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9.- Programmatic Development: Tsunami Early Warning Services

- 9.1 Regional Early Warning Systems -
Proposed agenda item for EC-57**
- 9.2 Global Coordination - Proposed
agenda item for EC-57**

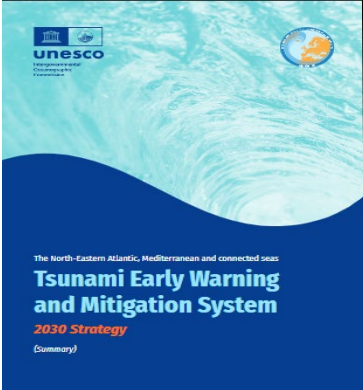


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9.1 Regional Early Warning Systems - Proposed agenda item for EC-57

IOC Officers Meeting, Paris, January 2024



ICG/NEAMTWS 2023

Key Meetings & Events

Ceremony event with UNESCO Permanent Delegations of Tsunami Service Provider (TSP) countries to launch NEAMTWS 2030 Strategy, 12 April 2022, HQ, Paris, France



Expert meeting on the Implementation of the new ICG/NEAMTWS 2030 Strategy to Further Advance NEAMTWS, Naples, Italy from 28-30 November 2022



Chairperson: **Ms Maria Ana Baptista (Portugal)**

Technical Secretary: **Dr Denis Chang Seng**



Tsunami Evacuation mapping and validation workshop in Larnaka, Cyprus, 25-26 Sep 2023. First country in NEAM to conduct evacuation mapping using PTHA with bilateral support of partners (Italy, Greece and Spain) (CoastWAVE Project)



Regional workshop to set the benchmark for the development of Tsunami Standard Operating Procedures (SOPs), JRC, Ispra, 6 October 2023 (CoastWAVE Project)

15 Tsunami Exercises Organised

- ✓ Regional NEAMWave23 conducted on 6-7 November 2023
- ✓ For the first time, NEAMWave 23 exercises was also conducted at the local communities in all the seven pilot "Tsunami Ready" CoastWAVE project countries.
- ✓ Exercises also conducted in Italy, France, and Portugal (Non CoastWAVE Project countries)



Hot debrief with mayor and stakeholders on NEAMWave23 Exercise at the local level in Chipiona, Spain, 6 Nov 2023

School evacuation in Chipiona, Spain, 6 November 2023



✓ Enhancing Tsunami Detection Network

- ✓ Installation, and training of three Affordable Tide Gauges (ATGs) in Alexandria (Egypt), Larnaca (Cyprus) and El Jadida (Morocco)

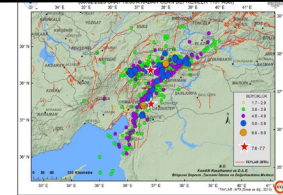


✓ Risk Perception Studies

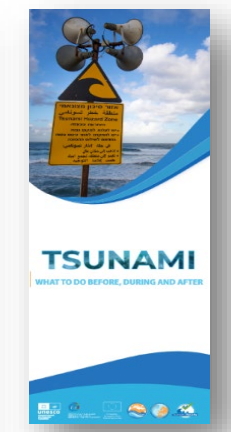
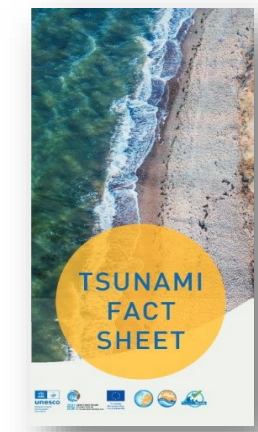
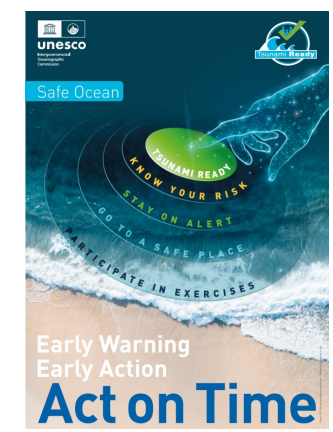
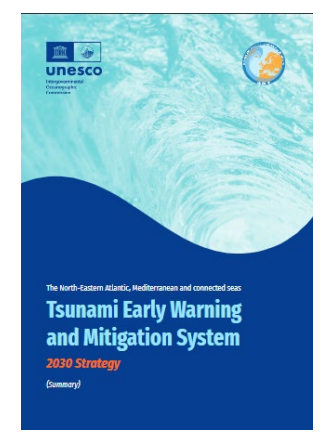
- ✓ Sea Level Related Multi-Hazard Risk Perception Surveys, National Reports completed in Egypt, Cyprus, Morocco, Greece, Malta, Spain, and Türkiye (CoastWAVE Project)

Communication and Outreach

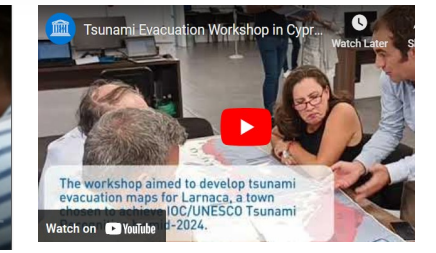
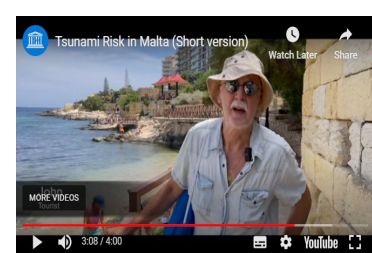
✓ 28 Articles Published



✓ 9 Brochures/ Leaflets and Posters



✓ 10 Videos published



UNESCO IOC Tsunami Ready Recognized Community

- Cannes (Alpes-Maritimes), France is the **first community to be recognized as UNESCO-IOC Tsunami Ready on 19th January 2024** in NEAM region.
- Mr David Lisnard, Major of Cannes unveiling the UNESCO-IOC TRR Plate at the ceremony)



- **New IOC DG-ECHO Funded CoastWAVE Project (1.2 M Euros) - Phase -II** project starting on 1 July 2024 (2 yrs) on “Scaling-Up and Strengthening the Resilience of Coastal Communities in the North-Eastern Atlantic and Mediterranean Regions to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazards”;
- **Target:** Total of 25 UNESCO-IOC Tsunami Ready Recognized Communities in NEAM region by end of 2025 (**25/2025**)

- **6 February 2024: ICG/NEAMTWS-XVIII Session, UNESCO Headquarters, Paris**
 - Election of new ICG/NEAMTWS Officers
 - Establishment of new Task Team on non-seismic tsunamis (e.g. volcano)
- **March 2024:** Ceremony event -Büyükçekmece, Istanbul to be recognized as UNESCO-IOC Tsunami Ready (exact date to be determined)
- **April 2024,** Barcelona, Ocean Decade Conference on *Cities and Communities Joining Tsunami Ready (Date to be confirmed)*
- **Early June 2024:** IOC DC ECHO CoastWAVE Final Project-Phase I meeting (exact venue and date to be determined)
- **7 additional Tsunami Ready Recognized communities** by June 2024(Egypt, Cyprus, Morocco, Greece, Malta, Spain, and Türkiye) (CoastWAVE Project- Phase -I)

PTWS Organisational Structure (as of ICG/PTWS-XXX 11-15 September 2023)



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Chair: Mr. Yuji Nishimae (Japan)

Vice-Chairs: Dr. Dakui Wang (China)

Dr. Wilfried Strauch (Nicaragua)

Mr. 'Ofa Fa'anunu (Tonga)

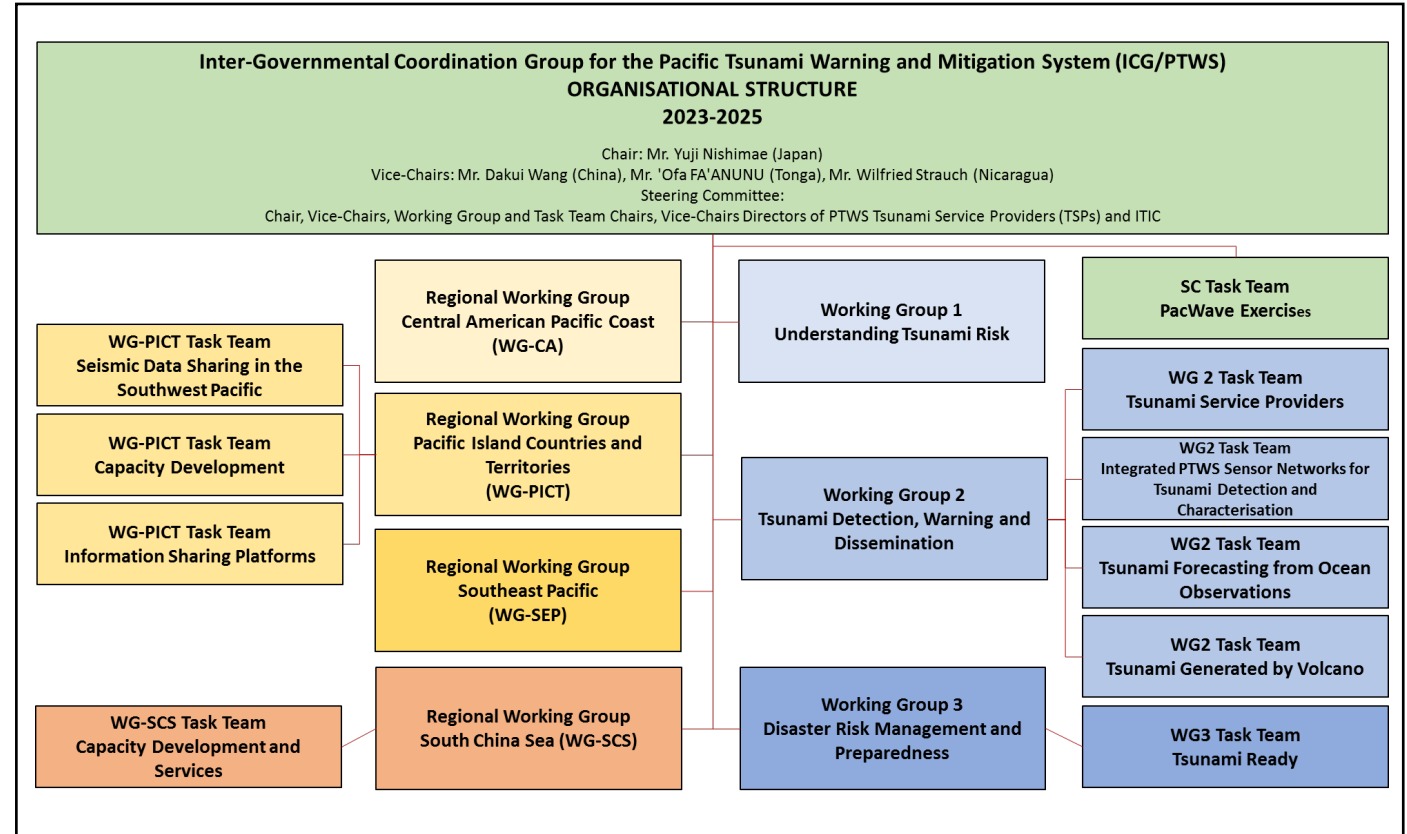
Technical Secretary: Dr. Öcal Necmioğlu (as of 1 September 2023)

Dissolved Task Teams;

- Task Team on UN Ocean Decade,
- Task Team on Future Goals and Performance Monitoring,
- WG2 Task Team on the Minimum Competency Levels for National Tsunami Warning Centre (NTWC) Operations Staff

Established Task Teams;

- WG2 Task Team on Tsunami Generated by Volcanoes (TGV)
- WG2 Task Team on Forecasting from Ocean Observations (TT-FOO)
- WG3 Task Team on Tsunami Ready
- Pacific Island Countries and Territories Working Group Task Team on Information Sharing Platforms



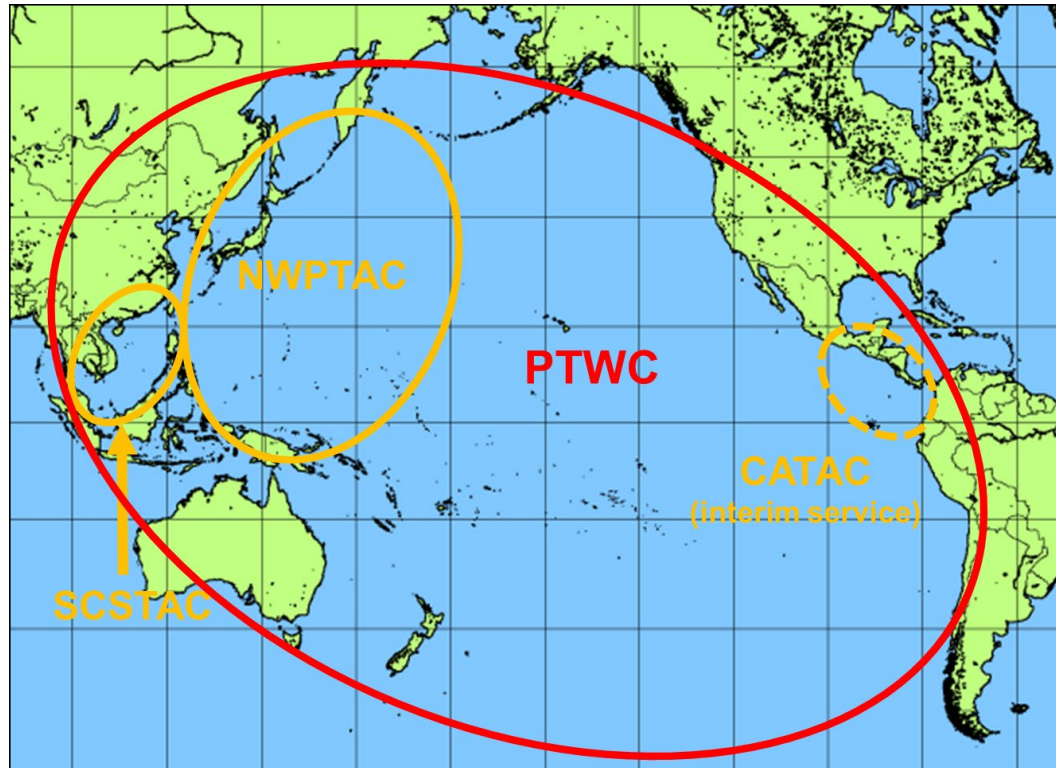
PTWS Tsunami Service Providers



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- Pacific Tsunami Warning Center (PTWC) operated by USA
- Northwest Pacific Tsunami Advisory Center (NWPTAC) operated by Japan
- South China Sea Tsunami Advisory Center (SCSTAC) operated by China
- Central America Tsunami Warning Center (CATAC) operated by Nicaragua
- The CATAC is fully operated (24/7) on the interim service.



Decision in the ICG/PTWS-XXX session

Decides to expand the PTWS Earthquake Source Zone to include an area from 63° to 52° south latitude and from 72° to 18° west longitude to include the Scotia Arc and its adjacent seismic zones.

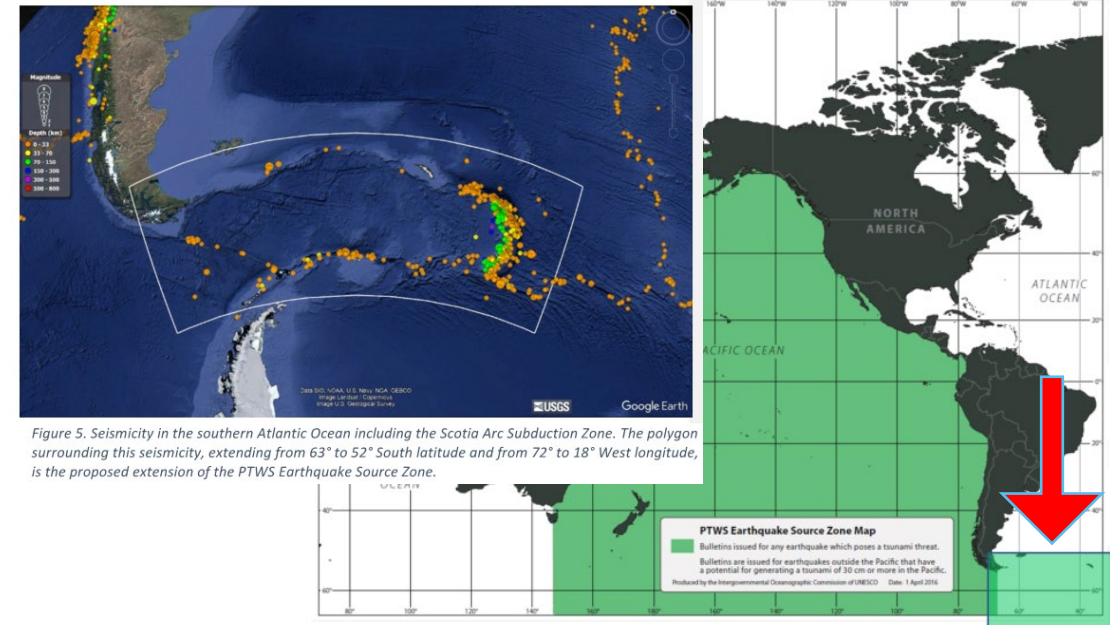


Figure 5. Seismicity in the southern Atlantic Ocean including the Scotia Arc Subduction Zone. The polygon surrounding this seismicity, extending from 63° to 52° South latitude and from 72° to 18° West longitude, is the proposed extension of the PTWS Earthquake Source Zone.

Figure 4. The current PTWS Earthquake Source Zone is indicated in green. The transparent green box at the lower right indicates the approximate proposed addition to the PTWS ESZ that would include the seismic zone associated with the Scotia Arc and South Sandwich Islands.

PTWS Meetings/Workshops/Trainings in 2023 & 2024



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2023

09 - 13 January	Cook Islands Tsunami Warning and Emergency Response: review and update of SOPs.
30 January - 01 February	Fiji Tsunami Ready training : Regional Training on the UNESCO/IOC Tsunami Ready Recognition Programme
02 - 03 February	Ninth Meeting of the WG-PICT- PTWS Regional Working Group on Tsunami Warning and Mitigation for Pacific Island Countries and Territories
06 - 09 March	ICG/PTWS Steering Committee Meeting
24 April	ICG/PTWS-WG-CA VI : Sexta reunion del Grupo de Trabajo Regional para America Central del ICG/PTWS
21 - 25 August	Tsunami Hazard Assessment meeting of experts Chile-Peru - UNESCO-IOC Meeting of Experts on tsunami sources and hazard in southern Peru and northern Chile
11 September	8th Joint ICG/PTWS– IUGG/JTC Technical Workshop in association with the ICG/PTWS sessions Understanding and lessons learned from the tsunami generated by the Hunga Tonga-Hunga Ha'apai volcano eruption on 15 January 2022 for development of Tsunami Warning and Mitigation System for tsunamis generated by volcanoes and other non-seismic sources
11-15 September	ICG/PTWS-XXX Nuku'alofa, Tonga
25-26 September	11 th Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG-XI) Guangzhou, China
6 December	ICG/PTWS WG-PICT Task Team Seismic Data Sharing in the Southwest Pacific
13 December	ICG/PTWS Officers Meeting (online)

2024

March (TBD)	ICG/PTWS SC Meeting (online)
19-30 August	ITP-2024 Chile
September (TBD)	ICG/PTWS SC Meeting (Hawaii, USA)
November (TBD)	12 th Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG-XII)
TBD	Scientific meeting of experts to understand tsunami sources, hazards, risk and uncertainties associated with the New Hebrides, San Cristobal and New Britain Subduction Zones

PTWS ICG/XXX Recommendation Highlights



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Recommends the PTWC to finalize necessary preparations to provide special tsunami maritime safety products specifically for ships for all NAVAREA Coordinators in the Pacific and in the Southwest Atlantic (e.g. NAVAREAs VI, X, XI, XII, XIII, XIV, XV, and XVI) to transmit to the NTWCs to be forwarded to the NAVAREA Coordinators of their countries, or upon their request directly to the NAVAREA Coordinators in the absence of a NTWC,

Decides to admit the start of the official full functional operations of the Central America Tsunami Advisory Center (CATAC) hosted by Nicaragua, starting after the IOC governing body meeting in 2024, with the specific starting date to be decided after the coordination with the ICG/CARIBE-EWS

Recommends the approval of the PTWS National Tsunami Warning Centre competencies, framework, and training requirements, as described in IOC ICG/PTWS-XXX Working Document (Agenda 4.5) Report from the Task Team on the Minimum Competency Levels for National Tsunami Warning Centre (NTWC) Operational Staff.

Decides to establish permanent HTHH monitoring and warning procedures based on the products and methods in use by PTWC since March 2022 and presented in the CL 2882 and CL 2902.

PACWAVE 24
September to November 2024 to support IDDRR (13 Oct. 2024) and WTAD (5 Nov. 2024) Live Communications Test from the PTWS TSPs on 5 November

ICG/PTWS-XXXI
Beijing, China
April 2025

ICG/PTWS-XXXII
Nouméa, New Caledonia
2027





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9.2 Global Coordination - Proposed agenda item for EC-57

IOC Officers Meeting, Paris, January 2024

CARIBE EWS Organisational Structure (as of ICG/CARIBE EWS 25-28 April 2023)



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ICG/CARIBE EWS-XVI decided to realign the ICG/CARIBE-EWS Working Groups (WG) around the Sendai Framework for Disaster Risk Reduction, the UN Early Warnings for All Initiative (EW4ALL) and the ODPDP pillars, including capacity development functions for all:

- WG1 on Risk Knowledge
- WG2 on Detection, Analysis and Forecasting
- WG3 on Warning Dissemination and Communication
- WG4 on Preparedness, Response Capabilities and Resilience

WG1: Risk Knowledge

Purpose: To advise the ICG on the identification and characterization of the risk associated with tsunami and other coastal hazards, and their assessment and required modeling.

Leadership:

- Chair: [Frederic Dondin](#) (France)
- Vice-Chair: [Raphaël Paris](#) (France)

WG2: Tsunami Detection, Analysis and Forecasting

Purpose: To review and recommend to the ICG priorities and actions required to ensure and enhance existing capabilities as well as explore new technologies to improve tsunami detection and forecasting capability.

Leadership:

- Chair: [Elizabeth Vanacore](#) (USA)
- Vice Chairs for Subgroups
 - Tsunami Source Identification and Characterization: [Dan McNamara](#) (USA)
 - Tsunami Detection: [Gloria Romero](#) (Venezuela)
 - Tsunami Forecasting: [Chris Moore](#) (USA)

WG3: Tsunami Warning Dissemination and Communication

Purpose: To examine current and developing capacities and advise the ICG about the definition and composition of early warnings and tsunami products and the methods and best practices for effective end-to-end dissemination and communication.

Leadership:

- Chair: [Christa von Hillebrandt-Andrade](#) (USA)
- Vice-Chair: [Susan Hodge](#) (Anguilla)

WG4: Preparedness and Response Capabilities

Purpose: To advise and recommend to the ICG strategies to enhance awareness, education, preparedness, response capabilities and mitigation and to develop the necessary recommendations, tools and procedures.

Leadership:

- Chair: [Silvia Chacon](#) (Costa Rica)
- Vice Chairs for Subgroups:
 - Preparedness and Response capabilities: [Jacob Ngumbah](#) (St Kitts and Nevis)
 - Mitigation: [Stacey Edwards](#) (SRC)
 - Tsunami Ready: [Fabian Hinds](#) (Barbados)

Task Team on CARIBE WAVE

Purpose: Coordinate planning, running, and follow-up of CARIBE WAVE Exercises.

Leadership:

- Chair: [Antonio Aguilar](#)
- Vice Chair: [Gisela Baez Sanchez](#)

Chairperson: **Mr Gerard Metayer (Haiti)**

Vice-Chairpersons:

Ms Regina Browne (US Virgin Islands)

Mr Anthony Murillo Gutierrez (Costa Rica)

Ms Marie-Noëlle Raveau (Martinique)

Technical Secretary: **Dr. Öcal Necmioğlu (as of 1 September 2023)**

CARIBE EWS Meeting / Trainings / Exercises



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2023

- 23 March **CARIBE WAVE 23** (Honduras Gulf ND Mount Pelee eruption scenarios – **720.000** participants)
- 25–28 April **ICG/CARIBE EWS-XVI** (San José, Costa Rica)
- 13-17 November **Training course** on the general principles of installation and maintenance of sea level stations and the use of tide gauge data (Costa Rica)

2024

- 1-2 February **Officers – WGs/TT Meetings** (online)
- 21 Mar **CARIBE WAVE 24** (2 scenario from Puerto Rico Trench and North Panama Deformed Belt)
- TBD **ICG/CARIBE EWS-XXVII** (no Host Country identified yet)
- TBD **Experts Meeting** on “Non-Seismic Sources of Tsunamis for the Caribbean and Adjacent Regions”
- TBD **Experts Meeting** on "Seismic Sources in the Northwest Caribbean"

2025

- TBD **CARIBE WAVE 25** (1962 Jamaica & 1755 Lisbon Scenarios)

UNESCO/IOC Tsunami Ready PTWS and CARIBE EWS



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PTWS Tsunami Ready

30 communities subject to UNESCO/IOC Tsunami Ready Recognition Programme
Recognition of 2 communities in 2023
12 communities with recognition valid as of 2023
Recognition of 8 communities in progress
TRR planning continues for 3 communities
Renewal for 7 communities is delayed

[ICG/PTWS-XXX] Established a Task Team for Tsunami Ready under WG3

[ICG/PTWS-XXX] Recommends WG3 develop formal PTWS guidelines following the 'Tsunami Ready Equivalency Approach' for recognition of tsunami readiness of communities not implementing the IOC Tsunami Ready Recognition Programme

CARIBE EWS Tsunami Ready

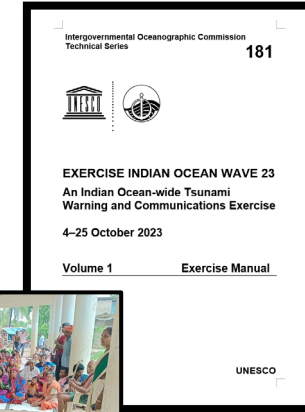
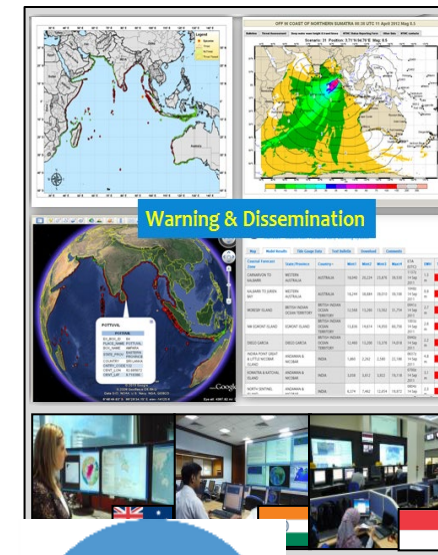
23 communities subject to UNESCO/IOC Tsunami Ready Recognition Programme
Recognition of 2 communities in 2023
11 communities with recognition valid as of 2023
Expression of interest of 1 community received
Recognition of 3 communities in progress
Renewal of 1 community is foreseen in 2024
Renewal for 7 communities is delayed

[ICG/CARIBE EWS XVI] requested CTIC with WG4 Subgroup on Tsunami Ready and Member States determine the target number of communities in the CARIBE-EWS for Tsunami Ready recognition by 2030.

[ICG/CARIBE EWS XVI] recommended the IOC Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) to identify a mechanism to cross credit other Members States assessment, preparedness and response efforts with the UNESCO-IOC Tsunami Ready programme.

Indian Ocean Tsunami Warning & Mitigation System (IOTWMS) Highlights (1)

- 1) **24 Active Member States UNESCO-IOC Intergovernmental Coordination Group**
- 2) **Exercise IOWAVE23** during Oct23 with 4 different scenarios, with 19 Member States participating and around 50,000 involved in community drills
- 3) **Review of national tsunami warning chains and SOPs for seismic, non-seismic, and complex source tsunamis** with training workshops Jul23 to help meet *Early Warnings For All 2027* UN target
- 4) **ISO compliant Tsunami Service Providers (TSPs) for IOTWMS providing threat information:** ISO 9001 (Australia and India) and ISO 22328-3 (Indonesia)
- 5) **Threat information provided for Indian Ocean for non-seismic source tsunamis** by TSP-Australia from Oct 2023
- 6) **Routine 6-monthly tsunami warning communication tests** Jun and Dec every year (email, GTS, SMS, Fax)
- 7) **Maritime products for NAVAREAs** to be trialed & implemented by TSPs from 2024
- 8) Gov of Australia extended support for **ICG/IOTWMS Secretariat Office** for further 4 years (2024-27) (USD\$310K/yr + office)



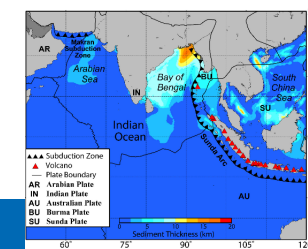
Indian Ocean Tsunami Warning & Mitigation System (IOTWMS) Highlights (2)



- 9) **Eleven Communities now Tsunami Ready Recognised** in India and Indonesia, with Australia, Iran, Maldives, Oman, Pakistan, Seychelles, Sri Lanka, Thailand, and Timor Leste planning to implement
- 10) **Tsunami Ready training Timor Leste (Jun23) and Seychelles (Nov23)**
- 11) **Probabilistic Tsunami Hazard Assessment (PTHA)** for NW Indian Ocean completed with funding from UNESCAP
- 12) **Inundation mapping and training evacuation planning** for NW Indian Ocean started Nov23 with funding from UNESCAP
- 13) Govt of Indonesia extended funding for **Indian Ocean Tsunami Information Centre (IOTIC)** for further 5-years (2022-26) (USD\$130K/yr+ office, staff)
- 14) **3rd IOTWMS Capacity Assessment** in 2024 to guide future development in collaboration with UNESCAP and funding support from Asian Development Bank and Govt. of Switzerland
- 15) **2nd Global Tsunami Symposium to commemorate 20th Anniversary Indian Ocean Tsunami 2004**, 11-14 November 2024 in Banda Aceh, Indonesia, back-to-back with **14th Session ICG/IOTWMS**, 18-21 November 2024 in Jakarta

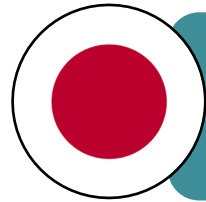


Banda Aceh 2004



TASK TEAM ON TSUNAMI WATCH OPERATIONS

2024-2025



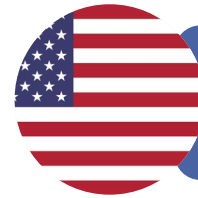
Mr Yuichi Nishimae
Chair

IOC/TOWS-WG-X/3, Annex II (Appendix 1): Terms of Reference of the Inter-ICG Task Team on Tsunami Watch Operations

- Provide a mechanism to the ICGs for coordination of tsunami watch operations among the Tsunami Warning Systems;
- Maintain an inventory of current and proposed products and their dissemination methods;
- Recommend and promote harmonized terminology;
- Maintain an inventory of areas of responsibilities, geographical coverage, system architectures, and other relevant characteristics;
- Recommend operational standards, procedures and guidelines for regional and national providers of tsunami forecast information;
- Share and harmonise methods of detection and characterization, forecasting techniques and dissemination to enhance the accuracy and effectiveness of tsunami forecast information for users;
- Monitor status of the regional provision of tsunami forecast information; Report to TOWS-WG.



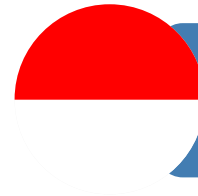
Ms Elizabeth Vanacore
ICG/CARIBE EWS



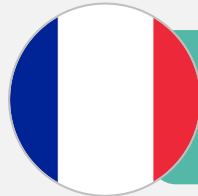
Mr Charles McCreery
ICG/CARIBE EWS



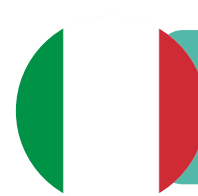
Ms Noura Alkaabi
ICG/IOTWMS



Mr Karyono
ICG/IOTWMS



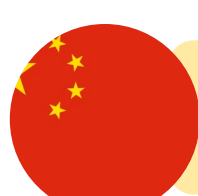
Ms Helene Hebert
ICG/NEAMTWS



Mr Alessio Piatanesi
ICG/NEAMTWS



Mr Yuichi Nishimae
ICG/PTWS



Mr Dakui Wang
ICG/PTWS

Intergovernmental Coordination Groups (ICGs) representatives

The representatives to the Inter-ICG Task Team on Tsunami Watch Operations shall be nominated by their respective ICG Chairpersons. The membership shall consist of two representatives from each ICG and include representatives from the regional providers of tsunami threat information. The IOC Chair will appoint the Chair of the Task Team.

TASK TEAM ON DISASTER MANAGEMENT & PREPAREDNESS

2024-2025

Intergovernmental Coordination Groups (ICGs) representatives

Harkunti Pertiwi Rahayu
Chair

Tsunami Information Center (TICs) representatives

IOC/TOWS-WG-VI/3, Annex II: Terms of Reference of the Inter-ICG Task Team on Disaster Management and Preparedness

Facilitate in collaboration with organization such as UNISDR, the exchange of experiences and information on preparedness actions,

education/awareness raising campaigns and other matters related to disaster management and preparedness;

Promote preparedness in coastal communities through education and awareness products and campaigns;

Facilitate SOP training across ICGs to strengthen emergency response capabilities of Member States and their Disaster Management Offices;

Promote preparedness programs and assessment tools that have been successful in one regional Tsunami Warning and Mitigation System in the others as appropriate;

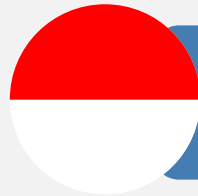
Facilitate the coordination of the TICs of the ICGs;

Report to the TOWS-WG



Ms Silvia Chacon

ICG/CARIBE EWS



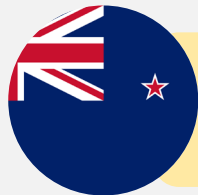
Ms Harkunti Pertiwi Rahayu

ICG/IOTWMS



Mr Ignacio Aguirre

ICG/NEAMTWS



Ms Ashleigh Fromont

ICG/PTWS



Ms Alison Brome

Caribbean Tsunami Information center



Mr Ardito M. Kodijat

Indian Ocean Tsunami Information center



Mr Marino Champalakis

ICG/NEAMTWS



Ms Laura Kong

International Tsunami Information Center

The representatives to the Inter-ICG Task Team on Disaster Management and Preparedness shall be nominated by their respective ICG Chairpersons. The membership shall consist of two representatives from each ICG, one of which should represent the ICG's Tsunami Information Center. The IOC Chair will appoint the Chair of the Task Team.

UN Ocean Decade Tsunami Programme Scientific Committee

Annex to Dec. A-31/3.4.1

Terms of reference of the Scientific Committee for the Ocean Decade Tsunami Programme

The Scientific Committee has an advisory role for the duration of the Ocean Decade Tsunami Programme (referred to as the programme).

Membership:

- Four (4) members nominated by the each of the TOWS-WG Task Teams;
- Three (3) members nominated by the TOWS-WG on the basis of their scientific expertise;

2024-2025

Annex to Dec. A-31/3.4.1 (cont.)

- All members will serve for a period of two years and would be eligible for renewal once.
- In selecting Expert Members, due consideration will be given to geographic, generational and gender balance.

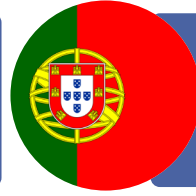


**Srinivasa Kumar
Tummala**

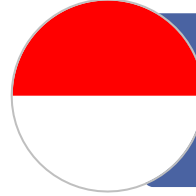
Chairperson



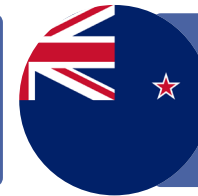
**Christa von
Hillebrandt**



Maria Ana Baptista



**Harkunti Pertiwi
Rahayu**



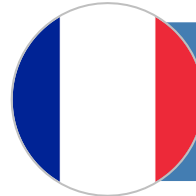
**David
Coetzee**



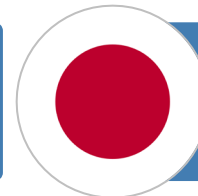
Silvia Chacon



**Srinivasa
Kumar
Tummala**



Helene Hebert



Yutaka Hayashi

Michael Angove

Sergio Barrientos

Alexander Rabinovich

2nd UNESCO IOC Global Tsunami Symposium

“Two Decades After 2004 Indian Ocean Tsunami: Reflection and the Way Forward”

Monday 11th - Thursday 14th November 2024
in BANDA ACEH, INDONESIA



Banda Aceh Convention Hall

Opening, Closing, Plenary and Side event activities

Main Event Venue

11-12 November 2024

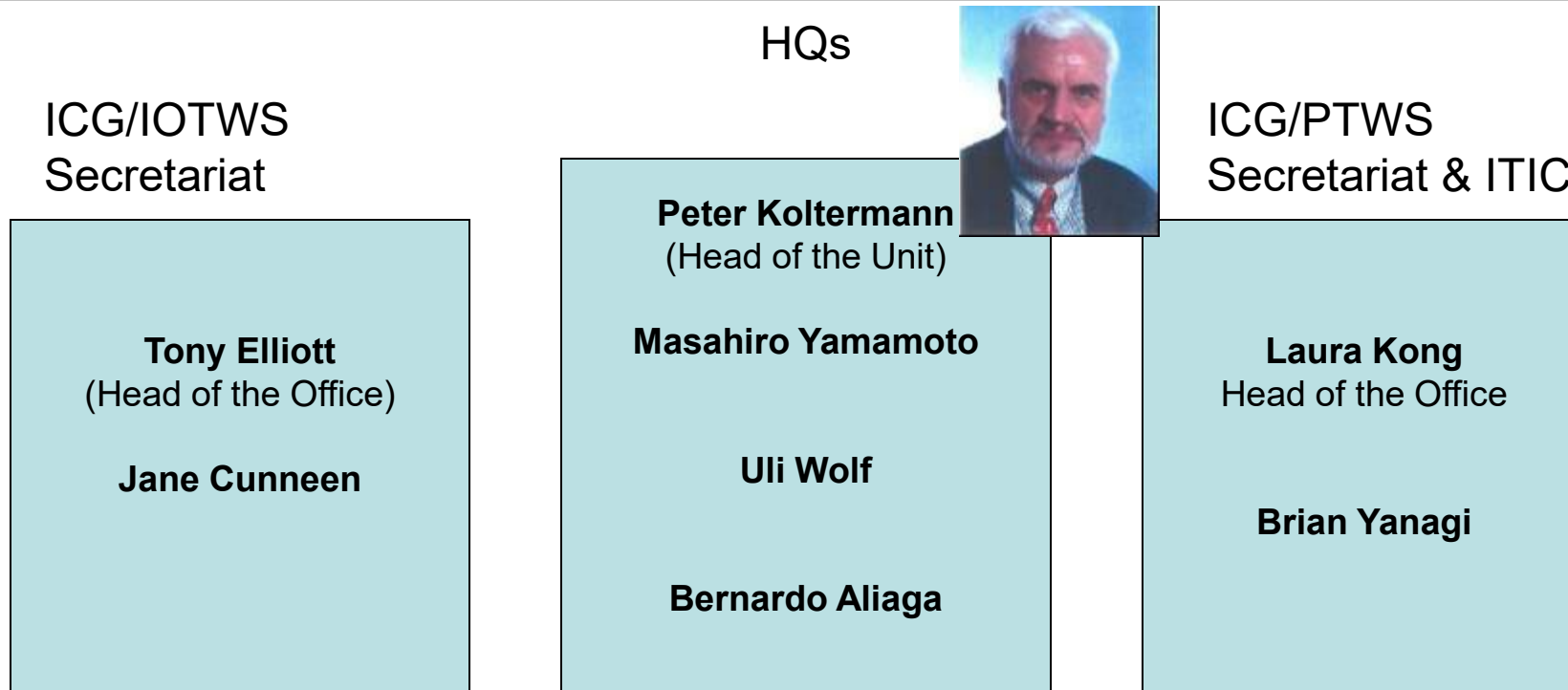


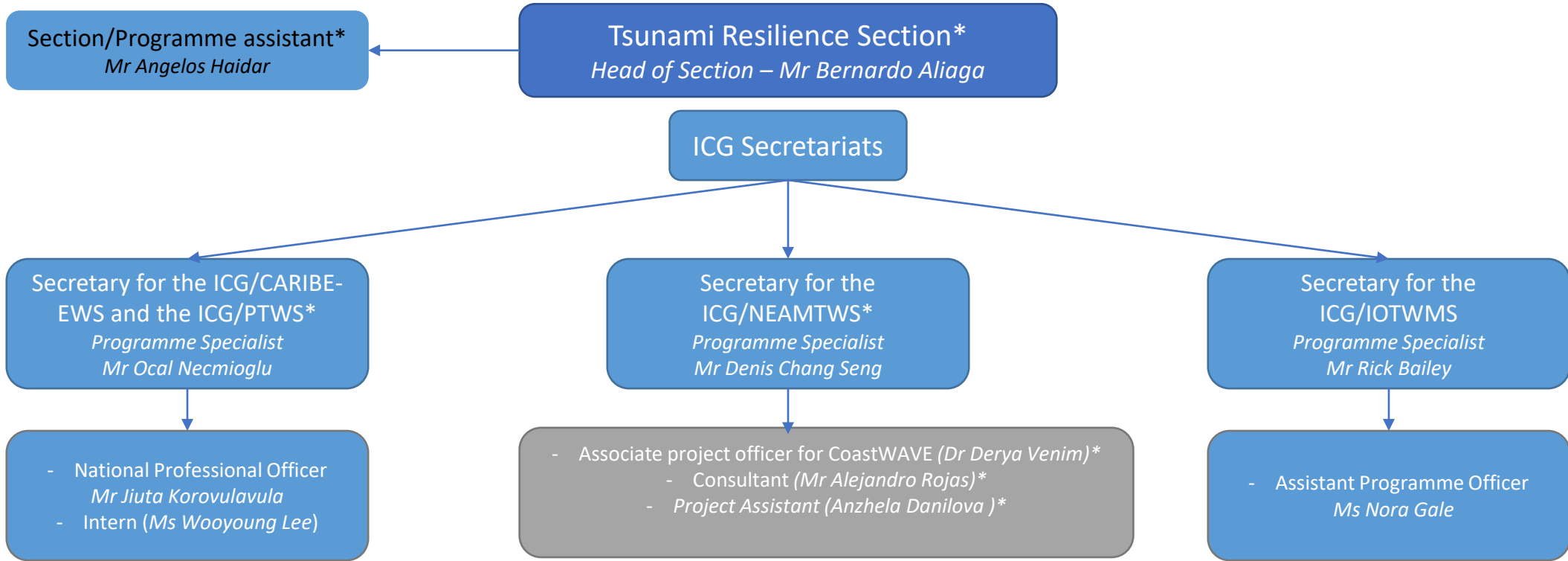
Capacity: 1,000 people



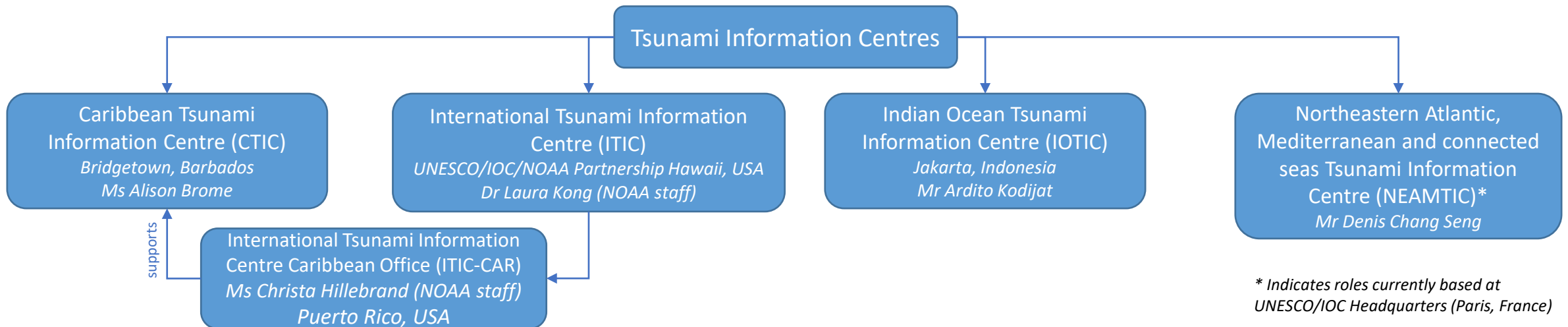
Towards the Establishment of a Tsunami Warning and Mitigation System for the Indian Ocean

2006 UNESCO/IOC Tsunami Coordination Unit





The work of ICGs is directly supported by Tsunami Information Centres - TICs



* Indicates roles currently based at UNESCO/IOC Headquarters (Paris, France)