

PacWave22-PICT regional exercise manual



1. Objectives	2
2. Scenario	2
3. Calendar	2
4. Exercise Roles	3
5. Exercise documents and materials	3
6. Exercise scenario timeline	5
7. Communication guidelines	8
7.1 E-mail communication guideline :	8
7.2 WhatsApp communication guideline :	10
7.3 Radio communication guideline :	11
8. Exercise Participants (last update: Nov 2, 2022)	13
Annex I	14

1. Objectives

1. Test the Hunga Tonga Hunga Ha'apai (HTHH) PTWC Interim Procedures and PTWS Products ([IOC Circular Letter 2902](#)),
2. Test regional communication and cooperation between PICT Member States, and the value of information sharing in facilitating national tsunami alert decision-making.

2. Scenario

The PacWave22-PICT will consist of a **2 hours real-time tabletop exercise starting at 2300 UTC on 9 November 2022** ([Access to your timezone](#)). The exercise scenario will replay the HTHH tsunami sequence that occurred on 15th January 2022 with PTWC-simulated products. During the exercise, PICT national stakeholders (National Tsunami Warning Centres and National Disaster Management Offices) will share event information through multiple informal communications modes, including by WhatsApp, mailing list, and/or HF Radio.

NOTE: *Countries or territories that would like to continue their exercise after the 2 first hours with other participants or at a national level are free to continue to use the WhatsApp group and mailing list.*

3. Calendar

Date and time (UTC)	Event	Link	Comment
9 November 2022, 22:55	Recall of starting soon the exercise		
9 November 2022, 23:00	Start of the regional exercise		
10 November 2022, 01:00	End of the regional exercise		<i>Countries and territories are free to continue their exercise at a national scale.</i>
16 November 2022, 23:00	Cold Wash - Regional Exercise Debrief	register	
21 December 2022	Deadline to complete and submit PacWave22-PICT Regional Post-Exercise Evaluation Form		<i>Only one evaluation form per participant.</i>

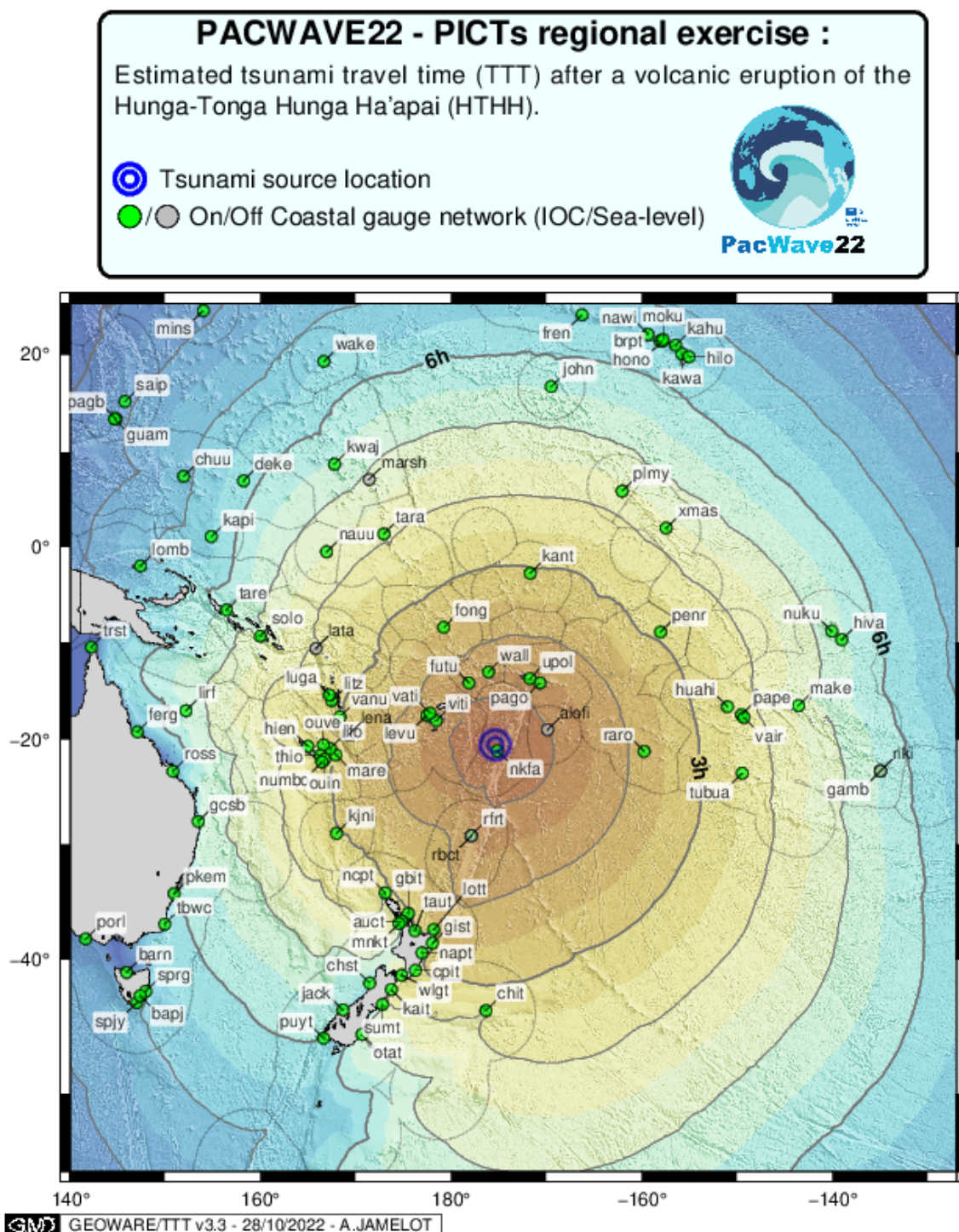
4. Exercise Roles

- Exercise Management – French Polynesia
- PTWC messages will be sent by UNESCO/IOC
- Observer/ Evaluator - ITIC

5. Exercise documents and materials






Please check all information and materials available to download on the dedicated regional exercise [webpage](#) (PTWC messages, IOC/Sealevel tide gauges marigrams and dataset, documentation, ...).

Below a regional and local Tsunami travel time map using the Hunga Tonga - Hunga Ha'apai Volcano as the point source location.



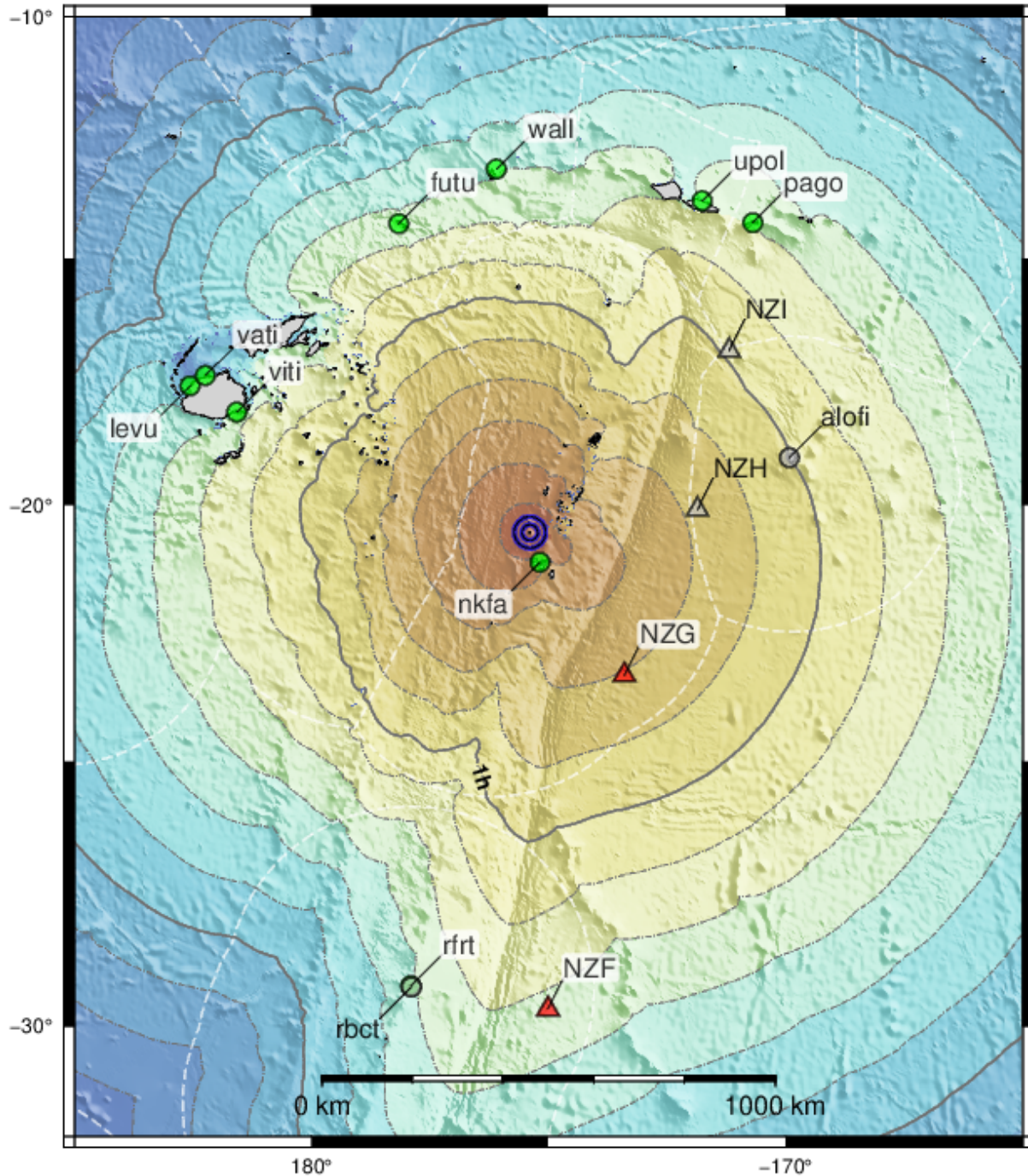
PACWAVE22 - PICTs regional exercise :

Estimated tsunami travel time (TTT) after a volcanic eruption of the Hunga-Tonga Hunga Ha'apai (HTHH).

-  Tsunami source location
-  /  On/Off Coastal gauge network
-  /  On/Off Bottom pressure sensors



PacWave22



6. Exercise scenario timeline

In red : Exercise setup comments (information will be shared by organizer through e-mail and whatsapp using inject numbers)

In Blue : Guidelines and recommendations of time for each NTWC/NDMO's participant to push updates on tsunami impact using one or all for the three communications modes as e-mail , WhatsApp and/or HF Radio. **All participants are free to ask or share any kind of information at any time.**

In Green: PTWC messages will be sent by email to all participants using the dedicated mailing list.

In. N°	Exercise Date and Time (UTC)	Delay since OT	Event and tsunami real-time observation (IOC/Sea Level and DART)	Action Taken	Comment
0	2022-11-09 22:40	OT-20min			<i>HF radio communication test on the primary frequency 7620 kHz</i>
1	22:55	OT-5min			<i>Recall of the beginning of the exercise in 5 Minutes using the mailing list tsunami-picts and a message through the WhatsApp Group.</i>
2	23:00	OT	Major volcanic Eruption of the HTHH, Origin Time (OT)	Start of the regional exercise	Volcanic explosive eruption is seen and hear by Tonga's population
3	23:10	OT+10min	Tsunami waves begin to impact on nearest coasts of Tonga islands	Tonga (TO - message 01) Initial message that trigger the regional volcanic eruption and tsunami warning	All NTWC/NDMO alerted and on observations
4	23:15	OT+15min	NEW OBS: First oscillations of 20 cm with high frequency periods of 4 minutes observed on the Nuku'alofa tide gauge (nkfa).		Trigger PTWC alarm
5	23:25	OT+25min		PTWC message number 01	
	23:35	OT+35min	NEW OBS: DART NZG has been triggered (by the shockwave), and began to send real-time high frequency dataset. A maximal height of 15 cm O-Crest is currently seen at this time.		
	23:38		UPDATE OBS: A first maximal height O-crest about 1,20 m was observed on Nuku'alofa tide gauge (nkfa), we only have a half period of the tsunami wave.		

6	23:40			Tonga (TO - message 02)	<i>Tsunami arrives at nearest Fiji islands</i>
7	23:45	OT+45min		PTWC message number 02	
8	23:50		NO OBS: coastal gage is offline at Niue	Fiji (FJ - message 01)	<i>Tsunami arrives at Niue</i>
	2022-11-10 00:00	OT+1h	OBS UPDATE: Nuku'alofa coastal gauge (nkfa) record is offline		
9	00:10		NEW OBS: First withdraw of 12cm O-Crest observed at Suva, Fiji on coastal gauge (viti)	Tonga (TO - message 03) Fiji (FJ - message 02) Niue (NU - message 01)	<i>Tsunami arrives at Samoa, American Samoa and at Suva (Fiji)</i>
	00:12		NEW OBS: First withdraw of 65 cm recorded at Pago-Pago, American Samoa's tide gauge (pago)		
10	00:15	OT+1h15	NEW OBS: First positive tsunami wave of 13 cm O-crest recorded by the tide gauge at Apia, Samoa (upol)	PTWC message number 03 American Samoa (AS - message 01) / Samoa (WS - message 01)	
11	00:20				<i>Tsunami arrives at Wallis et Futuna</i>
12	00:30	OT+1H30	NEW OBS: DART NZF has been triggered (by the shockwave), and began to send real-time high frequency dataset. A maximal height of 8 cm O-Crest is currently seen at this time.	Tonga (TO - message 04) Fiji (FJ - message 03) Niue (NU - message 02) Samoa (WS - message 02) American Samoa (AS - message 02) Wallis et Futuna (WF - message 01)	<i>Tsunami arrives at Raoul island (coastal gages are not working properly, no tsunami height measurable) and Tuvalu</i>
13	00:37				<i>Tsunami arrives at nearest Cook islands</i>
14	00:45	OT+1h45		PTWC message number 04	
15	01:00	OT+2H	OBS UPDATE: Nuku'alofa coastal gauge (nkfa) record is offline	Niue (NU - message 03) Cook islands (CK - message 01) Wallis et Futuna (WF - message 02) Tuvalu (TV - message 01)	<i>Tsunami arrives at Rarotonga, Cook islands.</i>
16	01:00			End of the regional exercise	Countries or territories that would like to continue their exercise with others or at a national level are free to continue.

	01:15			PTWC message number 05	
	01:30	OT+2h30	NEW OBS : Observation of several oscillation of height O-crest about 15 cm in New-Caledonia		<i>Tsunami arrives over Vanuatu. High frequencies observed in New Caledonia are generated the atmospheric pressure waves</i>
	02:00	OT+3H	OBS UPDATE : Maximal tsunami wave height O-crest recorded on tide gauge at Apia, Samoa (upol) is 25 cm	Vanuatu (VU)	<i>Tsunami arrives on coasts of Loyalty islands in New-Caledonia, Tokelau, New-Zealand</i>
	02:15			PTWC message number 06	<i>Tsunami arrives on nearest coasts from Solomon islands, French-Polynesia and Norfolk island</i>
	02:30	OT+3h30	OBS UPDATE : Maximal height O-crest recorded and available on real-time tide gauge at Fongafale, Tuvalu (fong) is 13 cm.	New-Caledonia (NC) / Tokelau (TK) / Vanuatu (VU)	
	03:15			PTWC message number 07	
	03:30	OT+4h30	OBS UPDATE : Observation of several oscillation of height O-crest between 60 cm and 1m are recorded on tide gauges in New-Caledonia		
	04:15			PTWC message number 08	<i>Tsunami arrives on nearest coasts of Australia and Papua New Guinea</i>
	05:00	OT+6h	OBS UPDATE : Maximal height O-crest recorded and available on real-time tide gauge at Kingston jetty in Norfolk island (kjni) is 1.3 m.		
	05:15			PTWC message number 09	

7. Communication guidelines

Participating NTWC/NDMO to highlight the following observation points during injects :

- Appreciation of impact and damages are based on each participant field survey following the HTHH event on the 15th January 2022.
- All participants are free to share any information about the event at any time since it is consistent with the timeline. We give here some examples and a non-exhaustive list of types of information to share.
- We also recommend participants to share as much as possible quantitative information and details (how high, how strong, what time, how long , ...) rather than general.
- For tide gages observations, all real-time HTHH tsunami records have been translated to the time of the exercise to help to run the exercise and are available on the [webpage](#).
- For all communication of tsunami height/amplitudes/run-up, please use metrics units.
- When sharing maximal heights, please specify if amplitude is given as 0-Crest observation or Crest-crest (See Annex I).

Recommendation to share its tsunami warning level :

Each country or territory has its own tsunami warning levels definition and related actions. In order to facilitate understanding between each other at a regional scale, we recommend to all participants that would like to share their warning level to list the actions related to their current warning level.

7.1 E-mail communication guideline :

To exchange or alert PICT member during the exercise, please send an email to tsunami-picts@list.woc.noaa.gov

Below a recommendation as header of each mail during this exercise :

To : tsunami-picts@list.woc.noaa.gov

Subject: <Country Code> - Message <Number>

Message: (Add the two following lines prior you main message)

Exercise - Exercise - Exercise
PacWave22-PICT regional exercise

“Your main Message”

<inject number> = referred to the timeline inject number list.

Through e-mail, the main message format and content is up to each participant to be the most efficient as possible.

NOTE: Only email given by each participant in the registration form is allowed to send an email to the list.

Example of a first email for Tonga

To : tsunami-picts@list.woc.noaa.gov

Subject: TO - Message 03

Message:

Exercise - Exercise - Exercise
PacWave22-PICT regional exercise

Massive volcanic eruption and explosion of Hunga-Tonga Hunga-Ha'apai, tsunami waves greater than 3 meters are impacting the NW coast of Tongatapu, Tonga.

7.2 WhatsApp communication guideline :

Group name : **PacWave22-PICT**

Admin of group : Jiuta Korovulavula (IOC/UNESCO),
Anthony Jamelot (French-Polynesia/NTWC)

Below a recommendation and examples of how to communicate and share information as simply as possible using WhatsApp application (mobile text messenger application).

One information per line is recommended, below a suggestion to how share informations on WhatsApp text message :

Option 1 :

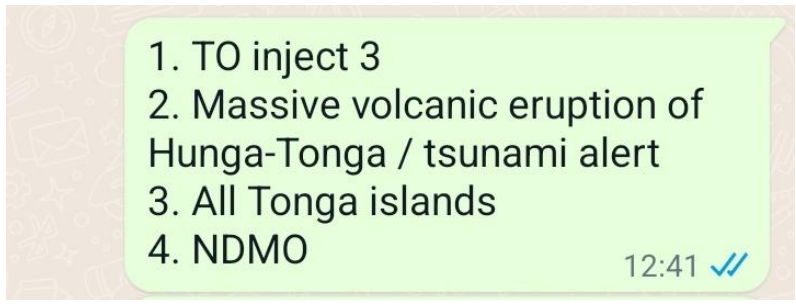
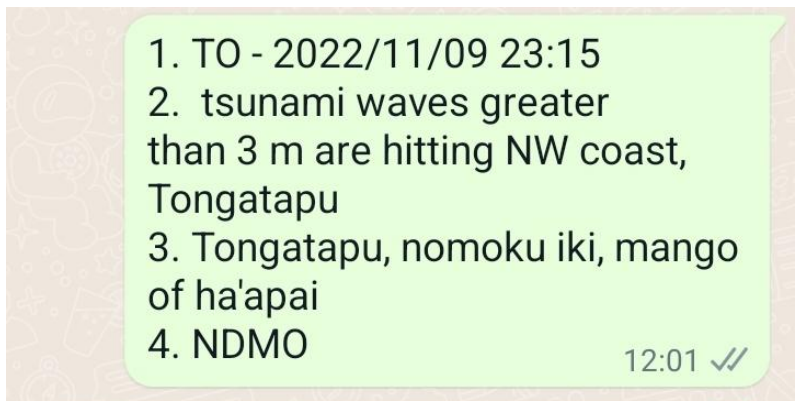
1. **<Country Code> - message <number>** - Use the corresponding inject number of the exercise timeline. The 2 letters country code is available in the participant list (section 8).
2. **Event / Observations / Public Advice**- Describe event source like the volcanic eruption or tsunami observations (runup height or damages) or Tsunami warning actions and public advice taken.
3. **Location** - Give at least the country/territories name, you can also describe the side of the coast mostly impacted or share geolocalized points.
4. **NTWC/NDMO** - identify the sender as part of the National tsunami warning center (NTWC) or part of National disaster management organization

Option 2 :

1. **<Country Code> - Date and time (timezone)** - Give the timestamp that corresponds to the time of your tsunami observation or NDMO action shared in this message.
2. **Event / Observations / Public Advice**- Describe events like volcanic eruption or tsunami observations (runup height or damages) or Tsunami warning actions and public advice taken.
3. **Location** - Give at least the country/territories name, you can also describe the side of the coast mostly impacted or share geolocalized points.
4. **NTWC/NDMO** - identify the sender as part of the National tsunami warning center (NTWC) or part of National disaster management organization.

NOTE: To make it easier, the identification of all group members and their mobile phone, a vCard will be shared privately among the WhatsApp group members.

Example of WhatsApp messages inject by Tonga NTWC/NDMO :

<p>Example a first message shared by Tonga (Option 1) (We can also imagine participants sharing pictures of the eruption seen from the coast ...)</p>	
<p>Update of tsunami impact shared by Tonga (Option 2)</p>	

7.3 Radio communication guideline :

HF Radio Frequency that will be used with Tonga and all participants during the exercise is :

- Primary 7620 kHz

NOTE: A HF Radio check will be done 20 minutes before the beginning of the exercise

Country	Recommended Call-Sign	Preferred Radio Frequency	Recommended Radio Frequency
Tonga	Tonga MET	Primary 7620 kHz Secondary 22051 kHz	
Fiji	3DA	-	14250 kHz
Tuvalu	T2A	22051 kHz	
Nauru	November Romeo (NR)	22051 kHz	
New Caledonia	FK8KA	7100 kHz / 3600 kHz and supplementary one 5351.5 kHz	14250 kHz

Below are the Code Names for each phase of the Exercise at start of any Radio message ;

1. Conduct of Comms Test : [RADIO CHECK!]
2. Conduct and Duration of Exercise : [EXERCISE! EXERCISE! EXERCISE!]
3. Completion of Exercise : [ZERO END, OVER]
4. Real situation : [NODUF]

8. Exercise Participants (last update: Nov 2, 2022)

Territories/ Islands	Territory Code	Participant	Observer
	2-letters		
American Samoa, USA	AS	Yes	
Australia	AU	Yes	
Cook Islands	CK	Yes	
Fiji	FJ	Yes	
French Polynesia, France	PF	Yes	
Kiribati	KI	No	Yes
Marshall Islands	MH		
Micronesia	FM		
Nauru	NR	Yes	
New Caledonia, France	NC	Yes	
New Zealand	NZ		
Niue	NU	No	Yes
Norfolk Island, Australia	NF		
Palau	PW		
Papua New Guinea	PG	Yes	
Pitcairn Islands	PN		
Samoa	WS	Yes	
Solomon Islands	SB	Yes	
Timor-Leste	TL	Yes	
Tokelau	TK	Yes	
Tonga, Kingdom of	TO	Yes	
Tuvalu	TV	No	Yes
Vanuatu	VU	Yes	
Wallis and Futuna, France	WF	Yes	

Number of islands that participate 15

Number of observers 3

Annex I

Tsunami observation parameter for PTWS Centres bulletin :

IOC Technical Series No 87

Annex IV – Page 4

