A. Survey Summaries

Caribe Wave 2017 Survey Report from TWFP/TNC
The following member states and territories participated in the post-exercise evaluation:

1. Antigua and Barbuda
2. Bahamas
3. Barbados
4. Belize
5. Brazil
6. Colombia
7. Costa Rica
8. Cuba
9. Dominican Republic
10. France (Martinique, Guadeloupe, St. Martin and Saint Bartholomey)
11. Grenada
12. Dominica
13. Guatemala
14. Guyana
15. Haiti
16. Honduras
17. Jamaica
18. Mexico
19. Netherlands (Aruba)
20. Netherlands (Curaçao)
21. Netherlands (Sint Maarten)
22. Netherlands (Bonaire, Saba, Sint Eustatius)
23. Nicaragua
24. Panama
25. Saint Kitts and Nevis
26. Saint Lucia
27. Saint Vincent and the Grenadines
28. Suriname
29. Trinidad and Tobago
30. UK (Anguilla)
31. UK (Bermuda)
32. UK (British Virgin Islands)
33. UK (Cayman Islands)
34. UK (Montserrat)
35. UK (Turks and Caicos)
36. US (Puerto Rico)
37. US (Virgin Islands)
38. Venezuela (Bolivarian Republic of)
### Contact Information - Agency

Answered: 38  Skipped: 0

#### Bar Chart:

- **Tsunami National Contacts (TNC)**
- **Tsunami Warning Focal Points (TWFP)**
- **National Tsunami Warning Center (NTWC)**
- **Other**

#### Table:

<table>
<thead>
<tr>
<th>Agency</th>
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<th>NTWC</th>
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Antigua & Barbuda: 26 educational facilities.

Brazil: Participation as observer.

Cuba: We carried out the exercise together with the National Civil Defense General Staff (NTWC) and other organizations.

Dominican Republic: We exercise communication exercise between focal point and emergency center.

France: This evaluation form is for the 4 FWI territories (Martinique, Guadeloupe, Saint-Martin and Saint-Barthélémy).

Grenada: This has been the fifth consecutive year of participation - the event getting more and more attention.

Haiti: The exercise also included representatives from several levels of the National System for Risk and Disaster Management.

Jamaica: Only Communications Component.

NL- Bonaire, Saba, Sint Eustatius: Bennett- We evacuated the island Harbor office/operations.

Panama: The Institute of Geoscience is proposal to National Tsunami Warning Center for Panama and in this exercise we received the warning from PTWC via FAX, and communicate the information to Civil
Protection of Panama (SINAPROC). And also was realized an evacuation of 9 school, and different restaurant and stores in the community of Almirante, Bocas del Toro, Panama.

**Saint Lucia:** Saint Lucia participated by evacuating 9 schools and a coastal community. Saint Lucia also convened a meeting of its advisory body NEMAC and also had a tabletop exercise for its Government Liaison officers.

**Suriname:** As observer.

**UK- Anguilla:** Two exercises - Earthquake and Tsunami evacuation drills at Primary Schools, Tabletop Discussion exercise for NEOC members.

**UK- Bermuda:** This year we undertook a watered down table top exercise, with the main players being BWS, Bermuda's emergency measures organization (EMO) and the TWFP alternate - Marine Operations Centre.

**UK- Montserrat:** Limited participation this year (Public awareness and Communication).
Comments:

France: But delay around 15 minutes on the GTS.

Grenada: Received by the TWFP and interpreted before sending to the NTWC.

NL- Bonaire, Saba, Sint Eustatius: By mail at 14:01 UTC, but by GTS at 14:18 UTC, later than expected and caused confusion.

Panama: via fax, and email.

Saint Lucia: The message was received by the St Lucia Met service and Alternate Saint Lucia Fire service.

Suriname: As observers.

UK- Bermuda: Yes it was and in a timely manner.
Comments:

**Dominican Republic:** AISR/AFTN it has not been confirmed even if I arrived through that route.

**Jamaica:** AMHS (Aviation Message Handling System) to be verified. They also have AISR as a backup, but need to verify. GTS (Fiber) also to be verified. EMWIN not operational. FAX unsure.

**UK- Bermuda:** All messages formats above were received by 1401Z.
Q7 1B.3: The PTWC issued the CARIBE WAVE 17 initial Dummy Message by several methods. Please indicate the time at which the message was received by the TWFP/NTWC (UTC, Coordinated Universal Time).

Answered: 37  Skipped: 1
Comments:

France: 15 minute delay: automated alarm triggering too late.

NL- Bonaire, Saba, Sint Eustatius: the GTS message was received later than expected and caused confusion.

Saint Lucia: Message received via fax and email, EMWIN system was down.

UK- Bermuda: We received two faxes, one at 1401Z and one at 1413Z - caused some confusion.

UK- British Virgin Islands: Dummy message didn't come on time.

UK- Montserrat: That's 1001hrs local time.

USA- Puerto Rico: Wilfredo- The initial Fax not received; They were received from the second bulletin./ Gisela- EMWIN 14:15 UTC.
Q9 1B.5: Did your TWFP/NTWC receive by email from PTWC the simulated exercise messages at the times specified in the Exercise Manual?

Answered: 37  Skipped: 1

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34 responses indicate Yes.
Comments:

**Antigua & Barbuda:** Disaster Services- Yes the Antigua and Barbuda Met Office

**Belize:** National Emergency Management Organization (NEMO)

**Dominican Republic:** Puerto Rico Seismic Network

**Jamaica:** Office of Disaster Preparedness and Emergency Management.

**NL- Bonaire, Saba, Sint Eustatius:** An extra message was received through aruba.aw, probably forwarded

**UK- British Virgin Islands:** Puerto Rico Seismic Network

**USA- Puerto Rico:** Wilfredo- Puerto Rico Seismic Network (PRSN)

**USA- US Virgin Islands:** Puerto Rico Seismic Network
Q11 2.1: Rate each product on its usefulness in decision making from 1 (less) to 5 (most).

Answered: 35  Skipped: 3

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<td>50.00%</td>
<td>20.39%</td>
<td>11</td>
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UK - Turks and Caicos Islands: This is because a communication test was conducted for this exercise. On the following day the DDME conducted a functional exercise to test the activation and operation of the NEOC.

USA - US Virgin Islands: We received Puerto Rico Seismic Network (PRSN) products and did not really see anything other than the exercise start message from PTWC.
Comments:

**Costa Rica:** Maybe for us would be useful to divide the Caribbean coast in north and south polygons.

**France:** Forecast from scientist agency and university laboratory (IPGP/OVSM, BRGM).

**Jamaica:** Like to increase to four places, NE, SE, NW, SW, eg. include Port Antonio (NE), Savana La Mar (SW).

**Nicaragua:** Corn Island, Bluefields, Puerto Cabezas.

**UK- Bermuda:** As indicated last year, Ruth's Bay is not an especially useful location as it is not well known. Just Bermuda or our main tide gauge (Esso Pier) location would be better. There was some ambiguity in the exercise between the forecast location and the observed wave location (Ruth's Bay vs Bermuda).
Comments:

**Cuba:** Local seismic network and historical tsunami evidences and reports.

**Panama:** Seismic only.

**UK- Bermuda:** Bermuda NEEDS outside assistance for this. We do not even have good bathymetry mapping or any decent modeling!

**USA- Puerto Rico:** Wilfredo- PRSN.
Comments:

Cuba: Maps of ancient geological evidences of tsunamis

USA- Puerto Rico: Wilfredo– PRSN
Q16 2.6: Currently only the text messages are available to the public. Indicate which of the others PTWC products that are currently sent via email to only TWFP/NTWC should be made available to the general public (for example: through PTWC, web, media and etc.).

Answered: 37  Skipped: 1

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<td>Table of Statistics for Each Polygon</td>
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Q17 2.7: Do you require additional training on PTWC products.

Answered: 38  Skipped: 0

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Total Respondents: 38
Antigua & Barbuda: On all the products

Cuba: Training courses for people related to tsunami risk management and evacuation mapping

Jamaica: Individuals involved should have some foundation information inculcated this is best hands on/in person. Not a one size fits all.

UK- Anguilla: Not applicable.

UK- Bermuda: Not applicable.

UK- Cayman Islands: Madison- Webinars.

UK- Montserrat: Opportunity to sensitize other key stakeholders.

USA- Puerto Rico: Gisela- In person, Webinars.

USA- US Virgin Islands: In person if possible otherwise Webinars.
Comments:

**Dominican Republic:** We have standard development procedure in case of tsunami. France: SOPs still need to be performed.

**Jamaica:** Steps available at the National Meteorological Centre, not sure if available at other organizations.

**NL- Sint Maarten:** We use our standard procedures, but they are not specifically geared for tsunami events. That needs to be improved.

**USA- US Virgin Islands:** This area is a gap but is also impacted by how the messages are received. We need to work on who and how messages are received.

**Venezuela:** But we are working in that.
Antigua & Barbuda: Use of dissemination software, telephone

Colombia: Training exercise

Costa Rica: Trainings and exercises

Cuba: Seminars, classes, improvement of communications, alternative local methods of communication, local risk centers strengthened

Dominica: Needs improvement in this area of awareness

Dominican Republic: Meetings, talks, training elaboration and transmission of tsunami bulletin.

France: Training on new enhanced products working on decision making SOP

Grenada: Steering committee meetings to discuss products, public education to explain messages etc.

Haiti: Training on new products, simulation exercises

Jamaica: There are many training opportunities/interactions that Jamaica should consider.

NL- Bonaire, Saba, Sint Eustatius: Developing efficient procedures to react on warnings
**NL- Curacao:** Internal training for issuing tsunami-warning messages.

**Panama:** In training for the community and social media

**Saint Kitts and Nevis:** Officers at the TWFP on both islands were trained in the procedure

**Saint Lucia:** Saint Lucia has implemented a number of Early Warning systems to augment its current capacity and capability, including radio Broadcast interrupts, Smartphone mobile apps, automated sirens. All these were tested during CARIBWAVE 2017.

**UK- Bermuda:** All relevant staff are trained via the BWS SOPs, as well as by completing the Tsunami COMET module.

**UK- British Virgin Islands:** Training with TWFP & Disaster Office staff on the products issued by the PTWC.

**UK- Turks and Caicos Islands:** 1. exercising of relevant plans and procedures. 2. regular communication testing. 3. development of draft earthquake contingency plan. 4. training in EOC management and operations

**USA- Puerto Rico:** Trainings and exercises.

**USA- US Virgin Islands:** This area is a gap that needs to be worked on

**Venezuela:** We are working with theses and interns to expand training in the field
Comments:

**Colombia:** Eventos locales: se aplica alarma personal.

**France:** At the moment only EMIZA and Martinique have deployed.

**Grenada:** There is a tsunami protocol but not broken into tele/regional or local - it is a general plan that needs development

**Guyana:** Flood response plan to be adapted for use in the case of a Tsunami.

**NL- Bonaire, Saba, Sint Eustatius:** Not sure, there are general emergency response plans, but tsunami response plans should be evaluated on the islands.

**NL- Sint Maarten:** We use our standard disaster response plan.

**Trinidad and Tobago:** Currently in draft form being revised and updated.

**UK- Bermuda:** Not yet! BWS are able to Watch and Warn on Tsunami Threats, but there is currently no national plan as to what to do with these!
UK- Montserrat: Included in draft document, key agencies are aware of national response actions

USA- Puerto Rico: We have a tsunami plan for the state and for every municipality that could be affected by a tsunami. Puerto Rico is recognized as TsunamiReady.

USA- US Virgin Islands: The territory has a tsunami incident annex to the Territorial Emergency Operations that is due to be reviewed and updated/revised as necessary

Venezuela: Yes, with the experience gained with the Caribbean Wave, plans are being improved
Antigua & Barbuda: MET Service- said Yes

Colombia: Solo para algunas poblaciones costeras del país.

Dominica: But is mainly for the north of the island

Dominican Republic: They have the tsunami contingency plan establishing the evacuation in case of tsunami

France: Have to be formalized

Guyana: Flood evacuation plan to be used in the case of a Tsunami.

Haiti: Three municipalities in the northern departments already developed coastal evacuation maps.

NL- Aruba: Did not work, we will try to find solutions

NL- Bonaire, Saba, Sint Eustatius: Bennett- said No

NL- Curacao: Fer- said Yes

NL- Sint Maarten: We are working on modeling, but this takes time.
Saint Lucia: A mass coastal evacuation plan was drafted for the coastal community tested for CARIBE WAVE 2017

UK- Anguilla: The Draft National Tsunami Plan does identify coastal areas as having to be evacuated; however no detailed procedures are in the plan. The public will have to self evacuate after reception of the tsunami messages from the Anguilla Warning System

UK- Bermuda: We do have a rudimentary inundation map that provides some guidance on where evacuations should take place though.

UK- Montserrat: Included in draft document

USA- Puerto Rico: Each municipality that could be affected by a tsunami in Puerto Rico has a tsunami mass coastal evacuation plan.

USA- US Virgin Islands: The territory has tsunami inundation maps and posted evacuation routes but not a formal written evacuation plan. Due to the size of each island and available roadways evacuation options are limited

Venezuela: Yes, with the experience gained with the Caribbean Wave, plans are being improved
Comments:

**Colombia:** Si el País cuenta con el Sistema nacional de Detección y Alerta de Tsunamis que trabajo en coordinación con el Sistema Nacional de Gestión del Riesgo

**France:** Have to be more formalized and harmonized between the 4 territories

**Guatemala:** Actualmente se trabaja para realizar esta actividad

**NL- Bonaire, Saba, Sint Eustatius:** Dost- Should be part of the next test, now mainly communication was tested/ Bennett- said Yes

**Panamá:** Name of the group: "Fuerza de Tarea Conjunta"

**Saint Lucia:** The National Emergency Operations Center in Saint Lucia was activated during CARIBE WAVE 2017. All arrangements to activate the NEOC was tested.

**Suriname:** But if there is a tsunami warning the EOC will be activated

**UK- Bermuda:** There is some scope for this, but as mentioned there is no current national plan once members of Emergency Measures Organization (EMO) convene.
Comments:

**Guyana:** The Flood plan contains same so it will be used in the case of a Tsunami

**NL- Bonaire, Saba, Sint Eustatius:** Bennett- said Yes

**Suriname:** We do not have response plans with regards to tsunami

**USA- Puerto Rico:** Each municipality knows that it is their responsibility to issue the all clear. Although this issue is set out in emergency plans, we need to reinforce the concept at the local level in each municipality.

**Venezuela:** Plans are being improved
Comments:

Dominica: Work need to be done in this area of developing material for dissemination


France: Brochures, leaflets, kakemonos, video, goodies, …

Jamaica: Jamaica through the ODPEM Earthquake Awareness programme each year Jan-March does disseminate information on Tsunami Readiness. This may need to be more organized and deliberate with respect to Tsunamis. Jamaica will also be (and started in 2016) commerating World Tsunami day activities on Nov 5 each year (or around the Nov 5 date).

NL- Aruba: Might need help from UNESCO

NL- Bonaire, Saba, Sint Eustatius: Bennett- Not as yet, we have now commence with this process

Saint Lucia: evacuation plans have been developed but are being revised before dissemination of the final product

USA- US Virgin Islands: Tsunami maps, Tsunami Awareness training, Quick series Tsunami Preparedness books, Tsunami Awareness/Preparedness presentations
Antigua & Barbuda: MET Services- Not sure of the details

Cuba: University, posgraduate courses, training courses

Dominican Republic: We have cooperated with the Ministry of Education in the development and design of two books for the baseline and initial on tsunami prevention, mitigation and response in public schools but not implemented

France: More particularly in Guadeloupe and Martinique

Guatemala: Aún no se tiene estas actividades

Honduras: One community

NL- Aruba: Will try to implement

NL- Bonaire, Saba, Sint Eustatius: Bennett- said no

Saint Vincent and the Grenadines: Some programmes available, not fully part of curriculum

Trinidad and Tobago: Schools programs in place.
UK- Anguilla: Informally at the Pre-school and Primary School levels

UK- British Virgin Islands: It is incorporated in teaching materials from pre-primary through tertiary with support from the DDM when requested (ie Books, Presentation and pamphlets)

UK- Cayman Islands: Madison- Yes. Grade 4 and above.

UK- Turks and Caicos Islands: Disaster related curriculum programmes are in place at secondary and tertiary levels

USA- Puerto Rico: A Tsunami-related curriculum was developed by PRSN, and the state adopted it for the public schools.

USA- US Virgin Islands: Presentations and outreach programs are tailored to each audience but formal curriculum for different levels has not been developed

Venezuela: We are working in that

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Q27 3B.7: Are there other preparedness/education tools and products utilised in your country/territory? Please list in comments section.

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Total: 36
Comments:

**Colombia:** En coordinación con la Unidad Nacional de Gestión del Riesgo se realizan talleres de sensibilización a nivel municipal

**Cuba:** Talks for schools, coastal populations and decision makers

**Dominican Republic:** Brochures, talks, conference, Visit tv Programs and others

**Grenada:** Weekly Television and radio programmes

**Haiti:** Tsunami training guidebook, flyers, posters, audio and video spots, short documentaries...

**Mexico:** Tripticos, capacitación, información escolar.

**NL- Bonaire, Saba, Sint Eustatius:** Bennett- Yes, an island education and training plan for all emergency responders island wide.

**Saint Kitts and Nevis:** Radio and Television Public Service announcements, talks to students, groups and organizations and distribution of literature

**Saint Lucia:** Training manual has been developed; Liaison officers were trained during a tabletop exercise, brochures, flyers distributed to schools and other public offices.

**Saint Vincent and the Grenadines:** Tsunami SMART Teachers programme

**UK- Anguilla:** Website, flyers, brochures, public meetings, TsunamiReady materials, signs etc

**UK- Cayman Islands:** Frederick- Not Applicable/ Madison- Brochures, plan available on website, public outreach

**UK- Montserrat:** Tsunami pamphlets, tsunami information on our website and facebook page

**USA- Puerto Rico:** Educational Talks and Workshops.

**Venezuela:** Games, theses and educational manuals have been developed
Comments:

**Dominican Republic:** Yes we implement our protocol with center of emergency operations

**Jamaica:** Contacted the ODPEM

**NL- Bonaire, Saba, Sint Eustatius:** We started our own procedures following the test message

**NL- Curacao:** Fer- said No
Comments:

**NL- Curacao:** Fer- said Yes

**NL- Sint Maarten:** Our TWFP alerted the participating resorts by calling them directly. Information given was based on the scenario.

**Panama:** The Geoscience Institute issued the messages for CARIBE WAVE 17

**UK- Bermuda:** In the form of a local Tsunami Watch and then Warning.

**UK- British Virgin Islands:** Information stating it was a drill was posted on the Department's facebook account, twitter and website

**UK- Cayman Islands:** Madison- said Yes

**USA- Puerto Rico:** Gisela- PRSN issued 16 bulletins with tsunami information, for details visit: caribewave.uprm.edu

**USA- US Virgin Islands:** The territory needs to review the TWFP process
Comments:

Brazil: Only for observational purposes.

France: Maritime emergency rescue service responsible for a large area including the FWI and several others English speaking WI countries

Grenada: The various government ministries

Guatemala: Unicamente se envio a la agencia de respuesta

Mexico: Mandos militares y mandos navales

NL- Curacao: Fer- said Yes to Emergency Services
NL- Sint Maarten: Only to the 4 resorts participating in the evacuation exercise.

Suriname: We haven't issued the messages because we were observers

UK- Anguilla: The Department received the messages and passed relevant content to the public via the Anguilla Warning System

USA- US Virgin Islands: Each of our Emergency Operations Centers were activated and received the messages as part of a table top exercise

Venezuela: Other non-governmental organizations were notified
Comments:

**Dominica:** Radio stations

**Grenada:** Horns and whistles and internal agreed warning
Guyana: Print

NL- Curacao: Fer- said Yes to email, website and social media.

NL- Sint Maarten: One participating resort used their on property siren warning system. Saint Lucia: The messages was distributed through radio broadcast interrupt system and through mobile smartphone apps

UK- Anguilla: The Anguilla Warning System was activated, in addition to those above the CAPiT Anguilla Smartphone app was also activated

UK- British Virgin Islands: Messages stating it was an exercise was sent/posted via the response in 3C.4

USA- Puerto Rico: CAD

Venezuela: Web-based video conference (hangouts, skype)
Comments:

Antigua & Barbuda: MET Service- 6-10 minutes

France: We received the message number 1 at 14:25 UTC. That is 10 minutes later the beginning of the exercise as we received the dummy message at 14:16 UTC

Grenada: The focal points within 1 - 5 minutes and all others within 6-10 minutes

NL- Bonaire, Saba, Sint Eustatius: Mainly automated

NL- Curacao: Capello- It was a communication test for our service./ Fer- 11-15 min.

Saint Vincent and the Grenadines: Not applicable

Suriname: See question 3C.3

UK- Cayman Islands: Frederick- Although the messages were sent fairly quickly there were delays in receiving text messages/ Madison- 6-10 minutes
Comments:

Dominica: Yes and no in some areas

Grenada: However some SMS were late

NL- Aruba: But needs improvement

NL- Curacao: Fer- said No

UK- Cayman Islands: Frederick- Although the messages were sent fairly quickly there were delays in receiving text messages/ Madison- Used SMS. Was instant to six hours
Comments:

**NL- Bonaire, Saba, Sint Eustatius:** Dost- We are awaiting further comments from the islands (Bonaire, Saba and St Eustace)/ Bennett- Submitted the questionnaire for St Eustace

**NL- Curacao:** Fer- said Yes
Comments:

**Antigua & Barbuda:** Disaster Services- Partially/ MET Service- Not sure

**Colombia:** Solo se realizó el ejercicio entre las entidades del SNDAT para poner a prueba el nuevo protocolo nacional.

**Dominica:** The ODM tested only the communication aspects

**France:** National, zonal, departmental and as well as municipal level

**Grenada:** But smaller EOCs was

**Guatemala:** Fue un simulacro de mesa

**Haiti:** The National EOC, a departmental EOC (North-East) and a communal EOC (Fort-Liberté) were activated.

**NL- Curacao:** Fer- said Yes

**UK- Bermuda:** However, the National Disaster Coordinator was present at BWS for the exercise.

**UK- Cayman Islands:** Frederick- Partial Activation - Full activation would take place to respond to the event

**UK- Turks and Caicos Islands:** NEOC was activated for the functional exercise which took place the day after CaribeWave but utilized CaribeWave scenario

**USA- US Virgin Islands:** Each of our three EOCs were activated
Comments:

**Colombia:** De acuerdo a lo establecido en el Protocolo Nacional

**Dominica:** No but with the CDEMA CU

**NL- Sint Maarten:** These are one and the same.

**Panama:** Always

**Saint Lucia:** The TWFP was at the national Emergency Operations centre

**UK- Anguilla:** The TWFP is only required to provide initial notification. Once notified Disaster Management takes over the monitoring of communications from the PTWC as per our tsunami plan

**UK- Bermuda:** Yes, the National Disaster Coordinator was present at BWS or available by cell phone throughout the exercise.

**UK- Cayman Islands:** Madison- Same Agency

**USA- Puerto Rico:** Wilfredo- NDMO and TWFP are the same. Gisela- said Yes
Antigua & Barbuda: MET Services- Not sure

NL- Bonaire, Saba, Sint Eustatius: Due to the fact that the islands are small, the local disaster management organizations are the same as the NDMO

NL- Curacao: Fer- said No

Saint Lucia: The NEOC maintained contact with local disaster officials on the ground in the coastal community being evacuated.

UK- Montserrat: Monitored HF radio throughout the exercise

USA- Puerto Rico: Each municipality has a local disaster management office.

USA- US Virgin Islands: VITEMA is the sole Emergency Management Agency for the territory
Comments:

**Antigua & Barbuda:** 26 education facilities

**Costa Rica:** Barra del Colorado

**Dominica:** Only the communication plan was tested

**Dominican Republic:** A community in palenque san cristobal mobilized some people. This community was trained between onamet and a project to respond to tsunami's occurrence

**France:** 60 000 students evacuated in Guadeloupe and 70 000 evacuated in Martinique

**Grenada:** 600 persons on Northern coast including primary, secondary and preschool aged, 125 on sister island

**NL- Aruba:** Did not go smoothly

**NL- Bonaire, Saba, Sint Eustatius:** Bennett- said Yes, we evacuated the island Harbor office/operations

**NL- Sint Maarten:** 4 beach front resorts evacuated sections of their properties lower than the 10 meter elevation.

**Panama:** In the community Los Almirante, Bocas del Toro, 9 schools (4000 students), restaurants, stores and industries (aprox 7000 people)
Saint Kitts and Nevis: Schools and businesses

Saint Lucia: Dennery Village, a coastal community on the east coast of Saint Lucia

Trinidad and Tobago: Some schools in the North-western area of Trinidad.

USA- Puerto Rico: During the exercise, several municipalities carried out evacuation drills.

USA- US Virgin Islands: St. Croix VITEMA office, territorial agencies and businesses in the Christiansted area conducted building evacuations as part of the exercise
Comments:

Antigua & Barbuda: MET Services- Yes- Local; Not sure about the others

Colombia: Solo para algunas poblaciones costeras del país, principalmente en el Pacífico.

Dominican Republic: We have flood maps are with local historical events and noaa bathymetric

France: An up to date is in progress

Haiti: For three municipalities in the northern only

Jamaica: Tsunami inundation maps are ONLY available for 1 community (Old Harbour Bay). This was development under a Regional/Caribbean Project Initiative - The CHILESPANA Project.

NL- Aruba: Needs to be improved

NL- Bonaire, Saba, Sint Eustatius: We are not sure for Bonaire

NL- Curacao: Fer- said No for Local Scenario

Panama: We are working on it.

Suriname: Not applicable
UK- Bermuda: There is one main map which shows a 10m-inundation line across the Island.

UK- Cayman Islands: Frederick- No Tsunami Modeling has been done for the Cayman Islands

USA- US Virgin Islands: Tsunami inundation maps have been developed for each island but are not scenario dependent

Dominican Republic: COMmit
France: BRGM (technical agency) run a tsunami municipal model before the exercise. Not able to do it in real time.
NL- Aruba: Needs improvement
Panama: We are using ComMIT.
UK- Anguilla: TWFP does not have this capacity.
UK- Bermuda: It would be wonderful if we could get some external assistance in developing these!
USA- Puerto Rico: Gisela- said Yes, Tide Tool
USA- US Virgin Islands: VITEMA doe not have the capability to run any modeling programs
Comments:

**Antigua & Barbuda**: MET Services- Responsibility of the NTWC

**Costa Rica**: It was a local scenario for us, so there was no time to consult many of the sources

**NL- Bonaire, Saba, Sint Eustatius**: PTWC as source of forecasts

**NL- Curacao**: Fer- said No to "Engage with social media"

**Saint Kitts and Nevis**: None applicable as specific areas and institutions were targeted

**Suriname**: None are applicable

**UK- Bermuda**: The main threat assessment was made via the email message from PTWC. A 'virtual' review of buoy data was made, but no data for the exercise was available (just standard real-time data).

**UK- Cayman Islands**: Madison- said Yes to both selected
**Comments:**

**Barbados:** Only issued to participants

**Costa Rica:** It was a local scenario

**Dominican Republic:** Only we send you information to the emergency operations center. but if we prevent the public

**France:** A text message informing people that a tsunami was generated and asking people to evacuate was sent by SMS

**Saint Kitts and Nevis:** Specific institutions were targeted for evacuation

**Saint Lucia:** Tsunami warnings were issued through automated sirens, Radio broadcast interrupt, smartphone mobile apps, amateur radio, emails and text messages

**UK- Bermuda:** A watch preceded the warning. Once a tsunami was confirmed by PTWC the warning was issued.

**USA- Puerto Rico:** Puerto Rico received a waiver from the FCC to use the actual tsunami warning code. Through this code the EAS and the NOAA Radio were activated to inform the population that had started the exercise.

**USA- US Virgin Islands:** As part of testing our territorial siren system
Q43 3E.2: Based on feedback, was the tsunami warning and/or information issued in a timely manner to the public (for example, prior to the scenario wave arrival time)?

Answered: 20  Skipped: 18

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 minutes</td>
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<tr>
<td>6-10 minutes</td>
<td>25.00%</td>
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<tr>
<td>11-15 minutes</td>
<td>5.00%</td>
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<td>10.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>
Comments:

Colombia: No aplica. No se emitió información al público.

Dominican Republic: Only we send you information to the emergency operations center. but if we
prevent the public

**France:** Firefighters vehicles with loudspeakers

**Guatemala:** No se aviso al público fue un simulacro de prueba de comunicación

**Haiti:** Church bells

**NL- Aruba:** Radio and tv failed to cooperate or reacted late

**NL- Curacao:** Capello- No applicable/ Fer- Telephone, SMS, Cell/mobile phone broadcast

**Panama:** And other institutions, i.e. firmans, red cross international, Lions club

**Saint Kitts and Nevis:** There was no need to contact the public as the exercise focused on specific entities and not community residents

**Saint Lucia:** Fire trucks was used in the Dennery Village to warn residents

**Saint Vincent and the Grenadines:** Not applicable

**Suriname:** Not applicable

**UK- Anguilla:** Anguilla Warning System includes FM broadcast interrupt and Smartphone app

**UK- Cayman Islands:** Frederick- Although the messages were sent fairly quickly there were delays in receiving SMS messages/ Madison said radio

**UK- Montserrat:** Public information and tsunami awareness

**USA- Puerto Rico:** Emergency Alert System (EAS)

**USA- US Virgin Islands:** Notices for the exercise and testing of the sirens issued thru our VI-Alert system. Conducted a Required Monthly Test of the EAS as part of the exercise

**Venezuela:** Amateur ham radio
Comments:

**Antigua & Barbuda**: MET Services- Education Ministry, schools/ Disaster Services- Police, Fire, EMS, ABDF, Volunteers

**Barbados**: School, and Emergency Services (First Responders), Volunteer Groups

**Dominican Republic**: Cruz Roja Dominicana, Defensa Civil Palenque - Est. 187 AND Div. de Pronósticos de la Oficina Nacional de Meteorología

**France**: Schools, social landlords, districts participated in evacuation test to reach safe location indicated by tsunami evacuation signage realized with the collaboration of the University Montpellier III

**Grenada**: Hotels, Businesses, Community groups

**Guatemala**: Participó el personal de radio de la agencia de respuesta

**Haiti**: Ministry of Public Works Transport and Communications, Ministry of Public Health and Population, Ministry of Interior and Territorial Communities, Ministry of Justice and Public Security through the National Police, Red Cross...

**México**: Capitanías de puerto, bomberos, escuelas
NL- Sint Maarten: Staff and guests of 4 resorts participated.

Saint Kitts and Nevis: Police, Fire and Rescue, schools and business establishments

Saint Lucia: The National Emergency Advisory Committee was activated, and so was the NEOC

Trinidad and Tobago: Four Municipal Corporations exercised various scenarios. Neighboring corporations were encouraged to assist those exercising. Mayaro/Rio Claro Regional Corporation-Eastern Regional Health Authority, REACT, Rio Claro Open Bible, Ministry of Rural Development and Local Government.

UK- Anguilla: One hotel and several private schools participated by performing evacuations (limited in the case of the hotel)

UK- Bermuda: Bermuda's Marine Operations Centre (MAROPS) also participated as the official TWFP alternate.

UK- British Virgin Islands: Estimated over 36 private agencies, 22 educational facilities and 40 government departments

UK- Turks and Caicos Islands: For the communication test a few agencies participated. for the functional exercise a number of agencies participated such as: RED Cross, ADRA, Fire, Police, Health, Social Welfare, 911, DDME, Public Works etc

USA- Puerto Rico: Wilfredo- Police Department, Fire Department, 911, Education department, Faith-based organizations, media organizations, Universities and colleges. Gisela- PREMA, NWS-SJ, Puerto Rico Broadcasters Association, PREMA Zones, Municipal Emergency Management Offices, TsunamiReady communities and state agencies

Venezuela: Hotels, private companies
Antigua & Barbuda: MET Services- Not sure of the details

Dominican Republic: Several communities were prepared but not certified as tsunami action

Grenada: Will start in June 2017

NL- Curacao: Fer- said No

Panama: We want to implement it

Trinidad and Tobago: Pilot programme to bring Tobago to Tsunami Ready status is underway but is moving very slowly. This programme will be used as a template for the fourteen municipalities in Trinidad.

UK- Anguilla: Anguilla was the first internationally recognised TsunamiReady community

UK- Montserrat: Project in draft and awaiting approval

USA- US Virgin Islands: The territory is designated as TsunamiReady and assembling our package for recertification in June

Venezuela: No yet, but we are working in that
Comments:

Brazil: I am not able to answer this question.

Colombia: Está siendo evaluado a nivel nacional.

Dominican Republic: Yes, but we need more training and cooperation

Saint Kitts and Nevis: St. Kitts-Nevis already received such recognition

Saint Lucia: Yes, but will need more information

UK- Anguilla: Anguilla was the first internationally recognised TsunamiReady community

UK- Bermuda: Perhaps, but it sounds like we need a vast amount of input from both internal and external sources which are not readily available.

USA- Puerto Rico: Puerto Rico is already TsunamiReady

USA- US Virgin Islands: We are already participating in the program
Q48  3.F.3: How many communities in your country have already been designated as TsunamiReady® or Tsunami Ready?
Answered: 38 Skipped: 0

Q49  3.F.4: What is the target number of Tsunami Ready communities in your country/territory you expect will pursue Tsunami Ready recognition?
Answered: 34 Skipped: 4

<table>
<thead>
<tr>
<th>Country/Territory</th>
<th>Q48</th>
<th>Q49</th>
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<td>Puerto Rico</td>
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</tr>
<tr>
<td>Saint Kitts and Nevis</td>
<td>55</td>
<td>60</td>
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</table>
Saint Lucia | 0 | 4
Saint Vincent and the Grenadines | 0 | 20
Sint Maarten | 0 | 5
Suriname | 0 | 2
Trinidad and Tobago | 0 | 15
Turks and Caicos | 0 | 15
U.S. Virgin Islands | 3 | 0
Venezuela | 0 | 10

**Comments:**

**NL- Curacao:** Fer- said No

**UK- Bermuda:** Marginally, not much change from last year's exercise.

**UK- British Virgin Islands:** However, continuous training is recommended as some staff are rotated

**USA- Puerto Rico:** This is the ninth time that Puerto Rico participates in this exercise. Each year is an opportunity to assess and improve the level of response to a tsunami.

**USA- US Virgin Islands:** The EOC staff members gained a better understanding of not only their roles but the challenges of tsunami preparedness and response
Comments:

Antigua & Barbuda: Disaster Services- Adequate early warning

Costa Rica: The community participating in the drill can only be evacuated by boat, therefore it should be analyzed the possibility to build vertical evacuation shelters

Dominica: And may require technical assistance

France: Sirens to disseminate the alert to the people are to be installed

NL- Curacao: Fer- said No

Saint Kitts and Nevis: Need for more signage

Suriname: Because there is no implementation of tsunami readiness program

UK- Bermuda: A long list includes local interest (money/time etc. to generate an adequate national tsunami plan), good bathymetry mapping & decent modeling, evacuation maps & routes, public education, a national tsunami plan. Bermuda is currently poorly prepared - if a tsunami struck tomorrow the population would panic at our Tsunami Watch/Warning and literally run for high ground causing chaos. Despite Bermuda's low risk of a significant tsunami impact, this notion is very concerning.

USA- Puerto Rico: The reception signal of the NOAA radio has to be improved for the east coast of Puerto Rico.
Comments:

**NL- Curacao:** Fer- said No

**UK- Bermuda:** There is somewhat of an enhanced relationship between BWS and the National Disaster Coordinator.

**UK- Montserrat:** Conducted desktop exercise stakeholders in December 2016

**USA- Puerto Rico:** Each year, prior to the exercise, there are multiple meetings and / or workshops with stakeholders to review and improve communication among all.
Comments:

**Dominican Republic:** We visit two tv shows.

**France:** Websites, Facebook and twitter accounts were used to diffuse alert and safety instructions to the population.

**Haiti:** On field level.

**Mexico:** [http://laredmultimedia.com/2017/03/22/simulacro-internacional-de-alerta-de-tsunami/](http://laredmultimedia.com/2017/03/22/simulacro-internacional-de-alerta-de-tsunami/)

**UK- Bermuda:** It did, but it was delayed because the government's Department of Communications & Information disseminated the Press Release late.


**UK- Montserrat:** A news feature Caribewave 17 was carried on the national radio.

**USA- Puerto Rico:** The media participates in a pre-exercise press conference. On the day of the exercise there is a wide coverage of the media.

**USA- US Virgin Islands:** Press releases were developed and sent out

Comments:

**Antigua & Barbuda:** Disaster Services- More agencies need to build the skills of planning exercises

**Jamaica:** Did not participate as the NMC was informed that Jamaica was not participating, only participated at a communications level.

**NL- Curacao:** Fer- said No

**Suriname:** As observer we can't comment on that

**UK- Anguilla:** Exercise evaluators expressed concern at the format of the NEOC discussion tabletop exercise.

**UK- Bermuda:** For the scope of what Bermuda realistically hoped to achieve, it was satisfactory.

**USA- US Virgin Islands:** Limited value to the territory. The territory would likely get more more from developing its own focused exercise
Q55 4.6: Exercise planning at the international level went well.

Answered: 35  Skipped: 3

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
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<td>Not Applicable</td>
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</table>

Total: 35

Comments:

NL- Curacao: Fer- said No

Suriname: See question 4.5
**Q56 4.7: Exercise planning at the national level went well.**

Answered: 38  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
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<tr>
<td>Not Applicable</td>
<td>21.05% 8</td>
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</table>

**Total** 38

**Comments:**

Dominica: We were late in planning

NL- Curacao: Fer- said No
Comments:

**Dominica:** No we they were late in planning

**NL- Bonaire, Saba, Sint Eustatius:** Reasonable, could be improved

**NL- Curacao:** Fer- said No

**Saint Lucia:** Several townhall meetings were held with residents. Meetings were well attended.

**Venezuela:** At this level there is more strength in community-based plans
Comments:

**Antigua & Barbuda:** Disaster Services- Very good

**France:** Despite some difficulties to register on Tsunamizone

**NL- Bonaire, Saba, Sint Eustatius:** There is too much diversity in websites. Could be hard to find the right information

**NL- Curacao:** Fer- said No

**USA- Puerto Rico:** These websites are an important tool for the exercise.
<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated Population</th>
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<tr>
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<td>Costa Rica</td>
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<td>Cuba</td>
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<td>Curaçao</td>
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<td>France</td>
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<td>Martinique</td>
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<td>Mexico</td>
<td>1,000</td>
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<td>Saint Barthélemy</td>
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<td>Saint Vincent and the Grenadines</td>
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<tr>
<td>St Eustatius</td>
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<tr>
<td>Venezuela</td>
<td>283,000</td>
</tr>
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</table>
Comments:

**NL- Bonaire, Saba, Sint Eustatius:** It will be useful to have the text messages in rtf/txt format, not only pdf

**NL- Curacao:** Fer- said No Applicable

**USA- Puerto Rico:** The Caribbean WAVE 17 Participant Handbook did not include domestic bulletins for Puerto Rico and it was not available in Spanish.

**USA- US Virgin Islands:** But of limited use
Comments:

**Antigua & Barbuda:** MET Services- said Yes

**Brazil:** We couldn't participate in webinars this year, but in the last years, they were very helpful.

**USA- Puerto Rico:** I think the first one in Spanish was too early. (January 18)
Q62 4.13: Was the IOC How to Plan, Conduct, and Evaluate Tsunami Exercises guideline (http://www.srh.noaa.gov/srh/ctwp) used in preparing for the exercise?

Answered: 38  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
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<td>Total</td>
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</table>

Comments:

NL- Curacao: Fer- said Not Familiar with the Guideline

UK- Bermuda: Sort of - it has been referenced before for previous exercises.

USA- Puerto Rico: It is a rather long and complex document. Some sections were useful.
Comments:

**Grenada:** A bit lengthy and detailed - maybe separated into two - one for the TWFP and another for the NTWC or NDMO, there are unfamiliar acronyms and tools

**Jamaica:** It has been an eye opener; next time I will pay more attention to the information being disseminated.

**NL- Bonaire, Saba, Sint Eustatius:** However, as a TWFP for 3 islands it would be nice to select all islands together

**NL- Curacao:** Fer- said Not Applicable

**Saint Kitts and Nevis:** Not in all areas

**USA- Puerto Rico:** A great improvement compared to last year.
Anguilla: As always the evacuation of the Primary Schools went well. A lot of effort has been put into developing earthquake and tsunami plans for these schools and they are well drilled annually and well prepared. The Anguilla Warning System was activated successfully with the increased number of FM Broadcast Interrupt enabled stations rising from 1 last year to 4 this year. In addition it was the first real test of the newly developed CAPiT Smartphone app for the Anguilla Warning System. The Department ran a large Public Education campaign for the app in time for the test at CaribeWave 17. The app proved to be successful. The CERTs were also activated as part of the evacuations and provided valuable support to the schools. The tabletop exercise at the NEOC was successful at educating the participants about the potential impacts and effects of a large scale earthquake and tsunami. Its discussion based format was not preferred by the exercise evaluators who would have preferred a longer timeframe exercise where participants would have had more time and opportunity to work together on exercise injects. This was not a realistic possibility due to the limited time frame (2 hours) which senior NEOC participants could have been expected to devote to the exercise on the day. Overall the CaribeWave exercise continues to be a valued annual contribution towards tsunami awareness and public education.

Antigua and Barbuda: Disaster Services- This exercise create the perfect opportunity for the focus of both earthquakes and Tsunami on a national scale and must be continued. great job to all at Caribe Wave 17 thank you. MET Services- Need to utilize the many forms of communication that exist to further reach the public.

Aruba: Hi, We noticed that the warning system is not up to par. The Meteorological Service (TWFP) will continue working with the EMO in order to make this more operational. We noticed also that evacuations, by door to door notifications did not work accurately. From calculations of the EMO, we would expect a total of 12000 deaths. This mainly because the press did not relay messages or relayed them late. The Met.Serv together with the EMO will work on a new system of warning that does not rely that much on the press. This would decrease the amount of people that did not know about a possible warning. We experience the same problem also when issuing severe weather bulletins. The press is more interested in politics/gossips than...
important news, such as tsunami, or severe weather.

**Barbados:** A greater level of communication and coordination would have enhanced the success of the Exercise. The dissemination of messages between different sectors was delayed.

**Belize:** The CARIBE WAVE 17 Tsunami exercise was a great initiative. Belize was only observational during the exercise, by looking at the products, analysis, arrival and dissemination time. The arrival of information was well within the time range. Belize need to have a ready nation plan and also to have Mack exercise with different stakeholders, such as the Red Cross, Coast Guards etc. For the CARIBE Wave 18, during the exercise message from participating countries should be sent out to PTWC on hourly base on the event that is taking place in each country. More stakeholders need to be involved.

**Bermuda:** The exercise was primarily undertaken to test BWS's communication channels for Tsunami Information to the Public, Government Agencies etc. This was done in collaboration with Bermuda's National Disaster Coordinator who attended the exercise at BWS. In this regard, the exercise went reasonably well, with just a few issues being noted such as: 1.) how easy it was to read the tsunami watch/warning statements, 2.) who received the watch/warning emails in a timely manner without duplications, 3.) unfortunately with the Press Release being delayed to the media, there were one or two members of the public that misunderstood that Caribewave17 was an exercise and not a real event - their concerns were nevertheless addressed swiftly. As alluded to many times in the survey and previous ones, Bermuda unlike say Puerto Rico, is in its infancy with regards a 'National Tsunami Plan'. An added challenge this year was trying to get agencies engaged ahead of arguably Bermuda's biggest international event ever, the Americas Cup (AC35), which takes in late May and June 2017. Because the tsunami threat level to Bermuda is 'relatively' minimal, garnering interest in developing a National Plan is extremely challenging. This event is the only real outreach to the community, aside from the odd public lecture. No comprehensive bathymetry exists, nor modelling, nor evacuation plans, nor public education (schools etc.) As again already mentioned, should a significant event occur, it is very likely chaos would ensue upon the BWS Tsunami Watch/Warning being issued on all our regular communication channels (phone, TV, internet website etc.) If the organisers of this exercise can offer any assistance to Bermuda, I am sure it would be very gratefully received, at least by BWS and the National Disaster Coordinator.

**Brazil:** We receive the GTS message almost instantly.

**Cayman Islands:** Madison- We found that SMS is not great to warn the public.

**Costa Rica:** The communities in our north Caribbean coast are highly vulnerable, as they lie on low grounds surrounded by river channels, and the only access is by boat, sometimes only during high tide. Therefore alternate evacuation methods should be explored and defined soon.
Cuba: This is our second exercise. We were able to increase the number of people prepared to do it, mainly young specialists. Local capacities have been strengthened. We note communication problems and identify ways to solve them. It has been one of the best exercises with a good variety of scenarios in a really small region in relation to the tsunamis propagation speed to very populated coastal areas. That provides us with training, the possibility of improving our work, and useful information also for the future.

Curacao: We encourage the national disaster management organization and other stake holders to participate in this exercise. We promoted this event on our Facebook page, so the general public could participate.

Dominica: The exercise was very use full and planing at the international and regional levels were good. The information was well early and the national office have to use that information to organised. The office of Disaster Management was late in it's planing having there to be a number of short coming. For the next exercise we intent to improve on that aspect and also to test the evacuation plan of the community. So early planning will be important in getting the communities involvd and be part of the 2018 exercise.

Dominican Republic: ALL WASS WELL.......As general terms, we recognize the importance and benefits of the Caribbean Wave exercises since its inception, in such ways that the only thing we suggest for the next Caribbean wave is to continue counting on the collaboration and consultancies of international and national organizations subject matter experts.

France: This exercise CARIBE WAVE 17 which scenario was simulated a local tsunami was very interesting to check the well appropriation of safety instructions diffused to the population for 5 years. It was also the opportunity to test and validate the evacuation routes signage settled on the field within the project we are working on for several years with the University of Montpellier III and others local partners. Furthermore, the Caribe Wave exercise was part of a larger EU Exercise which allow us to test the coordination between the different levels of crisis management of the french civil protection system (as well as municipal, departmental, zonal and national) and our reinforcement by the european civil protection mechanism. A large number and various quality of organizations (scientist instates, networks operators, rescue services, social land loaders, …) were mobilized. By the way, the media coverage of these exercises would have allowed to improve the raising awareness of the population to the risks of earthquake and tsunami.

Grenada: Another splendid opportunity to test tsunami readiness. The national planning committee continues to look for new and innovative ways to bring this message to its population to enable them to be tsunami ready. There was sense of competitiveness to beat the standards set in 2016. The 2016 performance gave the country an opportunity to showcase its work at the ICG EWS meeting in May in Costa Rica. This is motivation to continue doing what we do best - keeping people safe.
**Guatemala:** creo que cada participación de nuestro país en este tipo de simulacro no va dejando bastante conocimiento para actuar en un evento real.

**Guyana:** In this exercise we looked at the evacuation of the affected population. It was found that the current flood evacuation plans, which will be used in the case of a Tsunami, are inadequate and need to be updated. The Civil Defense body will be looking at this. The international aspect of this exercise was well planned and executed, congratulations to the team. Cheers.

**Haiti:** Overall, the exercise went well. Haiti has chosen Cuba’s scenario which was a local tsunami. Regarding the fact that the first wave of a local tsunami arrives in 1 hour or less, people in the inundation area have to evacuate immediately after strong shaking. For Haiti, by considering PAGER the coastal population couldn’t feel the strong shaking but moderate. It would be better to give the duration of the shaking. That is a good parameter for a coastal population to evacuate itself in a real time. We know if the shaking lasts 20 seconds, there is a possibility to have a tsunami. Globally, that was a special exercise for Haiti which is located near Cuba.

**Jamaica:** Make a call to countries that are "not" participating to be encouraged to pay attention to review and respond to the survey, eg "All Member States, irrespective of the level of participation, will be requested to answer the survey". Regarding to Tsunami Ready communities: Approximately 13 communities would be targeted to receive recognition based on or geograph. However, only one community (Old Harbour Bay) would be in a position to immediate start such a process. With an expect additional 1 or 2 to immediately follow Old Harbour Bay.

**Mexico:** EN GENERAL NOS PARECIÓ ADECUADO.

**Netherlands (Bonaire, Saba, St. Eustatius):** In general the preparation, planning and conduct of the test went well. One of the most important issues for us is to extend the test to activities on the islands (test of a local emergency plan etc.) On a national scale it worked well. The choice of only one scenario helps a lot to create focus.

**Panama:** we have to improve the communications.

**Puerto Rico:** Wilfredo- The comments in the different sections of this questionnaire give a general idea of how this exercise was carried out in the area of communications at the state level. Both the initial dummy message and the remaining 16 messages were received and retransmitted within the time set in the protocol. The communication was clear and without interference. And for the CARIBE WAVE 18 we recommend the 1918 earthquake / tsunami scenario in Puerto Rico as a commemoration of the 100th anniversary of that event.

**Saint Kitts and Nevis:** The exercise was conducted in specific geographical areas. This contributed to good coordination, safety during and after evacuation. It also highlighted the need
for more signage and for more entities to develop and test earthquake and tsunami contingency plans.

**Saint Lucia:** Saint Lucia’s National tsunami Exercise was held in the Eastern coastal community of Dennery Village and the Vide Bouteille/ Choc Beach area of North Castries. Saint Lucia’s simulation exercise occurred in four phases. The first phase was a review of Saint Lucia’s National Tsunami SOPs and a tsunami response tabletop exercise on Monday, March 20th. The second phase happened on March 21st, with the evacuation of two schools in Castries North, namely the Sir Ira Simmons Secondary and the Castries Comprehensive Secondary schools. The third phase was the testing of the country’s Early Warning systems, namely automated sirens in Castries, radio broadcast interrupt capability and provision of early warnings through mobile apps. The fourth phase will be done in Dennery Village, where seven schools, including one school for children with disabilities, and residents was evacuated to predetermine evacuation/assembly points. Saint Lucia National Disaster office collaborated with the Department of Education and Innovation to initiate a full scale evacuation drill involving two schools in the Castries North area, and seven schools in the Dennery South community, including three (3) preschools and one school for children with disabilities. Approximately 2600 students were evacuated to various assembly points within Dennery Village, namely Green Mountain and Mt Gerald and Castries North, namely Bisee and Monplaisir Hill. All identified assembly points are located above the inundation height expected for a tsunami wave generated by the earthquake event. The other agencies, along with NEMO, who were involved in the exercise, include, but not limited to, the Office of the Prime Minister, the Police, the Fire Service, the Dennery South District Disaster Preparedness Committee, Ministry of Health and Wellness, Dennery and St Jude’s Hospitals, and the Department of Education and Innovation. At the debriefing that followed, a number of positives were highlighted, including the effectiveness of teachers to fully evacuate schools and get to the assembly points in record time. Also the inter agency coordination between the various response agencies were also highlighted. The debriefing also highlighted a few deficiencies that needed strengthening. However, it was generally agreed the Saint Lucia's response to CARIBWAVE 2017 was a resounding success.

**Saint Vincent and the Grenadines:** Our involvement was to observe the messages received from the PTWC for the exercise.

**Trinidad and Tobago:** We have no further comment at this time. Mayaro/Rio Claro Regional Corporation- The Mayaro/Rio Claro Regional Corporation would like to thank your organisation for the opportunity to participate in CARIBE WAVE 17. This exercise proved to be a learning curve in this region's Tsunami Warning System and future improvement in Disaster Management with guidelines from the Sendai Framework for Disaster Risk Reduction 2015-2030 CARIBE WAVE 18 recommendations: - National participation from other state agencies - Better communication grid with participants - Implementation of an Online After Action Report - Focus on one territory as a Model to execute proper Tsunami Warning and Evacuation best practice - CARIBE WAVE 18 Skype group.
**USVI:** We need to work on who in the territory receives messages and how they receive them. Activating each of the EOCs which resulted in a somewhat realistic gradual reporting of EOC staff. We need to continue the evolution of how the territory conducts the exercise but keep activities at a manageable level.

**Venezuela:** The point of mobilization and educational work with the community, are one of the important points in the tsunami drills for Venezuela. These contributions and recommendations come from international observers, non-governmental organizations and staff of Funvisis, Civil Protection, among others. There was international observation from the United Nations Children's Fund (UNICEF), with education and risk specialist from Latin America and the Caribbean, Ruth Custode who, together with her team, provided us with excellent Recommendations and suggestions. It is proposed by 2018 to include UNICEF in the pre-coordination workshops, including the invitation of other non-governmental organizations such as the Red Cross, UNESCO Venezuela, Caritas Venezuela, among others. Work should be continued on improving their communications, and emergency protocols. We also recommend continuing to promote, support and implement the inter-institutional cooperation and integration mechanisms, which establishes the bases to guarantee an articulated and organized response in case of an event generating damages. It is observed that the participation in the Caribe Wave is greater. It was supported by government authorities. Participation was coordinated with all coastal institutions but time and communications needs to be improved. Community participation and education was very successful, but there were few resources for the logistics of the participants (eg sufficient water, etc.) in some coasts. Strengthen the signposting of both escape routes and safe places.
## B. Sea Level Status

As part of the CARIBE WAVE 17 Regional Tsunami Exercise, a sea level status analysis was performed. The table below present the availability of the stations represented by X= available, 0= not available, and N/A= not applicable, and not in system.

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C. Tsunami forecast (Tweb) for Costa Rica, Cuba and Northeastern Lesser Antilles Scenarios

The PMEL laboratory created three simulated scenarios. The events are accessed by going to the Archived Events tab, clicking on All events, selecting the Show Simulations checkmark and double clicking the wanted event. For the Mw 7.9 Costa Rica scenario, two units sources were selected along the Caribbean coast of Costa Rica (Fig. 1) and an alpha of 2.203 (factor of slip component) was added to all. For the Mw 8.2 Cuba scenario, 4 units sources were selected along the southeastern coast of Cuba (Fig. 2) and an alpha of 3.213 (factor of slip component) was added to all. For the Mw 8.5 Northeastern Lesser Antilles scenario, 6 units sources were selected along the East of the Northeastern Lesser Antilles (Fig. 3) and an alpha of 5.258 (factor of slip component) was added to all.

**Figure 1.** Costa Rica scenario. Selected unit sources are depicted in frosted rectangles. From left to right: at1b and at2b, with boxes measuring 100 km long and 50km wide.
Figure 2. Cuba scenario. Selected unit sources are depicted in frosted rectangles. From top to bottom and left to right: at62a, at61a, at62b and at61b, with boxes measuring 100 km long and 50km wide.

Figure 3. Northeastern Lesser Antilles scenario. Selected unit sources are depicted in frosted rectangles. From top to bottom and left to right: at44a, at43a, at42a, at44z, at43z, and at42z, with boxes measuring 100 km long and 50km wide.

As the event unfolds, Tweb shows a map overview with an Active Event message on the top left corner of the window. In addition, contour lines of estimated time arrivals are shown across the ocean basin that is in the vicinity of the event (Fig. 4 a, b, and c). As times progresses, a red contour line moves across the ocean basin, signaling places where the tsunami wave has reached.
Figure 4 a, b, and c. The figures shows an overall view of the modeled Costa Rica, Cuba, and Northeastern Lesser Antilles scenarios (respectively). The color along the coasts indicates the level of danger from the initial tsunami event: green for minimum hazard and yellow and red for maximum hazard (left colored bar). White lines depict 1-hour calculated tsunami travel time contours for surrounding ocean basins.

**Flooding Forecast**

For the scenarios, Tweb creates flooding forecast models for Puerto Rico and the Virgin Islands. The scenario includes forecasts for the municipalities of Arecibo, Fajardo, Mayaguez, San Juan, and Ponce. For the US Virgin Islands region, the model is run for settlements Charlotte Amalie, and Christiansted, located in St.Croix and St.Thomas respectively (Fig. 5 a, b, and c).
Figure 5 a, b, and c. The flooding forecast includes a table with Model Region, Arrival Time (UTC), C Grid Max (cm), C Grid Min (cm), Gauge maximum (cm), Gauge minimum (cm), Potential Flooding, Run status, and Overlay Status.
Figure 6. Screenshot from Tweb of the flooding forecast for different locations in the Caribbean Region during the Northeastern Lesser Antilles scenario. Colors represent amplitudes in cm. From top to bottom: a. Arecibo, b. Charlotte Amalie, c. Christiansted, d. Fajardo, e. Ponce, f. San Juan and g. Mayaguez.

DART buoys

In the Inversion section of Tweb, 3 DART buoys distributed in the Atlantic (2), and the Caribbean (1) are used to detect any sea level change during the scenarios (Fig. 7). From the Northeastern Lesser Antilles scenario buoy 41421 shows the highest sea level change of approximately 20cm (Fig. 8).
Figure 7. The figure shows the specific location of each DART buoys.
Figure 8. Pairs of time series for DART buoys in the vicinity of Northeastern Lesser Antilles. From top to bottom: DART 41421, 41420, and 42407. The x-axis represents time (UTC) and the y-axis represents the water sea level change in centimeters (cm).