

Department of Geology  
University of Puerto Rico, Mayagüez and  
NOAA's Caribbean Tsunami Warning Program

CARIBE WAVE 2017  
Supplement Report

June 2017

## **A. Survey Summaries**

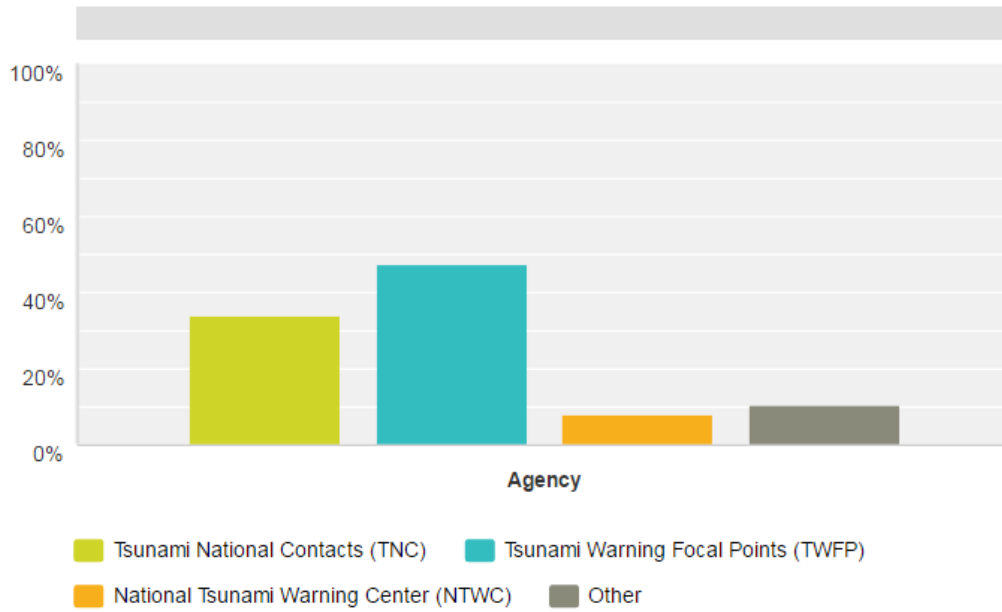
### ***Caribe Wave 2017 Survey Report from TWFP/TNC***

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



Agency	Tsunami National Contacts (TNC)	Tsunami Warning Focal Points (TWFP)	National Tsunami Warning Center (NTWC)	Other	Total
	34.21% 13	47.37% 18	7.89% 3	10.53% 4	38

### Q4 Did your Member State/Territory participate in CARIBE WAVE 17?

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	100.00%	38
No	0.00%	0
<b>Total</b>		<b>38</b>

#### Comments:

**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-Barthélemy).

**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 it advisory body NEMAC and also had a tabletop exercise for it Government Liaison officers

**Suriname:** As observer.

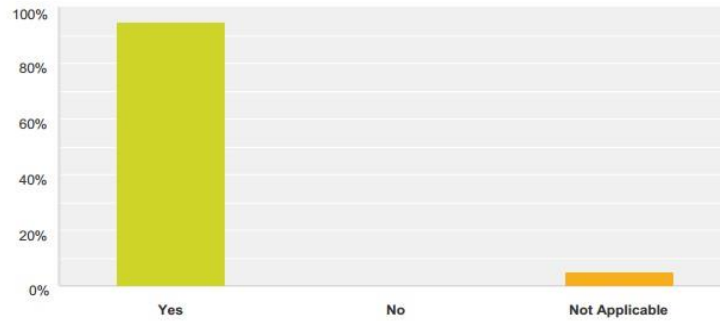
**UK- Anguilla:** Two exercises - Earthquake and Tsunami evacuation drills at Primary Schools, Tabletop Discussion exercise for NEOC members.

**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).

**Q5 1B.1: The PTWC CARIBE WAVE 17 initial Dummy (Start of Exercise) Message was received by your country's Tsunami Warning Focal Point / National Tsunami Warning Center.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	94.74%	36
No	0.00%	0
Not Applicable	5.26%	2
<b>Total</b>		<b>38</b>

**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.

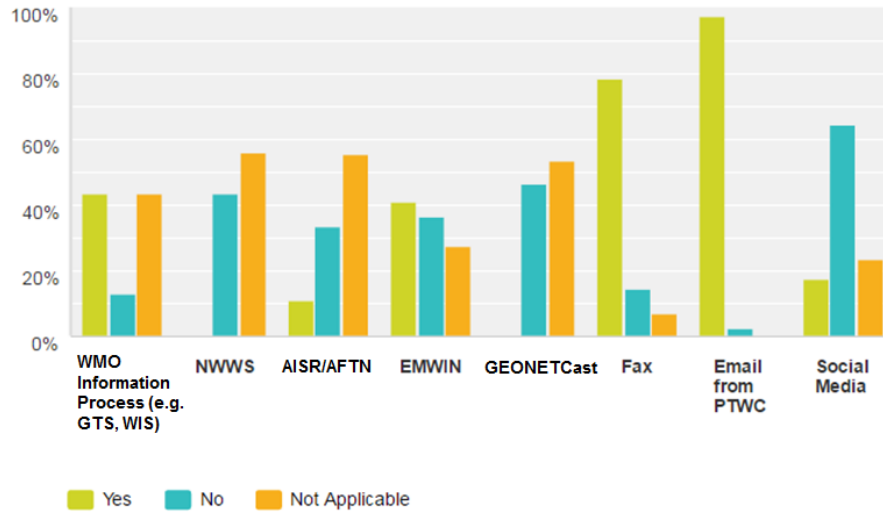
**Saint Lucia:** The message was received by the St Lucia Met service and Alternate Saint Lucia Fire service.

**Suriname:** As observers.

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

**Q6 1B.2: The PTWC issued the CARIBE WAVE 17 initial Dummy Message by several methods. Please check all methods through which the message was received by the TWFP/NTWC.**

Answered: 38 Skipped: 0



	Yes	No	Not Applicable	Total Respondents
WMO Information Process (e.g., GTS, WIS)	43.48% 10	13.04% 3	43.48% 10	23
NWWS	0.00% 0	43.75% 7	56.25% 9	16
AISR/AFTN	11.11% 2	33.33% 6	55.56% 10	18
EMWIN	40.91% 9	36.36% 8	27.27% 6	22
GEONETCast	0.00% 0	46.67% 7	53.33% 8	15
Fax	78.57% 22	14.29% 4	7.14% 2	28
Email from PTWC	97.37% 37	2.63% 1	0.00% 0	38
Social Media	17.65% 3	64.71% 11	23.53% 4	17

**Comments:**

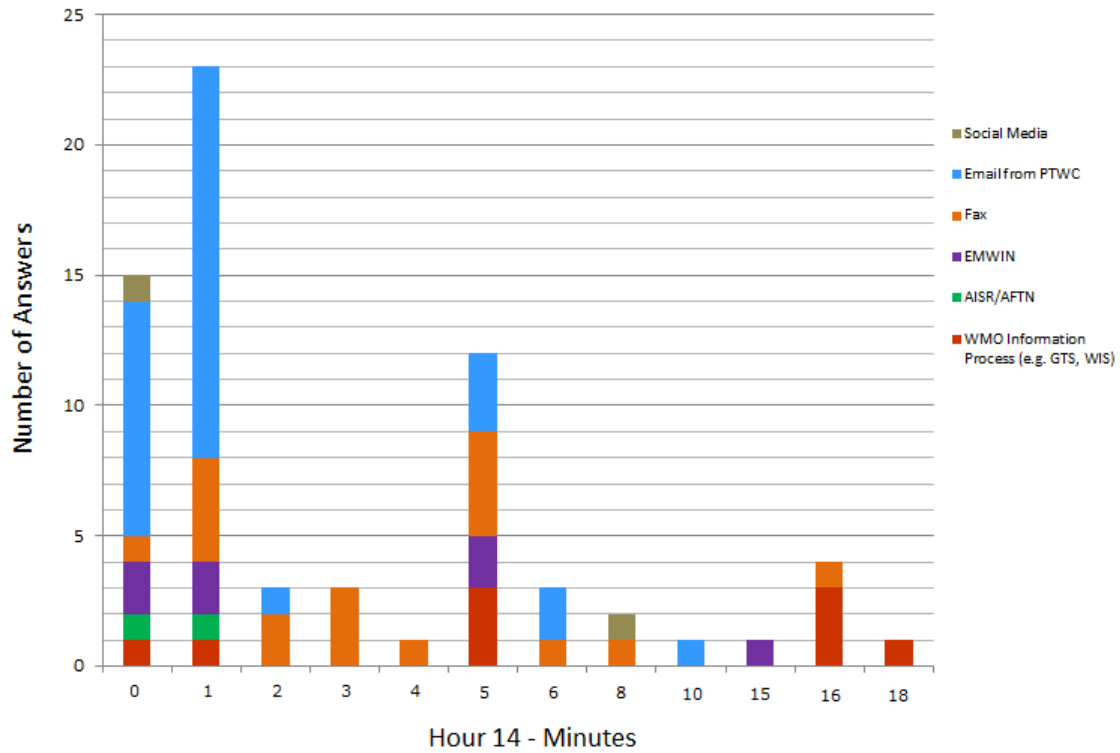
**Dominican Republic:** AISR/AFTN it has not been confirmed even if I arrived through that route.

**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).**

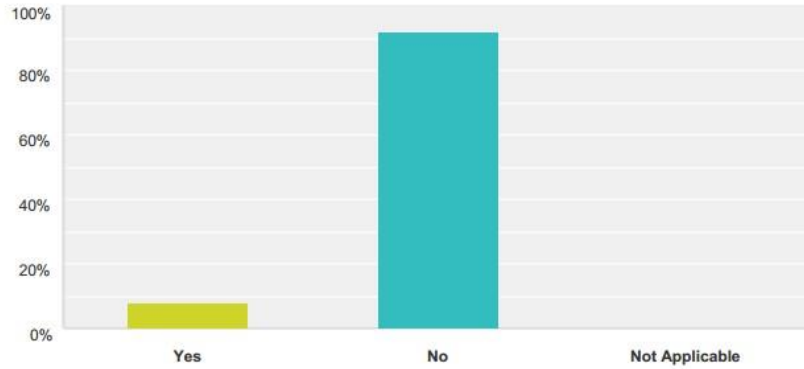
Answered: 37 Skipped: 1





**Q8 1B.4:Were there any problems with the receipt of PTWC CARIBE WAVE 17 initial Dummy (Start of Exercise) Message?**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	7.89%	3
No	92.11%	35
Not Applicable	0.00%	0
<b>Total</b>		<b>38</b>

**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.

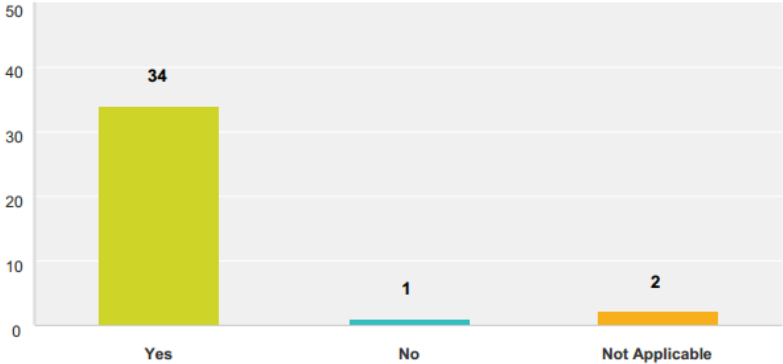
**UK- British Virgin Islands:** Dummy message didn't come on time.

**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?**

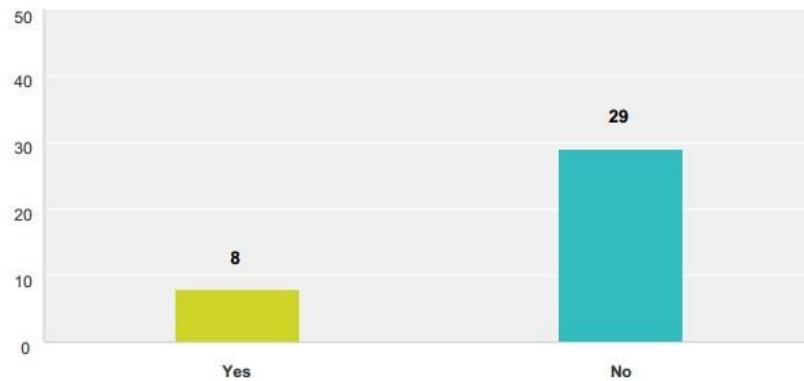
Answered: 37 Skipped: 1



Answer Choices	Responses	
Yes	91.89%	34
No	2.70%	1
Not Applicable	5.41%	2
<b>Total</b>		<b>37</b>

**Q10 1B.6: Did the Tsunami Warning Focal Point / National Tsunami Warning Center receive any message from an organisation other than the PTWC (e.g., Hydro/Met Office)? If yes, please use the comment box to indicate the agencies that received and communicated the products from PTWC during the exercise.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	21.62%	8
No	78.38%	29
<b>Total</b>		<b>37</b>

**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

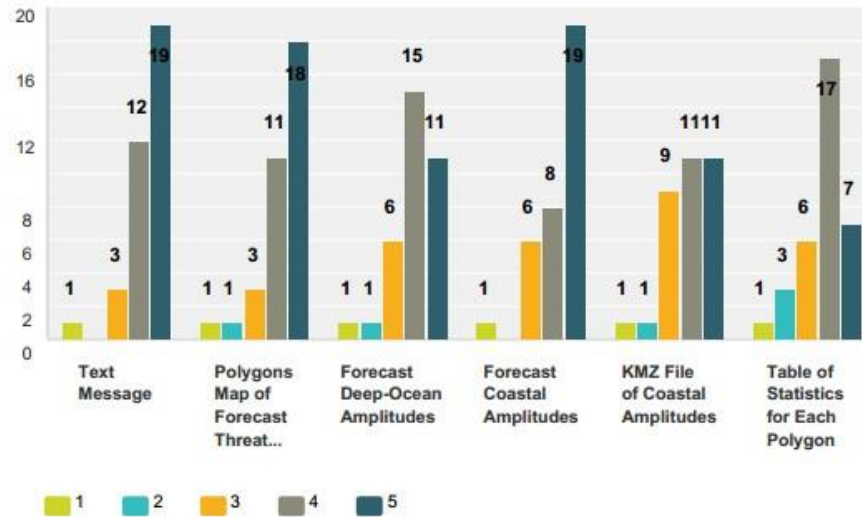
**UK-** British Virgin Islands: Puerto Rico Seismic Network

**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).

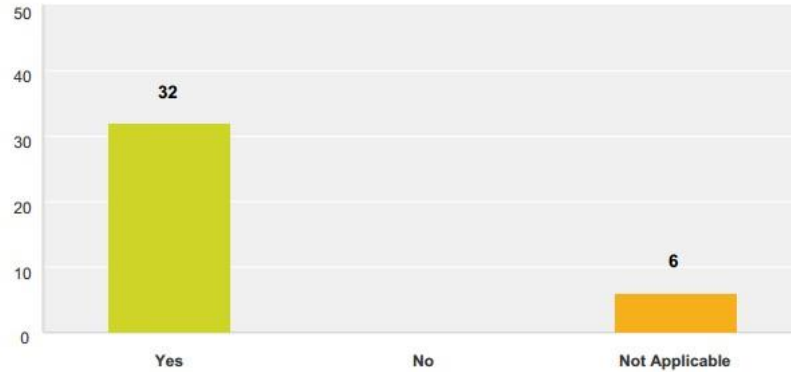
Answered: 35 Skipped: 3



	1	2	3	4	5	Total	Weighted Average
Text Message	2.86% 1	0.00% 0	8.57% 3	34.29% 12	54.29% 19	35	4.37
Polygons Map of Forecast Threat Levels	2.94% 1	2.94% 1	8.82% 3	32.35% 11	52.94% 18	34	4.29
Forecast Deep-Ocean Amplitudes	2.94% 1	2.94% 1	17.65% 6	44.12% 15	32.35% 11	34	4.00
Forecast Coastal Amplitudes	2.94% 1	0.00% 0	17.65% 6	23.53% 8	55.88% 19	34	4.29
KMZ File of Coastal Amplitudes	3.03% 1	3.03% 1	27.27% 9	33.33% 11	33.33% 11	33	3.91
Table of Statistics for Each Polygon	2.94% 1	8.82% 3	17.65% 6	50.00% 17	20.59% 7	34	3.76

**Q12 2.2: The information provided in the PTWC exercise products assisted with decision making, e.g., tsunami threats, earthquake parameters, estimated arrival times, forecast wave heights, etc.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	84.21%	32
No	0.00%	0
Not Applicable	15.79%	6
<b>Total</b>		<b>38</b>

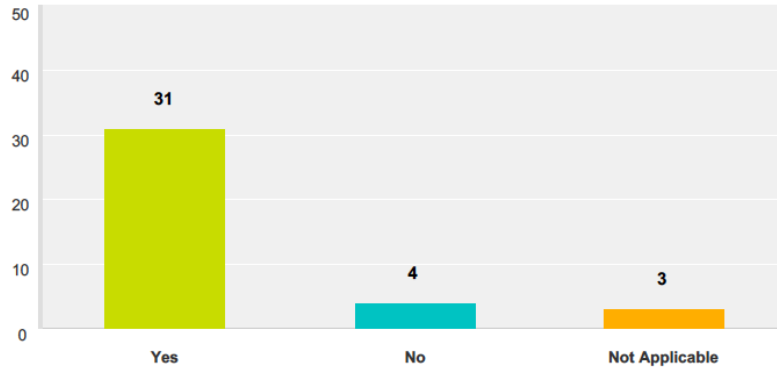
**Comments:**

**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.

**Q13 2.3: Content: The forecast locations in the text messages are appropriate? If not, please suggest better locations.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	81.58%	31
No	10.53%	4
Not Applicable	7.89%	3
<b>Total</b>		<b>38</b>

**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).

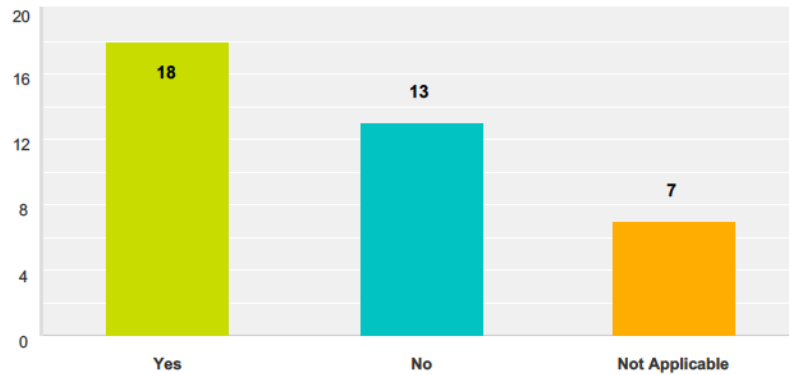
**Jamaica:** Like to increase to four places, NE, SE, NW, SW, eg. include Port Antonio (NE), Savana La Mar (SW).

**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).

**Q14 2.4: Existing in-country event information/local (local seismic network, oceanographic instance, etc.) data were utilized to complement the PTWC exercise messages.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	47.37%	18
No	34.21%	13
Not Applicable	18.42%	7
<b>Total</b>		<b>38</b>

**Comments:**

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

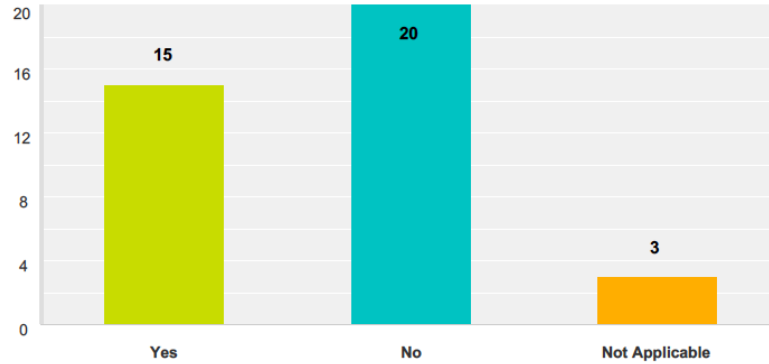
**Panama:** Seismic only.

**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.

**Q15 2.5: Additional in-country local/regional expert consultation was utilized for analyzing the PTWC exercise messages?**

Answered: 38 Skipped: 0



Answer Choices	Responses	
Yes	39.47%	15
No	52.63%	20
Not Applicable	7.89%	3
<b>Total</b>		<b>38</b>

**Comments:**

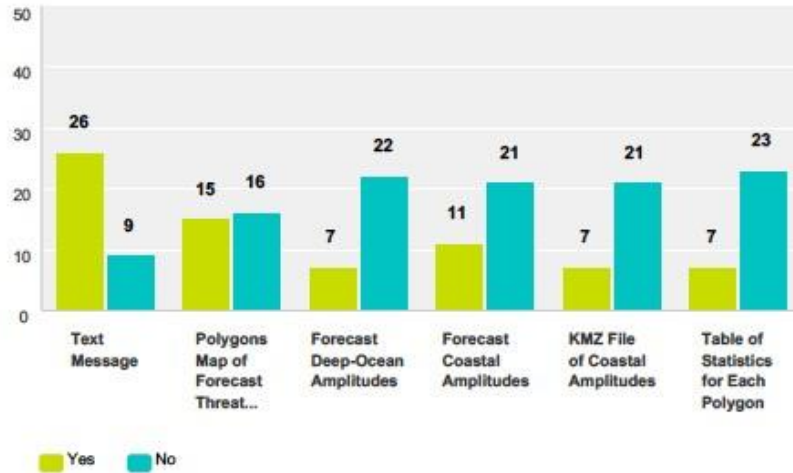
**Cuba: Maps of ancient geological evidences of tsunamis**

**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.).**

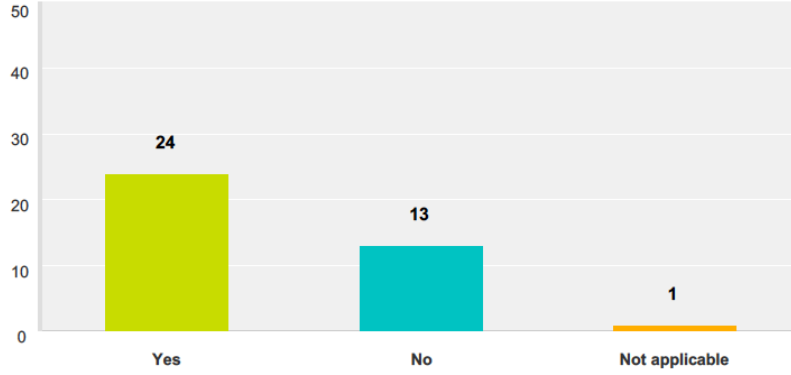
Answered: 37 Skipped: 1



	Yes	No	Total Respondents
Text Message	74.29% 26	25.71% 9	35
Polygons Map of Forecast Threat Levels	48.39% 15	51.61% 16	31
Forecast Deep-Ocean Amplitudes	24.14% 7	75.86% 22	29
Forecast Coastal Amplitudes	34.38% 11	65.63% 21	32
KMZ File of Coastal Amplitudes	25.00% 7	75.00% 21	28
Table of Statistics for Each Polygon	24.14% 7	79.31% 23	29

### Q17 2.7: Do you required additional training on PTWC products.

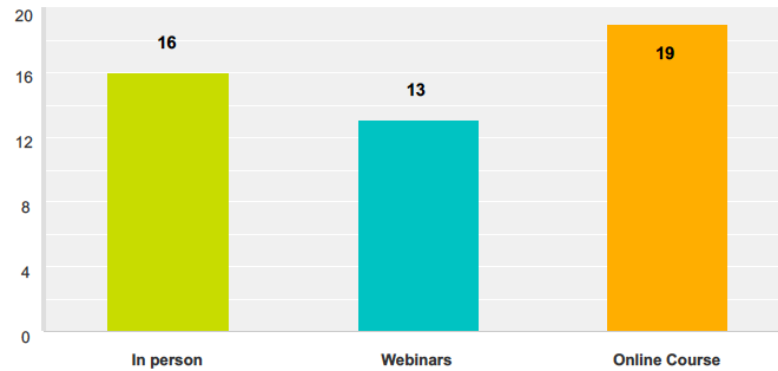
Answered: 38 Skipped: 0



Answer Choices	Responses	
Yes	63.16%	24
No	34.21%	13
Not applicable	2.63%	1
<b>Total Respondents: 38</b>		

### Q18 2.8:What type of training?

Answered: 26 Skipped: 12



Answer Choices	Responses	
In person	61.54%	16
Webinars	50.00%	13
Online Course	73.08%	19
<b>Total Respondents: 26</b>		

#### Comments:

**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.

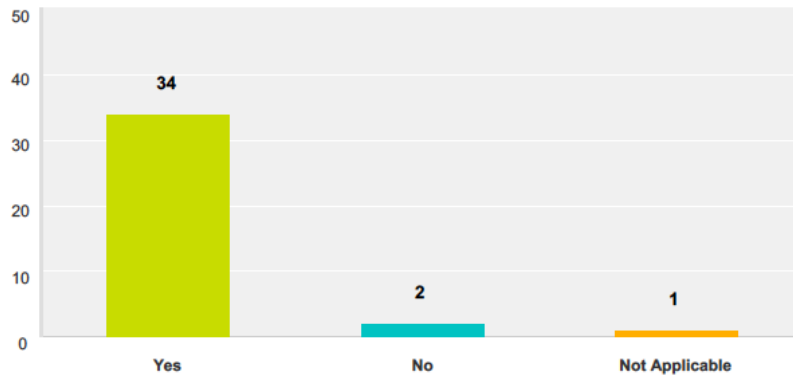
**UK- Montserrat:** Opportunity to sensitize other key stakeholders.

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

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

**Q19 3A.1: The TWFP/NTWC/NDMO has standard operating procedures in place for the receipt and dissemination of tsunami products.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	91.89%	34
No	5.41%	2
Not Applicable	2.70%	1
Total		37

**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.

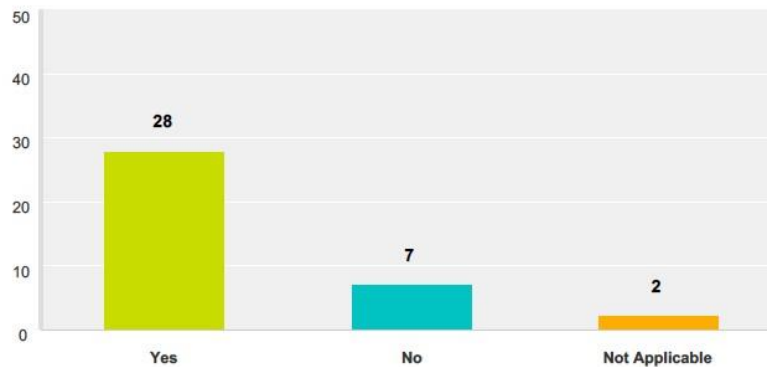
**NL- Sint Maarten:** We use our standard procedures, but they are not specifically geared for tsunami events. That needs to be improved.

**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.

**Q20 3A.2: The TWFP/NTWC/NDMO has undertaken activity to increase its capacity and capability to received and disseminate tsunami products (e.g. training, exercise, etc.). Note activities in Comments section.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	75.68%	28
No	18.92%	7
Not Applicable	5.41%	2
<b>Total</b>		<b>37</b>

**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

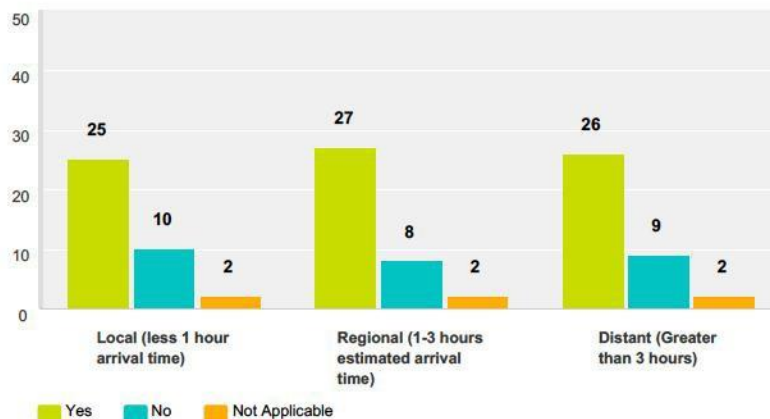
**USA- Puerto Rico:** Trainings and exercises.

**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

**Q21 3B.1: A country tsunami emergency response plan for tele/regional/local tsunamis exists.**

Answered: 37 Skipped: 1



	Yes	No	Not Applicable	Total
Local (less 1 hour arrival time)	67.57% 25	27.03% 10	5.41% 2	37
Regional (1-3 hours estimated arrival time)	72.97% 27	21.62% 8	5.41% 2	37
Distant (Greater than 3 hours)	70.27% 26	24.32% 9	5.41% 2	37

**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.

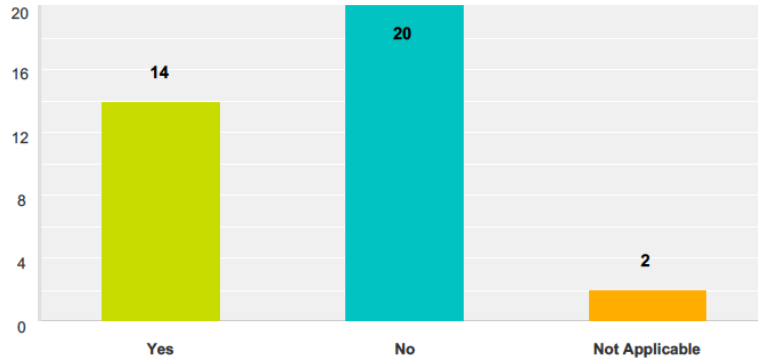
**USA- US Virgin Islands:** The territory has a tsunami incident annex to the Territorial Emergency Operations that is due to be reviewed and updated/ revised as necessary

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



**Q22 3B.2: The NDMO has a tsunami mass coastal evacuation plan.**

Answered: 36 Skipped: 2



Answer Choices	Responses	Count
Yes	38.89%	14
No	55.56%	20
Not Applicable	5.56%	2
<b>Total</b>		<b>36</b>

**Comments:**

**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

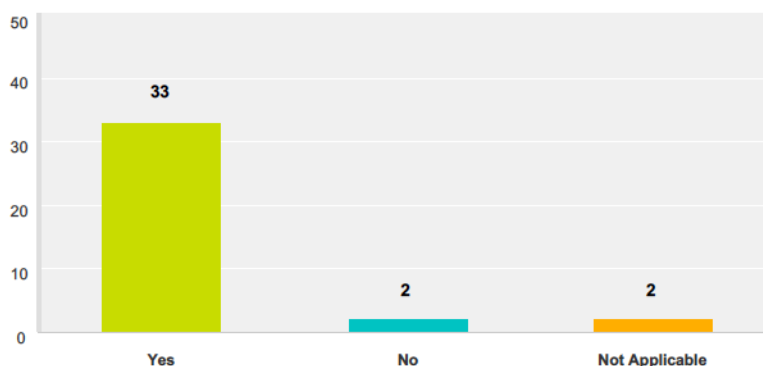
**USA- Puerto Rico:** Each municipality that could be affected by a tsunami in Puerto Rico has a tsunami mass coastal evacuation plan.

**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

**Q23 3B.3: Arrangements exist to assemble the in-country disaster management group (Emergency Operations Center) relevant to decision-making on tsunami warning and response.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	89.19%	33
No	5.41%	2
Not Applicable	5.41%	2
<b>Total</b>		<b>37</b>

**Comments:**

**Colombia:** Si el Pais 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"

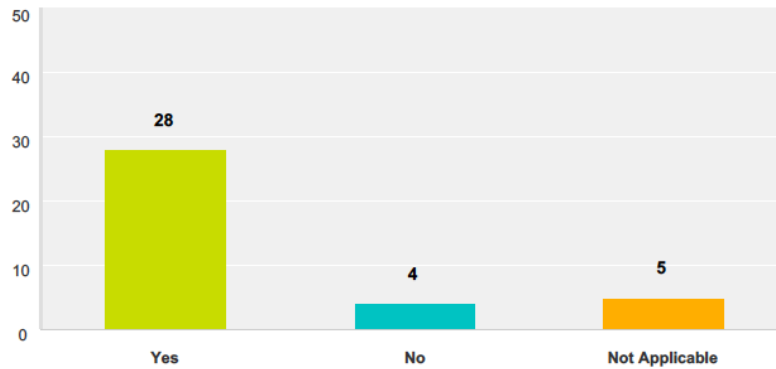
**Saint Lucia:** The National Emergency Operations Center in Saint Lucia was activated during CARIBE WAVE 2017. All arrangements to activate the NEOC was tested.

**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.

**Q24 3B.4: The response plan includes processes to issue Safe-to-Return (All-Clear) notices.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	75.68%	28
No	10.81%	4
Not Applicable	13.51%	5
<b>Total</b>		<b>37</b>

**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

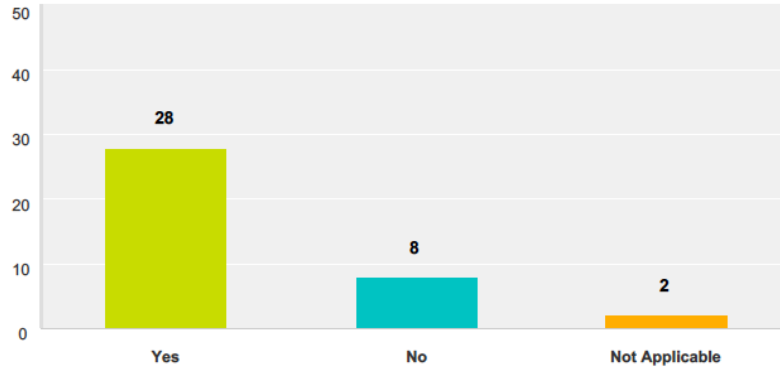
**Suriname:** We do not have response plans with regards to tsunami

**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

**Q25 3B.5: Public education materials have been developed and/or disseminated.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	73.68%	28
No	21.05%	8
Not Applicable	5.26%	2
<b>Total</b>		<b>38</b>

**Comments:**

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

**Dominican Republic:** WED PAGES: <http://onamet.gov.do/?param=realizaran-simulacro-tsunami-2017-para-mejorar-sistemas-de-comunicacion> AND SOCIAL NETWORKS.

**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) commemorating World Tsunami day activities on Nov 5 each year (or around the Nov 5 date).

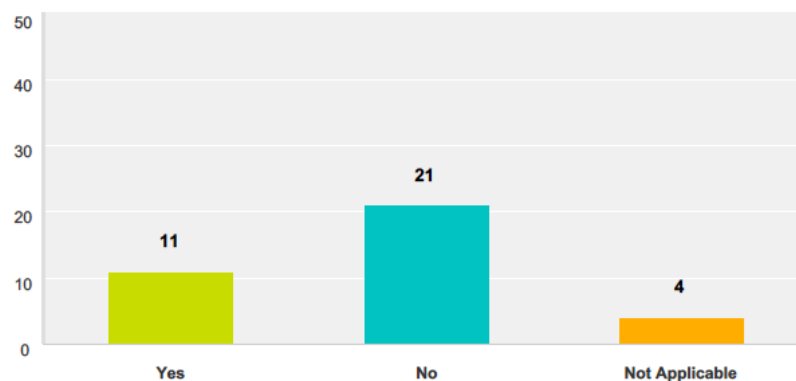
**NL- Aruba:** Might need help from UNESCO

**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

**Q26 3B.6: Tsunami-related curriculum programmes are in place for different levels of education. Note which levels in Comments section.**

Answered: 36 Skipped: 2



Answer Choices	Responses	
Yes	30.56%	11
No	58.33%	21
Not Applicable	11.11%	4
<b>Total</b>		<b>36</b>

**Comments:**

**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

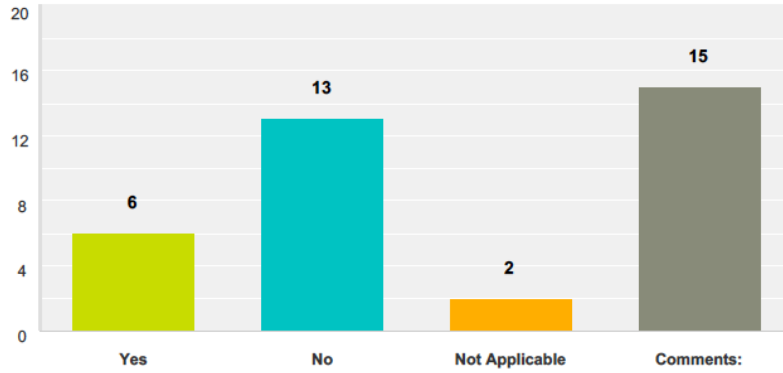
**USA- Puerto Rico:** A Tsunami-related curriculum was developed by PRSN, and the state adopted it for the public schools.

**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

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

Answered: 36 Skipped: 2



Answer Choices	Responses	
Yes	16.67%	6
No	36.11%	13
Not Applicable	5.56%	2
Comments:	41.67%	15
<b>Total</b>		<b>36</b>



## **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

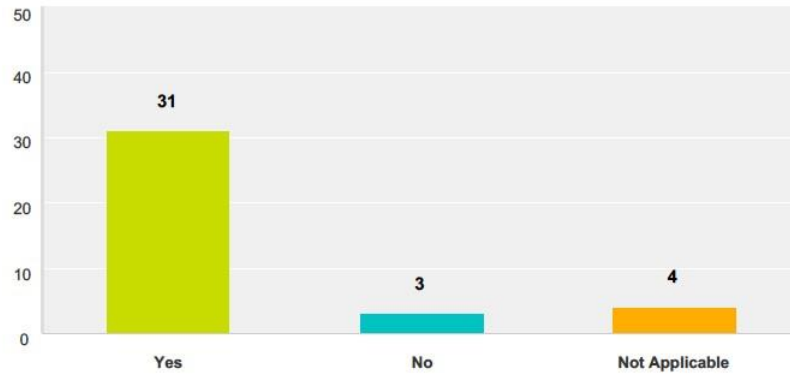
**UK- Montserrat:** Tsunami pamphlets, tsunami information on our website and facebook page

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

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

**Q28 3C.1: The response activation process was followed when the Dummy message from PTWC for CARIBE WAVE 17 exercise was received.**

Answered: 38 Skipped: 0



Answer Choices	Responses	
Yes	81.58%	31
No	7.89%	3
Not Applicable	10.53%	4
<b>Total</b>		<b>38</b>

**Comments:**

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

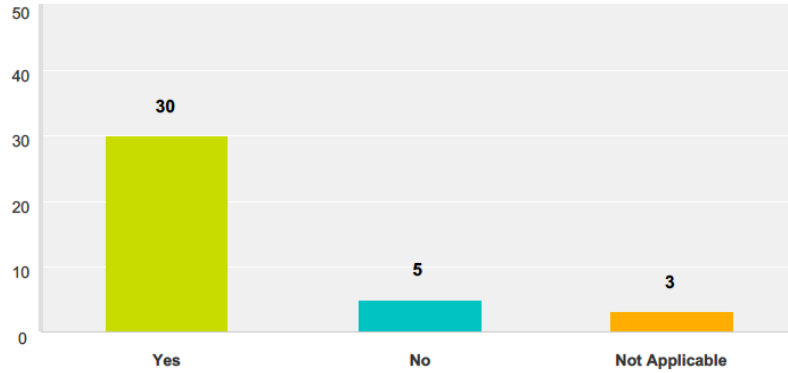
**Jamaica:** Contacted the ODPEM

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

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

**Q29 3C.2: Did the TWFP/NTWC issue the messages for CARIBE WAVE 17?**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	78.95%	30
No	13.16%	5
Not Applicable	7.89%	3
<b>Total</b>		<b>38</b>

**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

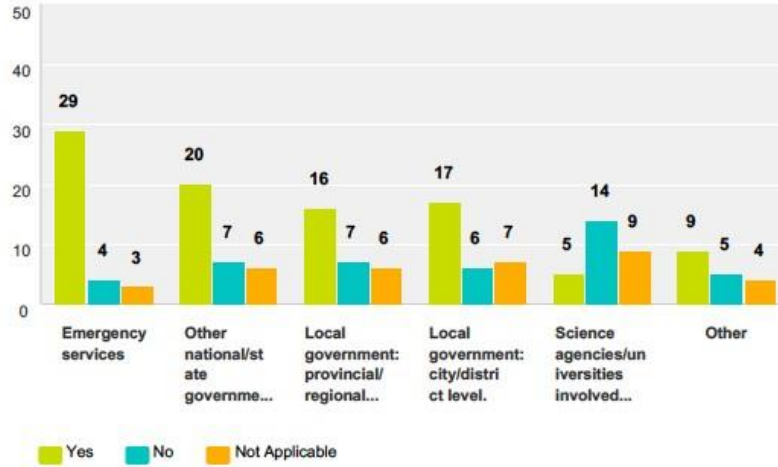
**UK- Cayman Islands:** Madison- said Yes

**USA- Puerto Rico:** Gisela- PRSN issued 16 bulletins with tsunami information, for details visit: [caribewave.uprm.edu](http://caribewave.uprm.edu)

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

**Q30 3C.3: CARIBE WAVE 17 messages were issued to:**

Answered: 36 Skipped: 2



	Yes	No	Not Applicable	Total
Emergency services	80.56% 29	11.11% 4	8.33% 3	36
Other national/state government agencies	60.61% 20	21.21% 7	18.18% 6	33
Local government: provincial/regional level	55.17% 16	24.14% 7	20.69% 6	29
Local government: city/district level.	56.67% 17	20.00% 6	23.33% 7	30
Science agencies/universities involved in assessment	17.86% 5	50.00% 14	32.14% 9	28
Other	50.00% 9	27.78% 5	22.22% 4	18

**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

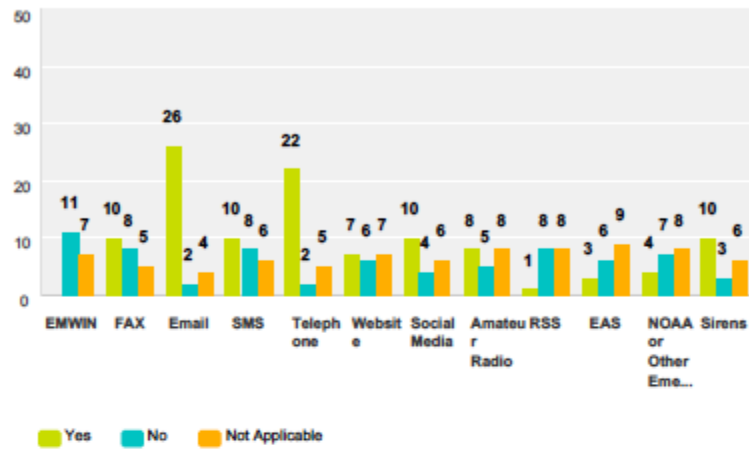
**UK- Anguilla:** The Department received the messages and passed relevant content to the public via the Anguilla Warning System

**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

**Q31 3C.4: What methods were used by the TWFP/NTWC/NDMO to disseminate the CARIBE WAVE 17 messages?**

Answered: 34 Skipped: 4



	Yes	No	Not Applicable	Total
EMWIN	0.00% 0	61.11% 11	38.89% 7	18
FAX	43.48% 10	34.78% 8	21.74% 5	23
Email	81.25% 26	6.25% 2	12.50% 4	32
SMS	41.67% 10	33.33% 8	25.00% 6	24
Telephone	75.86% 22	6.90% 2	17.24% 5	29
Website	35.00% 7	30.00% 6	35.00% 7	20
Social Media	50.00% 10	20.00% 4	30.00% 6	20
Amateur Radio	38.10% 8	23.81% 5	38.10% 8	21
RSS	5.88% 1	47.06% 8	47.06% 8	17
EAS	16.67% 3	33.33% 6	50.00% 9	18
NOAA or Other Emergency Alert Radio	21.05% 4	36.84% 7	42.11% 8	19
Sirens	52.63% 10	15.79% 3	31.58% 6	19

**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

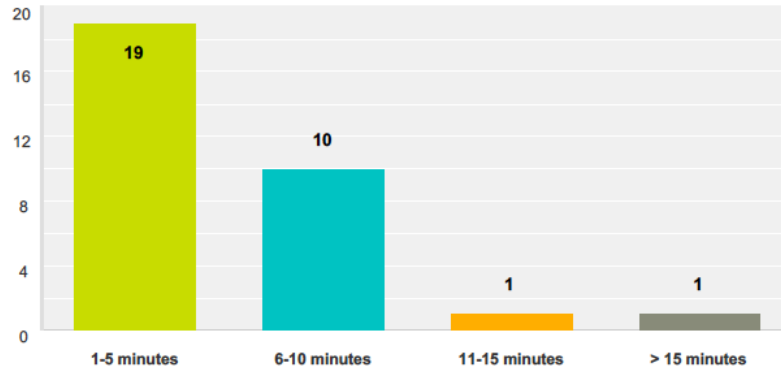
**UK- British Virgin Islands:** Messages stating it was an exercise was sent/posted via the response in 3C.4

**USA- Puerto Rico:** CAD

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

**Q32 3C.5: How soon after start of exercise were the CARIBE WAVE 17 exercise messages sent from TWFP/NTWC to the corresponding agency or agencies (listed before)?**

Answered: 31 Skipped: 7



Answer Choices	Responses
1-5 minutes	61.29% 19
6-10 minutes	32.26% 10
11-15 minutes	3.23% 1
> 15 minutes	3.23% 1
<b>Total</b>	<b>31</b>

**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

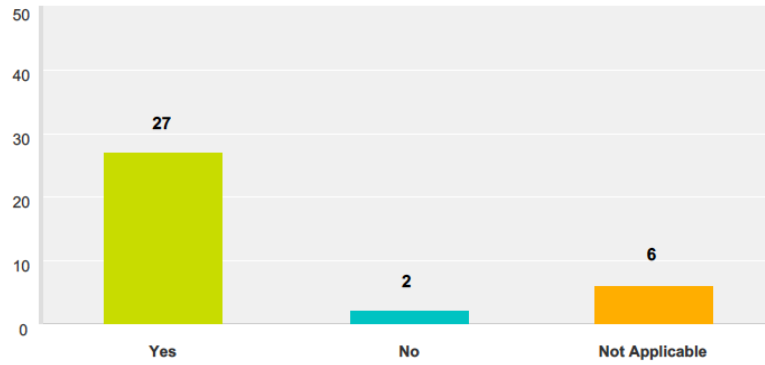
**Suriname:** See question 3C.3

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



**Q33 3C.6: Based on feedback from agencies were the communication methods timely and appropriate?**

Answered: 35 Skipped: 3



Answer Choices	Responses	
Yes	77.14%	27
No	5.71%	2
Not Applicable	17.14%	6
<b>Total</b>		<b>35</b>

**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

**Q34 3C.7: Based on feedback from agencies was the message(s) disseminated from TWFP/NTWC/NDMO accurate and clear?**

Answered: 36 Skipped: 2



Answer Choices	Responses	Count
Yes	83.33%	30
No	0.00%	0
Not Applicable	16.67%	6
<b>Total</b>		<b>36</b>

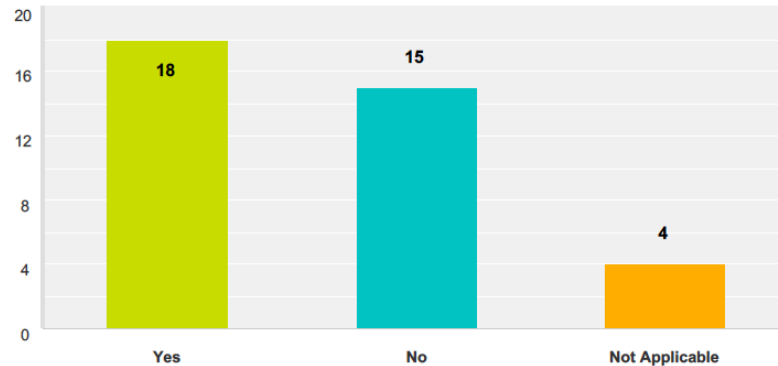
**Comments:**

**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

### Q35 3C.8: Was your Country's/Territory's Emergency Operations Center activated during the exercise?

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	48.65%	18
No	40.54%	15
Not Applicable	10.81%	4
<b>Total</b>		<b>37</b>

**Comments:**

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

**Colombia:** Solo se realizo 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.

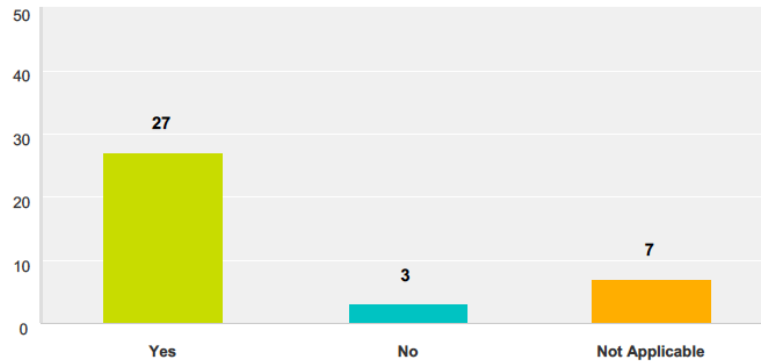
**UK- Cayman Islands:** Frederick- Partial Activation - Full activation would take place to respond to the event

**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

**Q36 3D.1: Did the National Disaster Management Organisation (or equivalent) maintain communication with the TWFP/NTWC throughout the event?**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	72.97%	27
No	8.11%	3
Not Applicable	18.92%	7
<b>Total</b>		<b>37</b>

**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

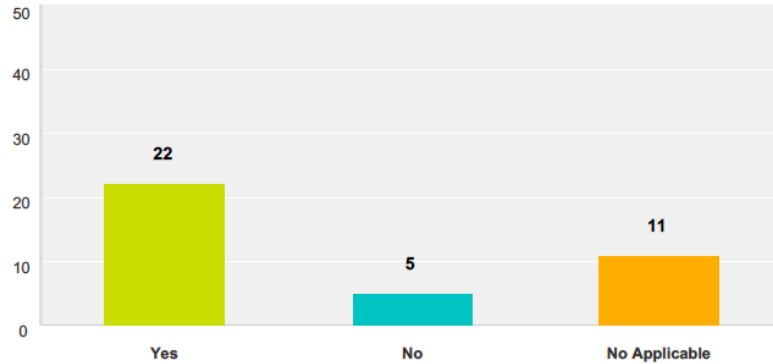
**UK- Bermuda:** Yes, the National Disaster Coordinator was present at BWS or available by cell phone throughout the exercise.

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

**USA- Puerto Rico:** Wilfredo- NDMO and TWFP are the same. Gisela- said Yes

**Q37 3D.2: Did the National Disaster Management Organisation (or equivalent) maintain communication with local/regional disaster management organisations (or equivalent)?**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	57.89%	22
No	13.16%	5
No Applicable	28.95%	11
<b>Total</b>		<b>38</b>

**Comments:**

**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.

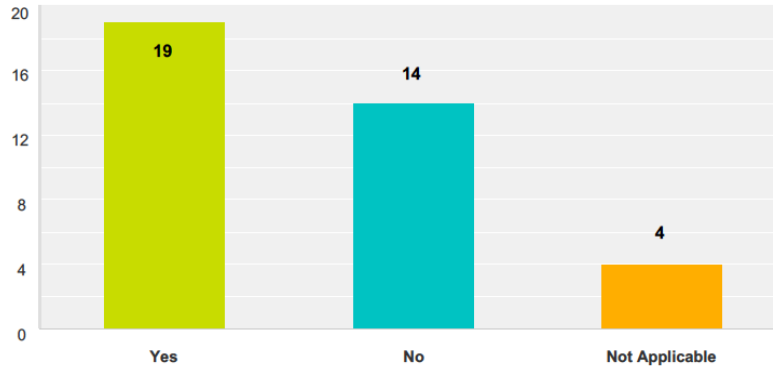
**UK- Montserrat:** Monitored HF radio throughout the exercise

**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

### Q38 3D.3: Were any areas evacuated as part of the CARIBE WAVE 17 Exercise?

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	51.35%	19
No	37.84%	14
Not Applicable	10.81%	4
<b>Total</b>		<b>37</b>

#### 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

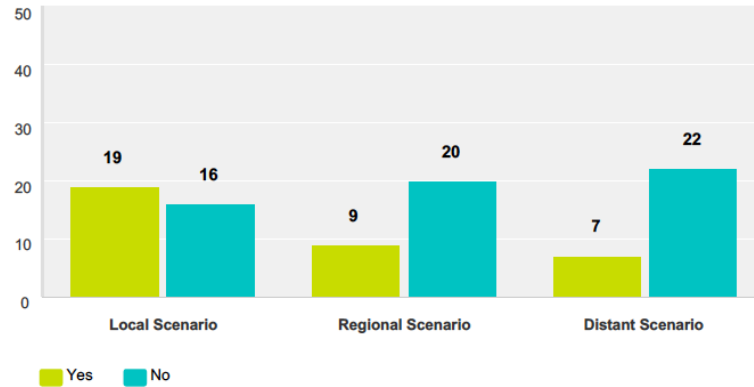
**Trinidad and Tobago:** Some schools in the North-western area of Trinidad.

**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

### Q39 3D.4: Are tsunami inundation maps available for your Country/Territory?

Answered: 35 Skipped: 3



	Yes	No	Total
Local Scenario	54.29% 19	45.71% 16	35
Regional Scenario	31.03% 9	68.97% 20	29
Distant Scenario	24.14% 7	75.86% 22	29

#### 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



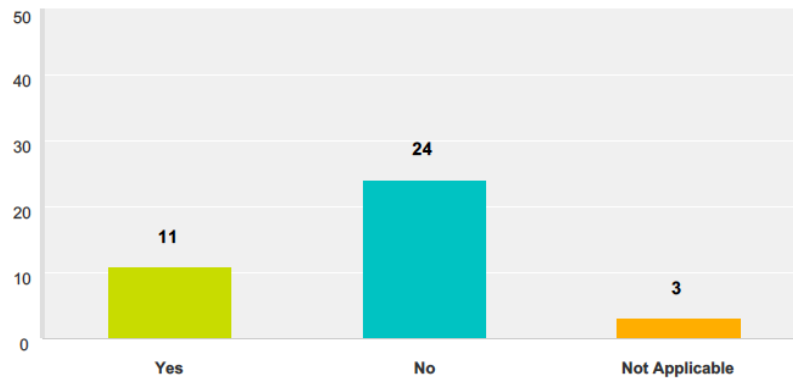
**UK- Bermuda:** There is one main map which shows a 10m-inundation line across the Island.

**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

**Q40 3D.5: Did your Tsunami Warning Focal Point run any tsunami numerical models during the exercise (e.g., deep-ocean propagation and/or coastal inundation models)?**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	28.95%	11
No	63.16%	24
Not Applicable	7.89%	3
<b>Total</b>		<b>38</b>

**Comments:**

**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.

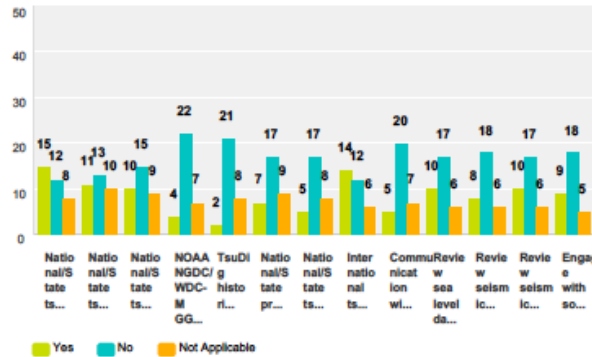
**UK- Bermuda:** It would be wonderful if we could get some external assistance in developing these!

**USA- Puerto Rico:** Gisela- said Yes, Tide Tool

**USA- US Virgin Islands:** VITEMA doe not have the capability to run any modeling programs

**Q41 3D.6: Did your Country/Territory consult any of the following resources in order to better assess the tsunami threat during the exercise? Select from the following list.**

Answered: 35 Skipped: 2



	Yes	No	Not Applicable	Total
National/State tsunami experts	42.86% 15	34.29% 12	22.86% 8	35
National/State tsunami coordination committee	32.35% 11	38.24% 13	29.41% 10	34
National/State tsunami historical database	29.41% 10	44.12% 15	26.47% 9	34
NOAA NGDC/WDC-MGG tsunami historical database (web)	12.12% 4	66.67% 22	21.21% 7	33
Tsunami historical database GIS tool (NGDC/ITIC offline)	6.45% 2	67.74% 21	25.81% 8	31
National/State pre-computed tsunami scenarios	21.21% 7	51.52% 17	27.27% 9	33
National/State tsunami forecasts	16.67% 5	56.67% 17	26.67% 8	30
International tsunami forecasts. Note source of forecasts (PTWC, NTWC) in Comments.	43.75% 14	37.50% 12	18.75% 6	32
Communication with outside sources (such as ITIC, media, other)	15.63% 5	62.50% 20	21.88% 7	32
Review sea level data availability (IOC Sea Level Monitoring Facility, Tide Tool, etc.)	30.30% 10	51.52% 17	18.18% 6	33
Review seismic data availability (IRIS, PRSN, etc.)	25.00% 8	56.25% 18	18.75% 6	32
Review seismic information tools (USGS, CISEN, PRSN)	30.30% 10	51.52% 17	18.18% 6	33
Engage with social media (Facebook, Twitter, Google Chat, etc.)	28.13% 9	56.25% 18	15.63% 5	32

**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

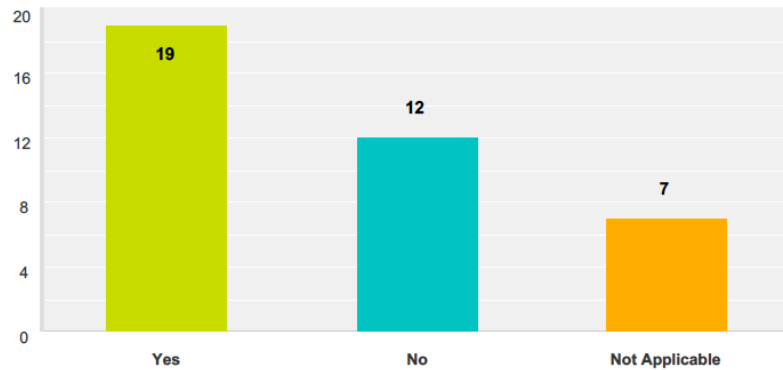
**Suriname:** None are applicable

**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

**Q42 3E.1 Was a tsunami warning and/or information issued to the public as part of the CARIBE WAVE 17 Exercise?**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	50.00%	19
No	31.58%	12
Not Applicable	18.42%	7
<b>Total</b>		<b>38</b>

**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

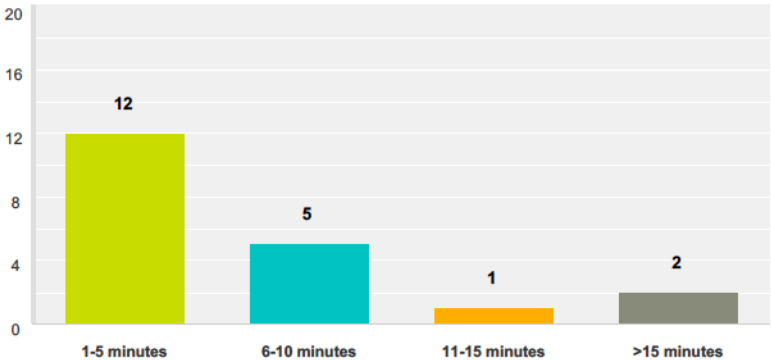
**UK- Bermuda:** A watch preceded the warning. Once a tsunami was confirmed by PTWC the warning was issued.

**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)?**

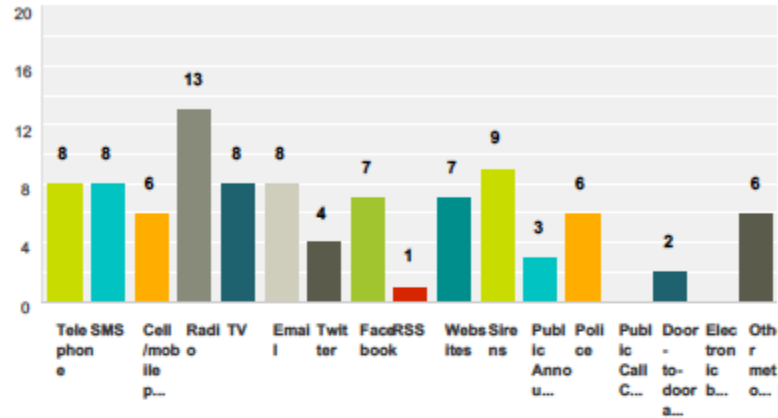
Answered: 20 Skipped: 18



Answer Choices	Responses	
1-5 minutes	60.00%	12
6-10 minutes	25.00%	5
11-15 minutes	5.00%	1
>15 minutes	10.00%	2
<b>Total</b>		<b>20</b>

**Q44 3E.3:How was the warning/information communicated to the public?Please check all that apply:**

Answered: 22 Skipped: 16



Answer Choices	Responses
Telephone	36.36% 8
SMS	36.36% 8
Cell/mobile phone broadcast	27.27% 6
Radio	59.09% 13
TV	36.36% 8
Email	36.36% 8
Twitter	18.18% 4
Facebook	31.82% 7
RSS	4.55% 1
Websites	31.82% 7
Sirens	40.91% 9
Public Announcement Systems	13.64% 3
Police	27.27% 6
Public Call Centre	0.00% 0
Door-to-door announcements	9.09% 2
Electronic billboards	0.00% 0
Other methods (specify below)	27.27% 6
<b>Total Respondents: 22</b>	

**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

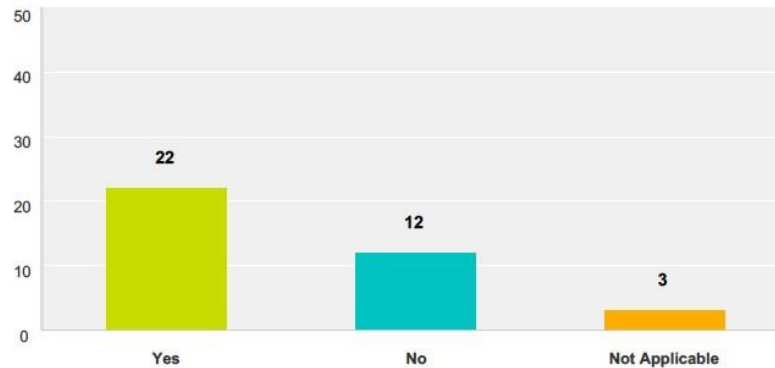
**USA- Puerto Rico:** Emergency Alert System (EAS)

**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

**Q45 3E.4: In addition to the TWFP/NDMO, did other government and private sector groups participate? If yes, please list in comments section.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	59.46%	22
No	32.43%	12
Not Applicable	8.11%	3
<b>Total</b>		<b>37</b>

**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

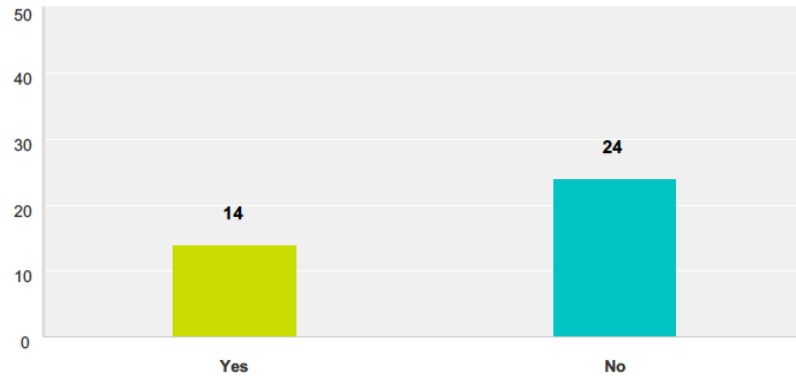
**UK- Turks and Caicos Islands:** For the communication test a few agencies participated. For the functional exercise a number of agencies participated such as: RED Cross, ADRA, Fire, Police, Health, Social Welfare, 911, DDME, Public Works etc

**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

**Q46 3.F.1: Is your country already implementing the Community Performance Based Tsunami Recognition Program (TsunamiReady or Tsunami Ready)?**

Answered: 38 Skipped: 0



Answer Choices	Responses	
Yes	36.84%	14
No	63.16%	24
<b>Total</b>		<b>38</b>

**Comments:**

**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

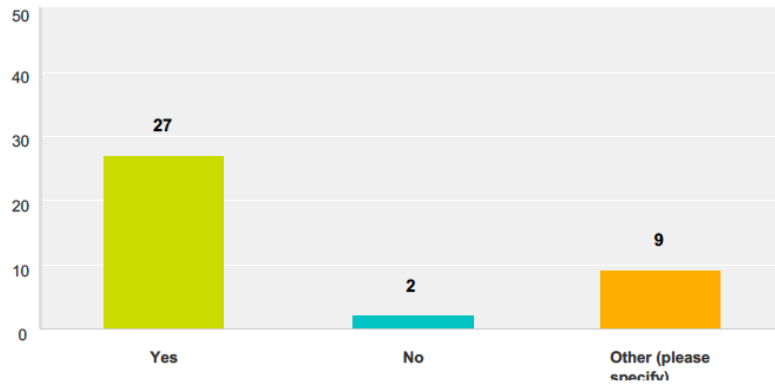
**UK- Montserrat:** Project in draft and awaiting approval

**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

**Q47 3.F.2: Is your country interested in implementing the Community Performance Based Tsunami Recognition Program (TsunamiReady or Tsunami Ready)?**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	71.05%	27
No	5.26%	2
Other (please specify)	23.68%	9
<b>Total</b>		<b>38</b>

**Comments:**

**Brazil:** I am not able to answers 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 bot 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

Country/Territory	Q48	Q49
Anguilla	1	1
Antigua and Barbuda	5	17
Aruba	0	1
Bahamas	0	-
Barbados	0	-
Belize	0	20
Bermuda	0	0
Brazil	0	0
British Virgin Islands	1	1
Cayman Islands	0	-
Colombia	0	0
Costa Rica	0	2
Cuba	0	40
Curaçao	0	5
Dominica	2	5
Dominican Republic	0	4
France	0	50
Grenada	0	10
Guatemala	0	1
Guyana	0	-
Haiti	0	2
Honduras	2	10
Jamaica	0	13
Mexico	0	2
Montserrat	0	7
Netherlands (Bonaire, Saba, St. Eustatius)	0	3
Nicaragua	0	15
Panama	0	10
Puerto Rico	46	46
Saint Kitts and Nevis	1	1

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	3
Venezuela	0	10
Total	61*	340

\*It represents the 18% of the total target number of Tsunami Ready communities.

**Q50 4.1: Through participating in the CARIBE WAVE 17 Exercise, the agencies in the Country/Territory (TNC/TWFP/NDEMO) have a better understanding of their responsibilities and roles in tsunami emergencies.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	89.47%	34
No	0.00%	0
Not Applicable	10.53%	4
<b>Total</b>		<b>38</b>

**Comments:**

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

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

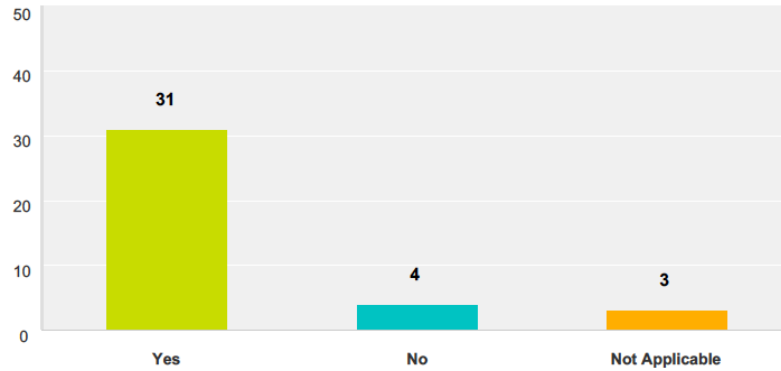
**UK- British Virgin Islands:** However, continuous training is recommended as some staff are rotated

**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.

**Q51 4.2: Gaps in capability and capacity have been identified.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	81.58%	31
No	10.53%	4
Not Applicable	7.89%	3
<b>Total</b>		<b>38</b>

**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

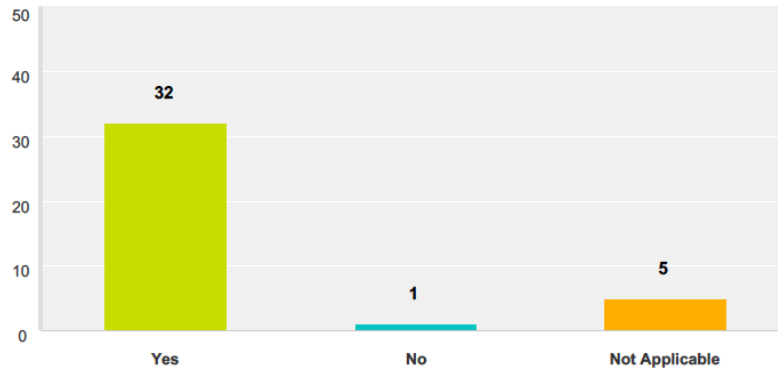
**Suriname:** Because there is no implementation of tsunami readiness program

**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.

**Q52 4.3: The Country/Territory enhanced relationships with and among the Tsunami Warning System stakeholders as a result of the exercise.**

Answered: 38 Skipped: 0



Answer Choices	Responses
Yes	84.21% 32
No	2.63% 1
Not Applicable	13.16% 5
<b>Total</b>	<b>38</b>

**Comments:**

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

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

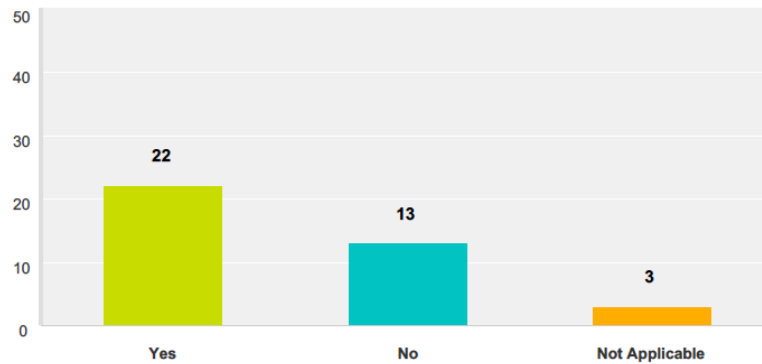
**UK- Montserrat:** Conducted desktop exercise stakeholders in December 2016

**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.



**Q53 4.4: News media participated and covered the exercise (please provide electronic links if applicable).**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	57.89%	22
No	34.21%	13
Not Applicable	7.89%	3
<b>Total</b>		<b>38</b>

**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/>

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

**UK- British Virgin Islands:** <http://www.bviplatinum.com/news.php?articleId=26777> & <http://bvinews.com/new/tsunami-evacuation-exercise-draws-record-25-of-bvi-population/>

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

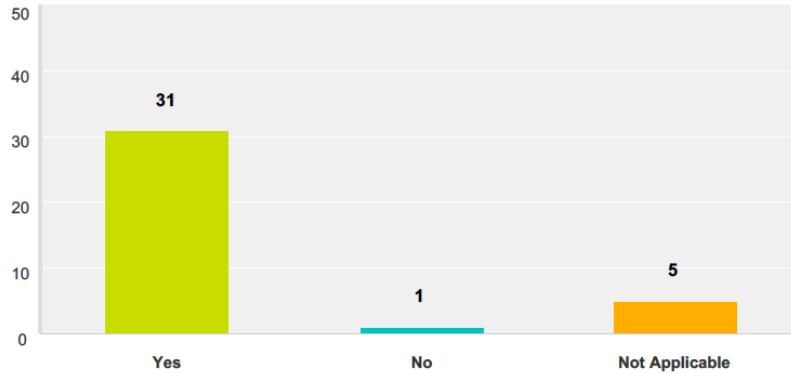
**USA- Puerto Rico:** The media participates in a pre-exercise press conference. On the day of the exercise there is a wide coverage of the media.

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

**Venezuela:** [www.noticias24.com/venezuela/.../ejercicio-de-alerta-de-tsunami-caribe-wabe-2017](http://www.noticias24.com/venezuela/.../ejercicio-de-alerta-de-tsunami-caribe-wabe-2017)  
[http://www.eluniversal.com/noticias/venezuela/simulacro-tsunami-caribe-wave-2017-conto-con-120-mil-funcionarios\\_644710](http://www.eluniversal.com/noticias/venezuela/simulacro-tsunami-caribe-wave-2017-conto-con-120-mil-funcionarios_644710) <http://vtv.gob.ve/inicio-simulacro-de-tsunami-caribe-wave-2017-en-anzoategui/>

**Q54 4.5: Overall, the exercise planning, conduct, format and style were satisfactory.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	83.78%	31
No	2.70%	1
Not Applicable	13.51%	5
<b>Total</b>		<b>37</b>

**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



Answer Choices	Responses	
Yes	74.29%	26
No	0.00%	0
Not Applicable	25.71%	9
Total		35

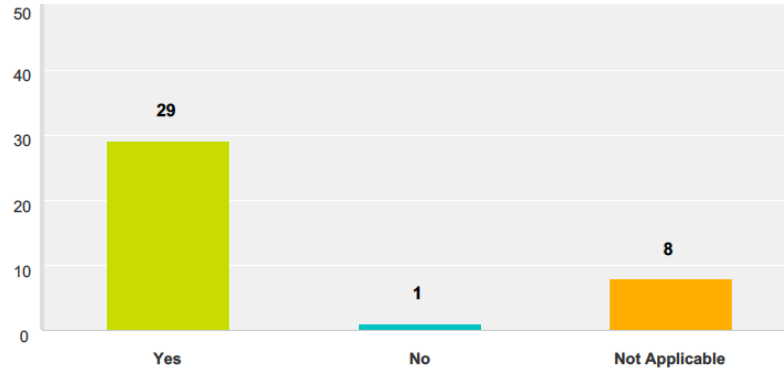
#### Comments:

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



Answer Choices	Responses	
Yes	76.32%	29
No	2.63%	1
Not Applicable	21.05%	8
<b>Total</b>		<b>38</b>

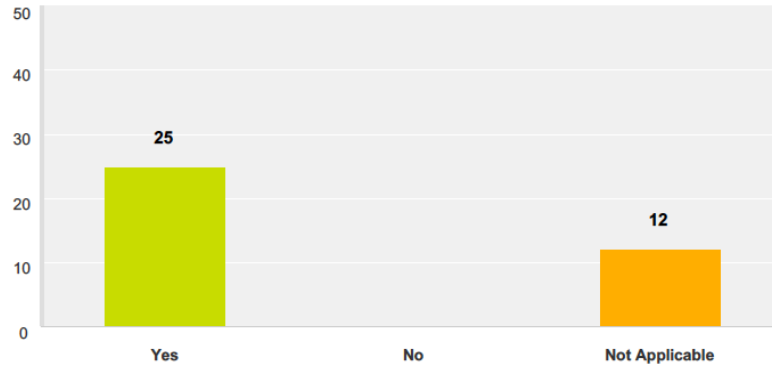
#### Comments:

**Dominica: We were late in planning**

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

**Q57 4.8:Exercise planning at the state/local level went well.**

Answered: 37 Skipped: 1



Answer Choices	Responses	Count
Yes	67.57%	25
No	0.00%	0
Not Applicable	32.43%	12
<b>Total</b>		<b>37</b>

**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

**Q58 4.9: The CARIBE WAVE 17 Tsunami Exercise website pages (eg. caribewave.info, tsunamizone.org/caribbean) were useful.**

Answered: 36 Skipped: 2



Answer Choices	Responses	Count
Yes	91.67%	33
No	0.00%	0
Not Applicable	8.33%	3
<b>Total</b>		<b>36</b>

**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.

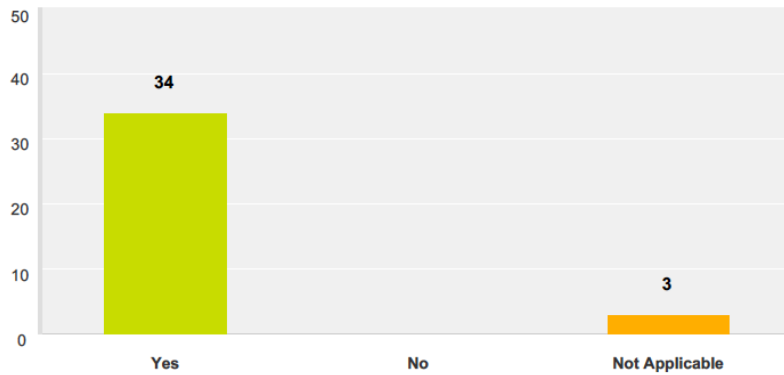
**Q59 4.10:How many people do you estimate participated in the exercise within your country/territory (use own statistics or tsunami.zone registration system)?**

Answered: 33 Skipped: 5

Anguilla	600
Antigua and Barbuda	5,000
Aruba	9,407
Bahamas	-
Barbados	250
Belize	6
Bermuda	6
Bonaire	20
Brazil	-
British Virgin Islands	7,113
Cayman Islands	30,000
Colombia	40
Costa Rica	50
Cuba	1,000
Curaçao	30
Dominica	72
Dominican Republic	977
France	200,000 for the 4 territories *
Grenada	20,000
Guadeloupe	*
Guatemala	10
Guyana	-
Haiti	2,891
Honduras	2,000
Jamaica	5
Martinique	*
Mexico	1,000
Montserrat	-
Netherlands	20
Nicaragua	30
Panama	7,000
Puerto Rico	153,398
Saba	-
Saint Barthélemy	*
Saint Kitts and Nevis	2,500
Saint Lucia	2,600
Saint Martin	*
Saint Vincent and the Grenadines	7
St Eustatius	-
Sint Maarten	1,900
Suriname	-
Trinidad and Tobago	11,100
Turks and Caicos	35
U.S. Virgin Islands	2,135
Venezuela	283,000

**Q60 4.11: The CARIBE WAVE 17 Participant Handbook provided an appropriate level of detail.**

Answered: 37 Skipped: 1



Answer Choices	Responses
Yes	91.89% 34
No	0.00% 0
Not Applicable	8.11% 3
<b>Total</b>	<b>37</b>

**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

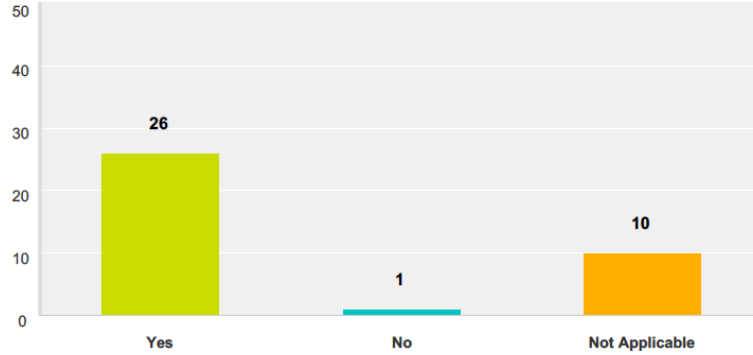
**USA- Puerto Rico:** The Caribbean WAVE 17 Participant Handbook did not include domestic bulletins for Puerto Rico and it was not available in Spanish.

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



**Q61 4.12: The CARIBE WAVE 17 Webinars were helpful in preparing for the exercise.**

Answered: 37 Skipped: 1



Answer Choices	Responses	
Yes	70.27%	26
No	2.70%	1
Not Applicable	27.03%	10
<b>Total</b>		<b>37</b>

**Comments:**

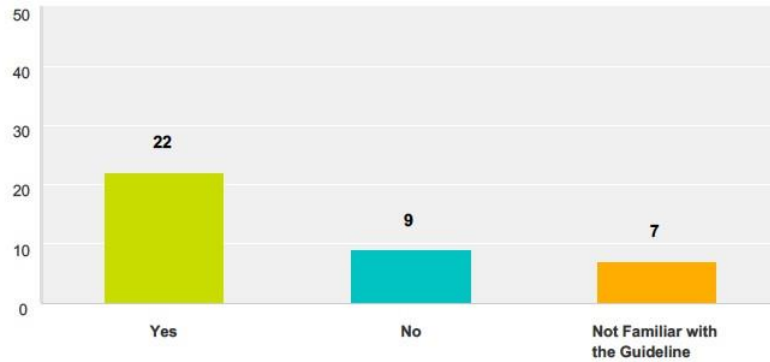
**Antigua & Barbuda:** MET Services- said Yes

**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



Answer Choices	Responses
Yes	57.89% 22
No	23.68% 9
Not Familiar with the Guideline	18.42% 7
<b>Total</b>	<b>38</b>

**Comments:**

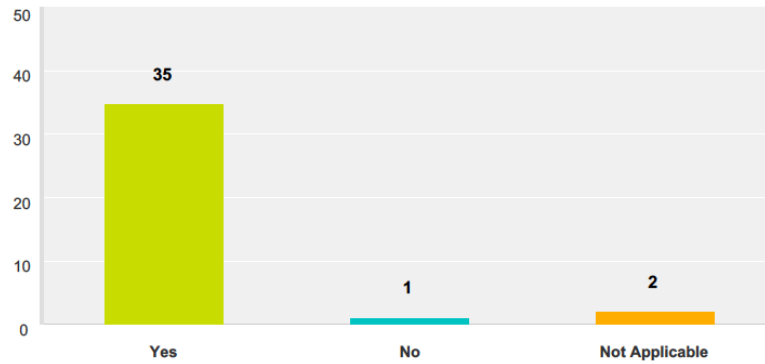
**NL- Curacao:** Fer- said Not Familiar with the Guideline

**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.

**Q63 4.14: This evaluation form is appropriate.**

Answered: 38 Skipped: 0



Answer Choices	Responses	Count
Yes	92.11%	35
No	2.63%	1
Not Applicable	5.26%	2
<b>Total</b>		<b>38</b>

**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.

**Q64 4.15: Please provide a general statement on your CARIBE WAVE 17 Tsunami Exercise experience, about what went well, what did not go well and what could be improved, in terms of both exercise planning and exercise conduct. You may comment about international, national, provincial and/or local level aspects. Also please share recommendations for the CARIBE WAVE 18 exercise, format, scenario, etc.**

Answered: 29 Skipped: 9

**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 tsunamis, 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 needs to have a ready national plan and also to have a mock exercise with different stakeholders, such as the Red Cross, Coast Guards etc. For the CARIBE Wave 18, during the exercise messages from participating countries should be sent out to PTWC on an hourly basis 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 to 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 place 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 invould 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 simulacros 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 immediately 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 issue 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.

## A. 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.

Station location	Country	IOC Sea Level	NOAA Tides and Currents	National Data Buoy Center	Tide Tool
AGUADILLA PR	Puerto Rico	0	0	0	0
ARECIBO PR	Puerto Rico	X	X	0	X
BARAHONA DO	Dominican Republic	0	0	0	0
BARBUDA AG	Antigua & Barbuda	X	0	0	0
BASSETERRE KN	St. Kitts & Nevis	X	0	0	X
BERMUDA UK	Bermuda	X	0	0	X
BOCAS DEL TORO PA	Panama	X	0	0	X
BRIDGEPORT BB	Barbados	X	0	0	0
BULLEN BAY CURACAO	Curacao	X	0	0	X
CAJA DE MUERTOS PR	Puerto Rico	X	X	0	X
CALLIAQUA VC	VC	N/A	0	0	X
CAP HAITIEN HT	Haiti	X	0	0	X
CARRIE BOW CAY BH	Bahamas	X	0	0	0

CEIBA CABOTAGE HN	Honduras	N/A	0	0	X
CHARLOTTEVILLE TT	Trinidad and Tobago	0	0	0	X
COVENAS CO	Colombia	X	0	0	X
DART 41420		Not in System	0	X	0
DART 41421		Not in System	0	X	X
DART 41424		Not in System	0	X	0
DART 42407		Not in System	0	X	X
DART 44401		Not in System	0	X	0
DART 44402		Not in System	0	X	0
DAUPHIN ISLAND AL	USA	X	0	0	0
DESHAIES GUADELOUPE	Guadalupe	X	0	0	X
DESIRADE GUADELOUPE	Guadalupe	Not in System	0	0	X
DUCK PIER NC	North Carolina	X	0	0	0
EL PORVENIR PA	Panama	X	0	0	X
ESPERANZA VIEQUES PR	Puerto Rico	Not in System	X	0	X
FORT DE FRANCE MQ	Martinique	X	0	0	X
FORTALEZA BR	Brazil	X	0	0	0
GEORGE TOWN CY	Cayman Islands	X	0	0	X

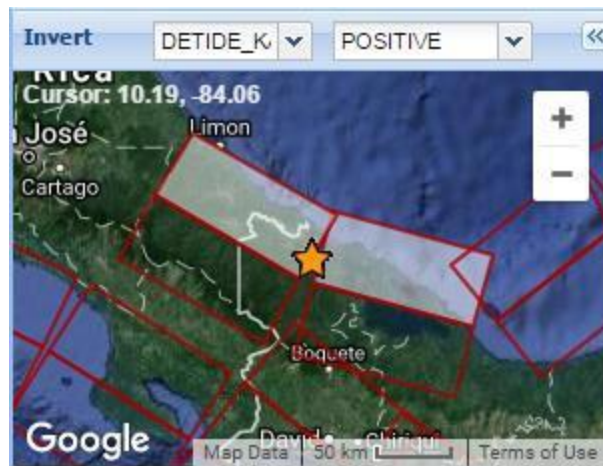
GRAND ISLE LA	USA	X	0	0	0
HATTERAS NC	North Carolina	Not in System	0	0	0
HORTA		Not in System	0	0	0
ILE ROYAL GUIANA FR	French Guiana	X	0	0	0
ISLA MUJERES	Mexico	0	0	0	0
JACMEL HT	Haiti	0	0	0	0
KEY WEST FL	Florida	0	0	0	0
LAMESHURBAYSTJOHN VI	St. Johns	X	X	0	X
LE PRECHEUR MARTINI	Martinique	X	0	0	X
LE ROBERT MARTINIQU	Martinique	X	0	0	X
LIMETREE VI	USA	X	X	0	X
LIMON CR	Costa Rica	X	0	0	X
MAGUEYES ISLAND PR	Puerto Rico	X	X	0	X
MAYAGUEZ PR	Puerto Rico	X	X	0	X
MINDELO CV	CV	0	0	0	0
MONA ISLAND PR	Puerto Rico	X	0	0	X
MONTAUK NY	USA	0	0	0	0
OREGON INLET NC	USA	0	0	0	0

PALMEIRA CAPE VERDE	Cape Verde	X	0	0	0
PARHAM AT	Antigua & Barbuda	0	0	X	0
POINT A PITRE GP	Guadalupe	X	0	0	X
POINT FORTIN TT	Trinidad and Tobago	0	0	0	0
PONTA DELGADA PT	Portugal	0	0	0	0
PORT AU PRINCE HT	Haiti	X	0	0	X
PORT OF SPAIN TT	Trinidad and Tobago	X	0	0	0
PORT ROYAL JM	Jamaica	X	0	0	0
PORT SAN ANDRES DO	Dominica	Not in System	0	0	X
PORT ST CHARLES BB	Barbados	X	0	0	X
PRAIA CV	Cabo Verde	0	0	0	0
PRICKLEY BAY GD	Grenada	X	0	0	0
PUERTO CORTES HN	Honduras	0	0	0	X
PUERTO ESTRELLA CO	Colombia	0	0	0	0
PUERTO MORELOS MX	Mexico	X	0	0	X
PUERTO PLATA DO	Dominican Republic	X	0	0	X
PUNTA CANA DO	Dominican Republic	X	0	0	X

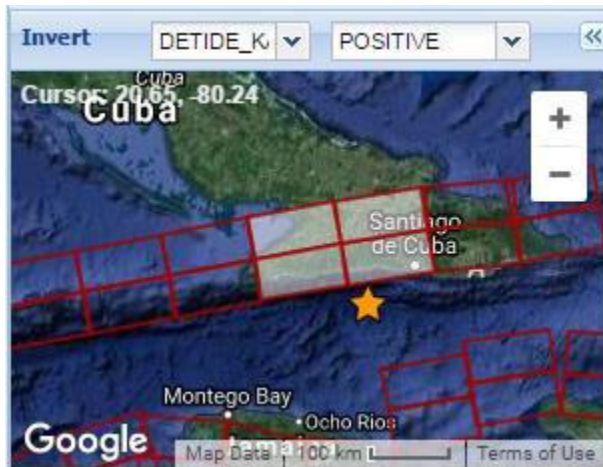
ROATAN ISLAND HN	Honduras	0	0	0	X
ROSEAU DM	Dominica	X	0	0	X
SAINT MARTIN FR	Saint Martin	X	0	0	0
SAN ANDRES CO	Colombia	X	0	0	X
SAN JUAN PR	Puerto Rico	X	X	0	X
SANTA MARIA	Colombia	Not in System	0	0	0
SANTA MARTA CO	Colombia	X	0	0	X
SAPZURRO CO	Colombia	0	0	0	0
SCARBOROUGH TT	Trinidad and Tobago	X	0	0	0
ST CROIX VI	Trinidad and Tobago	X	0	0	X
TELA HN	Honduras	0	0	0	0
TELCHAC MX	Mexico	0	0	0	0
TORTOLA VI UK	British Virgin Islands	X	0	0	X
UTILA ISLAND HN	Honduras	0	0	0	0
VACA KEY FL	Florida	0	0	0	X
VIRGINIA KEY FL	Florida	Not in System	0	0	X
YABUCOA PR	Puerto Rico	X	X	0	X

## B. 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.



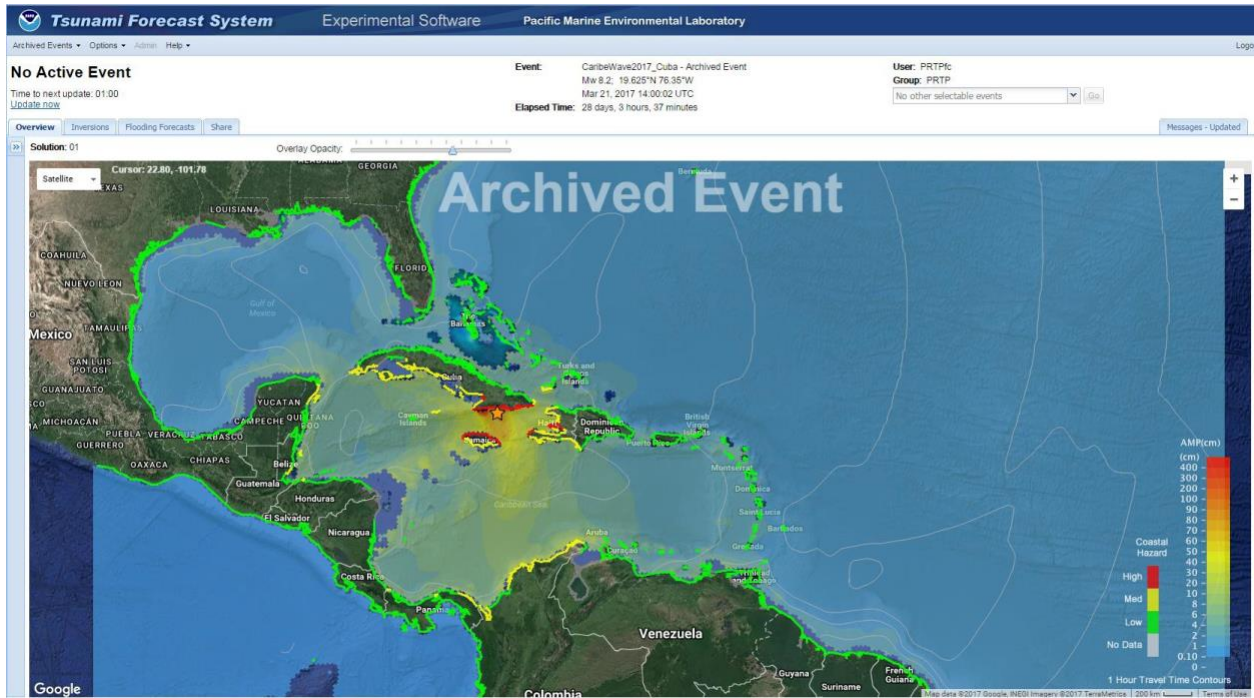
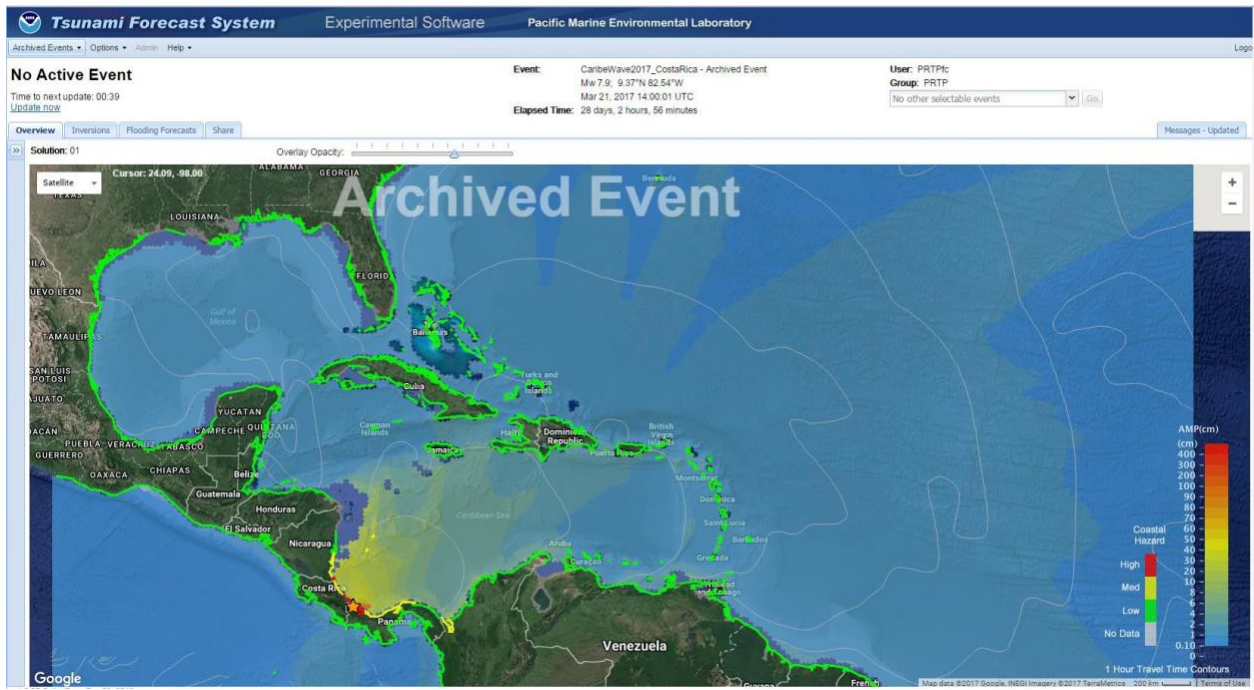
**Figure 2.** Cuba scenario. Selected unit sources are depicted in frosted rectangles. From top to bottom and left to right: at62a, at61a, at62b and at61b, with boxes measuring 100 km long and 50km wide.



**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.





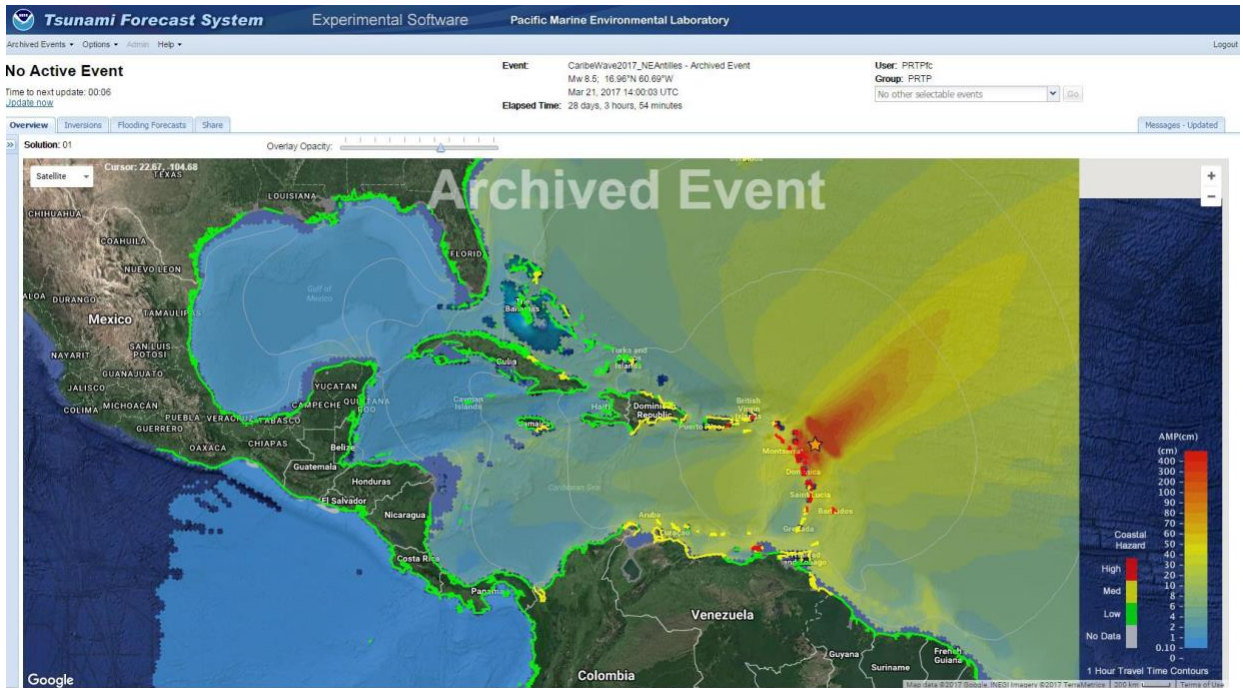


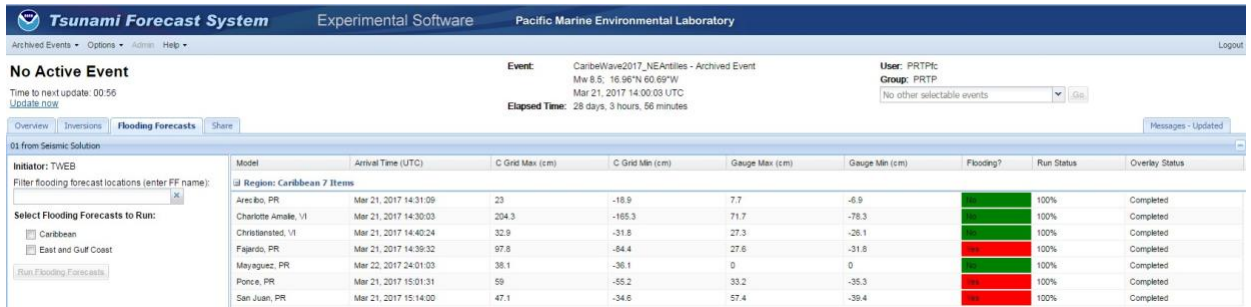
Figure 4 a, b, and c. The figures shows an overall view of the modeled **Costa Rica, Cuba, and Northeastern Lesser Antilles** scenarios (respectively). The color along the coasts indicates the level of danger from the initial tsunami event: green for minimum hazard and yellow and red for maximum hazard (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).

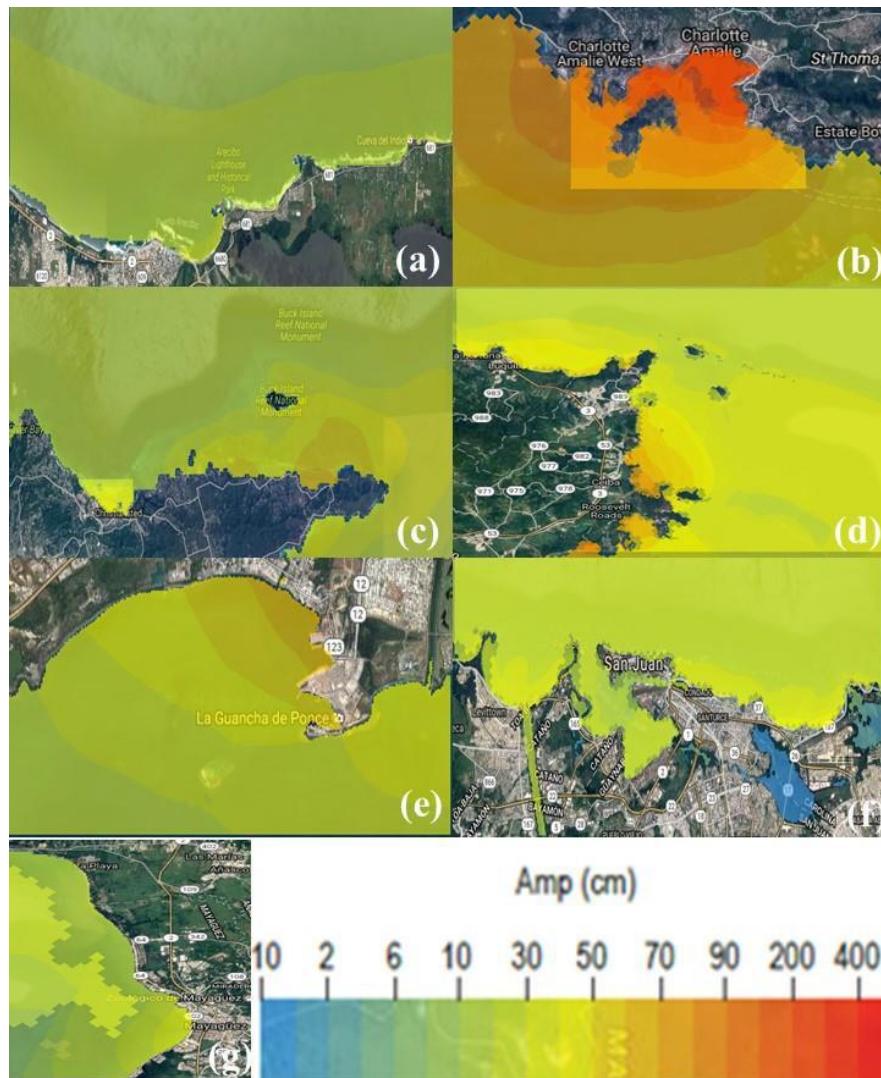
The screenshot shows a table of flooding forecast results for the Caribbean region. The table includes columns for Model, Arrival Time (UTC), C Grid Max (cm), C Grid Min (cm), Gauge Max (cm), Gauge Min (cm), Flooding?, Run Status, and Overlay Status.

Model	Arrival Time (UTC)	C Grid Max (cm)	C Grid Min (cm)	Gauge Max (cm)	Gauge Min (cm)	Flooding?	Run Status	Overlay Status
Region: Caribbean 7 Items								
Arecibo, PR	Mar 21, 2017 17:05:55	1.8	-1.4	1.5	-1.3	Yes	100%	Completed
Charlotte Amalie, VI	Mar 21, 2017 16:47:31	6.9	-7.7	3.4	-2.5	Yes	100%	Completed
Christiansted, VI	Mar 21, 2017 16:45:41	1.7	-0.9	3.2	-1.9	Yes	100%	Completed
Fajardo, PR	Mar 21, 2017 17:36:43	4.7	-4.9	2.3	-2.3	Yes	100%	Completed
Mayaguez, PR	Mar 21, 2017 17:00:35	4.4	-5.4	3.3	-2.6	Yes	100%	Completed
Ponce, PR	Mar 21, 2017 17:14:46	14.8	-11.9	2.6	-2.9	Yes	100%	Completed
San Juan, PR	Mar 21, 2017 17:15:27	14.2	-9.5	0.3	-0.3	Yes	100%	Completed



**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.





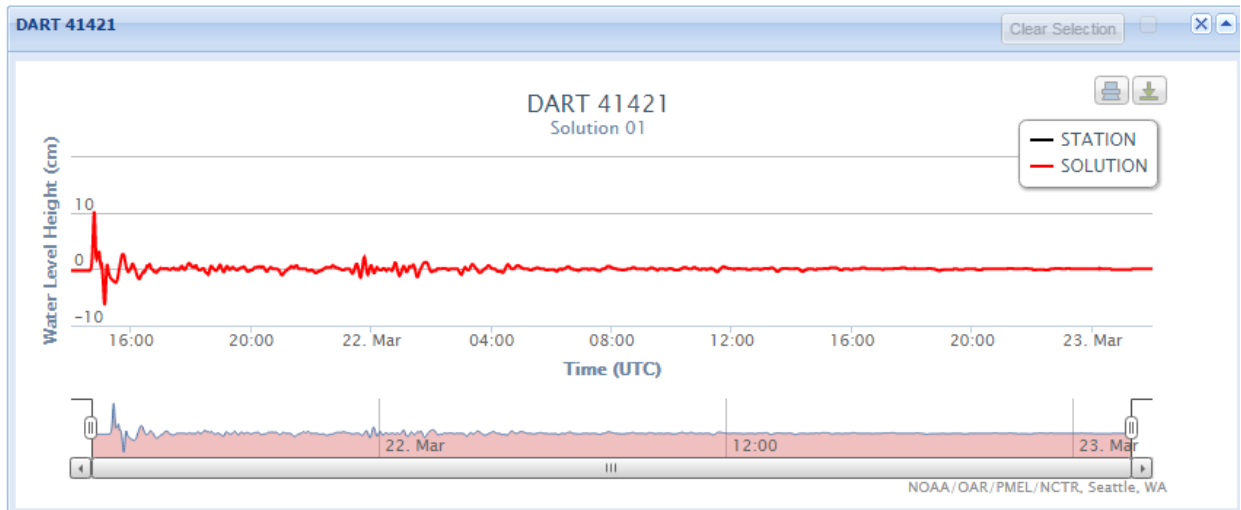
**Figure 6.** Screenshot from Tweb of the flooding forecast for different locations in the Caribbean Region during the Northeastern Lesser Antilles scenario. Colors represent amplitudes in cm. From top to bottom: **a.** Arecibo, **b.** Charlotte Amalie, **c.** Christiansted, **d.** Fajardo, **e.** Ponce, **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).