



# CARIBE WAVE 17

## 1<sup>st</sup> Webinar

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ICG CARIBE EWS Chair  
January 17, 2017

# Institutional Reference Frame for the Exercise

**UNESCO:** The United Nations Educational, Scientific, and Cultural Organization

**IOC:** UNESCO Intergovernmental Oceanographic Commission

**ICG/CARIBE EWS:** UNESCO IOC Intergovernmental Coordination Group for Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions

**CTIC:** Caribbean Tsunami Information Centre; A Government of Barbados UNESCO/ IOC Partnership

**NOAA:** National Oceanic and Atmospheric Administration, U.S. Department of Commerce

**PTWC:** NOAA Pacific Tsunami Warning Center (CARIBE EWS Tsunami Service Provider)

**CTWP:** NOAA Caribbean Tsunami Warning Program

**CEPREDENAC:** Coordination for Natural Disaster Prevention Center in Central America.

**CDEMA:** Caribbean Disaster and Emergency Management Agency

**EMIZ Antilles:** French West Indies Zone Disaster Management Authority

# CARIBE WAVE 2016

- 32 nations and 15 territories of the Caribbean and Adjacent Regions participated in this exercise with a total of 332,814 people engaged.
  - This represented a MS participation rate of 100% (same as 2015, up from 98% in 2014, 94% in 2013, 75% in 2011) and an increase of individual participation of 74% (up from 191,420 in 2015) .

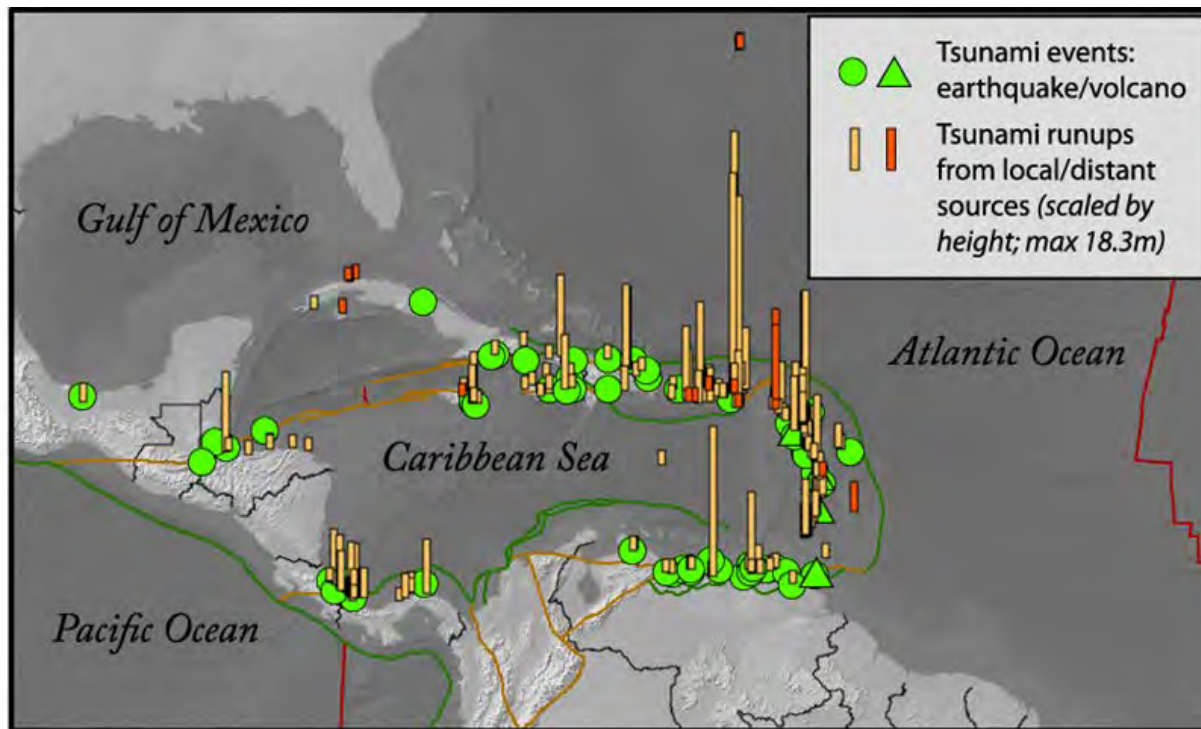




Country	Number of Participants, with post exercise updates from Member States
Antigua & Barbuda	393
Bahamas	5
Barbados	1,860
Belize	27
Brazil	10
Colombia	137
Costa Rica	200
Cuba	633
Dominica	353
Dominican Republic	380
France	147
Grenada	14,300
Guadeloupe	62,928
Guatemala	10
Guyana	10
Haiti	260
Honduras	6
Martinique	21,731
Mexico	1,810
Netherlands	5
NL- Aruba	3
NL- Curacao	180
NL- Sint Maarten	1,400
Nicaragua	525
Panama	5,958
Saint Kitts and Nevis	3,320
Saint Lucia	560
Saint Martin	4,026
Saint Vincent and the Grenadines	35
Trinidad and Tobago	279
UK- Anguilla	1,160
UK- Bermuda	158
UK- British Virgin Islands	4,762
UK- Cayman Islands	20
UK- Turks and Caicos Islands	30
USA- Puerto Rico	140,875
USA- U.S. Virgin Islands	2,928
Venezuela	61,390
<b>TOTAL</b>	<b>332,814</b>



According to the historical tsunami data base, over the past 500 years, at least 75 tsunamis have been observed in the region, and although they do not occur as frequently as in other basins, the vulnerability is very large; upwards of 500,000 people could be killed within hours if the response is not adequate.



Map of tsunami run-ups in the Caribbean 1493-2013 (National Centers for Environmental Information, <http://www.ngdc.noaa.gov/hazards/tsu.shtml>). Artist: Jessee Varner; originally published in von Hillebrandt-Andrade, 2013.

## CARIBE WAVE 17

# Objectives

- 1. To exercise and evaluate operations of the CARIBE EWS Tsunami Warning System.**
  - A. Validate the issuance of tsunami products from the PTWC.**
  - B. Validate the receipt of tsunami products by CARIBE EWS Tsunami Warning Focal Points (TWFPs) and/or National Tsunami Warning Centers NTWCs).**
- 2. To evaluate the use of PTWC CARIBE EWS products.**
- 3. To validate the readiness to respond to a tsunami.**
  - A. Validate the operational readiness of the TWFPs/ NTWCs and/or the National Disaster Management Office (NDMO).**
  - B. To improve operational readiness. Before the exercise, ensure appropriate tools and response plan(s) have been developed, including public education materials.**
  - C. Validate that the dissemination of warnings and information/advice by TWFPs, and NTWCs, to relevant in-country agencies and the public is accurate and timely.**
  - D. Validate the organizational decision-making process (tsunami response plans) about public warnings and evacuations.**
  - E. Validate that the methods used to notify and instruct the public are accurate and timely.**
  - F. Evaluate the status of the implementation of the Tsunami Ready recognition program.**

# Goals/ Metrics

Goal	2013 Result	2014 Metric	2014 Result	2015 Metric	2015 Result	2016 Metric	2016 Result	2017 Metric
<b>Participation of Member States of ICG CARIBE EWS with designated focal warning point</b>	94%	95%	98% (including two MS/Territory unofficial)	95%	100%	100%	100%	100%
<b>Compliance with the timeline</b>	Close to 100%	100%	Almost 100%	100%	Almost 100%	100%	Almost 100%	100%
<b>Community involvement (beyond TWFP)</b>	75%	75%	75%	80%	66%	85%	73%	90%
<b>Number of participants</b>	44,000	+10%	191,000	+10%	191,420	+10%	332,814	+10%
<b>TWFP receive the dummy message</b>	98%	100%	94%	100%	90%	100%	84%	100%
<b>Countries who participate submit exercise questionnaire</b>	90%	100%	100%	100%	91%	100%	100%	100%

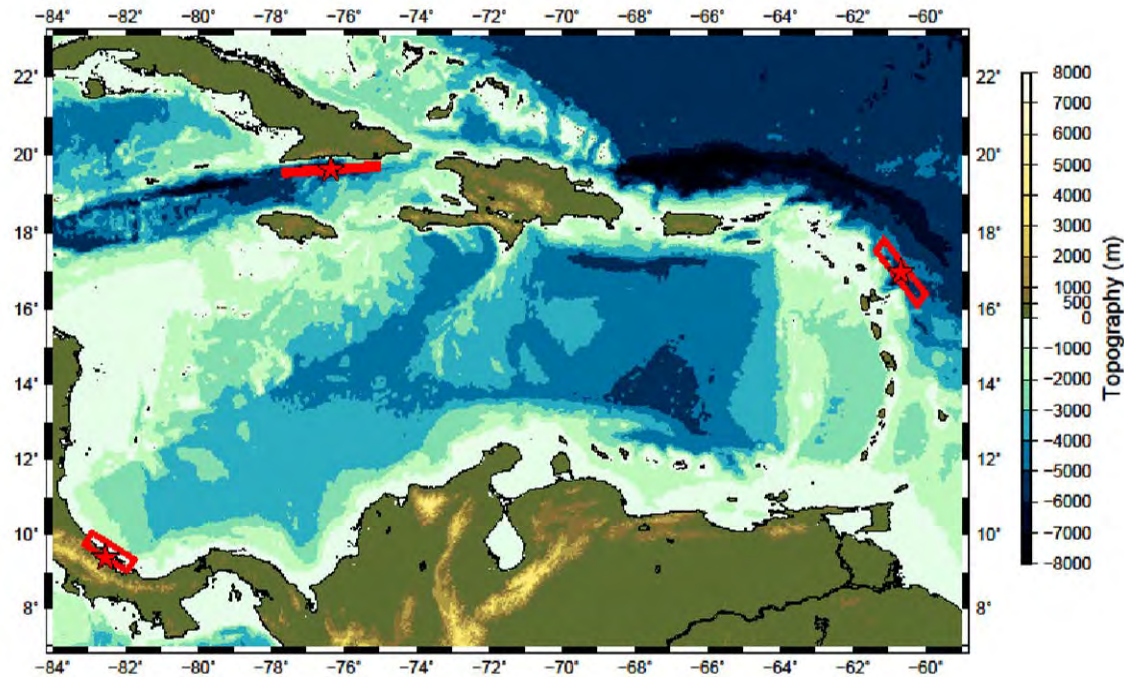


# Exercise Manuals

- The exercise manuals are available at [www.caribewave.info](http://www.caribewave.info)
- The manual includes:
  - Tsunami and earthquake scenarios description
  - Timelines
  - PTWC dummy message and simulated exercise threat messages
  - Travel times and expected wave heights
  - The website link to post-exercise evaluation questionnaire

# CARIBE WAVE 17

## Earthquake and Tsunami Scenarios



Scenario	Origin Time	Mw	Epicenter
Costa Rica	14:00:00 UTC March 21, 2017	7.9	9.37°, -82.54°
Cuba		8.2	19.625°, -76.35°
Northeastern Lesser Antilles		8.5	16.96°, -60.69°

# CARIBE WAVE 17

## Earthquake and Tsunami Scenarios

- The initial dummy message for the three scenarios will be issued by the CARIBE EWS Tsunami Service Provider [Pacific Tsunami Warning Center (PTWC)] on March 21, 2017 at 1400 UTC and disseminated over all its standard broadcast channels.
  - Each country and territory will choose one scenario and decide if and how to disseminate messages within its area of responsibility.
  - **By March 10, 2017**, each Member State needs to select one scenario and must inform its selection to PTWC ([charles.mccreery@noaa.gov](mailto:charles.mccreery@noaa.gov) and [gerard.fryer@noaa.gov](mailto:gerard.fryer@noaa.gov)) with a copy to the Caribbean Tsunami Warning Program ([carolina.hincapie@noaa.gov](mailto:carolina.hincapie@noaa.gov) and [cherrymar.reyes@noaa.gov](mailto:cherrymar.reyes@noaa.gov)). If the Member State does not inform the PTWC and CTWP, the organizers will decide for which scenario the PTWC will send the products.

## Appendix E. TWC Dummy (Start of Exercise) Messages

PTWC

Center

WECA41 PHEB 211400

WMO ID

TSUCAX

AWIPS ID

TEST...TSUNAMI EXERCISE MESSAGE NUMBER 1...TEST  
NWS PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS  
ISSUED AT 1400Z 21 MAR 2017

...CARIBEWAVE 17 TSUNAMI EXERCISE MESSAGE. REFER TO PTWC MESSAGE 1 IN THE EXERCISE HANDBOOK. THIS IS AN EXERCISE ONLY...

THIS MESSAGE IS BEING USED TO START THE CARIBEWAVE 17 CARIBBEAN TSUNAMI EXERCISE. THIS WILL BE THE ONLY EXERCISE MESSAGE BROADCAST FROM THE PACIFIC TSUNAMI WARNING CENTER EXCLUDING SPECIAL EMAIL MESSAGES DISCUSSED IN THE HANDBOOK. THE HANDBOOK IS AVAILABLE AT THE WEB SITE CARIBEWAVE.INFO. THE EXERCISE PURPOSE IS TO PROVIDE EMERGENCY MANAGEMENT A REALISTIC SCENARIO TO TEST TSUNAMI RESPONSE PLANS.

THIS IS ONLY AN EXERCISE.

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# Start of Exercise messages will also be sent out by PTWC twitter accounts

Users with US Cellphone providers can receive Tweets as text messages, sending as body message:

“Follow NWS\_PTWC” to 40404 (this account is for all PTWC products)

“Follow NWS\_CTWP” to 40404 (this account is only for PTWC products for the Caribbean and Adjacent Regions)

“This is a test message for the CARIBEWAVE17 tsunami exercise #CaribeWave” (will be issued at 14h00 UTC to NWS\_PTWC and NWS\_CTWP accounts/subscribers ).”



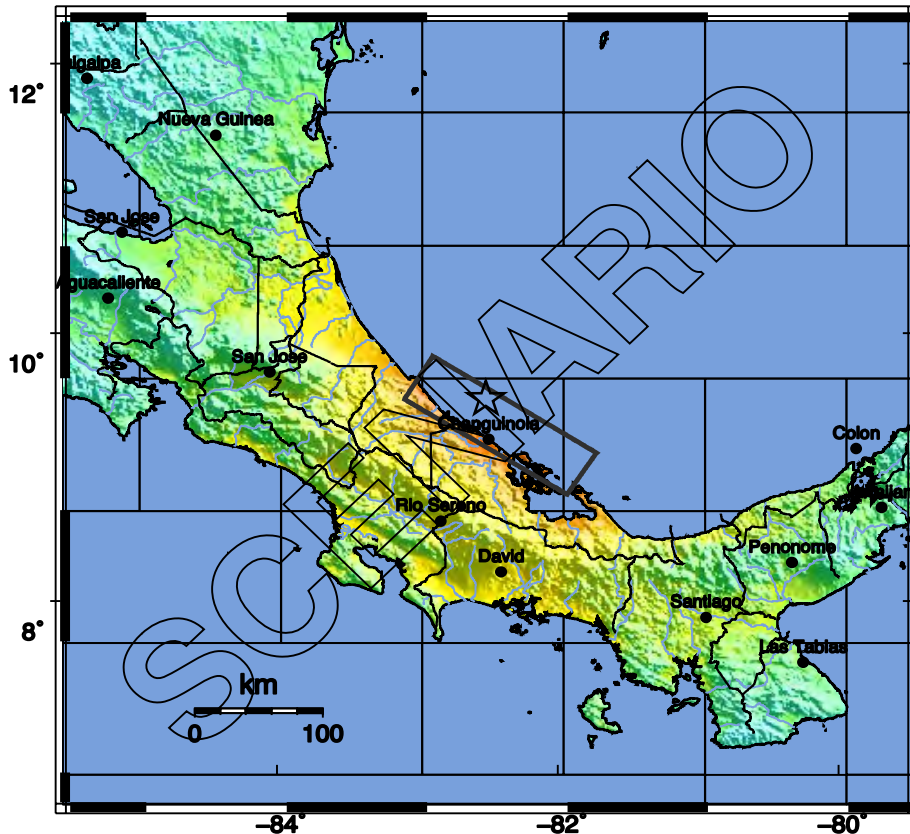
## Costa Rica Scenario

# Earthquake Impact Scenario

## Costa Rica

### --- Earthquake Planning Scenario--- ShakeMap for Costa Rica Scenario

**Scenario Date: Mar 21, 2017 14:00:00 UTC M 7.9 N9.73 W82.54 Depth: 19.0km**



**PLANNING SCENARIO ONLY — Map Version 1 Processed 2016-08-11 15:42:39 UTC**

<b>PERCEIVED SHAKING</b>	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
<b>POTENTIAL DAMAGE</b>	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
<b>PEAK ACC.(%g)</b>	<0.05	0.3	2.8	6.2	12	22	40	75	>139
<b>PEAK VEL.(cm/s)</b>	<0.02	0.1	1.4	4.7	9.6	20	41	66	>178
<b>INSTRUMENTAL INTENSITY</b>	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)



Earthquake Shaking  Red Alert

**M 7.9, Costa Rica: Caribe Wave 17**

Origin Time: 2017-03-21 14:00:00 UTC (08:00:00 local)

Location: 9.73°N 82.54°W Depth: 19km

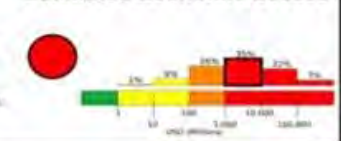
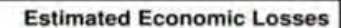
**FOR TSUNAMI INFORMATION, SEE: [tsunami.gov](http://tsunami.gov)**

Created: 40 minutes, 0 seconds after earthquake



Red alert level for economic losses. Extensive damage is probable and the disaster is likely widespread. Estimated economic losses are 3-20% GDP of Costa Rica. Past events with this alert level have required a national or international level response.

Orange alert level for shaking-related fatalities. Significant casualties are likely.



### Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = ±1000)		0.0	0.0	422k*	3,911k*	3,137k	108k	237k	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY		I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

\*Estimated exposure only includes population within the map area

### Population Exposure



**Structures:** Overall, the population in this region resides in structures that are a mix of vulnerable and earthquake resistant construction. The predominant vulnerable building types are adobe and concrete/cinder block masonry construction.

**Historical Earthquakes (with MMI levels):**

Date (UTC)	Dist. (km)	Mag.	Max Shaking MMI(#)	Deaths
1990-12-22	187	5.9	VIII(188)	1
1973-04-14	274	6.5	VIII(96)	26
1991-04-22	58	7.6	VII(213)	75

Recent earthquakes in this area have caused secondary hazards such as tsunamis, landslides, and liquefaction that might have contributed to losses.

### Selected City Exposure

from Geonames.org

MMI City	Population
VIII Bocas del Toro	101
VIII Sixaola	101
VIII Changuinola	231
VIII Guabito	61
VIII Isla Bastimentos	21
VIII Cusapin	11
VIII Puerto Limon	831
VI David	831
VI San Jose	3351
V Colon	771
IV San Andres	581

**bold cities appear on map**

7.9.se

Event ID: uscosta\_rica\_m7.9\_se

# Message Chronology issued by the PTWC

## Costa Rica

Date	Time (UTC)	PTWC	
		Type of Product	Transmission Method
3/21/17	1400	-----Earthquake Occurs-----	
3/21/17	1400	Dummy	NWWS, GTS, EMWIN, AISR, Fax, Email
3/21/17	1405	Tsunami Threat Message #1	Email
3/21/17	1425	Tsunami Threat Message # 2 and Graphic Enhanced Product	Email
3/21/17	1525	Tsunami Threat Message #3	Email
3/21/17	1625	Tsunami Threat Message #4	Email
3/21/17	1725	Tsunami Threat Message #5	Email
3/21/17	1825	Tsunami Threat Message #6	Email
3/21/17	1925	Final Tsunami Threat Message #7	Email

Appendix F. TWC Exercise Messages  
Costa Rica Earthquake Scenario

The following messages created for the CARIBE WAVE 17 tsunami exercise are representative of the official standard products issued by the PTWC during a large magnitude 7.93 earthquake and tsunami originating in Costa Rica. During a real event, NTWC and TWFP would be sent via email the graphical products. The alerts would persist longer during a real event than is depicted in this exercise.

PTWC Message #1

WECA41 PHEB 211405  
TSUCAX

WMO ID

AWIPS ID

TSUNAMI MESSAGE NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1405 UTC TUE MAR 21 2017

...TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM FOR THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE REFINED INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

PRELIMINARY EARTHQUAKE PARAMETERS

- \* MAGNITUDE 8.1
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 9.4 NORTH 82.5 WEST
- \* DEPTH 19 KM / 12 MILES
- \* LOCATION PANAMA-COSTA RICA BORDER REGION

EVALUATION

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.1 OCCURRED IN THE PANAMA-COSTA RICA BORDER REGION AT 1400 UTC ON TUESDAY MARCH 21 2017.
- \* BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.

TSUNAMI THREAT FORECAST

- \* HAZARDOUS TSUNAMI WAVES FROM THIS EARTHQUAKE ARE POSSIBLE WITHIN THE NEXT THREE HOURS ALONG SOME COASTS OF  
  
COSTA RICA... PANAMA... SAN ANDRES PROVID... COLOMBIA...  
NICARAGUA... HAITI... CAYMAN ISLANDS... ARUBA...  
JAMAICA... CUBA... BONAIRE... DOMINICAN REP... BAHAMAS...  
CURACAO AND PUERTO RICO

RECOMMENDED ACTIONS

- \* GOVERNMENT AGENCIES RESPONSIBLE FOR THREATENED COASTAL AREAS SHOULD TAKE ACTION TO INFORM AND INSTRUCT ANY COASTAL POPULATIONS AT RISK IN ACCORDANCE WITH THEIR OWN EVALUATION... PROCEDURES AND THE LEVEL OF THREAT.
- \* PERSONS LOCATED IN THREATENED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM NATIONAL AND LOCAL AUTHORITIES.

ESTIMATED TIMES OF ARRIVAL

- \* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN THE REGION IDENTIFIED WITH A POTENTIAL TSUNAMI THREAT. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN WAVES CAN BE FIVE MINUTES TO ONE HOUR.

LOCATION	REGION	COORDINATES		ETA(UTC)	
-----					
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1420	03/21
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1431	03/21
PROVIDENCIA	SAN ANDRES PROVI	12.6N	81.7W	1445	03/21
SAN ANDRES	SAN ANDRES PROVI	13.4N	81.4W	1456	03/21
ALIGANDI	PANAMA	9.2N	78.0W	1507	03/21
COLON	PANAMA	9.4N	79.9W	1507	03/21
PUERTO CARRETO	PANAMA	8.8N	77.6W	1521	03/21
CARTAGENA	COLOMBIA	10.4N	75.6W	1524	03/21
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1526	03/21
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1535	03/21
SANTA MARTA	COLOMBIA	11.2N	74.2W	1541	03/21
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1542	03/21
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1556	03/21
JACAMEL	HAITI	18.1N	72.5W	1610	03/21
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1616	03/21
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1624	03/21
ORANJESTAD	ARUBA	12.5N	70.0W	1625	03/21
KINGSTON	JAMAICA	17.9N	76.9W	1627	03/21
JEREMIE	HAITI	18.6N	74.1W	1627	03/21
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1627	03/21
RIOHACHA	COLOMBIA	11.6N	72.9W	1631	03/21
ONIMA	BONAIRE	12.3N	68.3W	1635	03/21
MONTEGO BAY	JAMAICA	18.5N	77.9W	1640	03/21
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1640	03/21
CIENFUEGOS	CUBA	22.0N	80.5W	1644	03/21
BARACOA	CUBA	20.4N	74.5W	1650	03/21
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1656	03/21
WILLEMSTAD	CURACAO	12.1N	68.9W	1700	03/21
MAYAGUEZ	PUERTO RICO	18.2N	67.2W	1700	03/21
CAP HAITEN	HAITI	19.8N	72.2W	1701	03/21

## POTENTIAL IMPACTS

- \* A TSUNAMI IS A SERIES OF WAVES. THE TIME BETWEEN WAVE CRESTS CAN VARY FROM 5 MINUTES TO AN HOUR. THE HAZARD MAY PERSIST FOR MANY HOURS OR LONGER AFTER THE INITIAL WAVE.
- \* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.
- \* IMPACTS CAN ALSO VARY DEPENDING UPON THE STATE OF THE TIDE AT THE TIME OF THE MAXIMUM TSUNAMI WAVES.
- \* PERSONS CAUGHT IN THE WATER OF A TSUNAMI MAY DROWN... BE CRUSHED BY DEBRIS IN THE WATER... OR BE SWEEPED OUT TO SEA.

## NEXT UPDATE AND ADDITIONAL INFORMATION

- \* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES) -ALL IN LOWERCASE LETTERS-.
- \* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV) AND AT [WWW.TSUNAMI.GOV](http://WWW.TSUNAMI.GOV).
- \* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV).
- \* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND AT [NTWC.ARH.NOAA.GOV](http://NTWC.ARH.NOAA.GOV).

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NNNN



**PTWC Message #2**

ZCZC  
WECA41 PHEB 211425 **WMO ID**  
TSUCAX **AWIPS ID**

TSUNAMI MESSAGE NUMBER 2  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1425 UTC TUE MAR 21 2017

**...TSUNAMI THREAT MESSAGE...**

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE  
UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM  
FOR  
THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL  
AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF  
ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE  
REFINED  
INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

**PRELIMINARY EARTHQUAKE PARAMETERS**

- \* MAGNITUDE 7.9
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 9.4 NORTH 82.5 WEST
- \* DEPTH 19 KM / 12 MILES
- \* LOCATION PANAMA-COSTA RICA BORDER REGION

**EVALUATION**

\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 7.9 OCCURRED IN  
THE PANAMA-COSTA RICA BORDER REGION AT 1400 UTC ON TUESDAY  
MARCH 21 2017.

\* BASED ON ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE  
FORECAST FOR SOME COASTS.

**TSUNAMI THREAT FORECAST...UPDATED**

\* TSUNAMI WAVES REACHING MORE THAN 3 METERS ABOVE THE TIDE  
LEVEL ARE POSSIBLE ALONG SOME COASTS OF

COSTA RICA.

\* TSUNAMI WAVES REACHING 1 TO 3 METERS ABOVE THE TIDE LEVEL ARE  
POSSIBLE ALONG SOME COASTS OF

PANAMA.

\* TSUNAMI WAVES REACHING 0.3 TO 1 METERS ABOVE THE TIDE LEVEL  
ARE POSSIBLE FOR SOME COASTS OF

NICARAGUA... JAMAICA... AND SAN ANDRES AND PROVIDENCIA.

\* ACTUAL AMPLITUDES AT THE COAST MAY VARY FROM FORECAST  
AMPLITUDES DUE TO UNCERTAINTIES IN THE FORECAST AND LOCAL  
FEATURES. IN PARTICULAR MAXIMUM TSUNAMI AMPLITUDES ON ATOLLS  
OR SMALL ISLANDS AND AT LOCATIONS WITH FRINGING OR BARRIER  
REEFS WILL LIKELY BE MUCH SMALLER THAN THE FORECAST  
INDICATES.

\* FOR ALL OTHER AREAS COVERED BY THIS MESSAGE... THERE IS NO  
TSUNAMI THREAT ALTHOUGH SMALL SEA LEVEL CHANGES MAY OCCUR.

RECOMMENDED ACTIONS

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COLON	PANAMA	9.4N	79.9W	1507 03/21
PUERTO CARRETO	PANAMA	8.8N	77.6W	1521 03/21
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1526 03/21
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1535 03/21
KINGSTON	JAMAICA	17.9N	76.9W	1627 03/21
MONTEGO BAY	JAMAICA	18.5N	77.9W	1640 03/21
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	1941 03/21

POTENTIAL IMPACTS

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- \* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.
- \* IMPACTS CAN ALSO VARY DEPENDING UPON THE STATE OF THE TIDE AT THE TIME OF THE MAXIMUM TSUNAMI WAVES.
- \* PERSONS CAUGHT IN THE WATER OF A TSUNAMI MAY DROWN... BE CRUSHED BY DEBRIS IN THE WATER... OR BE SWEEPED OUT TO SEA.

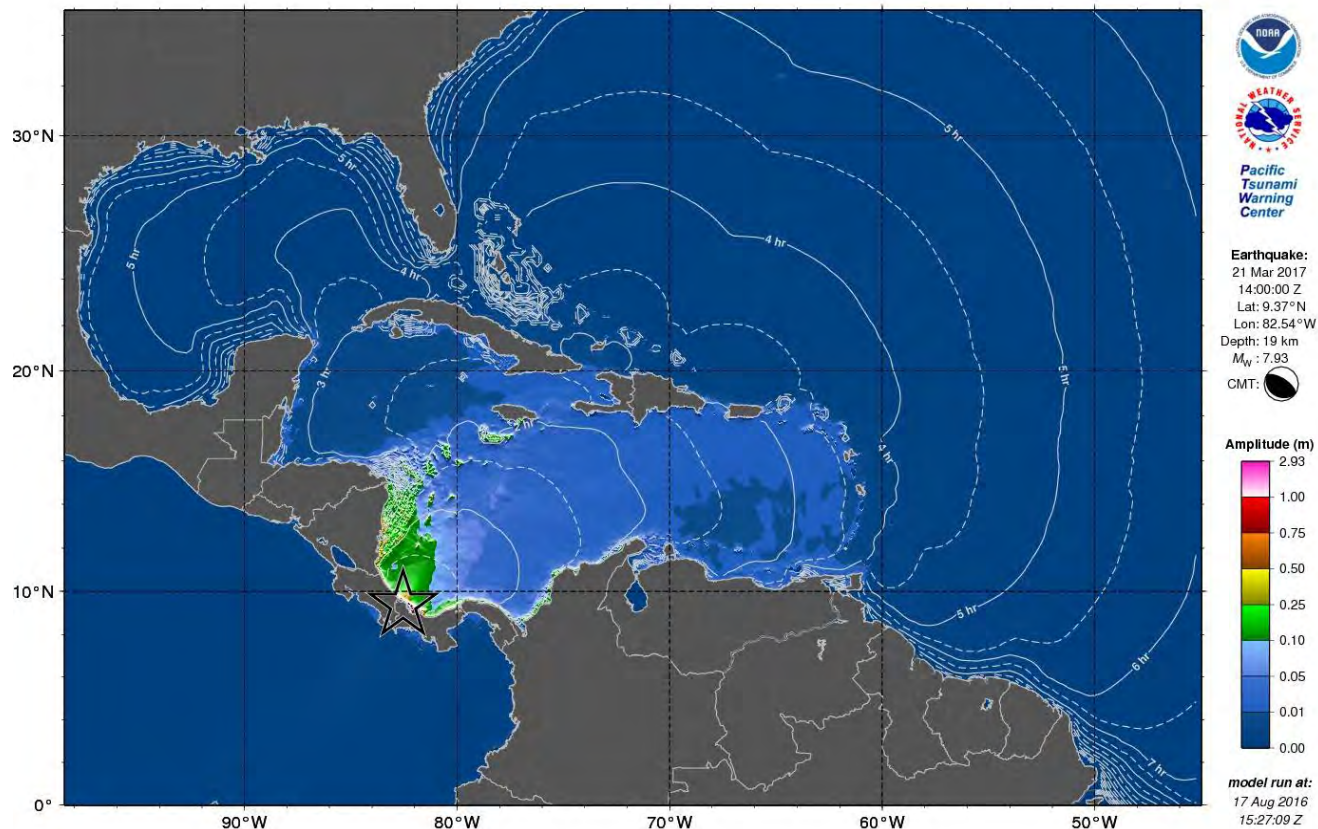
NEXT UPDATE AND ADDITIONAL INFORMATION

- \* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES) -ALL IN LOWERCASE LETTERS-.
- \* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV) AND AT [WWW.TSUNAMI.GOV](http://WWW.TSUNAMI.GOV).
- \* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV).
- \* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND AT [NTWC.ARH.NOAA.GOV](http://NTWC.ARH.NOAA.GOV).

\$\$  
NNNN

# Energy Forecast for Tsunami Wave Heights Costa Rica

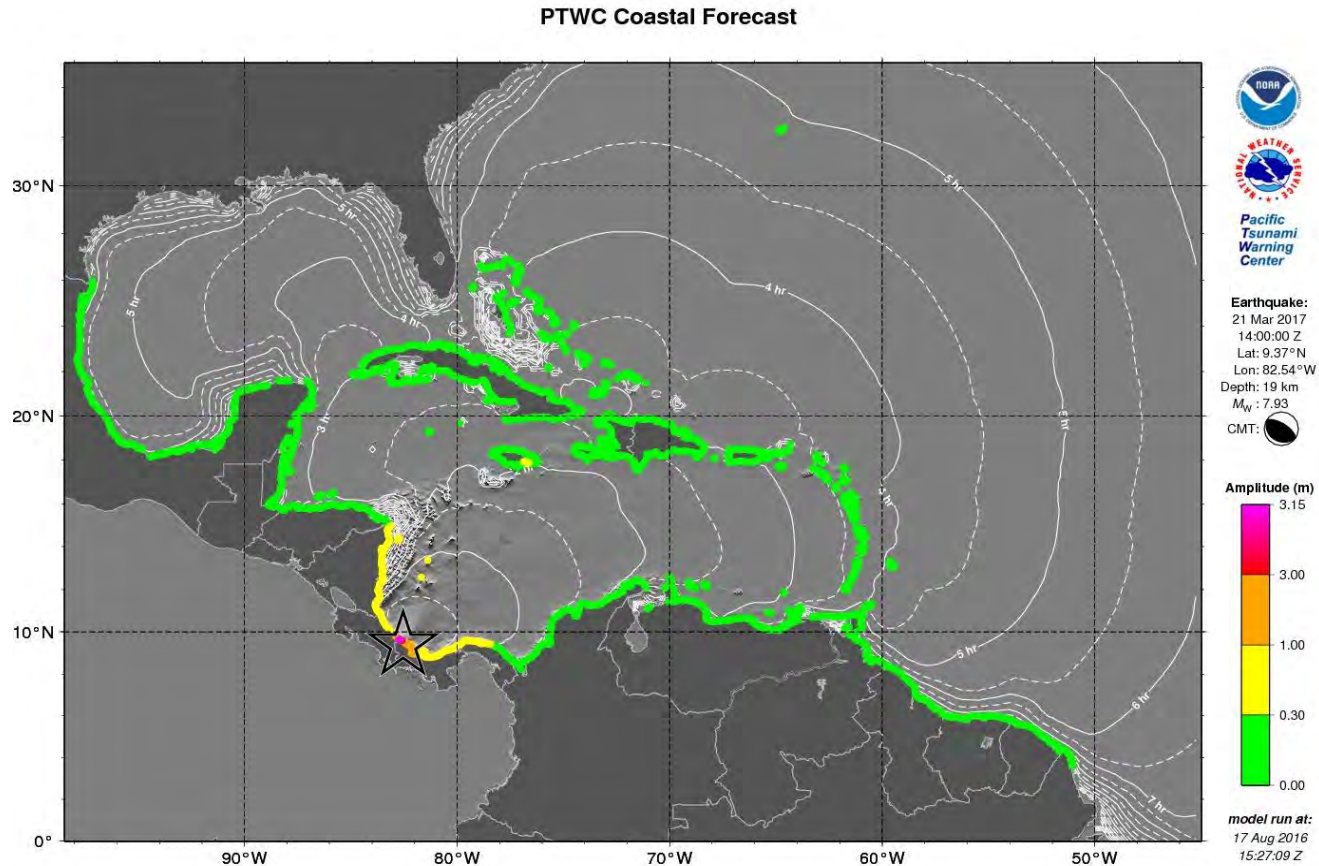
PTWC Energy Forecast



**RIFT maximum amplitude map for the Southern Caribbean Sea based on the scenario for Costa Rica.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

# Coastal Forecast for Tsunami Wave Heights Costa Rica



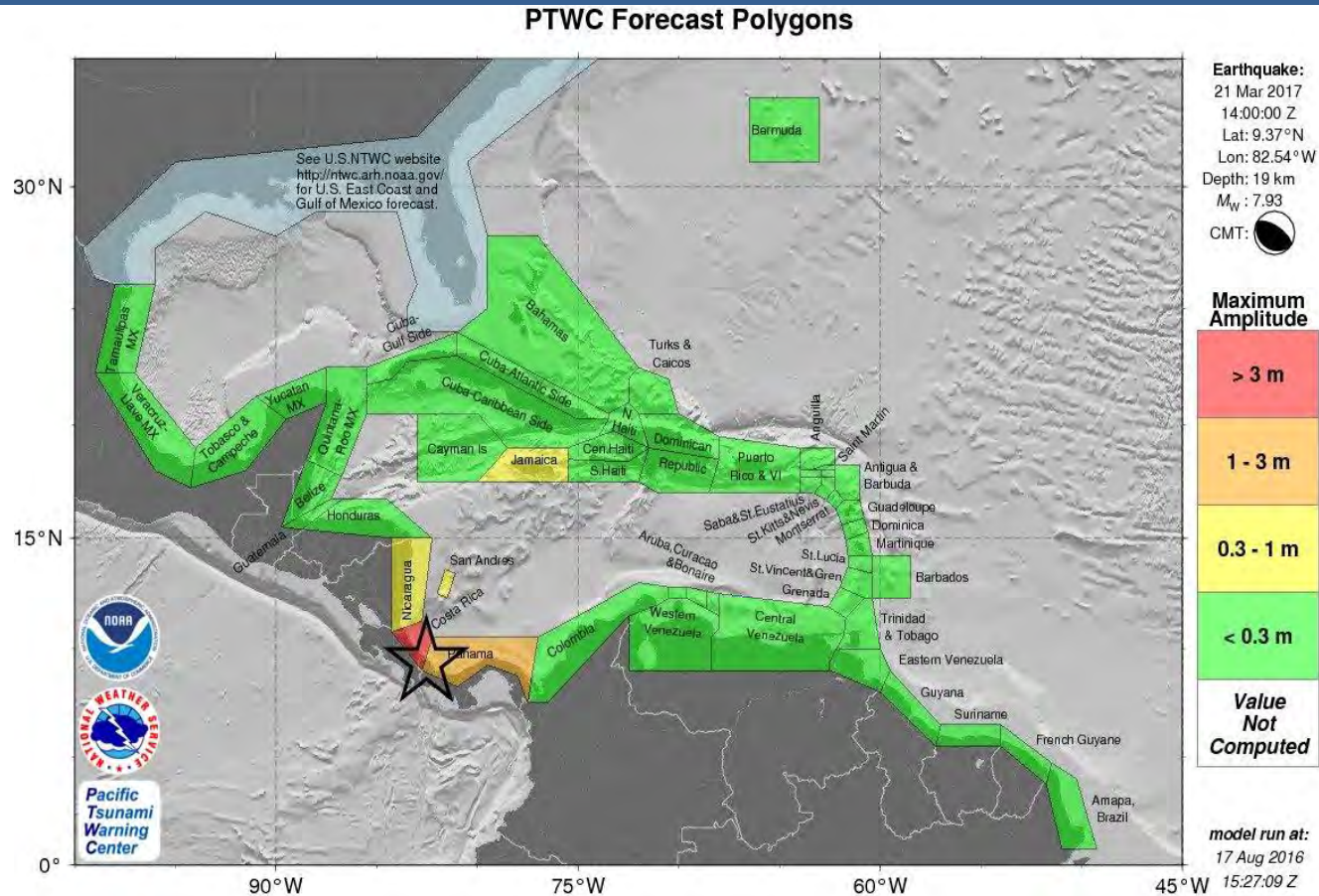
**RIFT coastal tsunami amplitude map for the Southern Caribbean Sea based on the scenario for Costa Rica.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.



# Polygons Forecast for Tsunami Wave Heights

## Costa Rica



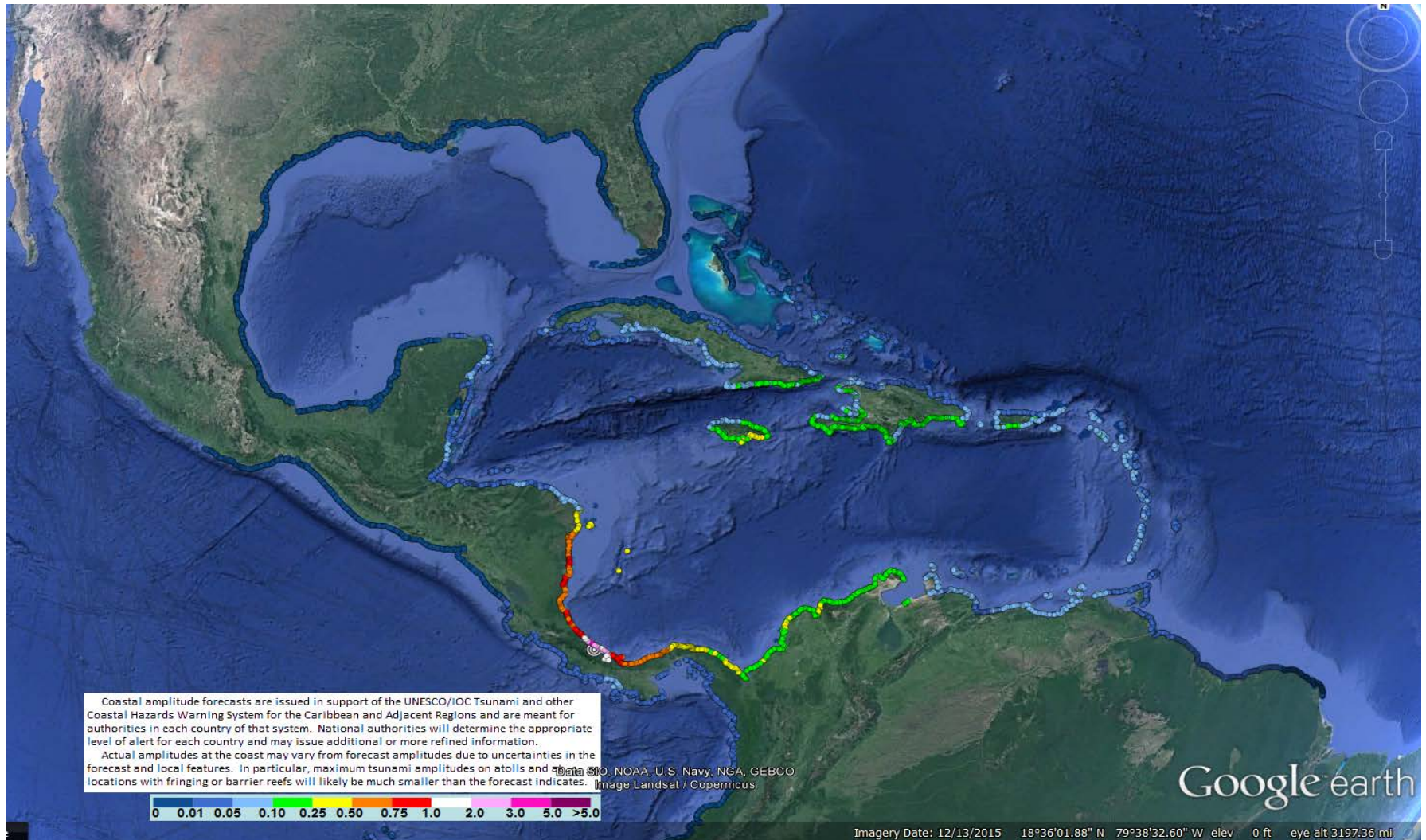
**RIFT forecast polygons for the Caribbean region on the Costa Rica scenario.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.



# KMZ

## Costa Rica



# Forecasted Maximum Wave Heights\*

## Costa Rica

### PTWC

LOCATION	MAXIMUM TSUNAMI HEIGHT	LOCATION	MAXIMUM TSUNAMI HEIGHT
SAINT MARTIN FR	0.06M/ 0.2FT	CAJA DE MUERTOS PR	0.11M/ 0.4FT
PRICKLEY BAY GD	0.07M/ 0.2FT	PORT SAN ANDRES DO	0.13M/ 0.4FT
POINT A PITRE GP	0.05M/ 0.2FT	YABUCOA PR	0.10M/ 0.3FT
LAMESHURBAYSTJOHNVI	0.07M/ 0.2FT	MAGUEYES ISLAND PR	0.09M/ 0.3FT
CALLIAQUA VC	0.06M/ 0.2FT	CAP HAITIEN HT	0.04M/ 0.1FT
PUERTO MORELOS MX	0.04M/ 0.1FT	MAYAGUEZ PR	0.08M/ 0.3FT
FORT DE FRANCE MQ	0.06M/ 0.2FT	ROATAN ISLAND HN	0.04M/ 0.1FT
ISLA MUJERES	0.05M/ 0.2FT	PUNTA CANA DO	0.09M/ 0.3FT
ROSEAU DM	0.07M/ 0.2FT	MONA ISLAND PR	0.09M/ 0.3FT
LE PRECHEUR MARTINI	0.05M/ 0.2FT	BULLEN BAY CURACAO	0.06M/ 0.2FT
DESHAIES GUADELOUPE	0.07M/ 0.2FT	BARAHONA DO	0.13M/ 0.4FT
BASSETERRE KN	0.05M/ 0.2FT	PORT ROYAL JM	0.33M/ 1.1FT
CEIBA CABOTAGE HN	0.04M/ 0.1FT	PUERTO ESTRELLA CO	0.16M/ 0.5FT
PORT AU PRINCE HT	0.14M/ 0.5FT	GEORGE TOWN CY	0.04M/ 0.1FT
CARRIE BOW CAY BH	0.06M/ 0.2FT	JACMEL HT	0.13M/ 0.4FT
PUERTO CORTES HN	0.04M/ 0.1FT	SANTA MARTA CO	0.24M/ 0.8FT
ARECIBO PR	0.04M/ 0.1FT	SAPZURRO CO	0.27M/ 0.9FT
PUERTO MORELOS MX	0.05M/ 0.2FT	COVENAS CO	0.22M/ 0.7FT
ESPERANZA VIEQUES P	0.08M/ 0.3FT	EL PORVENIR PA	0.38M/ 1.2FT
LIMETREE VI	0.09M/ 0.3FT	SAN ANDRES CO	0.48M/ 1.6FT
ST CROIX VI	0.08M/ 0.3FT	BOCAS DEL TORO PA	1.73M/ 5.7FT
UTILA ISLAND HN	0.04M/ 0.1FT	LIMON CR	0.91M/ 3.0FT
AGUADILLA PR	0.07M/ 0.2FT		

\*Maximum tsunami height is measured as water level above tide level at time of measurement, **run-up can be double this value**

**PTWC Message #7**

ZCZC  
WECA41 PHEB 211925 **WMO ID**  
TSUCAX **AWIPS ID**

TSUNAMI MESSAGE NUMBER 7  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1925 UTC TUE MAR 21 2017

**...FINAL TSUNAMI THREAT MESSAGE...**

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM FOR THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE REFINED INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

**PRELIMINARY EARTHQUAKE PARAMETERS**  
-----  
\* MAGNITUDE 7.9  
\* ORIGIN TIME 1400 UTC MAR 21 2017  
\* COORDINATES 9.4 NORTH 82.5 WEST  
\* DEPTH 19 KM / 12 MILES  
\* LOCATION PANAMA-COSTA RICA BORDER REGION

**EVALUATION**  
-----

\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 7.9 OCCURRED IN THE PANAMA-COSTA RICA BORDER REGION AT 1400 UTC ON TUESDAY MARCH 21 2017.

\* BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS EARTHQUAKE HAS PASSED AND THERE IS NO FURTHER THREAT. TSUNAMI THREAT FORECAST...UPDATED  
-----

**\* THE TSUNAMI THREAT HAS NOW LARGELY PASSED.**

**RECOMMENDED ACTIONS**  
-----

\* GOVERNMENT AGENCIES RESPONSIBLE FOR ANY IMPACTED COASTAL AREAS SHOULD MONITOR CONDITIONS AT THE COAST TO DETERMINE IF AND WHEN IT IS SAFE TO RESUME NORMAL ACTIVITIES.

\* PERSONS LOCATED NEAR IMPACTED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM LOCAL AUTHORITIES.

\* REMAIN OBSERVANT AND EXERCISE NORMAL CAUTION NEAR THE SEA.

**POTENTIAL IMPACTS**  
-----

\* MINOR SEA LEVEL FLUCTUATIONS OF UP TO 1 FOOT ABOVE AND BELOW THE NORMAL TIDE MAY CONTINUE OVER THE NEXT FEW HOURS.

#### NEXT UPDATE AND ADDITIONAL INFORMATION

---

\* THIS WILL BE THE FINAL STATEMENT ISSUED FOR THIS EVENT UNLESS NEW INFORMATION IS RECEIVED OR THE SITUATION CHANGES.

\* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S.

GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT  
EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.

\* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT  
PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

\* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS...  
AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC  
TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE  
PLACES THAT CAN BE FOUND AT PTWC.WEATHER.GOV.

\* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND  
THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S.  
NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND  
AT NTWC.ARH.NOAA.GOV.

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NNNN

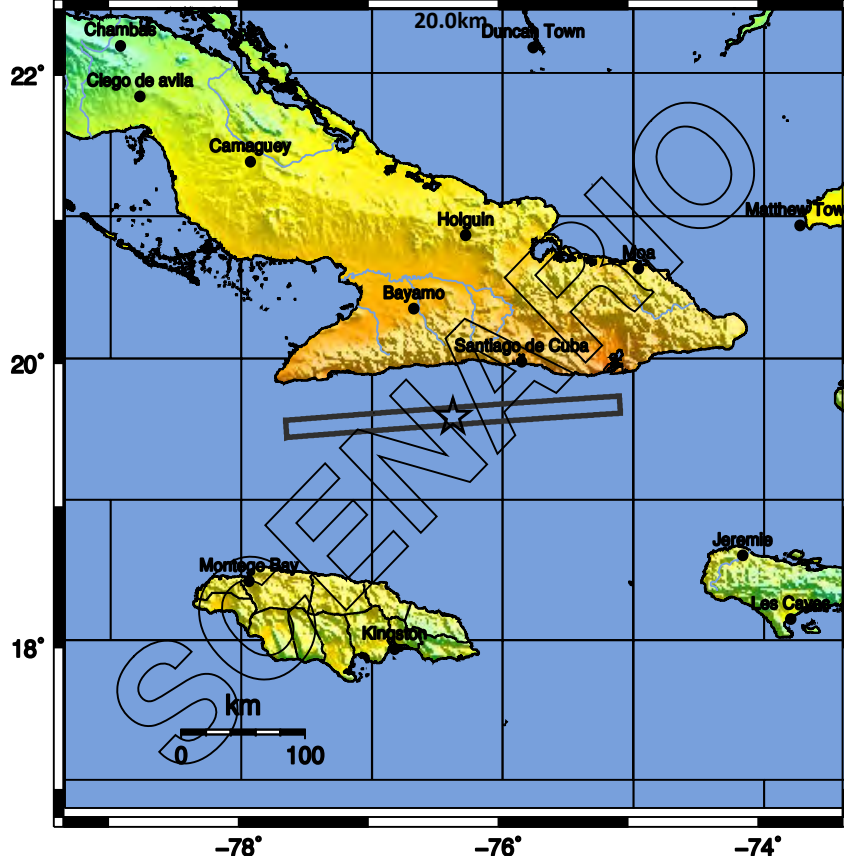
# Cuba Scenario



# Earthquake Impact Scenario Cuba

## --- Earthquake Planning Scenario --- ShakeMap for Cuba Scenario

Scenario Date: Mar 21, 2017 14:00:00 UTC M 8.2 N19.62 W76.35 Depth:



PLANNING SCENARIO ONLY — Map Version 1 Processed 2016-08-11 15:44:15 UTC

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)



Earthquake Shaking **Red Alert**



**PAGER**  
Version 1

M 8.2, Cuba: Caribe Wave 17

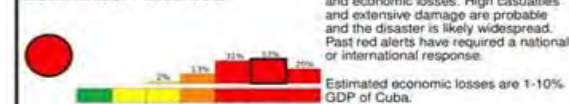
Origin Time: 2017-03-21 14:00:00 UTC (09:00:00 local)

Location: 19.62°N 76.35°W Depth: 20km

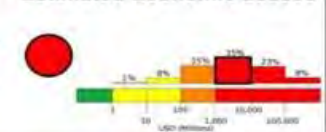
Created: 45 minutes, 0 seconds after earthquake

FOR TSUNAMI INFORMATION, SEE: [tsunami.gov](http://tsunami.gov)

### Estimated Fatalities



### Estimated Economic Losses



### Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	-	-	7k*	1,119k*	4,922k*	2,387k	1,018k	0	0	
ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+	
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme	
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

\*Estimated exposure only includes population within the map area

### Population Exposure



**Structures:**  
Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist. The predominant vulnerable building types are reinforced concrete and wood construction.

### Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max. Shaking (MMI)	Deaths
1998-12-28	212	5.6	VIII(3A)	0
1992-05-25	160	6.8	VIII(2.7)	0
1993-01-13	176	5.5	VII(2)	1

### Selected City Exposure

MMI City	Population
VIII Guantanamo	273k
VIII Palma Soriano	103k
VIII Santiago de Cuba	556k
VIII Niquero	19k
VIII Media Luna	17k
VIII El Cobre	5k
VI Las Tunas	204k
VI Holguin	319k
VI Spanish Town	145k
VI Camaguey	348k
VI Kingston	938k

bold cities appear on map

(k = x1000)

PAGER content is automatically generated, and only considers losses due to structural damage.

Limitations of input data, shaking estimates, and loss models may add uncertainty.

<http://earthquake.usgs.gov/pager>

Event ID: uscuba.m8.2.se

# Message Chronology issued by the PTWC Cuba

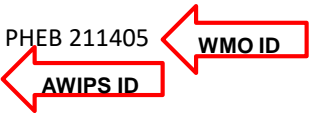
Date	Time (UTC)	PTWC	
		Type of Product	Transmission Method
3/21/17	1400	----- Earthquake Occurs -----	
3/21/17	1400	Dummy	NWWS, GTS, EMWIN, AISR, Fax, Email
3/21/17	1405	Tsunami Threat Message #1	Email
3/21/17	1425	Tsunami Threat Message # 2 and Graphic Enhanced Product	Email
3/21/17	1525	Tsunami Threat Message #3	Email
3/21/17	1625	Tsunami Threat Message #4	Email
3/21/17	1725	Tsunami Threat Message #5	Email
3/21/17	1825	Tsunami Threat Message #6	Email
3/21/17	1925	Tsunami Threat Message #7	Email
3/21/17	2025	Tsunami Threat Message #8	Email
3/21/17	2125	Final Tsunami Threat Message #9	Email

Appendix F. TWC Exercise Messages  
Cuba Earthquake Scenario

The following messages created for the CARIBE WAVE 17 tsunami exercise are representative of the official standard products issued by the PTWC during a large magnitude 8.24 earthquake and tsunami originating in southeastern coast of Cuba. During a real event, the TWCs would also issue graphical and html-based products to their web sites and via RSS. The alerts would persist longer during a real event than is depicted in this exercise.

PTWC Message #1

ZCZC  
WECA41 PHEB 211405  
TSUCAX



TSUNAMI MESSAGE NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1405 UTC TUE MAR 21 2017

...TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM FOR THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE REFINED INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

PRELIMINARY EARTHQUAKE PARAMETERS

- \* MAGNITUDE 8.0
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 19.6 NORTH 76.4 WEST
- \* DEPTH 20 KM / 12 MILES
- \* LOCATION CUBA REGION

EVALUATION

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.0 OCCURRED IN THE CUBA REGION AT 1400 UTC ON TUESDAY MARCH 21 2017.
- \* BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.

TSUNAMI THREAT FORECAST

- \* HAZARDOUS TSUNAMI WAVES FROM THIS EARTHQUAKE ARE POSSIBLE WITHIN THE NEXT THREE HOURS ALONG SOME COASTS OF
- CUBA... HAITI... CAYMAN ISLANDS... JAMAICA... BAHAMAS...  
TURKS N CAICOS... DOMINICAN REP... PUERTO RICO...  
MEXICO... COLOMBIA... HONDURAS... ARUBA... BONAIRE... SAN  
ANDRES PROVID... US VIRGIN IS... BR VIRGIN IS... PANAMA...  
SABA... SINT MAARTEN... ANGUILLA... SINT EUSTATIUS...  
CURACAO... SAINT KITTS... MONTSERRAT... VENEZUELA... COSTA  
RICA... GUADELOUPE... BARBUDA... DOMINICA... SAINT  
MARTIN... BERMUDA... ANTIGUA... SAINT BARTHELEMY... SAINT  
LUCIA... MARTINIQUE... SAINT VINCENT... BELIZE... GRENADA  
AND BARBADOS

RECOMMENDED ACTIONS

- \* GOVERNMENT AGENCIES RESPONSIBLE FOR THREATENED COASTAL AREAS SHOULD TAKE ACTION TO INFORM AND INSTRUCT ANY COASTAL POPULATIONS AT RISK IN ACCORDANCE WITH THEIR OWN EVALUATION... PROCEDURES AND THE LEVEL OF THREAT.
- \* PERSONS LOCATED IN THREATENED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM NATIONAL AND LOCAL AUTHORITIES.

ESTIMATED TIMES OF ARRIVAL

- \* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN THE REGION IDENTIFIED WITH A POTENTIAL TSUNAMI THREAT. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN WAVES CAN BE FIVE MINUTES TO ONE HOUR.

LOCATION	REGION	COORDINATES		ETA (UTC)	
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1405	03/21
JEREMIE	HAITI	18.6N	74.1W	1425	03/21
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1429	03/21
BARACOA	CUBA	20.4N	74.5W	1435	03/21
MONTEGO BAY	JAMAICA	18.5N	77.9W	1441	03/21
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1441	03/21
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1445	03/21
CAP HAITEN	HAITI	19.8N	72.2W	1446	03/21
JACAMEL	HAITI	18.1N	72.5W	1450	03/21
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1451	03/21
CIENFUEGOS	CUBA	22.0N	80.5W	1451	03/21
GIBARA	CUBA	21.1N	76.1W	1454	03/21
MAYAGUANA	BAHAMAS	22.3N	73.0W	1455	03/21
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1457	03/21
KINGSTON	JAMAICA	17.9N	76.9W	1504	03/21
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1506	03/21
LONG ISLAND	BAHAMAS	23.3N	75.1W	1514	03/21
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1515	03/21
EXUMA	BAHAMAS	23.6N	75.9W	1525	03/21
PORT AU PRINCE	HAITI	18.5N	72.4W	1527	03/21
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1528	03/21
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1529	03/21
CAT ISLAND	BAHAMAS	24.4N	75.5W	1533	03/21
MAYAGUEZ	PUERTO RICO	18.2N	67.2W	1535	03/21
SAN JUAN	PUERTO RICO	18.5N	66.1W	1537	03/21
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1537	03/21
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1541	03/21
COZUMEL	MEXICO	20.5N	87.0W	1543	03/21
SANTA MARTA	COLOMBIA	11.2N	74.2W	1546	03/21
PUERTO CORTES	HONDURAS	15.9N	88.0W	1547	03/21
ORANJESTAD	ARUBA	12.5N	70.0W	1547	03/21
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1550	03/21
ONIMA	BONAIRE	12.3N	68.3W	1553	03/21
SAN ANDRES	SAN ANDRES PROVI	13.4N	81.4W	1553	03/21
CARTAGENA	COLOMBIA	10.4N	75.6W	1556	03/21
CHRISTIANSTED	US VIRGIN IS	17.7N	64.7W	1559	03/21
ANEGADA	BR VIRGIN IS	18.8N	64.3W	1601	03/21
PROVIDENCIA	SAN ANDRES PROVI	12.6N	81.7W	1602	03/21
NASSAU	BAHAMAS	25.1N	77.4W	1602	03/21
LA HABANA	CUBA	23.2N	82.4W	1607	03/21
ALIGANDI	PANAMA	9.2N	78.0W	1608	03/21
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1608	03/21
SABA	SABA	17.6N	63.2W	1610	03/21
FREEPORT	BAHAMAS	26.5N	78.8W	1614	03/21
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1616	03/21
PUERTO CARRETO	PANAMA	8.8N	77.6W	1617	03/21
THE VALLEY	ANGUILLA	18.3N	63.1W	1617	03/21
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1618	03/21
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1619	03/21
WILLEMSTAD	CURACAO	12.1N	68.9W	1619	03/21
RIOHACHA	COLOMBIA	11.6N	72.9W	1622	03/21
CHARLOTTE AMALI	US VIRGIN IS	18.3N	64.9W	1624	03/21
ROADTOWN	BR VIRGIN IS	18.4N	64.6W	1625	03/21
BASSETTERRE	SAINT KITTS	17.3N	62.7W	1625	03/21
BIMINI	BAHAMAS	25.8N	79.3W	1627	03/21
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1629	03/21
MAIQUETIA	VENEZUELA	10.6N	67.0W	1629	03/21
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1629	03/21
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1632	03/21
TRUJILLO	HONDURAS	15.9N	86.0W	1633	03/21
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1634	03/21
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1634	03/21
PALMETTO POINT	BARBUDA	17.6N	61.9W	1637	03/21
ROSEAU	DOMINICA	15.3N	61.4W	1638	03/21
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	1638	03/21
COLON	PANAMA	9.4N	79.9W	1639	03/21
RUTHS BAY	BERMUDA	32.4N	64.6W	1640	03/21
BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	1640	03/21
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1642	03/21
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1643	03/21
CASTRIES	SAINT LUCIA	14.0N	61.0W	1645	03/21
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1647	03/21
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1649	03/21
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1650	03/21
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1654	03/21
BELIZE CITY	BELIZE	17.5N	88.2W	1656	03/21
CUMANA	VENEZUELA	10.5N	64.2W	1700	03/21
SAINT GEORGES	GRENADA	12.0N	61.8W	1703	03/21
BRIDGETOWN	BARBADOS	13.1N	59.6W	1703	03/21

POTENTIAL IMPACTS

\* A TSUNAMI IS A SERIES OF WAVES. THE TIME BETWEEN WAVE CRESTS CAN VARY FROM 5 MINUTES TO AN HOUR. THE HAZARD MAY PERSIST FOR MANY HOURS OR LONGER AFTER THE INITIAL WAVE.

\* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.

\* IMPACTS CAN ALSO VARY DEPENDING UPON THE STATE OF THE TIDE AT THE TIME OF THE MAXIMUM TSUNAMI WAVES.

\* PERSONS CAUGHT IN THE WATER OF A TSUNAMI MAY DROWN... BE CRUSHED BY DEBRIS IN THE WATER... OR BE SWEEPED OUT TO SEA.

NEXT UPDATE AND ADDITIONAL INFORMATION

\* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.

\* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.

\* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

\* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT PTWC.WEATHER.GOV.

\* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

\$\$  
NNNN

PTWC Message #2

ZCZC  
WECA41 PHEB 211425  
TSUCAX

← WMO ID

← AWIPS ID

TSUNAMI MESSAGE NUMBER 2  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1425 UTC TUE MAR 21 2017

...TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE  
UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM  
FOR  
THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL  
AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF  
ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE  
REFINED  
INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

PRELIMINARY EARTHQUAKE PARAMETERS

- \* MAGNITUDE 8.2
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 19.6 NORTH 76.4 WEST
- \* DEPTH 20 KM / 12 MILES
- \* LOCATION CUBA REGION

EVALUATION

\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.2 OCCURRED IN  
THE CUBA REGION AT 1400 UTC ON TUESDAY MARCH 21 2017.

\* BASED ON ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE  
FORECAST FOR SOME COASTS.

TSUNAMI THREAT FORECAST...UPDATED

\* TSUNAMI WAVES REACHING MORE THAN 3 METERS ABOVE THE TIDE  
LEVEL ARE POSSIBLE ALONG SOME COASTS OF

COLOMBIA... CUBA... HAITI... PANAMA... BAHAMAS... CAYMAN  
ISLANDS... AND JAMAICA.

\* TSUNAMI WAVES REACHING 1 TO 3 METERS ABOVE THE TIDE LEVEL ARE  
POSSIBLE ALONG SOME COASTS OF

BELIZE... COSTA RICA... DOMINICAN REPUBLIC... GUATEMALA...  
HONDURAS... MEXICO... NICARAGUA... VENEZUELA... ARUBA...  
BONAIRE... CURACAO... DOMINICA... GRENADA... GUADELOUPE...  
MARTINIQUE... MONTSERRAT... PUERTO RICO AND VIRGIN  
ISLANDS... SAINT KITTS AND NEVIS... SAINT LUCIA... SAINT  
VINCENT AND THE GRENADINES... SAN ANDRES AND  
PROVIDENCIA... AND TURKS AND CAICOS ISLANDS.

\* TSUNAMI WAVES REACHING 0.3 TO 1 METERS ABOVE THE TIDE LEVEL  
ARE POSSIBLE FOR SOME COASTS OF

ANGUILLA... ANTIGUA AND BARBUDA... BARBADOS... SABA AND  
SAINT EUSTATIUS... SAINT BARTHELEMY... SINT MAARTEN...  
SAINT MARTIN... AND TRINIDAD AND TOBAGO.

\* ACTUAL AMPLITUDES AT THE COAST MAY VARY FROM FORECAST  
AMPLITUDES DUE TO UNCERTAINTIES IN THE FORECAST AND LOCAL  
FEATURES. IN PARTICULAR MAXIMUM TSUNAMI AMPLITUDES ON ATOLLS  
OR SMALL ISLANDS AND AT LOCATIONS WITH FRINGING OR BARRIER  
REEFS WILL LIKELY BE MUCH SMALLER THAN THE FORECAST  
INDICATES.

\* FOR ALL OTHER AREAS COVERED BY THIS MESSAGE... THERE IS NO  
TSUNAMI THREAT ALTHOUGH SMALL SEA LEVEL CHANGES MAY OCCUR.

RECOMMENDED ACTIONS

\* GOVERNMENT AGENCIES RESPONSIBLE FOR THREATENED COASTAL AREAS SHOULD TAKE ACTION TO INFORM AND INSTRUCT ANY COASTAL POPULATIONS AT RISK IN ACCORDANCE WITH THEIR OWN EVALUATION... PROCEDURES AND THE LEVEL OF THREAT.

\* PERSONS LOCATED IN THREATENED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM NATIONAL AND LOCAL AUTHORITIES.

ESTIMATED TIMES OF ARRIVAL

\* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN THREATENED REGIONS ARE GIVEN BELOW. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN WAVES CAN BE FIVE MINUTES TO ONE HOUR.

LOCATION	REGION	COORDINATES		ETA (UTC)
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1405 03/21
JEREMIE	HAITI	18.6N	74.1W	1425 03/21
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1429 03/21
BARACOA	CUBA	20.4N	74.5W	1435 03/21
MONTEGO BAY	JAMAICA	18.5N	77.9W	1441 03/21
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1441 03/21
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1445 03/21
CAP HAITEN	HAITI	19.8N	72.2W	1446 03/21
JACAMEL	HAITI	18.1N	72.5W	1450 03/21
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1451 03/21
CIENFUEGOS	CUBA	22.0N	80.5W	1451 03/21
GIBARA	CUBA	21.1N	76.1W	1454 03/21
MAYAGUANA	BAHAMAS	22.3N	73.0W	1455 03/21
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1457 03/21
KINGSTON	JAMAICA	17.9N	76.9W	1504 03/21
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1506 03/21
LONG ISLAND	BAHAMAS	23.3N	75.1W	1514 03/21
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1515 03/21
EXUMA	BAHAMAS	23.6N	75.9W	1525 03/21
PORT AU PRINCE	HAITI	18.5N	72.4W	1527 03/21
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1528 03/21
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1529 03/21
MAYAGUEZ	PUERTO RICO	18.2N	67.2W	1535 03/21
SAN JUAN	PUERTO RICO	18.5N	66.1W	1537 03/21
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1537 03/21
CAT ISLAND	BAHAMAS	24.4N	75.5W	1533 03/21

ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1541 03/21
COZUMEL	MEXICO	20.5N	87.0W	1543 03/21
SANTA MARTA	COLOMBIA	11.2N	74.2W	1546 03/21
PUERTO CORTES	HONDURAS	15.9N	88.0W	1547 03/21
ORANJESTAD	ARUBA	12.5N	70.0W	1547 03/21
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1550 03/21
ONIMA	BONAIRE	12.3N	68.3W	1553 03/21
SAN ANDRES	SAN ANDRES PROVI	13.4N	81.4W	1553 03/21
CARTAGENA	COLOMBIA	10.4N	75.6W	1556 03/21
CHRISTIANSTED	US VIRGIN IS	17.7N	64.7W	1559 03/21
ANEGADA	BR VIRGIN IS	18.8N	64.3W	1601 03/21
PROVIDENCIA	SAN ANDRES PROVI	12.6N	81.7W	1602 03/21
NASSAU	BAHAMAS	25.1N	77.4W	1602 03/21
LA HABANA	CUBA	23.2N	82.4W	1607 03/21
ALIGANDI	PANAMA	9.2N	78.0W	1608 03/21
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1608 03/21
SABA	SABA	17.6N	63.2W	1610 03/21
FREEPORT	BAHAMAS	26.5N	78.8W	1614 03/21
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1616 03/21
PUERTO CARRETO	PANAMA	8.8N	77.6W	1617 03/21
THE VALLEY	ANGUILLA	18.3N	63.1W	1617 03/21
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1618 03/21
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1619 03/21
WILLEMSTAD	CURACAO	12.1N	68.9W	1619 03/21
RIOHACHA	COLOMBIA	11.6N	72.9W	1622 03/21
CHARLOTTE AMALI	US VIRGIN IS	18.3N	64.9W	1624 03/21
ROADTOWN	BR VIRGIN IS	18.4N	64.6W	1625 03/21
BASSETERRE	SAINT KITTS	17.3N	62.7W	1625 03/21
BIMINI	BAHAMAS	25.8N	79.3W	1627 03/21
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1629 03/21
MAIQUETIA	VENEZUELA	10.6N	67.0W	1629 03/21
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1629 03/21
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1632 03/21
TRUJILLO	HONDURAS	15.9N	86.0W	1633 03/21
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1634 03/21
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1634 03/21
PALMETTO POINT	BARBUDA	17.6N	61.9W	1637 03/21
ROSEAU	DOMINICA	15.3N	61.4W	1638 03/21
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	1638 03/21
COLON	PANAMA	9.4N	79.9W	1639 03/21
BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	1640 03/21
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1642 03/21
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1643 03/21
CASTRIES	SAINT LUCIA	14.0N	61.0W	1645 03/21
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1647 03/21
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1649 03/21
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1650 03/21
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1654 03/21
BELIZE CITY	BELIZE	17.5N	88.2W	1656 03/21
CUMANA	VENEZUELA	10.5N	64.2W	1700 03/21
SAINT GEORGES	GRENADA	12.0N	61.8W	1703 03/21
BRIDGETOWN	BARBADOS	13.1N	59.6W	1703 03/21
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1715 03/21
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1722 03/21
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	1739 03/21
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1745 03/21
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1809 03/21
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1817 03/21
NUEVA GERONA	CUBA	21.9N	82.8W	1853 03/21
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1908 03/21
PROGRESO	MEXICO	21.3N	89.7W	1928 03/21
PORLAMAR	VENEZUELA	10.9N	63.8W	2024 03/21
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2036 03/21



## POTENTIAL IMPACTS

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- \* A TSUNAMI IS A SERIES OF WAVES. THE TIME BETWEEN WAVE CRESTS CAN VARY FROM 5 MINUTES TO AN HOUR. THE HAZARD MAY PERSIST FOR MANY HOURS OR LONGER AFTER THE INITIAL WAVE.
- \* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.
- \* IMPACTS CAN ALSO VARY DEPENDING UPON THE STATE OF THE TIDE AT THE TIME OF THE MAXIMUM TSUNAMI WAVES.
- \* PERSONS CAUGHT IN THE WATER OF A TSUNAMI MAY DROWN... BE CRUSHED BY DEBRIS IN THE WATER... OR BE SWEEPED OUT TO SEA.

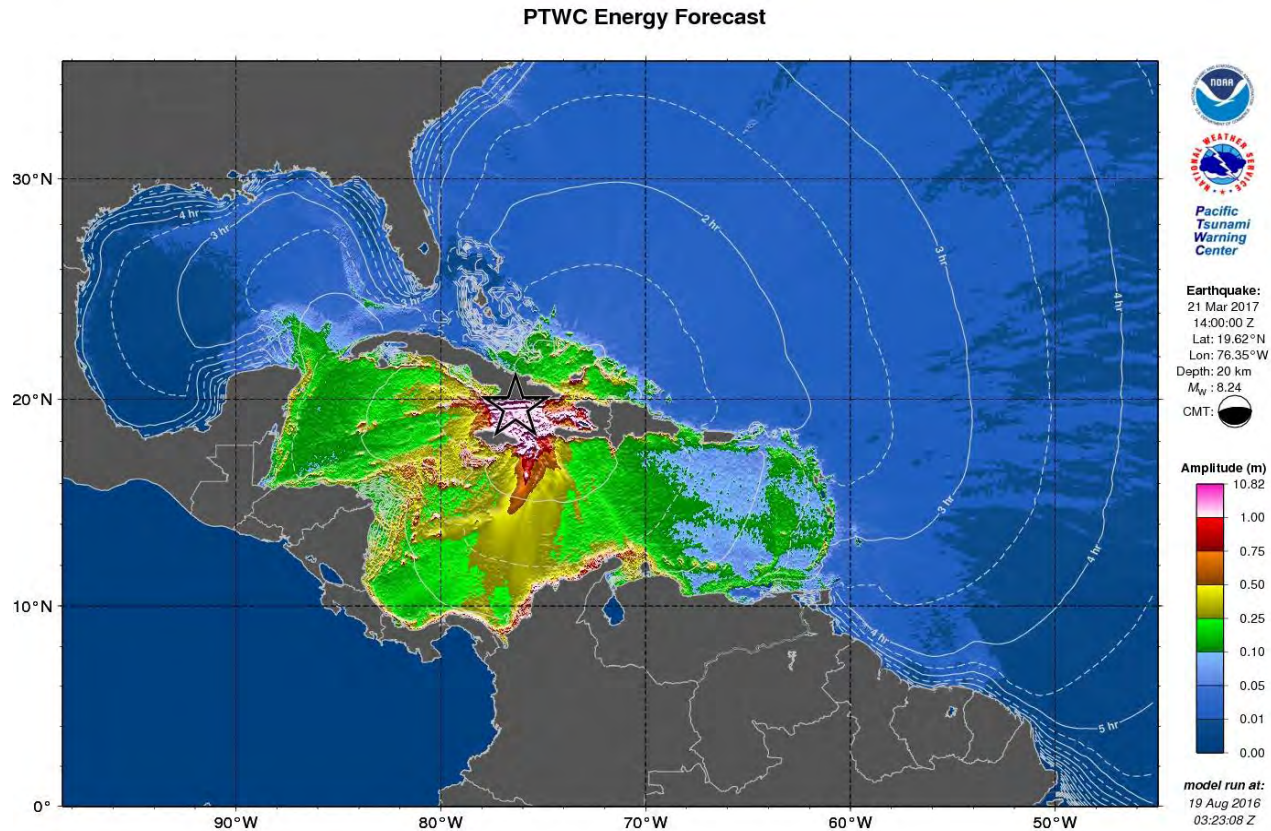
## NEXT UPDATE AND ADDITIONAL INFORMATION

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- \* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES) -ALL IN LOWERCASE LETTERS-.
- \* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV) AND AT [WWW.TSUNAMI.GOV](http://WWW.TSUNAMI.GOV).
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NNNN

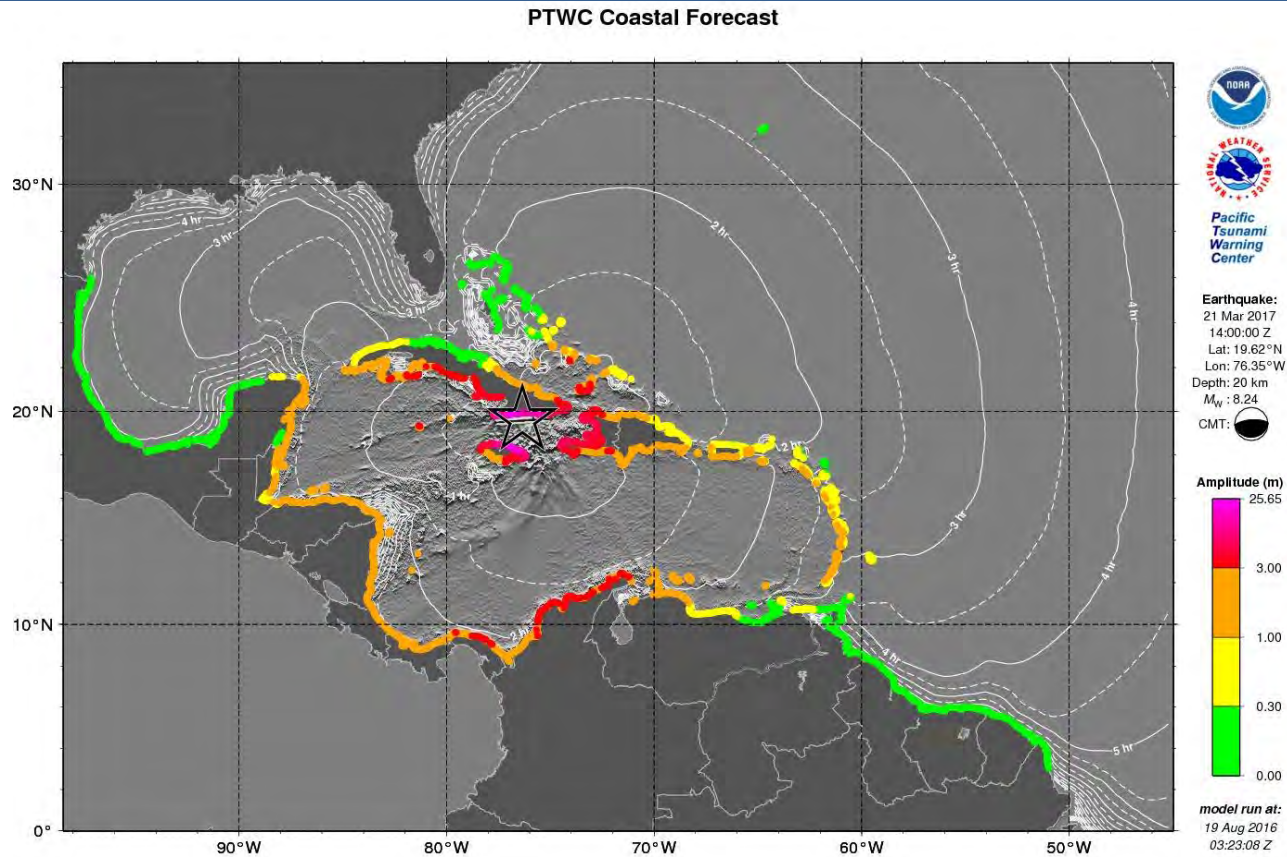
# Energy Forecast for Tsunami Wave Heights Cuba



**RIFT maximum amplitude map for the Northwestern portion of the Caribbean Sea scenario for Cuba.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

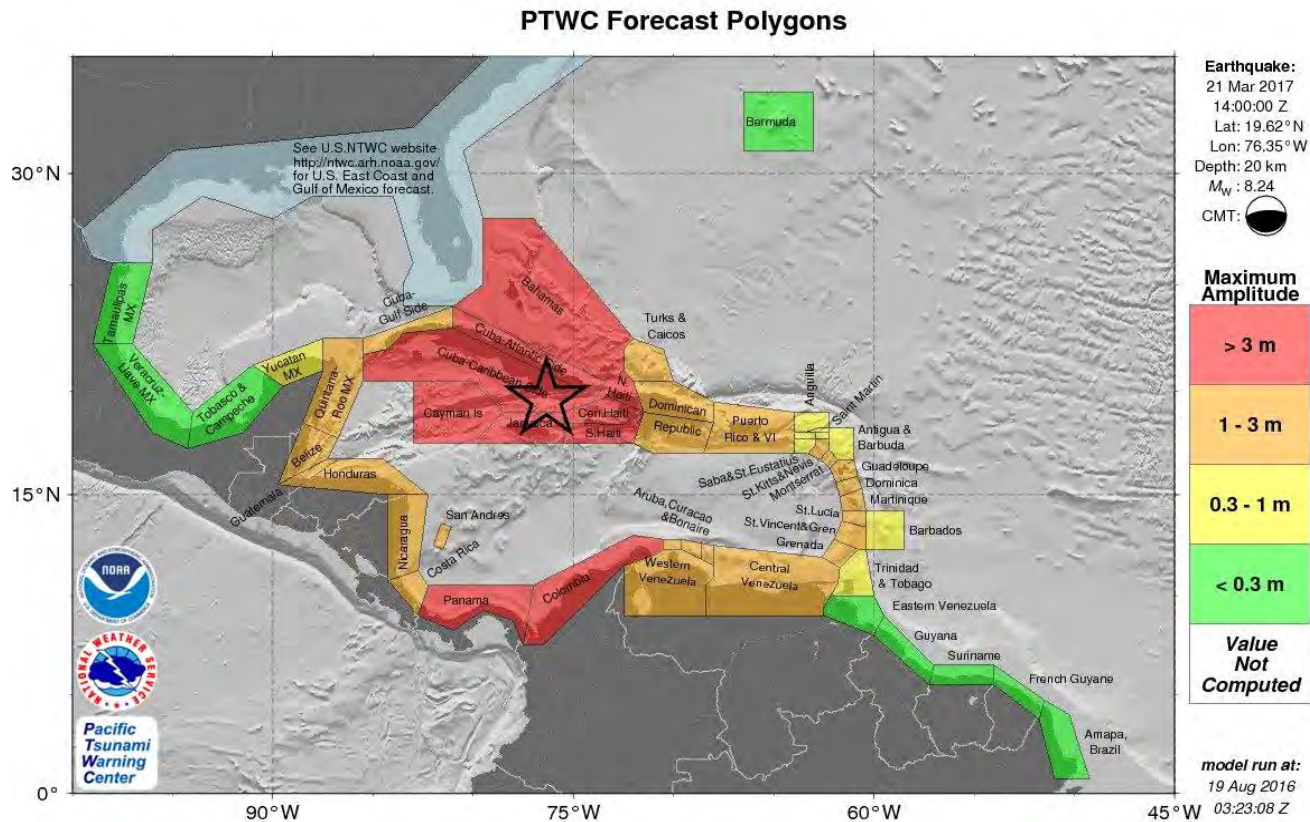
# Coastal Forecast for Tsunami Wave Heights Cuba



**RIFT coastal tsunami amplitude map for the Northwestern portion of the Caribbean Sea scenario for Cuba.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami.

# Polygons Forecast for Tsunami Wave Heights Cuba

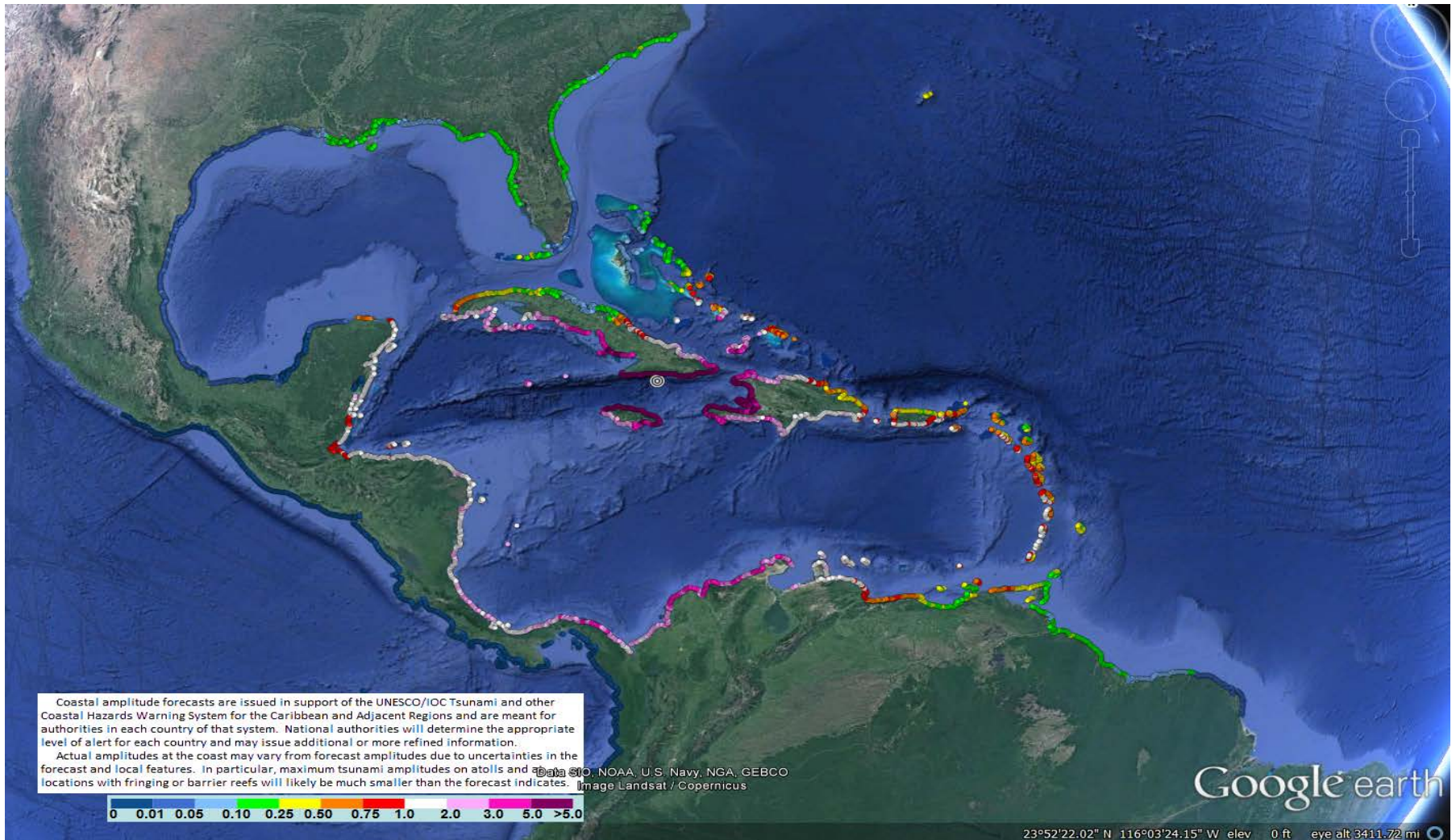


**RIFT forecast polygons for the Caribbean region on the Cuba scenario.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.



# KMZ Cuba





# Forecasted Maximum Wave Heights\*

## Cuba

### PTWC

LOCATION	MAXIMUM TSUNAMI HEIGHT	LOCATION	MAXIMUM TSUNAMI HEIGHT
TELCHAC MX	0.04M/ 0.1FT	EL PORVENIR PA	2.36M/ 7.7FT
DAUPHIN ISLAND AL	0.06M/ 0.2FT	PUERTO MORELOS MX	1.05M/ 3.5FT
WRIGHT BEACH NC	0.36M/ 1.2FT	ISLA MUJERES	1.37M/ 4.5FT
GRAND ISLE LA	0.11M/ 0.4FT	SAN ANDRES CO	1.84M/ 6.0FT
PORT OF SPAIN TT	0.26M/ 0.9FT	ESPERANZA VIEQUES P	1.07M/ 3.5FT
TRIDENT PIER FL	0.10M/ 0.3FT	LIMETREE VI	1.16M/ 3.8FT
CHARLOTTEVILLE TT	0.38M/ 1.2FT	ST CROIX VI	0.55M/ 1.8FT
SCARBOROUGH TT	0.24M/ 0.8FT	CEIBA CABOTAGE HN	1.04M/ 3.4FT
PILOTS STATION LA	0.17M/ 0.6FT	CAJA DE MUERTOS PR	1.16M/ 3.8FT
VACA KEY FL	0.21M/ 0.7FT	PUERTO ESTRELLA CO	2.93M/ 9.6FT
TORTOLA VI UK	0.64M/ 2.1FT	YABUCOA PR	0.84M/ 2.8FT
KEY WEST FL	0.21M/ 0.7FT	BULLEN BAY CURACAO	1.54M/ 5.1FT
BRIDGEPORT BB	0.47M/ 1.5FT	MAGUEYES ISLAND PR	1.21M/ 4.0FT
PRICKLEY BAY GD	0.81M/ 2.7FT	PORT SAN ANDRES DO	1.86M/ 6.1FT
PORT ST CHARLES BB	0.45M/ 1.5FT	CARRIE BOW CAY BH	1.16M/ 3.8FT
VIRGINIA KEY FL	0.04M/ 0.1FT	PUERTO CORTES HN	1.56M/ 5.1FT
CALLIAQUA VC	1.36M/ 4.5FT	SANTA MARTA CO	3.02M/ 9.9FT
TELA HN	1.03M/ 3.4FT	PUERTO MORELOS MX	1.74M/ 5.7FT
BOCAS DEL TORO PA	1.89M/ 6.2FT	PUNTA CANA DO	0.90M/ 3.0FT
LE ROBERT MARTINIQU	0.50M/ 1.6FT	SAN JUAN PR	0.21M/ 0.7FT
FORT DE FRANCE MQ	1.13M/ 3.7FT	AGUADILLA PR	0.58M/ 1.9FT
BARBUDA AG	0.20M/ 0.7FT	UTILA ISLAND HN	1.25M/ 4.1FT
BERMUDA UK	0.26M/ 0.8FT	MAYAGUEZ PR	0.85M/ 2.8FT
LE PRECHEUR MARTINI	0.91M/ 3.0FT	ARECIBO PR	0.33M/ 1.1FT
POINT A PITRE GP	0.48M/ 1.6FT	MONA ISLAND PR	1.00M/ 3.3FT
ROSEAU DM	0.96M/ 3.1FT	DART 42407	0.12M/ 0.4FT
LAMESHURBAYSTJOHNVI	0.61M/ 2.0FT	PORT AU PRINCE HT	5.37M/ 17.6FT
DESHAIES GUADELOUPE	0.82M/ 2.7FT	ROATAN ISLAND HN	1.51M/ 5.0FT
SAINT MARTIN FR	0.67M/ 2.2FT	BARAHONA DO	1.51M/ 5.0FT
SAPZURRO CO	2.45M/ 8.1FT	PORT ROYAL JM	5.23M/ 17.2FT
BASSETERRE KN	0.50M/ 1.6FT	PUERTO PLATA DO	1.12M/ 3.7FT
PARHAM AT	0.27M/ 0.9FT	JACMEL HT	2.20M/ 7.2FT
DESIRADE GUADELOUPE	0.45M/ 1.5FT	CAP HAITIEN HT	2.86M/ 9.4FT
COVENAS CO	2.39M/ 7.9FT	GEORGE TOWN CY	2.55M/ 8.4FT

\*Maximum tsunami height is measured as water level above tide level at time of measurement,  
run-up can be double this value

PTWC Message #9

ZCZC  
WECA41 PHEB 212125  
TSUCAX

← WMO ID

← AWIPS ID

TSUNAMI MESSAGE NUMBER 9  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
2125 UTC TUE MAR 21 2017

...FINAL TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

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UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING  
SYSTEM FOR  
THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL  
AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF  
ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE  
REFINED  
INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

PRELIMINARY EARTHQUAKE PARAMETERS

- \* MAGNITUDE 8.2
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 19.6 NORTH 76.4 WEST
- \* DEPTH 20 KM / 12 MILES
- \* LOCATION CUBA REGION

EVALUATION

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.2 OCCURRED IN THE CUBA REGION AT 1400 UTC ON TUESDAY MARCH 21 2017.
- \* BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS EARTHQUAKE HAS PASSED AND THERE IS NO FURTHER THREAT.

TSUNAMI THREAT FORECAST...UPDATED

- \* THE TSUNAMI THREAT HAS NOW LARGELY PASSED.

RECOMMENDED ACTIONS

- \* GOVERNMENT AGENCIES RESPONSIBLE FOR ANY IMPACTED COASTAL AREAS SHOULD MONITOR CONDITIONS AT THE COAST TO DETERMINE IF AND WHEN IT IS SAFE TO RESUME NORMAL ACTIVITIES.
- \* PERSONS LOCATED NEAR IMPACTED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM LOCAL AUTHORITIES.
- \* REMAIN OBSERVANT AND EXERCISE NORMAL CAUTION NEAR THE SEA.

POTENTIAL IMPACTS

- \* MINOR SEA LEVEL FLUCTUATIONS OF UP TO 1 FOOT ABOVE AND BELOW THE NORMAL TIDE MAY CONTINUE OVER THE NEXT FEW HOURS.

TSUNAMI OBSERVATIONS

- \* THE FOLLOWING ARE TSUNAMI WAVE OBSERVATIONS FROM COASTAL AND/OR DEEP-OCEAN SEA LEVEL GAUGES AT THE INDICATED LOCATIONS. THE MAXIMUM TSUNAMI HEIGHT IS MEASURED WITH RESPECT TO THE NORMAL TIDE LEVEL.

GAUGE LOCATION	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD
	LAT	LON	(UTC)		(MIN)
TELCHAC MX	21.3N	89.3W	1943	0.04M/	0.1FT 28
DAUPHIN ISLAND AL	30.3N	88.1W	1858	0.06M/	0.2FT 26
WRIGHT BEACH NC	34.2N	77.8W	1850	0.36M/	1.2FT 28
GRAND ISLE LA	29.3N	90.0W	1832	0.11M/	0.4FT 26
PORT OF SPAIN TT	10.6N	61.5W	1831	0.26M/	0.9FT 22
TRIDENT PIER FL	28.4N	80.6W	1819	0.10M/	0.3FT 28
CHARLOTTEVILLE TT	11.3N	60.5W	1800	0.38M/	1.2FT 24
SCARBOROUGH TT	11.2N	60.7W	1750	0.24M/	0.8FT 20
PILOTS STATION LA	28.9N	89.4W	1734	0.17M/	0.6FT 26
VACA KEY FL	24.7N	81.1W	1728	0.21M/	0.7FT 20
TORTOLA VI UK	18.4N	64.6W	1736	0.64M/	2.1FT 16
KEY WEST FL	24.6N	81.8W	1729	0.21M/	0.7FT 20
BRIDGEPORT BB	13.1N	59.6W	1717	0.47M/	1.5FT 20
PRICKLEY BAY GD	12.0N	61.8W	1712	0.81M/	2.7FT 18
PORT ST CHARLES BB	13.3N	59.6W	1712	0.45M/	1.5FT 18
VIRGINIA KEY FL	25.7N	80.2W	1705	0.04M/	0.1FT 24
CALLIAQUA VC	13.1N	61.2W	1701	1.36M/	4.5FT 18
TELA HN	15.8N	87.5W	1704	1.03M/	3.4FT 28
BOCAS DEL TORO PA	9.4N	82.3W	1659	1.89M/	6.2FT 18
LE ROBERT MARTINIQUE	14.7N	60.9W	1703	0.50M/	1.6FT 20
FORT DE FRANCE MQ	14.6N	61.1W	1702	1.13M/	3.7FT 22
BARBUDA AG	17.6N	61.8W	1658	0.20M/	0.7FT 26
BERMUDA UK	32.4N	64.7W	1651	0.26M/	0.8FT 22
LE PRECHEUR MARTINI	14.8N	61.2W	1646	0.91M/	3.0FT 24
POINT A PITRE GP	16.2N	61.5W	1648	0.48M/	1.6FT 18
ROSEAU DM	15.3N	61.4W	1653	0.96M/	3.1FT 18
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1644	0.61M/	2.0FT 14
DESHAIES GUADELOUPE	16.3N	61.8W	1640	0.82M/	2.7FT 18
SAINT MARTIN FR	18.1N	63.1W	1639	0.67M/	2.2FT 24
SAPZURRO CO	8.7N	77.4W	1641	2.45M/	8.1FT 26
BASSETTERRE KN	17.3N	62.7W	1638	0.50M/	1.6FT 22
PARHAM AT	17.1N	61.8W	1634	0.27M/	0.9FT 22
DESIRADE GUADELOUPE	16.3N	61.1W	1634	0.45M/	1.5FT 26
COVENAS CO	9.4N	76.2W	1630	2.39M/	7.9FT 16
EL PORVENIR PA	9.6N	78.9W	1623	2.36M/	7.7FT 22
PUERTO MORELOS MX	21.4N	86.8W	1614	1.05M/	3.5FT 26
ISLA MUJERES	21.2N	86.7W	1614	1.37M/	4.5FT 22
SAN ANDRES CO	12.6N	81.7W	1610	1.84M/	6.0FT 18
ESPERANZA VIEQUES P	18.1N	65.5W	1614	1.07M/	3.5FT 28
LIMETREE VI	17.7N	64.8W	1613	1.16M/	3.8FT 24
ST CROIX VI	17.7N	64.7W	1605	0.55M/	1.8FT 14
CEIBA CABOTAGE HN	15.8N	86.8W	1611	1.04M/	3.4FT 26
CAJA DE MUERTOS PR	17.9N	66.5W	1605	1.16M/	3.8FT 28
PUERTO ESTRELLA CO	12.4N	71.3W	1602	2.93M/	9.6FT 28
YABUCOA PR	18.1N	65.8W	1559	0.84M/	2.8FT 22
BULLEN BAY CURACAO	12.2N	69.0W	1600	1.54M/	5.1FT 16
MAGUEYES ISLAND PR	18.0N	67.0W	1600	1.21M/	4.0FT 28
PORT SAN ANDRES DO	18.4N	69.6W	1606	1.86M/	6.1FT 22
CARRIE BOW CAY BH	16.8N	88.1W	1601	1.16M/	3.8FT 28
PUERTO CORTES HN	15.8N	88.0W	1555	1.56M/	5.1FT 16
SANTA MARTA CO	11.2N	74.2W	1556	3.02M/	9.9FT 18
PUERTO MORELOS MX	20.9N	86.9W	1546	1.74M/	5.7FT 20
PUNTA CANA DO	18.5N	68.4W	1543	0.90M/	3.0FT 24
SAN JUAN PR	18.5N	66.1W	1549	0.21M/	0.7FT 26
AGUADILLA PR	18.5N	67.2W	1544	0.58M/	1.9FT 18
UTILA ISLAND HN	16.1N	86.9W	1547	1.25M/	4.1FT 26
MAYAGUEZ PR	18.2N	67.2W	1540	0.85M/	2.8FT 26
ARECIBO PR	18.5N	66.7W	1549	0.33M/	1.1FT 26
MONA ISLAND PR	18.1N	67.9W	1546	1.00M/	3.3FT 20
DART 42407	15.3N	68.2W	1546	0.12M/	0.4FT 22
PORT AU PRINCE HT	18.5N	72.4W	1539	5.37M/	17.6FT 22
ROATAN ISLAND HN	16.3N	86.5W	1532	1.51M/	5.0FT 16
BARAHONA DO	18.2N	71.1W	1530	1.51M/	5.0FT 24
PORT ROYAL JM	17.9N	76.8W	1517	5.23M/	17.2FT 14
PUERTO PLATA DO	19.8N	70.7W	1512	1.12M/	3.7FT 20
JACMEL HT	18.2N	72.5W	1457	2.20M/	7.2FT 24
CAP HAITIEN HT	19.8N	72.2W	1456	2.86M/	9.4FT 22
GEORGE TOWN CY	19.3N	81.4W	1447	2.55M/	8.4FT 16

## NEXT UPDATE AND ADDITIONAL INFORMATION

\* THIS WILL BE THE FINAL STATEMENT ISSUED FOR THIS EVENT UNLESS

NEW INFORMATION IS RECEIVED OR THE SITUATION CHANGES.

\* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S.

GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.

\* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

\* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT PTWC.WEATHER.GOV.

\* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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NNNN

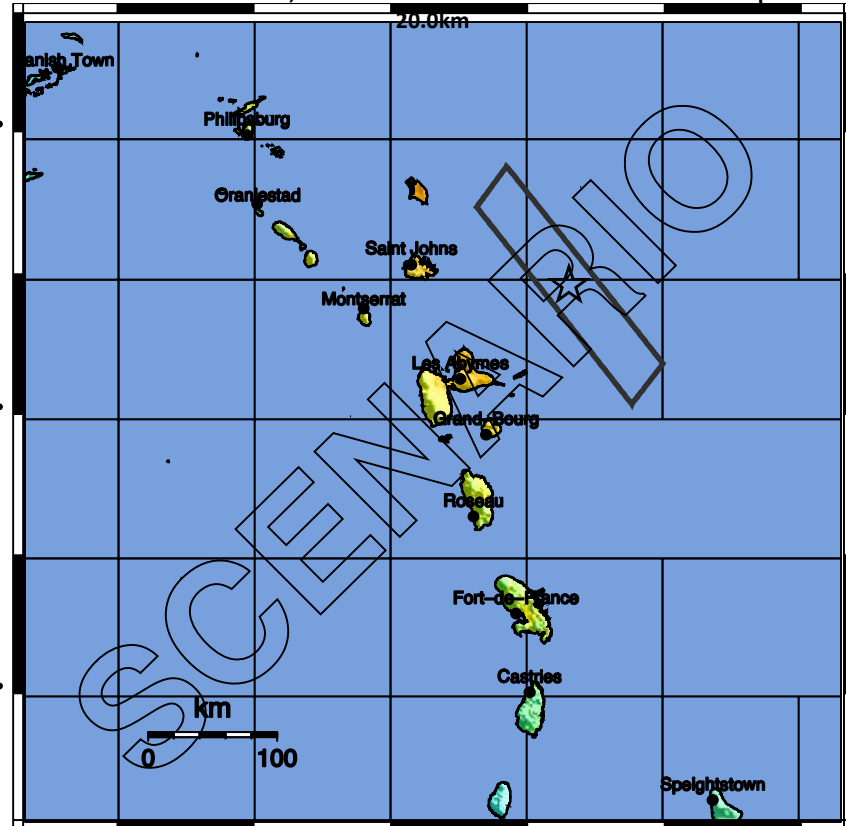
# Northeastern Lesser Antilles Scenario

# Earthquake Impact Scenario Northeastern Lesser Antilles

--- Earthquake Planning Scenario ---

ShakeMap for Northeastern Antilles Scenario

Scenario Date: Mar 21, 2017 14:00:00 UTC M 8.5 N16.96 W60.69 Depth:



PLANNING SCENARIO ONLY — Map Version 9 Processed 2016-08-12 19:25:02 UTC

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)



Earthquake Shaking Yellow Alert



M 8.5, Northeastern Antilles: Caribe Wave 17

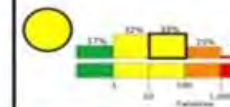
Origin Time: 2017-03-21 14:00:00 UTC (10:00:00 local)

Location: 16.96°N 60.69°W Depth: 20km

FOR TSUNAMI INFORMATION, SEE: [tsunami.gov](http://tsunami.gov)

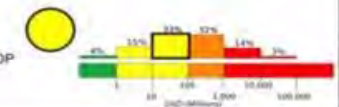
Created: 48 minutes, 0 seconds after earthquake

## Estimated Fatalities



Yellow alert for shaking-related fatalities and economic losses. Some casualties and damage are possible and the impact should be relatively localized. Past yellow alerts have required a local or regional level response. Estimated economic losses are 1-7% GDP of Guadeloupe.

## Estimated Economic Losses



## Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	171k*	394k*	663k*	364k	0	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe
POTENTIAL DAMAGE	Resistant Structures: none	Resistant Structures: none	Resistant Structures: none	Resistant Structures: V. Light	Resistant Structures: Light	Resistant Structures: Moderate	Resistant Structures: Moderate/Heavy
POTENTIAL DAMAGE	Vulnerable Structures: none	Vulnerable Structures: none	Vulnerable Structures: none	Vulnerable Structures: Light	Vulnerable Structures: Moderate	Vulnerable Structures: Moderate/Heavy	Vulnerable Structures: Heavy

\*Estimated exposure only includes population within the map area

## Population Exposure



## Structures:

Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist. The predominant vulnerable building types are reinforced concrete and informal (metal, timber, GI etc.) construction.

## Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max. Shaking (MMI)	Deaths
1985-03-16	186	6.4	VII(6k)	0
1974-10-08	143	7.5	VIII(40k)	0
2004-11-21	179	6.3	VII(3k)	1

Recent earthquakes in this area have caused secondary hazards such as tsunamis that might have contributed to losses.

## Selected City Exposure

MMI City	Population
VII Piggotts	<1k
VII Saint John's	24k
VII Parham	<1k
VII All Saints	3k
VII Le Moule	23k
VII Potters Village	1k
VI Roseau	17k
VI Basseterre	13k
VI Fort-de-France	90k
IV Bridgetown	99k
IV Kingstown	25k

bold cities appear on map (k = x1000)

PAGER content is automatically generated, and only considers losses due to structural damage.

Limitations of input data, shaking estimates, and loss models may add uncertainty.

<http://earthquake.usgs.gov/pager>

Event ID: usnia.m8.5.se

# Message Chronology issued by the PTWC

## Northeastern Lesser Antilles

Date	Time (UTC)	PTWC	
		Type of Product	Transmission Method
3/21/17	1400	----- Earthquake Occurs -----	
3/21/17	1400	Dummy	NWWS, GTS, EMWIN, AISR, Fax, Email
3/21/17	1405	Tsunami Threat Message #1	Email
3/21/17	1425	Tsunami Threat Message # 2 and Graphic Enhanced Product	Email
3/21/17	1525	Tsunami Threat Message #3	Email
3/21/17	1625	Tsunami Threat Message #4	Email
3/21/17	1725	Tsunami Threat Message #5	Email
3/21/17	1825	Tsunami Threat Message #6	Email
3/21/17	1925	Tsunami Threat Message #7	Email
3/21/17	2025	Tsunami Threat Message #8	Email
3/21/17	2125	Final Tsunami Threat Message #9	Email



Appendix F. TWC Exercise Messages  
Northeastern Antilles Earthquake Scenario

The following messages created for the CARIBE WAVE 17 tsunami exercise are representative of the official standard products issued by the PTWC during a large magnitude 8.5 earthquake and tsunami originating in the Northeastern Antilles. During a real event, the TWCs would also issue graphical and html-based products to their web sites and via RSS. The alerts would persist longer during a real event than is depicted in this exercise.

PTWC Message #1

ZCZC  
WECA41 PHEB 211405 **WMO ID**  
TSUCAX **AWIPS ID**

TSUNAMI MESSAGE NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1405 UTC TUE MAR 21 2017

...TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM FOR THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE REFINED INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

PRELIMINARY EARTHQUAKE PARAMETERS

- \* MAGNITUDE 8.3
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 17.0 NORTH 60.7 WEST
- \* DEPTH 40 KM / 25 MILES
- \* LOCATION LEEWARD ISLANDS

EVALUATION

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.3 OCCURRED IN THE LEEWARD ISLANDS AT 1400 UTC ON TUESDAY MARCH 21 2017.
- \* BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.

TSUNAMI THREAT FORECAST

- \* HAZARDOUS TSUNAMI WAVES FROM THIS EARTHQUAKE ARE POSSIBLE WITHIN THE NEXT THREE HOURS ALONG SOME COASTS OF

MONTserrat... GUADELOUPE... DOMINICA... SAINT LUCIA...  
MARTINIQUE... ANTIGUA... BARBUDA... SINT EUSTATIUS...  
SAINT KITTS... SABA... BARBADOS... ANGUILLA... US VIRGIN  
IS... SAINT VINCENT... BR VIRGIN IS... SINT MAARTEN...  
PUERTO RICO... SAINT BARTHELEMY... SAINT MARTIN...  
GRENADA... DOMINICAN REP... TURKS N CAICOS... TRINIDAD  
TOBAGO... HAITI... BONAIRE... BAHAMAS... CUBA... ARUBA...  
VENEZUELA... BERMUDA... CURACAO... CAYMAN ISLANDS...  
COLOMBIA AND JAMAICA

RECOMMENDED ACTIONS

- \* GOVERNMENT AGENCIES RESPONSIBLE FOR THREATENED COASTAL AREAS SHOULD TAKE ACTION TO INFORM AND INSTRUCT ANY COASTAL POPULATIONS AT RISK IN ACCORDANCE WITH THEIR OWN EVALUATION... PROCEDURES AND THE LEVEL OF THREAT.
- \* PERSONS LOCATED IN THREATENED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM NATIONAL AND LOCAL AUTHORITIES.

ESTIMATED TIMES OF ARRIVAL

- \* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN THE REGION IDENTIFIED WITH A POTENTIAL TSUNAMI THREAT. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN WAVES CAN BE FIVE MINUTES TO ONE HOUR.

LOCATION	REGION	COORDINATES		ETA (UTC)	
PLYMOUTH	MONTserrat	16.7N	62.2W	1426	03/21
BASSE TERRE	GUaDELOUPE	16.0N	61.7W	1430	03/21
ROSEAU	DOMINICA	15.3N	61.4W	1432	03/21
CASTRIES	SAINT LUCIA	14.0N	61.0W	1439	03/21
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1439	03/21
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1439	03/21
PALMETTO POINT	BARBUDA	17.6N	61.9W	1441	03/21
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1443	03/21
BASSETERRE	SAINT KITTS	17.3N	62.7W	1443	03/21
SABA	SABA	17.6N	63.2W	1444	03/21
BRIDGETOWN	BARBADOS	13.1N	59.6W	1447	03/21
THE VALLEY	ANGUILLA	18.3N	63.1W	1449	03/21
CHRISTIANSTED	US VIRGIN IS	17.7N	64.7W	1451	03/21
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1453	03/21
ANEGADA	BR VIRGIN IS	18.8N	64.3W	1453	03/21
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1455	03/21
SAN JUAN	PUERTO RICO	18.5N	66.1W	1455	03/21
ROADTOWN	BR VIRGIN IS	18.4N	64.6W	1507	03/21
MAYAGUEZ	PUERTO RICO	18.2N	67.2W	1508	03/21
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1513	03/21
CHARLOTTE AMALI	US VIRGIN IS	18.3N	64.9W	1513	03/21
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	1515	03/21
BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	1518	03/21
SAINT GEORGES	GRENADA	12.0N	61.8W	1520	03/21
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1521	03/21
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1523	03/21
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1529	03/21
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1531	03/21
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1532	03/21
CAP HAITEN	HAITI	19.8N	72.2W	1540	03/21
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1542	03/21
ONIMA	BONAIRE	12.3N	68.3W	1544	03/21
MAYAGUANA	BAHAMAS	22.3N	73.0W	1547	03/21
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1548	03/21
BARACOA	CUBA	20.4N	74.5W	1559	03/21
JACAMEL	HAITI	18.1N	72.5W	1600	03/21
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1601	03/21
ORANJESTAD	ARUBA	12.5N	70.0W	1601	03/21
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1602	03/21
MAIQUETIA	VENEZUELA	10.6N	67.0W	1607	03/21
LONG ISLAND	BAHAMAS	23.3N	75.1W	1611	03/21
JEREMIE	HAITI	18.6N	74.1W	1611	03/21
RUTHS BAY	BERMUDA	32.4N	64.6W	1612	03/21
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1614	03/21
GIBARA	CUBA	21.1N	76.1W	1617	03/21
CUMANA	VENEZUELA	10.5N	64.2W	1617	03/21
WILLEMSTAD	CURACAO	12.1N	68.9W	1618	03/21
EXUMA	BAHAMAS	23.6N	75.9W	1619	03/21
CAT ISLAND	BAHAMAS	24.4N	75.5W	1619	03/21
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1621	03/21
ELEUTHERA ISLAND	BAHAMAS	25.2N	76.1W	1625	03/21
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1633	03/21
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1633	03/21
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1645	03/21
NASSAU	BAHAMAS	25.1N	77.4W	1646	03/21
SANTA MARTA	COLOMBIA	11.2N	74.2W	1648	03/21
MONTEGO BAY	JAMAICA	18.5N	77.9W	1657	03/21
FREPORT	BAHAMAS	26.5N	78.8W	1658	03/21
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1701	03/21
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1701	03/21
CARTAGENA	COLOMBIA	10.4N	75.6W	1703	03/21
PORT AU PRINCE	HAITI	18.5N	72.4W	1704	03/21

## POTENTIAL IMPACTS

\* A TSUNAMI IS A SERIES OF WAVES. THE TIME BETWEEN WAVE CRESTS CAN VARY FROM 5 MINUTES TO AN HOUR. THE HAZARD MAY PERSIST FOR MANY HOURS OR LONGER AFTER THE INITIAL WAVE.

\* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.

\* IMPACTS CAN ALSO VARY DEPENDING UPON THE STATE OF THE TIDE AT THE TIME OF THE MAXIMUM TSUNAMI WAVES.

\* PERSONS CAUGHT IN THE WATER OF A TSUNAMI MAY DROWN... BE CRUSHED BY DEBRIS IN THE WATER... OR BE SWEEPED OUT TO SEA.

**NEXT UPDATE AND ADDITIONAL INFORMATION**

\* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.

\* AUTHORITY INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES) -ALL IN LOWERCASE LETTERS-.

\* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT  
PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

\* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV).

\* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND AT [NTWC.ARH.NOAA.GOV](http://NTWC.ARH.NOAA.GOV).

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**PTWC Message #2**

ZCZC  
WECA41 PHEB 211425  
TSUCAX

← WMO ID

← AWIPS ID

TSUNAMI MESSAGE NUMBER 2  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1425 UTC TUE MAR 21 2017

...TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE  
UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM  
FOR  
THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL  
AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF  
ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE  
REFINED  
INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

**PRELIMINARY EARTHQUAKE PARAMETERS**

- \* MAGNITUDE 8.5
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 17.0 NORTH 60.7 WEST
- \* DEPTH 40 KM / 25 MILES
- \* LOCATION LEEWARD ISLANDS

**EVALUATION**

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.5 OCCURRED IN THE LEEWARD ISLANDS AT 1400 UTC ON TUESDAY MARCH 21 2017.
- \* TSUNAMI WAVES HAVE BEEN OBSERVED.
- \* BASED ON ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS.

**TSUNAMI THREAT FORECAST...UPDATED**

- \* TSUNAMI WAVES REACHING MORE THAN 3 METERS ABOVE THE TIDE LEVEL ARE POSSIBLE ALONG SOME COASTS OF  
  
ANTIGUA AND BARBUDA... BARBADOS... DOMINICA...  
GUADELOUPE... MARTINIQUE... MONTSERRAT... SABA AND SAINT  
EUSTATIUS... AND SAINT KITTS AND NEVIS.
- \* TSUNAMI WAVES REACHING 1 TO 3 METERS ABOVE THE TIDE LEVEL ARE POSSIBLE ALONG SOME COASTS OF  
  
DOMINICAN REPUBLIC... FRENCH GUYANE... GUYANA...  
SURINAME... VENEZUELA... ANGUILLA... ARUBA... BERMUDA...  
BONAIRE... CURACAO... GRENADA... PUERTO RICO AND VIRGIN  
ISLANDS... SAINT BARTHELEMY... SAINT LUCIA... SINT  
MAARTEN... SAINT MARTIN... SAINT VINCENT AND THE  
GRENADINES... AND TRINIDAD AND TOBAGO.
- \* TSUNAMI WAVES REACHING 0.3 TO 1 METERS ABOVE THE TIDE LEVEL ARE POSSIBLE FOR SOME COASTS OF  
  
BRAZIL... COLOMBIA... COSTA RICA... CUBA... HAITI...  
NICARAGUA... PANAMA... BAHAMAS... JAMAICA... SAN ANDRES  
AND PROVIDENCIA... AND TURKS AND CAICOS ISLANDS.
- \* ACTUAL AMPLITUDES AT THE COAST MAY VARY FROM FORECAST AMPLITUDES DUE TO UNCERTAINTIES IN THE FORECAST AND LOCAL FEATURES. IN PARTICULAR MAXIMUM TSUNAMI AMPLITUDES ON ATOLLS OR SMALL ISLANDS AND AT LOCATIONS WITH FRINGING OR BARRIER REEFS WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.
- \* FOR ALL OTHER AREAS COVERED BY THIS MESSAGE... THERE IS NO TSUNAMI THREAT ALTHOUGH SMALL SEA LEVEL CHANGES MAY OCCUR.

RECOMMENDED ACTIONS

\* GOVERNMENT AGENCIES RESPONSIBLE FOR THREATENED COASTAL AREAS SHOULD TAKE ACTION TO INFORM AND INSTRUCT ANY COASTAL POPULATIONS AT RISK IN ACCORDANCE WITH THEIR OWN EVALUATION... PROCEDURES AND THE LEVEL OF THREAT.

\* PERSONS LOCATED IN THREATENED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM NATIONAL AND LOCAL AUTHORITIES.

ESTIMATED TIMES OF ARRIVAL

\* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN THREATENED REGIONS ARE GIVEN BELOW. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN WAVES CAN BE FIVE MINUTES TO ONE HOUR.

LOCATION	REGION	COORDINATES		ETA(UTC)	
PLYMOUTH	MONTserrat	16.7N	62.2W	1426	03/21
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1430	03/21
ROSEAU	DOMINICA	15.3N	61.4W	1432	03/21
CASTRIES	SAINT LUCIA	14.0N	61.0W	1439	03/21
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1439	03/21
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1439	03/21
PALMETTO POINT	BARBUDA	17.6N	61.9W	1441	03/21
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1443	03/21
BASSETERRE	SAINT KITTS	17.3N	62.7W	1443	03/21
SABA	SABA	17.6N	63.2W	1444	03/21
BRIDGETOWN	BARBADOS	13.1N	59.6W	1447	03/21
THE VALLEY	ANGUILLA	18.3N	63.1W	1449	03/21
CHRISTIANSTED	US VIRGIN IS	17.7N	64.7W	1451	03/21
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1453	03/21
ANEGADA	BR VIRGIN IS	18.8N	64.3W	1453	03/21
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1455	03/21
SAN JUAN	PUERTO RICO	18.5N	66.1W	1455	03/21
ROADTOWN	BR VIRGIN IS	18.4N	64.6W	1507	03/21
MAYAGUEZ	PUERTO RICO	18.2N	67.2W	1508	03/21
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1513	03/21
CHARLOTTE AMALI	US VIRGIN IS	18.3N	64.9W	1513	03/21
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	1515	03/21
BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	1518	03/21
SAINT GEORGES	GRENADA	12.0N	61.8W	1520	03/21

CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1521	03/21
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1523	03/21
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1529	03/21
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1531	03/21
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1532	03/21
CAP HAITEN	HAITI	19.8N	72.2W	1540	03/21
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1542	03/21
ONIMA	BONAIRE	12.3N	68.3W	1544	03/21
MAYAGUANA	BAHAMAS	22.3N	73.0W	1547	03/21
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1548	03/21
BARACOA	CUBA	20.4N	74.5W	1559	03/21
JACAMEL	HAITI	18.1N	72.5W	1600	03/21
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1601	03/21
ORANJESTAD	ARUBA	12.5N	70.0W	1601	03/21
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1602	03/21
MAIQUETIA	VENEZUELA	10.6N	67.0W	1607	03/21
LONG ISLAND	BAHAMAS	23.3N	75.1W	1611	03/21
JEREMIE	HAITI	18.6N	74.1W	1611	03/21
RUTHS BAY	BERMUDA	32.4N	64.6W	1612	03/21
GIBARA	CUBA	21.1N	76.1W	1617	03/21
CUMANA	VENEZUELA	10.5N	64.2W	1617	03/21
WILLEMSTAD	CURACAO	12.1N	68.9W	1618	03/21
EXUMA	BAHAMAS	23.6N	75.9W	1619	03/21
CAT ISLAND	BAHAMAS	24.4N	75.5W	1619	03/21
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1621	03/21
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1625	03/21
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1633	03/21
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1633	03/21
NASSAU	BAHAMAS	25.1N	77.4W	1646	03/21
SANTA MARTA	COLOMBIA	11.2N	74.2W	1648	03/21
MONTEGO BAY	JAMAICA	18.5N	77.9W	1657	03/21
FREEPORT	BAHAMAS	26.5N	78.8W	1658	03/21
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1701	03/21
CARTAGENA	COLOMBIA	10.4N	75.6W	1703	03/21
PORT AU PRINCE	HAITI	18.5N	72.4W	1704	03/21
BIMINI	BAHAMAS	25.8N	79.3W	1711	03/21
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1712	03/21
KINGSTON	JAMAICA	17.9N	76.9W	1713	03/21
RIOHACHA	COLOMBIA	11.6N	72.9W	1716	03/21
ALIGANDI	PANAMA	9.2N	78.0W	1725	03/21
PUERTO CARRETO	PANAMA	8.8N	77.6W	1731	03/21
SAN ANDRES	SAN ANDRES PROVI	13.4N	81.4W	1732	03/21
PROVIDENCIA	SAN ANDRES PROVI	12.6N	81.7W	1735	03/21
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1743	03/21
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1747	03/21
CAYENNE	FRENCH GUYANE	4.9N	52.3W	1801	03/21
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1803	03/21
COLON	PANAMA	9.4N	79.9W	1805	03/21
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1817	03/21
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1828	03/21
GEORGETOWN	GUYANA	6.8N	58.2W	1847	03/21
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1855	03/21
PARAMARIBO	SURINAME	5.9N	55.2W	1904	03/21
PORLAMAR	VENEZUELA	10.9N	63.8W	1912	03/21
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1928	03/21
ILHA DE MARACA	BRAZIL	2.2N	50.5W	2147	03/21
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2222	03/21

POTENTIAL IMPACTS

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- \* A TSUNAMI IS A SERIES OF WAVES. THE TIME BETWEEN WAVE CRESTS CAN VARY FROM 5 MINUTES TO AN HOUR. THE HAZARD MAY PERSIST FOR MANY HOURS OR LONGER AFTER THE INITIAL WAVE.
- \* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.
- \* IMPACTS CAN ALSO VARY DEPENDING UPON THE STATE OF THE TIDE AT THE TIME OF THE MAXIMUM TSUNAMI WAVES.
- \* PERSONS CAUGHT IN THE WATER OF A TSUNAMI MAY DROWN... BE CRUSHED BY DEBRIS IN THE WATER... OR BE SWEEPED OUT TO SEA.

TSUNAMI OBSERVATIONS

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\* THE FOLLOWING ARE TSUNAMI WAVE OBSERVATIONS FROM COASTAL AND/OR DEEP-OCEAN SEA LEVEL GAUGES AT THE INDICATED LOCATIONS. THE MAXIMUM TSUNAMI HEIGHT IS MEASURED WITH RESPECT TO THE NORMAL TIDE LEVEL.

GAUGE		TIME OF MAXIMUM		WAVE	
COORDINATES		MEASURE		TSUNAMI PERIOD	
GAUGE LOCATION	LAT LON	(UTC)	HEIGHT	(MIN)	
-----					
DESIRADE GUADELOUPE	16.3N 61.1W	1414	14.72M/48.3FT	16	

NEXT UPDATE AND ADDITIONAL INFORMATION

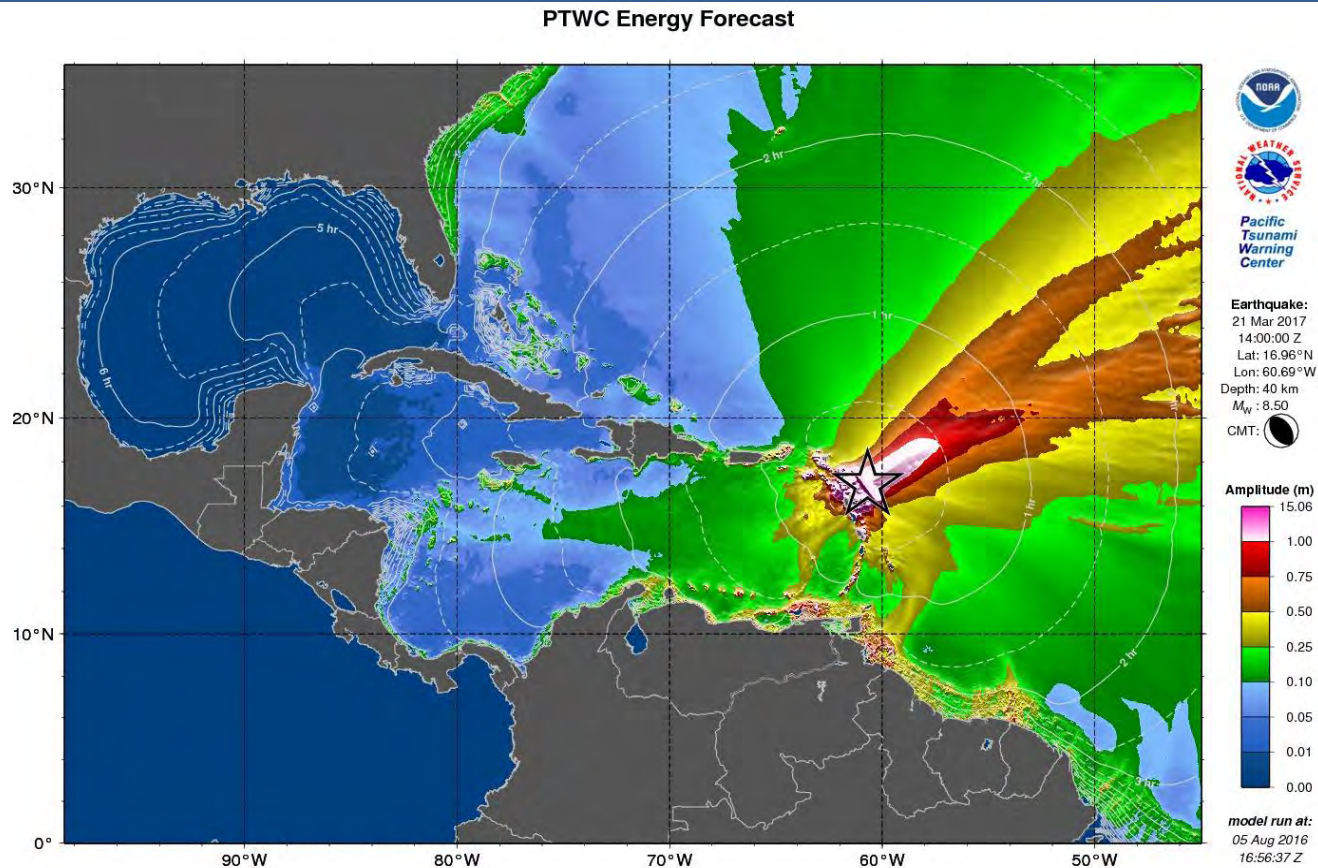
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- \* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES) -ALL IN LOWERCASE LETTERS-.
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- \* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO PACIFIC TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT [PTWC.WEATHER.GOV](http://PTWC.WEATHER.GOV).
- \* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND AT [NTWC.ARH.NOAA.GOV](http://NTWC.ARH.NOAA.GOV).

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NNNN

# Energy Forecast for Tsunami Wave Heights

## Northeastern Lesser Antilles

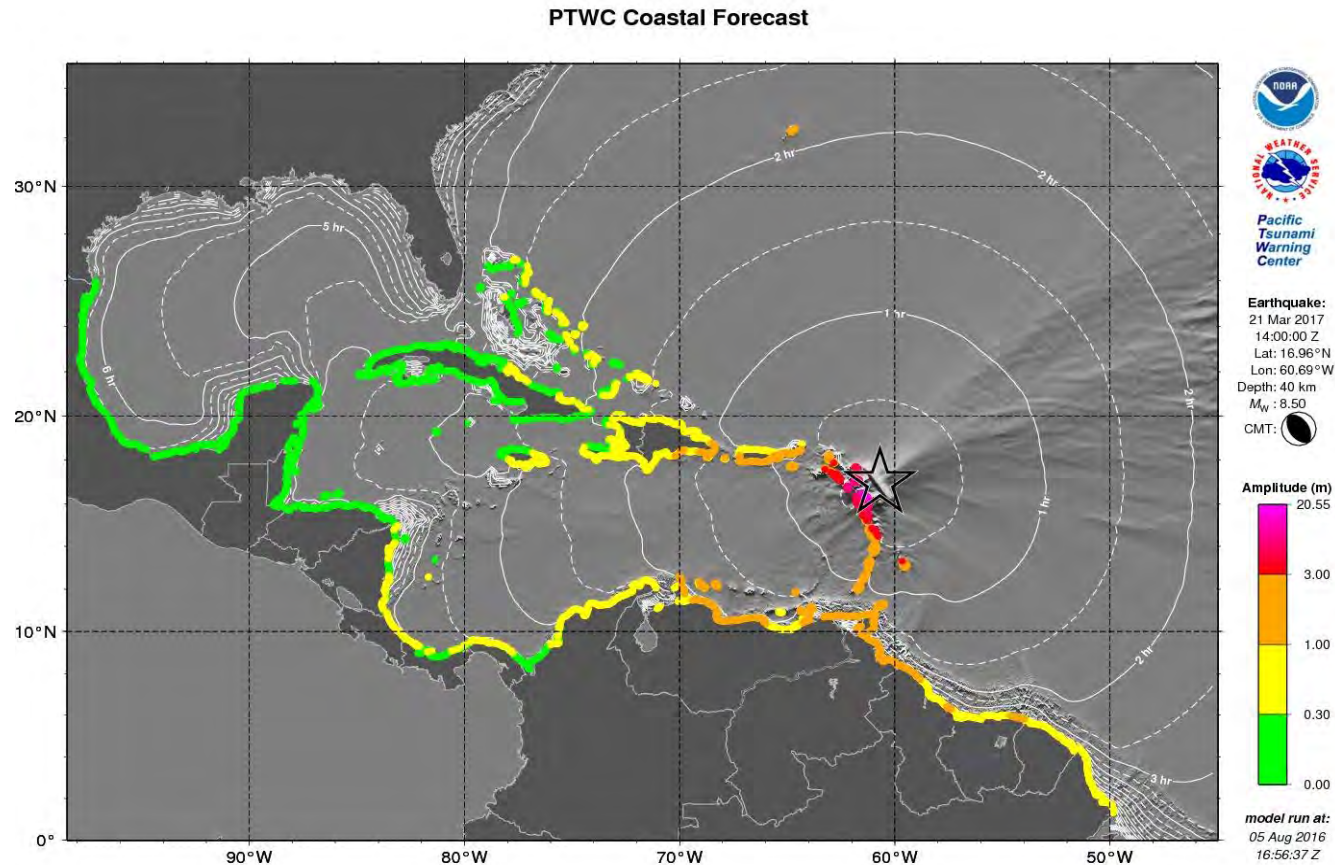


**RIFT maximum amplitude map for the Southeastern portion of the Caribbean Sea scenario for Northeastern Lesser Antilles.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.



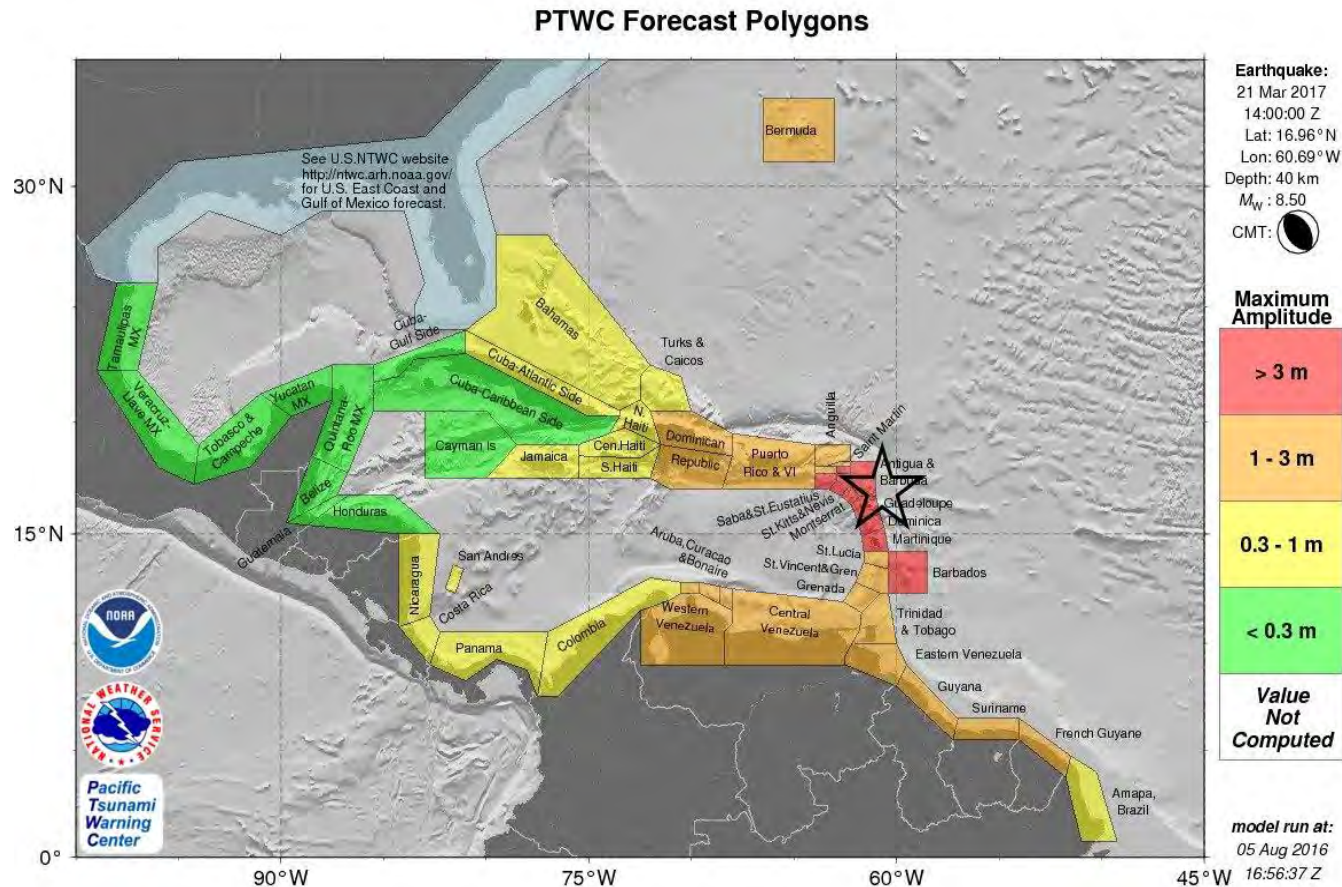
# Coastal Forecast for Tsunami Wave Heights Northeastern Antilles



**RIFT coastal tsunami amplitude map for the Southeastern portion of the Caribbean Sea scenario for Northeastern Antilles.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami.

# Polygons Forecast for Tsunami Wave Heights Northeastern Lesser Antilles



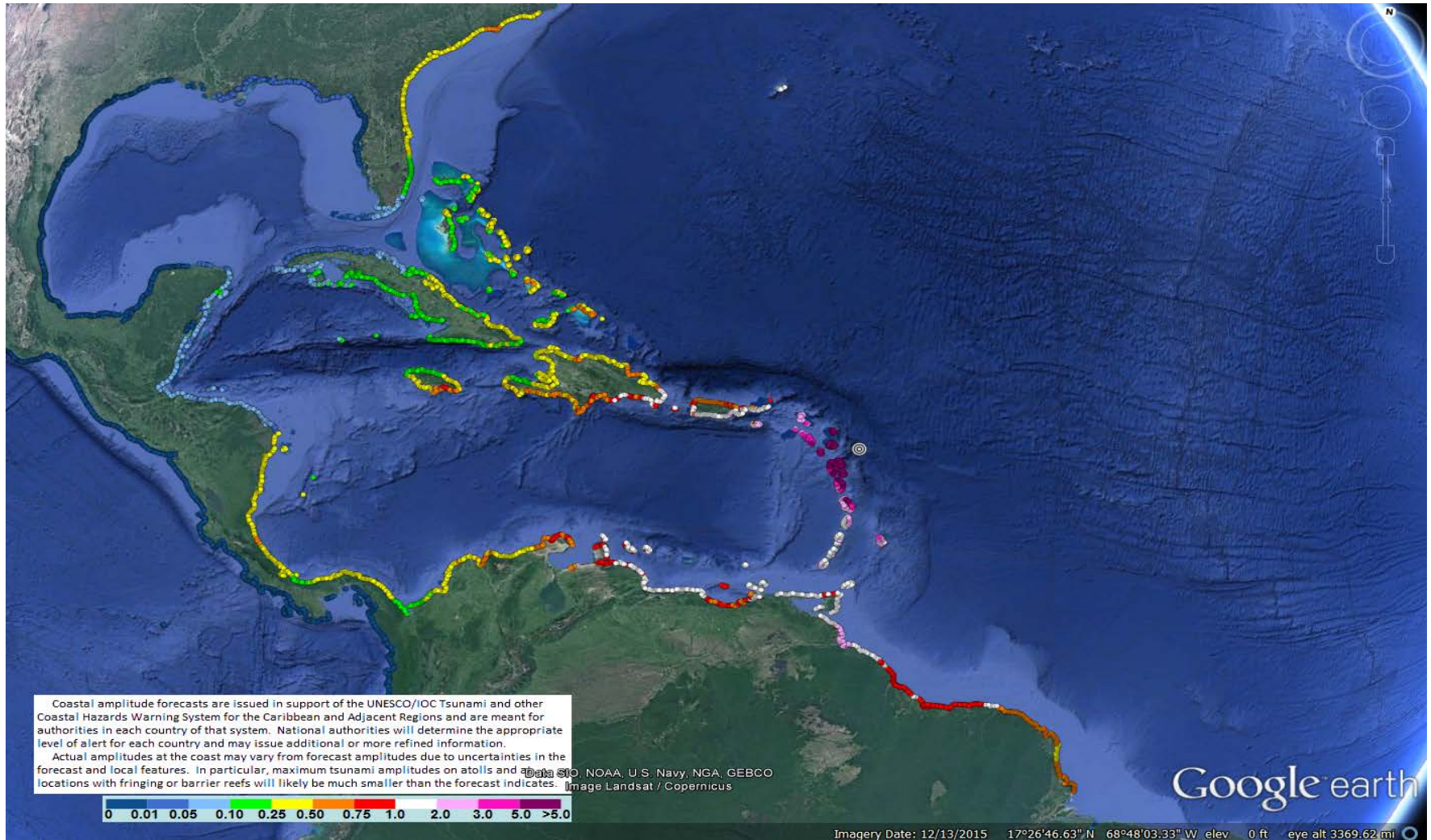
**RIFT forecast polygons for the Caribbean region on the Northeastern Antilles scenario.**

During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.



KMZ

# Northeastern Lesser Antilles



# Forecasted Maximum Wave Heights\*

## Northeastern Lesser Antilles

### PTWC

LOCATION	MAXIMUM TSUNAMI HEIGHT	LOCATION	MAXIMUM TSUNAMI HEIGHT
POINT FORTIN TT	1.37M/ 4.5FT	TORTOLA VI UK	1.68M/ 5.5FT
PONTA DELGADA PT	1.70M/ 5.6FT	PORT SAN ANDRES DO	1.29M/ 4.2FT
HORTA	2.77M/ 9.1FT	JACMEL HT	0.83M/ 2.7FT
SANTA MARIA	1.96M/ 6.4FT	BULLEN BAY CURACAO	1.55M/ 5.1FT
MONTAUK NY	0.76M/ 2.5FT	BARAHONA DO	0.90M/ 3.0FT
FORTALEZA BR	0.65M/ 2.1FT	CAP HAITIEN HT	0.41M/ 1.3FT
PALMEIRA CAPE VERDE	1.72M/ 5.6FT	CHARLOTTEVILLE TT	1.29M/ 4.2FT
TELA HN	0.09M/ 0.3FT	SCARBOROUGH TT	1.29M/ 4.2FT
KEY WEST FL	0.05M/ 0.2FT	DART 42407	0.13M/ 0.4FT
PRAIA CV	0.97M/ 3.2FT	MAGUEYES ISLAND PR	1.25M/ 4.1FT
MINDELO CV	1.71M/ 5.6FT	PUERTO PLATA DO	0.57M/ 1.9FT
VACA KEY FL	0.05M/ 0.2FT	PUNTA CANA DO	1.11M/ 3.6FT
OREGON INLET NC	0.85M/ 2.8FT	PRICKLEY BAY GD	1.82M/ 6.0FT
DUCK PIER NC	0.76M/ 2.5FT	CAJA DE MUERTOS PR	1.50M/ 4.9FT
PUERTO MORELOS MX	0.07M/ 0.2FT	LAMESHURBAYSTJOHNVI	1.68M/ 5.5FT
ISLA MUJERES	0.08M/ 0.3FT	MONA ISLAND PR	1.01M/ 3.3FT
BOCAS DEL TORO PA	0.39M/ 1.3FT	SAINT MARTIN FR	2.10M/ 6.9FT
CEIBA CABOTAGE HN	0.08M/ 0.3FT	DART 41420	0.08M/ 0.3FT
LIMON CR	0.35M/ 1.1FT	AGUADILLA PR	0.86M/ 2.8FT
CARRIE BOW CAY BH	0.09M/ 0.3FT	MAYAGUEZ PR	0.86M/ 2.8FT
PUERTO CORTES HN	0.09M/ 0.3FT	ESPERANZA VIEQUES P	1.47M/ 4.8FT
PUERTO MORELOS MX	0.10M/ 0.3FT	ARECIBO PR	0.77M/ 2.5FT
UTILA ISLAND HN	0.09M/ 0.3FT	YABUCOA PR	1.90M/ 6.2FT
HATTERAS NC	0.66M/ 2.2FT	DART 41421	0.16M/ 0.5FT
SAPZURRO CO	0.40M/ 1.3FT	SAN JUAN PR	0.89M/ 2.9FT
VIRGINIA KEY FL	0.07M/ 0.2FT	LIMETREE VI	1.19M/ 3.9FT
ROATAN ISLAND HN	0.08M/ 0.3FT	CALLIAQUA VC	1.56M/ 5.1FT
EL PORVENIR PA	0.43M/ 1.4FT	ST CROIX VI	1.19M/ 3.9FT
SAN ANDRES CO	0.34M/ 1.1FT	BARBUDA AG	4.26M/ 14.0FT
ILE ROYAL GUIANA FR	0.74M/ 2.4FT	BRIDGEPORT BB	2.08M/ 6.8FT
COVENAS CO	0.42M/ 1.4FT	PORT ST CHARLES BB	2.23M/ 7.3FT
DART 44402	0.09M/ 0.3FT	BASSETERRE KN	2.76M/ 9.1FT
PORT ROYAL JM	0.95M/ 3.1FT	FORT DE FRANCE MQ	2.84M/ 9.3FT
PORT AU PRINCE HT	0.72M/ 2.3FT	LE ROBERT MARTINIQU	2.84M/ 9.3FT
DART 44401	0.15M/ 0.5FT	ROSEAU DM	3.23M/ 10.6FT
GEORGE TOWN CY	0.13M/ 0.4FT	LE PRECHEUR MARTINI	2.62M/ 8.6FT
SANTA MARTA CO	0.59M/ 1.9FT	POINT A PITRE GP	20.10M/ 65.9FT
PORT OF SPAIN TT	1.16M/ 3.8FT	DESHAIES GUADELOUPE	6.35M/ 20.8FT
DART 41424	0.07M/ 0.2FT	PARHAM AT	12.98M/ 42.6FT
PUERTO ESTRELLA CO	0.85M/ 2.8FT	DESIRADE GUADELOUPE	14.72M/ 48.3FT
BERMUDA UK	0.75M/ 2.4FT		

\*Maximum tsunami height is measured as water level above tide level at time of measurement, **run-up can be double this value**

PTWC Message #9

ZCZC  
WECA41 PHEB 212125  
TSUCAX  
TSUNAMI MESSAGE NUMBER 9  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
2125 UTC TUE MAR 21 2017

...FINAL TSUNAMI THREAT MESSAGE...

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

THIS MESSAGE IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE UNESCO/IOC TSUNAMI AND OTHER COASTAL HAZARDS WARNING SYSTEM FOR THE CARIBBEAN AND ADJACENT REGIONS AND IS MEANT FOR NATIONAL AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

NATIONAL AUTHORITIES WILL DETERMINE THE APPROPRIATE LEVEL OF ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE REFINED INFORMATION.

\*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\* NOTICE \*\*\*\*

PRELIMINARY EARTHQUAKE PARAMETERS

- \* MAGNITUDE 8.5
- \* ORIGIN TIME 1400 UTC MAR 21 2017
- \* COORDINATES 17.0 NORTH 60.7 WEST
- \* DEPTH 40 KM / 25 MILES
- \* LOCATION LEEWARD ISLANDS

EVALUATION

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.5 OCCURRED IN THE LEEWARD ISLANDS AT 1400 UTC ON TUESDAY MARCH 21 2017.
- \* BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS EARTHQUAKE HAS PASSED AND THERE IS NO FURTHER THREAT. TSUNAMI THREAT FORECAST...UPDATED

- \* THE TSUNAMI THREAT HAS NOW LARGELY PASSED.

RECOMMENDED ACTIONS

- \* GOVERNMENT AGENCIES RESPONSIBLE FOR ANY IMPACTED COASTAL AREAS SHOULD MONITOR CONDITIONS AT THE COAST TO DETERMINE IF AND WHEN IT IS SAFE TO RESUME NORMAL ACTIVITIES.
- \* PERSONS LOCATED NEAR IMPACTED COASTAL AREAS SHOULD STAY ALERT FOR INFORMATION AND FOLLOW INSTRUCTIONS FROM LOCAL AUTHORITIES.
- \* REMAIN OBSERVANT AND EXERCISE NORMAL CAUTION NEAR THE SEA.

POTENTIAL IMPACTS

- \* MINOR SEA LEVEL FLUCTUATIONS UP TO 30 CM ABOVE AND BELOW THE NORMAL TIDE MAY OCCUR IN COASTAL AREAS NEAR THE EARTHQUAKE OVER THE NEXT FEW HOURS.... AND CONTINUING FOR UP TO SEVERAL HOURS.

#### NEXT UPDATE AND ADDITIONAL INFORMATION

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\* THIS WILL BE THE FINAL STATEMENT ISSUED FOR THIS EVENT UNLESS  
NEW INFORMATION IS RECEIVED OR THE SITUATION CHANGES.

\* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE  
U.S.

GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT  
EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.

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AT NTWC.ARH.NOAA.GOV.

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NNNN



# Sea Level Monitoring

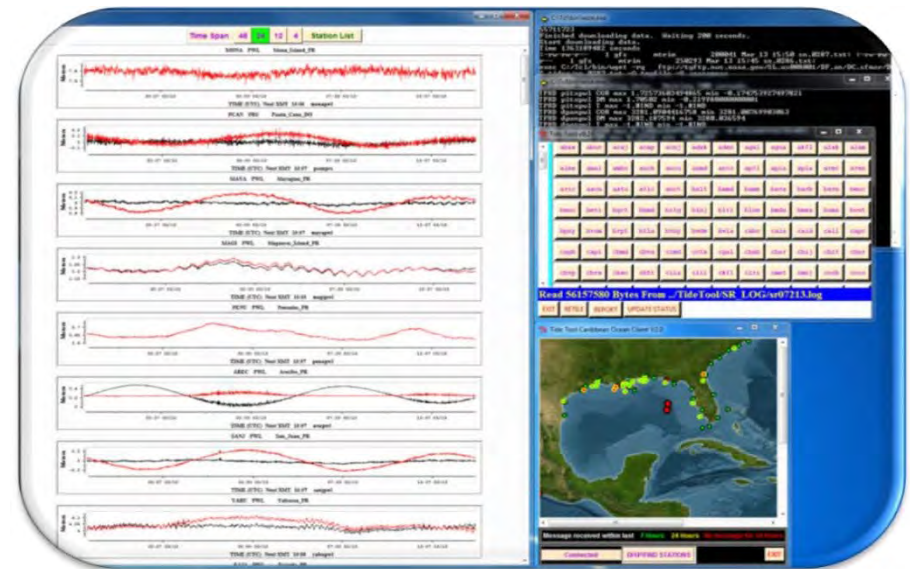
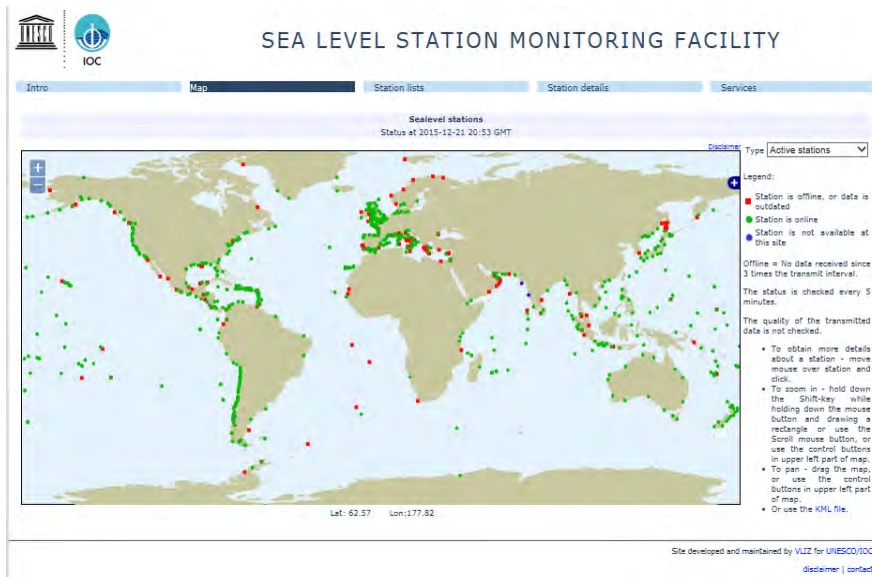
As good practice, during the exercise corresponding authorities are encouraged to check out sea level readings in real time on the IOC Sea Level Monitoring Facility and Tide Tool which can also be run with the earthquake parameters.

IOC Sea Level Monitoring Facility

<http://www.ioc-sealevelmonitoring.org/>

Tide Tool

[stuart.weinstein@noaa.gov](mailto:stuart.weinstein@noaa.gov)



# Member State Participation – The *TsunamiZone* Registration

Member States establish their own national task teams to determine the scope of their national participation and testing.



Home TsunamiZone Regions Other Languages Contact Us Search Login

**The TsunamiZone** California Tsunami Preparedness Week March 20-26, 2016

[Register Here!](#) [Know Your Zone](#) [Who is Participating?](#) [How to Participate](#) [Resources](#) [News & Events](#) [Partners & Sponsors](#)

There is No Tsunami Warning, Advisory, Watch, or Threat in effect.

**WELCOME TO THE TSUNAMIZONE!**

[ESPAÑOL](#) | [FRANÇAIS](#)

Everyone, everywhere should know how to be prepared for tsunamis and what to do to be safe. This is true for people who live or work near the ocean, but also for anyone who may visit someday. Are you in the Zone?

TsunamiZone.org provides [suggestions](#) and [resources](#) for your family or organization to "[know your zone](#)" and to [learn](#) how to be safe.

Be counted among people and organizations worldwide by [registering](#) your 2017 tsunami preparedness activities!

**2017 CALENDAR**

- March 19-25  
[Puerto Rico, U.S. Virgin Islands, CARIBE WAVE 2017 \(March 21\), LANTEXT17 \(March 22\)](#)
- March 25-31  
Alaska, Guam
- March 27-31  
[California](#)
- March 29  
PACIFEX exercise
- April  
Hawaii
- September 24-30  
American Samoa
- October  
Oregon & Washington

**Staying Safe Where the Wav...**

The PTWC will send via email all the simulated enhanced products (text and graphical) to the designated TWFP and NTWC (no need to register to received them **but if registered, you will be part of the statistical count of who is participating**). To verify the current list of officially designated UNESCO IOC CARIBE EWS TWFP and NTWC check out:

[http://www.ioc-tsunami.org/index.php?option=com\\_content&view=article&id=6&Itemid=22&lang=en](http://www.ioc-tsunami.org/index.php?option=com_content&view=article&id=6&Itemid=22&lang=en)

Username: tsunami pwd: bigwave



# The TsunamiZone

California  
Tsunami Preparedness Week  
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[Alaska, Guam](#)

**March 27-31**

[California](#)

**March 29**

[PACIFEX](#) exercise

**April**

[Hawaii](#)

**September 24-30**

[American Samoa](#)

**October**

[Oregon & Washington](#)

Over 400,000 participants registered



Countries can keep track of registration by clicking on « Who is Participating »



## WHO IS PARTICIPATING?

Click on a category name to see a list of who is participating. Click on a region name to see details of participation totals by area.

These totals are current as of 01/05/2017 3:25 AM PST.

Category	Participants	Participation totals for each area	Total
<b>Total:</b>	<b>405,086</b>	<b>California</b>	<b>71437</b>
<a href="#">Individuals/Families</a>	1,950	<a href="#">North Coast</a>	1536
<a href="#">Childcare and Pre-Schools</a>	2,766	<a href="#">Shasta Cascade</a>	2
<a href="#">K-12 Schools and Districts</a>	126,695	<a href="#">Bay Area</a>	1357
<a href="#">Colleges and Universities</a>	72,304	<a href="#">Delta Sierra</a>	161
<a href="#">Local Government</a>	36,350	<a href="#">Inyo-Mono</a>	0
<a href="#">State Government</a>	44,199	<a href="#">Central Valley South</a>	17
<a href="#">Federal Government (Including Military)</a>	30,707	<a href="#">Central Coast</a>	40736
<a href="#">Tribes</a>	30	<a href="#">Southern California Coast</a>	2334
<a href="#">Businesses</a>	1,952	<a href="#">Inland Southern California</a>	67
<a href="#">Hotels and Other Lodgings</a>	3,099	<a href="#">San Diego</a>	25215
<a href="#">Healthcare</a>	5,233	<a href="#">Other Areas</a>	12
<a href="#">Senior Facilities/Communities</a>	344		
<a href="#">Disability/AFN Organizations</a>	30	<b>Caribbean</b>	<b>332814</b>
<a href="#">Non-Profit Organizations</a>	2,364	<a href="#">Anguilla</a>	1160
<a href="#">Neighborhood Groups</a>	107	<a href="#">Antigua and Barbuda</a>	393
<a href="#">Preparedness Organizations</a>	12,127	<a href="#">Aruba</a>	3
<a href="#">Faith-based Organizations</a>	336	<a href="#">Bahamas</a>	5
<a href="#">Museums, Libraries, Parks, etc.</a>	20	<a href="#">Barbados</a>	1860
<a href="#">Volunteer/Service Clubs</a>	1,031	<a href="#">Belize</a>	27
<a href="#">Youth Organizations</a>	45	<a href="#">Bermuda</a>	158
<a href="#">Animal Shelter/Service Providers</a>	0	<a href="#">Brazil</a>	10
<a href="#">Agriculture/Livestock</a>	0	<a href="#">British Virgin Islands</a>	4762
<a href="#">Volunteer Radio Groups</a>	183	<a href="#">Cayman Islands</a>	20
<a href="#">Science/Engineering Organizations</a>	517	<a href="#">Colombia</a>	137
<a href="#">Media Organizations</a>	53	<a href="#">Costa Rica</a>	200
<a href="#">Other</a>	62,644	<a href="#">Cuba</a>	633
		<a href="#">Curacao</a>	180





## WHO IS PARTICIPATING?

Click on a category name to see a list of who is participating. Click on a region

These totals are current as of 01/05/2017 3:25 AM PST.

Category	Participants
<b>Total:</b>	<b>332,814</b>
<a href="#">Individuals/Families</a>	1,487
<a href="#">Childcare and Pre-Schools</a>	2,696
<a href="#">K-12 Schools and Districts</a>	125,775
<a href="#">Colleges and Universities</a>	36,256
<a href="#">Local Government</a>	32,681
<a href="#">State Government</a>	44,138
<a href="#">Federal Government (Including Military)</a>	1,821
<a href="#">Tribes</a>	0
<a href="#">Businesses</a>	1,485
<a href="#">Hotels and Other Lodgings</a>	3,079
<a href="#">Healthcare</a>	4,881
<a href="#">Senior Facilities/Communities</a>	294
<a href="#">Disability/AFN Organizations</a>	30
<a href="#">Non-Profit Organizations</a>	1,587
<a href="#">Neighborhood Groups</a>	82
<a href="#">Preparedness Organizations</a>	12,094
<a href="#">Faith-based Organizations</a>	276
<a href="#">Museums, Libraries, Parks, etc.</a>	20
<a href="#">Volunteer/Service Clubs</a>	981
<a href="#">Youth Organizations</a>	45
<a href="#">Animal Shelter/Service Providers</a>	0
<a href="#">Agriculture/Livestock</a>	0
<a href="#">Volunteer Radio Groups</a>	113
<a href="#">Science/Engineering Organizations</a>	417
<a href="#">Media Organizations</a>	47
<a href="#">Other</a>	62,529

# Media Arrangements

- PRSN Tsunami Media Guide (English and Spanish)  
<http://www.prsn.uprm.edu/mediakit/>
- Seismic Research Unit Tsunami and other Coastal Hazards WS Media Information Kit  
<http://www.uwiseismic.com>
- Handbook sample press release, which can be adapted as necessary.
- Social media; #CaribeWave



# Actions in Case of a Real Event

- In the case of a real event occurring during the exercise, the PTWC will issue the corresponding messages for the event. Such messages will be given full priority and a decision will be made by the PTWC whether to issue the Caribe Wave 17 dummy messages and to send email messages to corresponding recipients.
- In the case of smaller earthquakes, PTWC will issue the corresponding Tsunami Information Statement and the exercise will not be disrupted.
- All documentation and correspondence relating to this exercise is to be clearly identified as “**CARIBE WAVE 17**” and “**Exercise.**”

# Procedure for False Alarm

- Any time disaster response exercises are conducted; the potential exists for the public or media to interpret the event as real. Procedures should be set up by all participating entities to address public or media concerns involving this exercise in case of misinterpretation by media or the public.

# Post-Exercise Evaluation Form

- Each CARIBE EWS member state and territory is requested to provide feedback on the exercise.
  - This feedback will assist the ICG/CARIBE-EWS in the evaluation of Caribe Wave 17 and the development of subsequent exercises, and help response agencies document lessons learned.
  - To facilitate feedback the online evaluation survey can be accessed at the following link:  
<https://www.surveymonkey.com/r/CaribeWave17>
  - The deadline for completing the evaluation is April 3, 2017.
    - 64 questions (2016 were 83 questions), 11 pages, should take no more than 20 minutes.

# Resources

- IOC Manual “How to plan, conduct and evaluate tsunami exercises” which will also be a useful resource.
- CARIBE WAVE 2011, 2013, 2014, 2015, 2016 Handbooks
- CARIBE WAVE 2013, 2014, 2015, 2016 Final and Media Report
- PTWC Communications Plan for the Caribbean
- Available at [www.caribewave.info](http://www.caribewave.info)
- Questions on the exercise can be addressed to the members of the CARIBE WAVE 17 Task Team

## Additional Info

- Additional materials will be added to CTWP ([www.caribewave.info](http://www.caribewave.info)) and PRSN websites.
- Send links of other national pages to [christa.vonh@noaa.gov](mailto:christa.vonh@noaa.gov) to include on CTWP and PRSN websites
- This presentation is available on CTWP website

# CARIBE WAVE 17 Task Team

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# Timeline

ACTION	DUE DATE
Draft Circulated among ICG CARIBE EWS TNC/TWFP	Sep-16
Deadline for Comments	Sep-16
Final Exercise Handbook Available Online	Oct-16
Circular Letter Issued by IOC to MS	Nov-16
1 <sup>st</sup> Webinar CW	17 - Jan- 2017 -English 18 - Jan- 2017 -Spanish 19 - Jan- 2017 -French
2 <sup>nd</sup> Webinar CW	7- Mar- 2017 -English 8- Mar- 2017 -Spanish 9- Mar- 2017 -French
Member States and Territories inform which scenario they will be using for the exercise	10-Mar-2017
Exercise	21-Mar-17
Exercise Evaluation Due	3-Apr-17
Draft Final Caribe 17 Report	19- Apr- 17
Discussion of Exercise ICG CARIBE EWS 12 <sup>th</sup> Session	10-12 May-17

## Questions, Comments

Thank you for participating

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