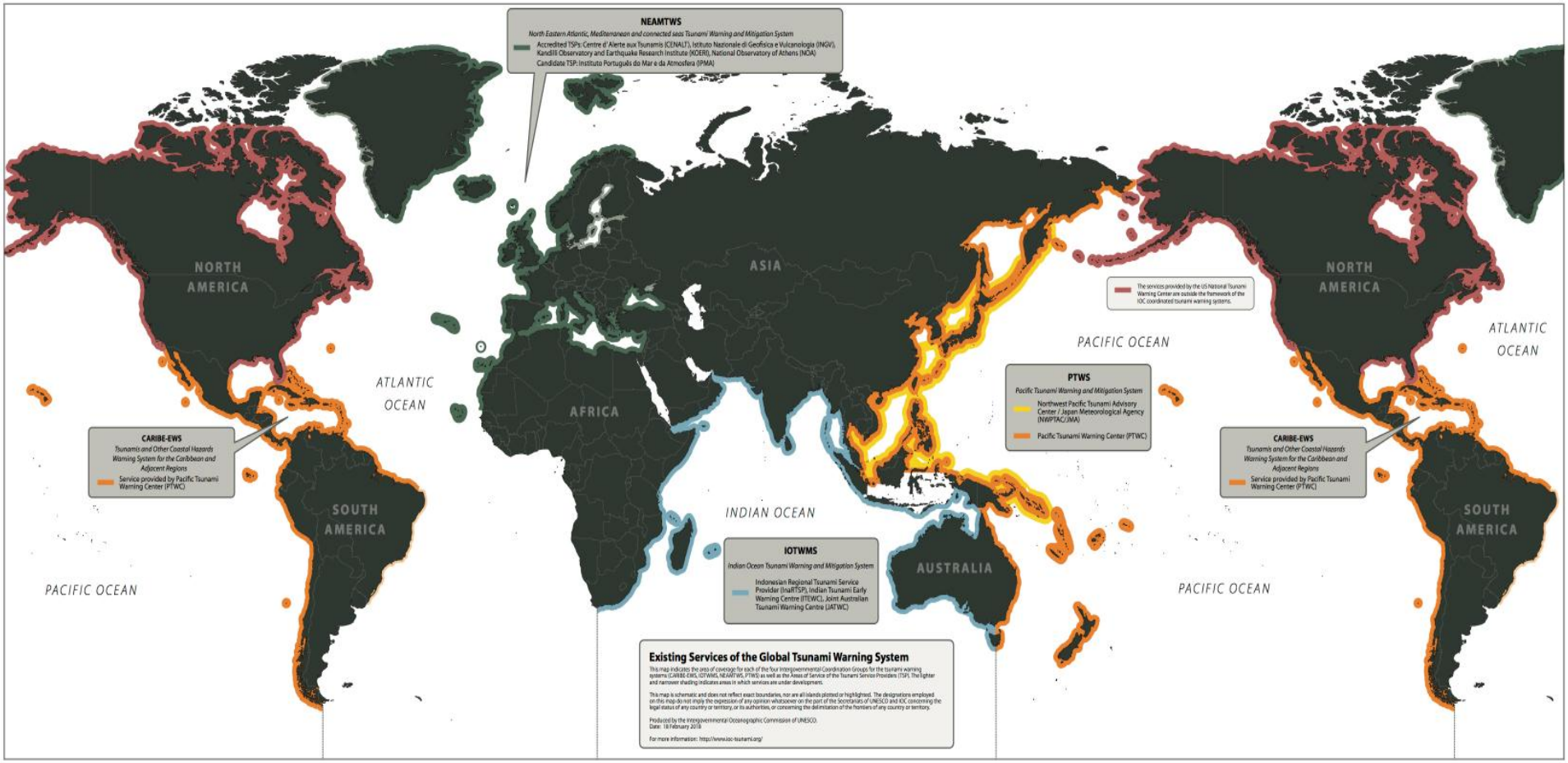
NAVAREA XI, NAVAREA XIII, NAVAREA X

NORTHEAST PACIFIC COASTS

THE THREAT HAS NOW LARGELY PASSED FOR THE TSUNAMI GENERATED BY A MAGNITUDE 8.4 EARTHQUAKE THAT OCCURRED IN THE RYUKYU ISLANDS ON MARCH 9 2018 AT 1452UTC.

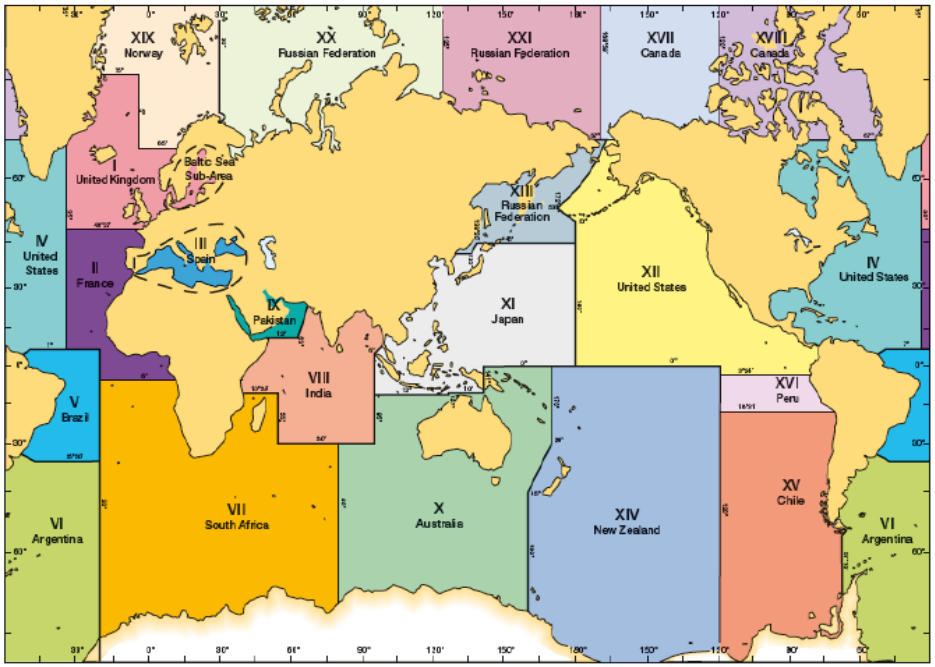
HOWEVER, SHIPS APPROACHING THE COAST SHOULD STILL CONSULT LOCAL AUTHORITIES REGARDING LOCAL CONDITIONS AND ADVICES.

# Existing Services of the Global Tsunami Warning System

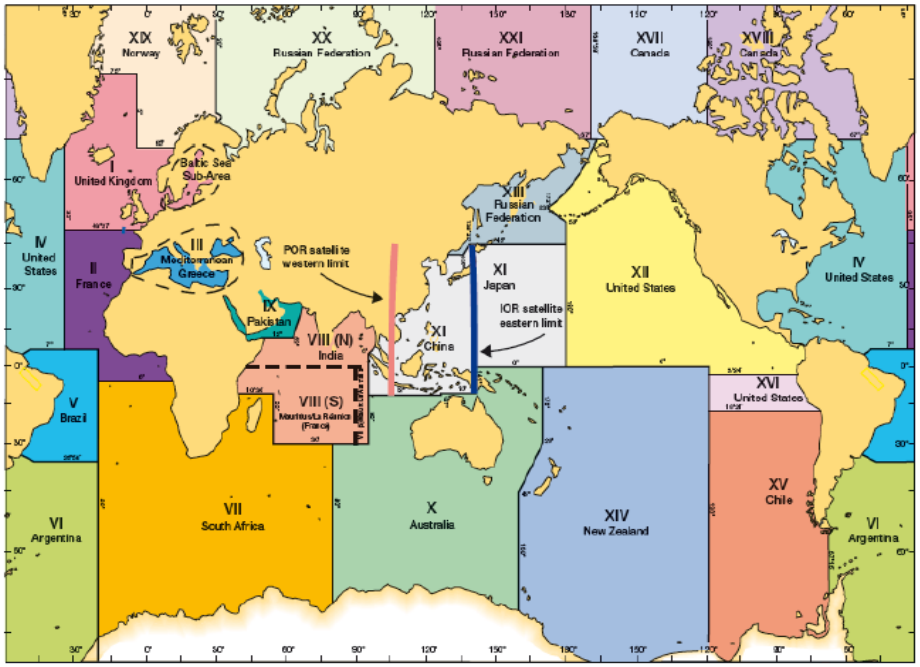



The map indicates the area of coverage for each of the four Intergovernmental Coordination Groups for the tsunami warning systems in the Caribbean (CARIBE-EWS), Indian Ocean (IOTWMS), NE Atlantic, Mediterranean & connected seas (NEAMTWS), and the Pacific (PTWS). In addition, the map also shows Areas of Service of the Tsunami Service Providers (TSP).

# Delimitation of NAVAREAS & METAREAS




NAVAREAS




METAREAS

Note that multiple TSPs cover some NAVAREAs and each TSP covers multiple NAVAREAs

# Way Forward

- 10th meeting of WWNWS-SC is requested to review the Draft Proposal and provide feedback to IOC on Message Format, Dissemination Methods, etc.
- Final proposal incorporating feedback to be shared with the WWNWS-SC, presented to the TOWS-WG in February 2019 and thereafter to the IOC Assembly in June 2019 for approval.
- ICGs consider the proposal in their respective ICG Meetings.
- ICG TSPs work towards upgrading their operational systems to generate NAVAREA Tsunami Warning Messages.
- IOC Secretariat and WWNWS-SC work together on the operational arrangements – eg. Mapping TSP AoS to NAVAREAS, Finalising operational email lists, etc.
- Capacity Development of NAVAREA Coordinators for interpreting and handling TSP Tsunami Messages.

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# Thank you

IOC