



INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

(of UNESCO)

**Intergovernmental Coordination Group for the Pacific
Tsunami Warning and Mitigation System (ICG/PTWS)
Steering Committee Second Meeting**

ITIC, Honolulu, Hawaii, USA, 17–20 August 2010

FINAL REPORT

1. OPENING, AGENDA

Edward Young, Deputy Director of the National Weather Service for the Pacific Region, welcomed the PTWS Steering Committee (SC) to the US National Oceanic and Atmospheric Administration (NOAA) premises in Honolulu. He stressed the collaboration between World Meteorological Organisation (WMO) and IOC in coordinating international Ocean-related Early Warning Systems.

Giorgio de la Torre, chairman of ICG/PTWS, opened the meeting and welcomed the participants (Annex 5). He briefly outlined the issues this meeting has to address and presented the agenda which was adopted as is presented in Annex 1.

The meeting logistics were explained by Brian Yanagi from International Tsunami Information Center (ITIC).

2. MEDIUM TERM STRATEGY 2009-2013

The meeting reviewed briefly the actual status of the Medium Term Strategy (MTS) and even though progress has been made by several Member States (MS) which are aligned with the MTS, a number of MS are yet to start. The committee therefore asked the IOC Secretariat to provide information if the official letters have been sent to Permanent Delegations and Foreign Ministries asking to report on national status of implementation of the PTWS Medium-Term strategy. Copies of the letter should be sent to PTWS officers and Tsunami National Contacts (TNCs).

Action: Letters to be send As Soon As Possible (ASAP) at least by end of September 2010.

3. REVISION AND UPDATE OF THE DRAFT IMPLEMENTATION PLAN

The committee asked the technical secretariat to assist in accomplishing the lines of action. Several items in the draft plan, e.g. action 2, were viewed as too detailed for a more generic implementation

plan. The committee reviewed the current plan, and discussed and adopted a draft priority list of actions. The secretariat will provide a modified version of the Implementation Plan and General List of Action Items to be reviewed by the SC before publication. Detailed Action Items will be defined by the respective Working Groups (WGs).

In coordination with the IOC secretariat WG 2 will review the warning dissemination process, if required. WGs are requested to review and provide updated information to the different lines of action from the implementation plan, define priorities and provide recommendations on maintenance and sustainability. WG 2 and MS are requested to explore options to improve the DART network especially in the southern Pacific.

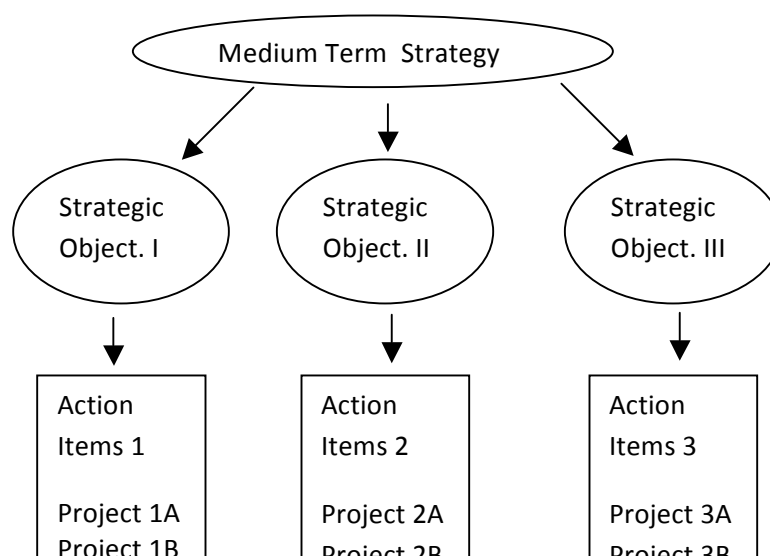
Action: IOC secretariat to finalize an updated version of the Implementation Plan by end of September 2010, SC to provide comments by mid October 2010. The translated Implementation Plan should be released by end of November to the latest.

Action: Regional WGs to monitor implementation of the action items and report to the next ICG.

4. FINANCIAL STRATEGY

The committee discussed the funding options for the respective WGs to support implementation of the action plan. Based on the discussion the chairman volunteered to outline a funding scheme for extra-budgetary financial support for projects meeting the Medium-Term Strategy and the List of Action Items and requested the secretariat to provide detailed information on the status of the regular budget allocated to ICG/PTWS, including the status and allocation of MS contributions.

Action: Secretariat to provide Regular Programme (RP) and extrabudgetary funds allocated to PTWS by end of September 2010. Chairman PTWS to provide an outline for a funding scheme by end of October 2010



5. REPORTS OF PTWS INSTITUTIONS

Pacific Tsunami Warning Center (PTWC)

Charles McCreery, director of the PTWC, noted that several Pacific tsunamis have occurred since the last ICG meeting, with two major tsunamis – the September 29, 2009 regional Samoa/Tonga event and the February 27, 2010 Pacific-wide tsunami originating off the coast of Chile – as well as a few other smaller tsunamis. He reported that NOAA is continuing with its plans to relocate PTWC and ITIC along with their parent organization, the Pacific Region Headquarters of the National Weather Service, into a common NOAA building on Ford Island in Pearl Harbor by the year 2013. Aside from bringing PTWC and ITIC together, the facility will provide many other benefits to the US tsunami program including more space for operations, visitors, and the ITIC Library. He highlighted the current Information Technology (IT) Modernization project underway for PTWC and West Coast / Alaska Tsunami Warning Center (WC/ATWC) that will harmonize their IT infrastructure and products, as well as a separate project to develop a web-based “tsunami portal” to give users a common access to the warning centers’ products as well as other tsunami-related information. He informed that both tsunami warning centers (TWCs) have applied to increase their staff by up to 5 posts to meet 24x7 shift requirements and to provide for improved outreach, IT management, and continuity of staff as they retire or change jobs. He noted the TWCs increased use of tsunami forecast models for guidance during recent events and highlighted the PTWC-developed RIFT model that gives a comprehensive forecast for all Pacific coasts. Application of the RIFT forecast to PTWC warning criteria for the PTWS should, at a minimum, significantly reduce over-warning and allow for some prediction of the levels of impact. The overall accuracy of the RIFT coastal forecast is now being quantified in a study using past tsunami observations. Lastly, he pointed out the considerable expense incurred in disseminating PTWC text products for recent events by fax. Although each fax or fax attempt may only cost a few dollars, PTWC sends to over a hundred fax numbers in the Pacific and for the Chile tsunami there were 27 bulletins issued. PTWC would like to explore with the ICG ways to reduce this cost. These might include asking countries to limit the number of fax lines of their Tsunami Warning Focal Point (TWFP) to only what is essential – maybe a maximum of two lines (one primary and one alternate), and possibly only using the fax for the initial bulletin and not for subsequent bulletins unless there is a significant change.

Action: Secretariat to include in the Action Paper or Annotated Agenda at ICG/PTWS-XXIV the suggestion of modifying the TWFP/TNC Form in the PTWS Operational Users Manual to only two (2) fax numbers per Member States

Japan Meteorological Agency Northwest Pacific Tsunami Advisory Center (JMA NWPTAC)

Takeshi Koizumi, Senior Coordinator for International Earthquake and Tsunami Information at JMA, informed the committee that Yohei Hasegawa could not continue his duty as vice chair of PTWS before his term finished due to a new assignment within JMA. But he ensured the group that JMA is

strongly interested in continuing to play an active role in the ICG/PTWS. He also reported on the planned update of the transmission intervals of additional sea-level stations in the Western Pacific via the Japanese satellite MTSAT. On the request of JMA the chairman of ICG/PTWS invited NWPTAC as a permanent member to the ICG/PTWS Steering Committee.

ITIC

Laura Kong, director of ITIC, reported on the various ITIC training activities (mainly on SOPs and strengthening national warning centers) conducted in the last two years focussing on Pacific countries. From 2009 through October 2010, the ITIC Training Program conducted two 2-week trainings in Hawaii attended by a total of 29 participants from 17 countries and Pacific Islands Applied Geosciences Commission (SOPAC), and 18 1-week trainings internationally reaching more than 400 national staff in 12 PTWS and 4 Indian Ocean Tsunami Warning and Mitigation System (IOTWS) countries. The ITIC was also involved in coordinating international post-tsunami surveys (ITST-Samoa and Tonga, ITST-Chile) after the 29 September 2009 and 27 February 2010 tsunamis. In the US, ITIC has been developing national tsunami preparedness courses that will be a part of the US Department of Homeland Security/Federal Emergency Management Agency National Disaster Preparedness Center DHS/FEMA NDPTC) training curriculum.

She also informed the PTWS-SC on recent information, awareness and educational materials produced and printed in bulk that are available to MS, in English and several in Spanish and French. MS are requested to contact ITIC to receive copies of the materials– see the ITIC website (www.tsunamiwave.info) under Awareness Materials for a listing.

Action: In order to meet the enormous training needs of regions the group recommended for ITIC to create a group of in-region trainers that could meet the needs.

Action: ITIC is requested to coordinate specific awareness campaigns to advocate participation in the ICG/PTWS coordination process e.g. through stakeholder workshops and other training. Requests from MS should be channelled through relevant regional WGs.

6. PACWAVE08 AND LESSONS LEARNED FOR PACWAVE11

Laura Kong briefly presented the Exercise Pacific Wave 2008 (PACWAVE08) report and the outcomes of the exercise. She explicitly mentioned that based on the experience from 2006 the exercise could be conducted more effectively due to improved communication to national centres and incorporation of media, while still several shortcomings in the regional-national communication were detected. Although left to the decision of national authorities none of the MS involved coastal communities (e.g. through local evacuation drills) in the exercise.

Considering the general objectives of PACWAVE08, the SC approved the report and requests WG 2 and 3 to cooperate in the preparation of an end-to-end communication exercise PACWAVE11 in October/November 2011. The actual evacuation of local communities (or parts of it) will be left to

the decision of local or national authorities. A task Team will be formed and elaborate on detailed scenarios. It is intended to conduct the exercise using multiple scenarios.

Francois Schindele, chairman of Working 1 - Risk and Hazard Assessment, sent his comments by email. He voted for Middle America as one of the target regions for the PACWAVE11 exercise and expressed his hope that this might raise some awareness on the risk in the area. To improve the warning products for civil defense and disaster managers he stressed the importance of producing inundation maps detailing predicted wave amplitudes, especially for sensitive spots on threatened coastlines.

Action: The group decided to conduct a multi-scenario exercise, probably in October/November 2011. The responsible Task Team (established by WG2 and 3) will elaborate on the detailed scenarios.

7. LESSONS LEARNED FROM 29 SEPTEMBER 2009 and 27 FEBRUARY 2010

Samoa EQ and tsunami on Sep 29, 2009: Filomena Nelson, vice-chair of PTWS and Principal Disaster Management Officer for Samoa, reported that the Samoan NTWC issued the tsunami warning 7 minutes after the event, mainly based on the strong earthquake which was felt all over the islands. She is preparing a national report while comprehensive reports from New Zealand and NOAA exist.

Action: The group asked the secretariat if a summary report could be compiled based on these reports in view of the fact that no System wide review (as for the Chile event) was conducted for the Samoa event.

Chile EQ and tsunami on Feb 27, 2010: A draft Technical Report from the secretariat was provided based on a survey questionnaire to this event. The group appreciates the initiative taken but asks the secretariat not to publish the report before PTWC, JMA and ITIC as well as the ICG/PTWS WGs reviewed the document. The participants explicitly mentioned that this report could be used as an important basis to learn about the actual shortcomings of the PTWS and prioritise ICG/PTWS Implementation Plan action items and thus should be structured based on the three central pillars of the Medium Term Strategy 2009-2013.

Action: PTWC, NWPTAC, ITIC and WGs will review the draft technical report of the Chile tsunami on February 27, 2010, by end of September 2010.

8. REPORTS FROM PTWS WORKING GROUPS

David Coetzee, chairperson of WG3 - Awareness and Response, reported on the activities of his Working Group and the active role of ITIC in conducting training courses and producing educational

material. He also mentioned the starting of global coordination efforts through the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS) Working Groups which met in Lisbon in May 2010. The respective TOWS Task Teams will next meet at the end of November in Seattle.

Ken Gledhill, chairperson of the regional WG for the Southwest Pacific, reported on the progress achieved within his WG and the recent status of the instrumentation networks in the region. He also mentioned that a SeisComp 3 training course has been conducted in Early July 2010 in Fiji that comprised trainees from nearly all MS of the region. As an outcome this course also produced a position paper on possible upgrade of the seismic network in the region which could be of use for the Implementation Plan.

Walter Flores, chairperson of the regional WG for the Southeast Pacific, reported on the various activities in the region, which have been closely coordinated among the four member states and mainly funded through the European Commission's Humanitarian Aid Department for Disaster Preparedness (DIPECHO) project. The ongoing upgrade of the seismic and tide-gauge network is funded through national funds and partially through Global Ocean Observing System (GLOSS). There are plans to establish a cross-country expert group on tsunami and inundation modelling. He also provided a list of recommendations from the WG (see Annex 2).

Alejandro Rodriguez, chairperson of the regional WG for Central America Pacific Coast, reported that recently Nicaragua has successfully conducted a tsunami exercise. So far roughly 25 inundation and evacuation maps have been developed for Pacific cities in Nicaragua, El Salvador and Honduras (detailed list of Nicaragua and Central America inundation maps under Annex 3).

Mohd Rosaidi Che Abas, chairperson of the regional WG for the South China Sea, reported that he plans to conduct a WG meeting back to back with the SOP training course in Kuala Lumpur on October 4-8, 2010.

There is a generic issue of getting a better and active participation from MS to Working Groups which was discussed intensively.

Action: The group decided to address this issue through individual contacts and campaigning by all members of the Steering Committee. The chair of ICG/PTWS also expressed his concern about the reluctance of some mainly island states in becoming members of IOC.

Action: Among the actual membership of WG2, the SC appointed Nora Gale (NZ) as ad-interim chair for WG2 to fill the vacancy left by David McKinnie (USA).

Action: As most of the action items of the draft ICG/PTWS implementation plan are allocated to WG2 the SC recommends for this Working Group to meet in person before ICG/PTWS-24. Ken Gledhill will explore options for NZ or Australia to host the meeting. Southwest Pacific Seismic Data Sharing and Pacific Emergency Communications task teams could meet back-to-back.

9. REPORTS FROM OTHER ORGANISATIONS AND BODIES

Rhett Butler from Incorporated Research Institutions for Seismology (IRIS) gave a brief presentation on the Global Seismographic Network (GSN) seismic network and how the network is supporting the regional TWCs with accessibility to the global network. He pointed out that IRIS and its data centre are open to the idea of archiving and serving sea level data.

Action: ITIC, PTWC and IOC secretariat to provide an updated map of the PTWS seismic stations for the Implementation Plan by end of September 2010.

Bernie Kilonsky from the IOC/GLOSS Group of Experts reported on the long-standing cooperation between ICG/PTWS and GLOSS and the recent achievements in upgrading mainly the transmission frequencies of tide gauges with the goal of 5min intervals with priority to near source zones. Still, there are numerous transmission methods, channels and formats complicating easy access for TWCs.

Action: Based on the following discussion the SC ICG/PTWS asked IOC/GLOSS to look into the possibility to develop and adopt a common transmission format for real time sea level data.

Action: The confirmed GLOSS list on tide gauge update plans as well as a map of PTWS sea-level stations will be part to the Implementation Plan (see annex 4).

Edward Young presented the draft operating plan of WMO RA V which entails several links to ICG/PTWS to enhance the collaboration between IOC and WMO on both, communication and instrumentation upgrades. He also briefly reported that he is seeking funding to support a RANET/EMWIN/LRIT Workshop to be held in 2011 possibly in Wellington, New Zealand, and that he would be willing to seek funding for members of WG2 to meet at the same time.

10. PREPARATION OF ICG/PTWS-XXIV

The Secretariat reported that it was in contact with the State Oceanic Administration of China, through its National Marine Environment Forecasting Center (NMEFC). It is foreseen that the latter will host the ICG/PTWS-XXIV meeting in Beijing in May 2011. The host agreement is under review.

11. OTHER BUSINESS

Due to their importance to PTWS, the Steering Committee supports for ITIC and NWPTAC to become permanent members of the SC.

Due to an ongoing request from ICG/PTWS for the Secretariat to continuously update the TWFP and TNC listing through official channels and display the actual list of institutions on the ICG/PTWS website and the detailed contact information on a PW-protected workspace (see: <http://www.ioc-tsunami.org/content/view/288/1124/>), noting that the PTWS web site presently contains out-of-date and incomplete information, and given the limited staff in the IOC Secretariat, the members of the Steering Committee requested the IOC Secretariat to allow ITIC to help support PTWS website. ITIC has indicated its willingness to support this activity, pending availability of resources.

Action: The IOC secretariat is requested to provide access to the IODE/VLIZ server for ITIC to maintain the ICG/PTWS website.

12. Adoption of the Summary Report and Action Items

The IOC Secretariat introduced the Summary Report and the Actions of the Meeting. The PTWS-SC adopted the report and the recommendations.

13. Close of the Meeting

The Chairman closed the meeting after calling for a strong involvement of Member States in the activities of the Working Groups and in the preparation of and participation to the Twenty-fourth session of the ICG/PTWS in May 2010 in China. He thanked the Director of ITIC for hosting the meeting.

Annex 1.**ICG-PTWS Steering Committee Meeting, 17-20 August 2010****Revised Agenda****17 August**

ACTIVITY	NEEDS/RESPONSIBLE
Opening Welcome	ITIC, NWS Pacific Region, PTWS Chair
Logistics and Safety	ITIC
Reporting and Rapporteurs	PTWS Chair

Morning - Afternoon

ACTIVITY	NEEDS/RESPONSIBLE
Revision of the present state of adoption and implementation of the Medium Term Strategy of 2009-2013 concerning the Member States of the ICG-PTWS	Report of the Member States/Technical Secretary. If the information does not exist, we needed to urgently ask for it via letter, as well as through any other alternating means (e.g. email)
Revision and correction of the Plan of Implementation 2009-2011	Members of the SC to review and to bring prepared its written down observations and the proposals of correction or change /All the members of the SC
Adoption of the Plan of Implementation	

ACTIVITY	NEEDS/RESPONSIBLE
Establishment of the lines of financing required on the basis of the adopted Plan of Implementation and identification of potential funding sources/donors	Members of the SC to prepare information according to the (preliminary document/All the members of the SC?)
Establishment of the Strategy for Funding PTWS Activities	

18 August - Wednesday**Morning**

ACTIVITY	NEEDS/RESPONSIBLE
Reports of PTWS Organizations – PTWC, JMA, ITIC	PTWC, JMA, ITIC
PTWS Operational Users Guide	distributed by ITIC 14 August

ACTIVITY	NEEDS/RESPONSIBLE
Summary Results of PACWAVE08	Report PACWAVE08 distributed by ITIC Director 14 August

ACTIVITY	NEEDS/RESPONSIBLE
Establishment of lessons learned and recommendations for the next exercise/definition of the date of the next exercise	Members of the SC to review and to bring its written down observations/All the members of the SC; Input received from F. Schindele

Design of PACWAVE11 Dates, Scenario, Evaluation	Task Team
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Afternoon

ACTIVITY	NEEDS/RESPONSIBLE
Summary of Lessons Learned from 29 September 2009 and 27 February 2010	PTWC, Samoa, SWP WG; SEP WG, JMA
Critical evaluation and effectiveness of the action of the PTWS during the tsunami event of Chile, 27 of February and other events happened after the last meeting	Technical Report of the Secretariat following the survey

19 August – Thursday

Review ICG/PTWS-XXIII recommendations and make recommendations for ICG/PTWS-XXIV	Members of the SC to review and to bring its written down observations/All the members of the SC
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ACTIVITY	NEEDS/RESPONSIBLE
Revision and attention to the recommendations under responsibility of fulfilment of the WG2, designation of a new President	Report of David, proposals of candidates to President/Technical Secretariat, members of the SC

ACTIVITY	NEEDS/RESPONSIBLE
Revision and attention to the recommendations under responsibility of fulfilment by technical and regional Working Groups	Report of WG Chairmen/Technical Secretariat
Discussions on Seismic, Sea Level, Forecasting, Emergency Communications	Invited presentations from PTWC, IRIS, UHSLC/GLOSS, Filomena Nelson/Ed Young

20 August**Morning**

ACTIVITY	NEEDS/RESPONSIBLE
Revision and attention to the recommendations under responsibility of fulfilment by technical and regional Working Groups	Report of WG Chairmen/Technical Secretariat
Discussions on SW Pacific, SE Pacific, Central America Pacific, South China Sea	WG Chairs

Afternoon

Review and Adoption of Summary Report	Chair, Vice-Chair, Secretariat
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Annex 2. Recommendations of Working Group 5 (SE Pacific)

The Working Group

- Recommended to establish protocols and procedures for communication among response agencies locally and regionally
- Encouraged exercise and establish communication protocols between the components of monitoring (tide gauge and seismic) and Warning Centres of the Region, as well as with other groups of ICG / PTWS to coordinate and ensure effective mitigation and tsunami warning
- Requested technical support to efficiently utilize TIDE TOOL, through the PTWS
- Asks to develop and implement national and regional level, simulation models of occurrence of tsunamis. Noting the need to know all the basics of modelling through COMMIT MOST and other basic tools like FUNWAVE, that allows for bi-national collaboration and adapted to regional realities
- Recommended that training workshops aimed specifically at journalists to improve disclosure by reliable media alerts, with a good level of confidence in the accuracy of it
- Requested technical assistance from experts from the IOC / UNESCO, as well as facilitate the exchange of experiences among members of the region

Annex 3. Tsunami Maps from Nicaragua and Central America

1. Mapa de Tsunami de centroamerica - escala 1:1.000,000
2. Mapa de Tsunami a nivel Nacional escala 1:750,000
3. Mapas de amenaza de Tsunami para Corinto (16,624 habitantes): 1:5000
4. Mapa de amenaza de Tsunami para Puerto Sandino (7,068 hab): 1:5000
5. Mapa de Amenaza de Tsunami para San Juan del Sur (INETER-JICA). Escala 1:25,000.
6. Mapas de amenazas de Tsunami Pochomil – Quizalá. (INETER, COSUDE, CRUZ ROJA) escala 1:5.000.
7. Mapas de amenazas de Tsunami para Quizalá. (INETER, COSUDE, CRUZ ROJA) escala 1:5.000.
8. Mapa de Amenaza de Tsunami para Masachapa (5697 hab): 1:5000
9. Mapas de amenaza de Tsunami para la zona de Golfo de Fonseca: Potosí, Nicaragua.
10. Mapa de amenaza de Tsunami para la zona del Golfo de Fonseca: Choluteca, Honduras, (INETER, COPECO, SNET, BGR). Escala de 1:2000
11. Mapa de amenaza de Tsunami para la zona del Golfo de Fonseca: La Unión, El Salvador, (INETER, COPECO, SNET, BGR). Escala de 1:2000
12. Mapa de Amenaza de Tsunami para PoneLOYA, escala 1: 2000, Ineter – Bosai.
13. Mapa de Amenaza de Tsunami para Las Peñitas, escala 1: 2000, Ineter – Bosai.
14. Mapa de Amenaza por Tsunami para Miramar, escala 1: 5000. Ineter – Albanisa

Sistema de Alerta Temprana, instrumentado para las siguientes comunidades:

- Masachapa, Pochomil y Quizalá
- Corinto, El Realejo
- Las Peñitas, PoneLOYA, Salinas Grandes, en proceso.

En proceso los siguientes mapas de amenaza por tsunami:

1. Mapa de amenaza por Tsunami para San Juan del Sur
2. Mapas de Amenaza por Tsunami para El Astillero, (INETER, GTZ, ALCALDIA DE TOLA).
1. Mapa de Amenaza para Pie de Gigante (INETER, GTZ, ALCALDIA DE TOLA). SAT en Puerto Sandino, con la participación de Defensa Civil y/o Gobierno nacional,
2. SAT en el municipio de El Viejo, con la participación de la Defensa Civil,

Annex 4. PTWS/GLOSS Tide Gauge Transmission Frequency Update Plan

PID	User ID	Location	Country	Lat	Long	Recom. transm. frequency (min)
test		Langara Point	BC, Canada	54.2	-133.1	
		Patricia Bay	BC, Canada	48.4	-123.4	
		Port Alberni	BC, Canada	49.2358	-124.8155	
active, 1min		Tofino	BC, Canada	49.15	-125.91	
active, 1min		Winter Harbour	BC, Canada	50.7	-128.3	
ADC12228	CHSHOA	Ancud	Chile	-41.86	-74.35	15
ADC0F6BA	CHSHOA	Antofagasta	Chile	-23.6542	-70.4045	5
ADC0D056	CHSHOA	Arica	Chile	-18.472	-70.335	5
		Bahia Mansa	Chile	-40.5808	-73.73694	5
ADC104C4	CHSHOA	Caldera	Chile	-27.058	-70.834	5
		Constitucion	Chile	-35.3558	-72.45778	5
ADC117B2	CHSHOA	Coquimbo	Chile	-29.93	-71.35	5
		Cta. Meteoro	Chile			15
14066424	CHSHOA	Corral	Chile	-39.8667	-73.4333	15
93202BDA	NWSTSU, HIGUOH	Easter Island (Isla de Pascua)	Chile	-27.1547	-109.4395	5
ADC0E5CC	CHSHOA	Iquique	Chile	-20.2167	-70.17	5
ADC0A6C6	CHSHOA	Isla San Felix	Chile	-26.2922	-80.1086	5
ADC0802A, 60min		Isla San Pedro	Chile	-47.7167	-74.8833	
		Isla Wollanston	Chile			15
ADC0B5B0	CHSHOA	Juan Fernandez	Chile	-33.636	-78.8295	5
		Lebu	Chile	-37.5939	-73.66472	15
		Maulin	Chile			
ADC1315E		Puerto Chacabuco	Chile			10
		Puerto Melinka	Chile			15
ADC063D8		Puerto Montt	Chile	-41.483	-72.967	15
ADC147CE		Puerto Williams	Chile	-54.9333	-67.6112	15
5621F26C		Punta Arenas	Chile			15
1401F372	CHSHOA	San Antonio	Chile	-33.5833	-71.6333	15
ADC0C320	CHSHOA	Talcahuano	Chile	-36.6833	-73.1	5
35402444		Valparaiso	Chile	-33.033	-71.617	5
354316D0, Check Station	HIGUOH	Valparaiso	Chile			15
CB179530		Bahia Buenaventura	Colombia	3.883333	-77.06667	60
	IDEAM	Bahia Solano	Colombia	6.267	77.433	
Not assigned yet		Isla Gorgona	Colombia	2.966667	-78.16667	60
CB013298	IDEAM	Isla Malpelo	Colombia	4	-81.6	60
	IDEAM	Juanchaco	Colombia	3.933	77.367	
CB178646	IDEAM	Tumaco	Colombia	1.816667	-78.71667	60
3541A0AA	HIGUOH	Penrhyn	Cook Islands	-9.01666	-158.0667	5
93201092, 65980	NWSTSU	Rarotonga Island	Cook Islands	-21.2	-159.783	15 (3)
3540A250	HIGUOH	Quepos	Costa Rica	9.4	-84.16667	5

932040EE	HIGUOH	Baltra Island, Galapagos	Ecuador	-0.433	-90.283	5
	INOCAR	Esmeraldas	Ecuador	1	79.65	
3540B126, 93205398	HIGUOH	La Libertad	Ecuador	-2.2177	-80.9064	5 (60)
	INOCAR	Manta	Ecuador	0.933	80.7167	
932085F0	HIGUOH	Santa Cruz, Galapagos Island	Ecuador	-0.752	-90.307	5
50313520, 93229372	SMHCPH	Acajutla	El Salvador	13.5739	-89.8383	5 (60)
		La Union	El Salvador	13.3995	-87.8309	
		Bora Bora	French Polynesia			
9322451A	NWSTSU	Hiva Oa, Marquesas	French Polynesia	-9.8047	-139.0344	15 (60)
B1F0371A	SHOM	Huahine Island, Society Islands	French Polynesia	-16.7216	-151.0324	60
		Moorea	French Polynesia			
3540D4C0	HIGUOH	Nuku Hiva	French Polynesia	-8.9219	-140.0953	5
9322338A	HIGUOH	Nuku Hiva, Marquesas	French Polynesia			15
3341D3F6	HIGUOH	Papeete	French Polynesia	-17.533	-149.567	5
B1F00280	SHOM	Rangiroa Atoll, Tuamotu	French Polynesia	-14.9458	-147.706	60
3541F0D6	HIGUOH	Rikitea	French Polynesia	-23.133	-134.97	5
		Rurutu	French Polynesia			
		Tuamutu	French Polynesia			
B1F011F6	SHOM	Tubuai, Austral	French Polynesia	-23.3418	-149.4755	60
		Ua Pou	French Polynesia			
		Viarao	French Polynesia			
3542F7D8	HIGUOH	Christmas	Kiribati	1.983333	-157.4667	15
354305A6	HIGUOH	Kanton	Kiribati	-2.81667	-171.7167	15
93213484, 67680	NWSTSU	Majuro	Marshall Islands	7.1061	171.3725	15 (6)
3540E15A	HIGUOH	Acapulco	Mexico	16.8333	-99.9166	5
93209686	NWSTSU	Cabo San Lucas, Baja California	Mexico	22.87861	-109.91	15
3541502E	HIGUOH	Manzanillo	Mexico	19.06	-104.3	5
3540674E	HIGUOH	Socorro	Mexico	18.717	-110.017	5
RBCT, 3min		Boat Cove Raoul	New Zealand	-29.2798	-177.8938	
CPIT, 3min		Castlepoint	New Zealand	-40.8993	176.2317	
9321E2EC, CHIT	NWSTSU	Chatham Island	New Zealand	-44.0247	-176.3688	15 (3)
RFRT, 3min, inactive		Fishing Rock Raoul	New Zealand	-29.2519	-177.8999	
		Lottin Pt	New Zealand	-37.5503	178.159	
		North Cape	New Zealand	-34.4148	173.0487	
		Owenga	New Zealand	-44.024	-176.3675	
PUYT, 3min		Puysegur	New Zealand	-46.0848	166.5894	
354135C8	HIGUOH	Puerto Corinto	Nicaragua	12.4836	-87.1675	5
9322B59E	HIGUOH	Niue Island	Niue	-19.0525	-169.9214	15 (60)
		San Jose	Panama	13.9167	-90.8333	

35414358, 9323727A	HIGUOH	Atico	Peru	-16.2311	-73.6944	5 (60)
354165B4	HIGUOH	Callao	Peru	-12.071	-77.167	5
		Chicama	Peru	-7.6833	-79.4333	
	DHN	Chimbote	Peru	-9.0667	-78.6	
		Ilo	Peru	-17.6333	-71.3333	
		Lobos de Afuera	Peru	-6.935	-80.72	
354176C2	HIGUOH	Matarani	Peru	-16.9833	72.1	5
		Paita	Peru	-5.06667	-81.1	
		Pisco	Peru	-13.8	-76.2833	
		San Juan	Peru	-15.3333	75.15	
	HIGUOH	Talara	Peru	-4.5833	-81.3	5
3541D63A, 3540F22C	HIGUOH	Kapingamarangi	Pohnpei, Micronesia	1.085	154.768	5 (60)
3540E15A	HIGUOH	Funafuti Atoll	Tuvalu			5
35403732	HIGUOH	Barbers Point, HI	USA	21.3216	-158.12	5
9322566C	NWSTSU	Ewa Beach, HI	USA			15
93227080	NWSTSU	Ewa Beach, HI	USA			15
15D142A4	HIGUOH	Johnston Island	USA	16.739	-169.5233	5
3542C242	HIGUOH	Kaunapali, HI	USA	20.78	-156.9	5
9321778E, 3363A17C	NWSPAC	Midway Island, HI	USA	28.207	-177.356	15 (6)
3542E4AE (OPEN)	HIGUOH	Snug Harbor, HI	USA	21.31667	-157.8833	5
354232C6	HIGUOH	Snug Harbor, HI	USA			5
15D58280	HIGUOH	Tern Island, French Frigate Shoals, HI	USA	23.869	-166.2884	5
93201E40, 33638790	NWSTSU	Wake Island	USA	19.29	166.618	15
12A011E0	IPGPFR	Deshaies				5
12A00296	IPGPFR	La Desirade				5
354002A8	HIGUOH	test				5
9322D078	NWSTSU					15
9322E5E2	NWSTSU					15
9322C30E	NWSTSU					15
3341059E	NOANOS					5
35402444	CHSHOA					5
1401F372	CHSHOA					5
14066424	CHSHOA					5

Annex 5. Participants of the PTWS Steering Committee meeting

NAME	PTWS POSITION	AGENCY POSITION	AGENCY	EMAIL
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