

**User's Guide  
for the Pacific Tsunami Warning  
Center Enhanced Products for the  
Tsunami and other Coastal Hazards  
Warning System for the Caribbean  
and Adjacent Regions  
(CARIBE-EWS)**

**October 2017**

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## OVERVIEW

The Pacific Tsunami Warning Center (PTWC) operated by the United States National Weather Service has served as the Tsunami Service Provider (TSP) for the Tsunami and Other Hazards Warning and Mitigation System for the Caribbean and Adjacent Seas (CARIBE-EWS), a subsidiary body of UNESCO's Intergovernmental Oceanographic Commission (IOC), since the establishment of the CARIBE-EWS in 2005. Products issued by PTWC since then to countries around the Caribbean in support of this mission have evolved over time as supporting data, analysis methods, computational capabilities, and communications have all improved. This User's Guide describes the current procedures and products issued to designated national authorities of the Member States of the CARIBE-EWS ([APPENDIX I: CARIBE EWS MEMBER STATES](#)) in support of their own tsunami response procedures. The products are for information only. National authorities are responsible for determining the level of tsunami alert within each Member State.

PTWC was established in 1949 as a tsunami warning center for the U.S. State of Hawaii following the unwarned April 1, 1946 tsunami from the Aleutian Islands that killed 159 persons in Hawaii. It became a warning center for the entire Pacific in 1965 following the May 22, 1960 Chile tsunami from a magnitude 9.5 earthquake that spread across the entire Pacific and killed 139 people in Japan, striking there almost a day after it was generated. In 2005, following the December 26, 2004 tsunami in the Indian Ocean that killed 230,000 people, PTWC took the responsibility of serving as an interim TSP for both the Indian Ocean and the Caribbean. PTWC service for the Indian Ocean ended in 2013 following the establishment of capable Tsunami Service Providers (TSPs) in Indonesia, Australia and India. In 2016, the Intergovernmental Coordination Group for the CARIBE-EWS recommended that the PTWC be considered as a CARIBE-EWS TSP for the Caribbean and Adjacent Regions, removing the interim nature of its services. The product suite issued by PTWC for the CARIBE-EWS for potential and actual tsunami events includes text and graphical products. Text products provide concise and general information about the earthquake, the tsunami threat, expected first wave arrival times, expected maximum tsunami amplitudes at pre-determined tsunami warning points, and measurements of tsunami waves at available sea level gauges. The graphical products provide more detailed information regarding the expected directionality of the tsunami and expected amplitudes along all coasts.

To provide information as quickly as possible following an earthquake, the initial tsunami guidance in PTWC products is based solely on the preliminary assessment of the earthquake, without a numerical tsunami forecast. This information is usually issued within 5-10 minutes. A forecast is only produced after the earthquake mechanism is determined – about 20-30 minutes after the earthquake. This mechanism drives the forecast model. The forecast is further constrained, if necessary, by any readings of the tsunami on coastal or deep-ocean sea level gauges. In general, products continue to be issued until no further coasts in the region are threatened and readings on gauges have fallen below threat levels.

It is important to note the limitations with respect to the PTWC products. The science of forecasting tsunamis in real time is still developing. A good forecast depends upon knowing how the seafloor was deformed by the earthquake to initiate the tsunami. This cannot be measured directly and must be inferred from the seismic analyses or sea level readings. Another limitation is being able to observe the tsunami prior to impact – not only to confirm and measure the waves but to help constrain the forecast. For the nearest coasts where the tsunami is usually largest,

there will likely be no readings before impact. A third limitation is in forecasting how the tsunami will interact with the coast. In most cases a general approximation must be used that does not take into account local effects that may increase or decrease amplitudes. Numerical simulation of inundations is computationally intensive and requires accurate and finely gridded coastal bathymetry and topography. Even when coastal inundation models are available, capturing coastal resonances, trapped wave energy, and multiple wave interactions after even a few wave cycles is difficult. For all these reasons, the forecast model information provided in the products should be viewed as a general approximation of the tsunami and its impacts, taking into consideration limitations generally described here and explained further in this document.

## I. PTWC CAPABILITIES AND PROCEDURES

The product suite is tied closely to PTWC’s scientific and technical capabilities and procedures. This section of the User’s Guide provides an overview of those capabilities and procedures and how they will drive the products. The overview is presented in terms of a timeline of events that occur in PTWC’s processing of an actual or potential tsunami. Times indicated are only approximate, but are typical.

**Table 1. General Timeline of events for PTWC CARIBE-EWS Products**

Elapsed Time	Event
00h00m	A large earthquake occurs in the Caribbean or Atlantic region.
00h00m to 00h02m	Vibrations from the earthquake reach seismic stations near the earthquake epicenter, triggering event alarms at PTWC. PTWC duty analysts respond to the operations centre and begin to analyze the event. <i>[PTWC currently monitors over 600 seismic stations from around the world, with data collected at most of those stations reaching PTWC within a minute of when it is collected.]</i>
00h02m to 00h07m	Using a combination of automatic and interactive analyses, duty analysts complete their preliminary determination of the earthquake epicenter, depth, and magnitude. These parameters are sent to the US Geological Survey and get immediately displayed on the CISN Display used by many National Tsunami Warning Centers (NTWCs). These parameters also trigger the W-phase Centroid Moment Tensor (WCMT) earthquake fault parameter analysis.
00h03m to 00h10m	Based on the preliminary earthquake location and magnitude, an initial PTWC text product for the CARIBE-EWS is issued according to criteria listed in Table 2. A one-time Information Statement is issued if there is no tsunami threat. An Information Statement is also issued for a potential threat from far away that is still under evaluation. A Threat Message will be immediately issued for earthquakes that pose a potential tsunami threat to CARIBE-EWS coasts in accordance with the Table 2 criteria.

Elapsed Time	Event
00h15m	The seismic analyses continue as data from additional seismic stations arrive and are processed. If the earthquake parameters change significantly then another text product may be issued using the same Table 2 criteria.
00h20m	The aforementioned WCMT analysis based upon data from broadband seismic stations in the surrounding regions. This analysis gives an accurate estimate of the earthquake centroid, depth and magnitude, and an estimate of the earthquake's mechanism —the strike angle of the fault, the dip angle of the fault, and the direction and amount of slip along the fault. These parameters are used to estimate the seafloor deformation that is the tsunami source. PTWC's RIFT tsunami forecast model is then initiated based on the CMT parameters. For Caribbean earthquakes the run completes in about 2-3 minutes. For Atlantic events, the run completes in about 7-9 minutes.
00h20m to 00h30m	For events with any RIFT forecast amplitudes above 0.3 m on CARIBE-EWS coasts, then a Threat Message is issued along with accompanying maps, a table of forecast statistics, and a coastal forecast amplitudes kmz file that cover the entire Caribbean region and adjacent seas of the CARIBE-EWS. If the forecast indicates no amplitudes above 0.3 m and data from the nearest sea-level gauges are consistent with that forecast, then a final Threat Message is issued.
00h30m to 02h00m	If there is a threat, sea-level gauges are monitored for tsunami signals. Within the first 30 minutes to an hour the tsunami may arrive on the nearest one or two coastal gauges and one or two deep-ocean gauges. Tsunami amplitudes are measured and compared, when possible, with forecast amplitudes produced by the models. Model forecasts may be adjusted to be more consistent with observations. Supplemental Threat Messages that include key observations and any revised forecasts are issued at least once an hour.
Beyond 2h	The process of refining the earthquake parameters and collecting additional sea-level observations continues, with that information used to constrain the forecast. The tsunami is monitored as it advances. When it is likely that there is no longer a significant tsunami threat then a final Threat Message is issued.



**Table 2. Criteria for PTWC Initial Text Products for the CARIBE-EWS.**

Region	Earthquake			Product	
	Location	Depth	Magnitude (M <sub>w</sub> )	Type	Tsunami Threat
Caribbean	under the sea or very near the coast	any	< 6.0	none	none
			6.0 – 7.0	Information Statement	None - earthquake is too small
	well inland		≥ 6.0	Information Statement	None – earthquake is too far inland
Atlantic	under the sea or very near the coast	any	< 6.5	none	none
			6.5 – 7.0	Information Statement	None - earthquake is too small
	well inland		≥ 6.5	Information Statement	None – earthquake is too far inland
Caribbean or Atlantic	under the sea or very near the coast	≥ 100 km	≥ 7.1	Information Statement	None - earthquake is too deep
		< 100 km	7.1 - 7.5	Threat Message	Potential threat to coasts within 300 km
			7.6 – 7.8	Threat Message	Potential threat to coasts within 1000 km
			≥ 7.9	Threat Message	Potential threat to coasts with ETA ≤ 3 hours
Atlantic	under the sea or very near the coast	< 100 km	≥ 7.9	Information Statement	Potential threat but no coasts with ETA ≤ 3 hours. Evaluation continues.

## II. RIFT FORECAST MODEL DESCRIPTION AND LIMITATIONS

### RIFT Description

RIFT (Real-time Forecast of Tsunamis) is an experimental tsunami forecast model based on the linear shallow water equations. Studies of its accuracy for a wide variety of sources and coasts are still underway. However, based upon its general success in forecasting impacts from several recent tsunamis, including the February 2010 Chile tsunami and the March 2011 Japan tsunami, and its unique capability to use estimates of the earthquake fault geometry as the primary source constraint and to produce comprehensive forecast for all coasts in real time, RIFT forms the basis for the new products being produced for the PTWS.

Definitions:  $z_{2p}$ =maximum absolute value of RIFT zero to peak wave amplitude  
 $z_{2t}$ =maximum absolute value of RIFT zero to trough wave amplitude

### RIFT Deep-Ocean Maximum Tsunami Wave Amplitude Map

At each model grid point in the ocean, RIFT produces a time series of the sea level fluctuations caused by the passing tsunami waves. Shown on the map is the maximum amplitude of those fluctuations,  $A_{max}$ , defined by:

$$A_{max} = 0.5 * (z_{2p} + z_{2t}) \text{ in meters}$$

These are the maximum deep-ocean tsunami amplitudes. Maximum coastal amplitudes can be much larger.

### RIFT Coastal Maximum Tsunami Wave Amplitude Map

For each model grid point near the coast, the tsunami amplitude at the coast can be estimated based upon Green's Law.

$$\text{Green's Law: } A_{coast} = A_{offshore} * (D_{offshore} / D_{coast})^{1/4}$$

where  $A_{coast}$  is the tsunami amplitude at the coast  
 $A_{offshore}$  is the tsunami amplitude at the offshore grid point  
 $D_{coast}$  is the depth of the ocean at the coast  
 $D_{offshore}$  is the depth of the ocean at the offshore grid point, and

The offshore ocean depth can vary from about 15 m to 1000 m, depending upon the resolution at which RIFT is run - 30 arc-sec, 1 arc-min, 2 arc-min or 4 arc-min. The coastal ocean depth is set to be 1 m.

The offshore point is the closest model grid point with a water depth greater than the water depth at the model's coastal point. If the distance from the coastal point to the offshore point is greater than 100 km, then no forecast is made for the coastal point. There is no confidence in the quality of the coastal forecast if Green's Law is applied over distances > 100 km. Consequently, there might not be a forecast for coasts with wide continental shelves at 4-arc-

min. resolution. In those cases, a RIFT run at finer than 4 arc-min resolution is required for RIFT to produce a Green's Law coastal forecast.

### **RIFT Limitations**

1. Initial results can vary easily by a factor of two, because of uncertainties in the preliminary magnitude, depth and assumed mechanism of the earthquake. Later results, constrained by the earthquake centroid moment tensor as well as by deep-ocean observations should be more reliable.
2. For small islands (e.g., islands generally less than 30 km in diameter), and for islands with fringing or barrier reefs, Green's Law can overestimate the coastal amplitude. In those cases, a forecast amplitude between the offshore and Green's Law amplitude may be more appropriate.
3. For resonant harbors, the Green's Law amplitude can underestimate the actual wave amplitude. Green's Law amplitude should be interpreted as average wave amplitude at the open coast, not necessarily the maximum amplitude inside a harbor or at a sea-level gauge.
4. The RIFT forecast coastal amplitude is not necessarily indicative of inundation depth, which is a function of the local topography. A 30-meter coastal amplitude from Green's Law does not mean the inundation depth will reach 30 meters. But it does indicate a very major tsunami impact.
5. In the near field, Green's law amplitude does not necessarily take into account wave propagation and dissipation. Thus, a coastal amplitude of 20-30 meters can be misleading, it should also simply be interpreted as a major tsunami.

### Detailed explanation of Green's law and the limitations of model forecast.

There can be significant uncertainties of the RIFT forecast because of its assumptions and the uncertainties of the earthquake source parameters.

1. The forecast is sensitive to the earthquake magnitude. A difference of 0.2 in the earthquake magnitude results in factor of two in the tsunami wave amplitude.
2. The forecast is sensitive to the earthquake focal mechanism. For example, two earthquakes of magnitude 7.5 with different focal mechanisms can give vastly different results, easily by a factor of two or more.
3. Experience shows that when RIFT is forced by the earthquake's computed centroid moment tensors (CMT) mechanism, it tends to give a much better result. However, the CMT will not be become available until 25-30 minutes after the earthquake occurs. The initial CMT can be off by 0.2 or more in magnitude for large earthquakes, resulting in a factor of two difference in the RIFT tsunami wave forecast.

### Key Assumptions of Green's Law

1. The coastline in question is linear and exposed to the open ocean.
2. Tsunami waves near the coast behave as one-dimensional plane waves.
3. There are no significant wave reflections and no dissipation by turbulence.

4. The bathymetry varies slowly compared to the wavelength of the tsunami waves. Thus, for steep bathymetry, the Green's Law forecast can overestimate the tsunami wave amplitudes.
5. Cliff boundary conditions are used. In other words, the coast is assumed to be a vertical wall.

### III. DESCRIPTION OF PRODUCTS

#### Text Products

Text products are organized into the following discreet sections.

#### Headers

At the top of each text product are some header lines that include the World Meteorological Organization (WMO) Product ID and issue date/time, an AWIPS ID, a product type line, an issuing office line, and an issuance date/time line. Identifiers are listed in the table below.

Product Type	WMO ID	AWIPS ID
Tsunami Information Statement	WECA43 PHEB	TIBCAX
Tsunami Threat Message	WECA41 PHEB	TSUCAX

#### Headline

Immediately below the header lines is a brief headline, leading and trailing with an ellipsis (...). The headline indicates either an information statement or a tsunami threat message.

#### Target Area

Below the headline is a statement indicating the geographic area ([APPENDIX II: GEOGRAPHICAL AREAS USED IN TARGET AREA SECTION OF THE PTWC TEXT PRODUCTS](#)) that the product is intended for. The products are for most of the Caribbean and Adjacent Regions except those parts exclusively covered by other centers. This statement is to help avoid confusion in areas not covered by the product.

#### Updates

This section is to report any significant changes to the information in the products. Typically this might be a change in the earthquake magnitude, and update to the forecast, and new or revised sea level observations.

#### Tsunami Threat Forecast

Within this section are indicated the countries or places with a potential or forecast tsunami threat. For a forecast threat, the levels are tsunami heights of 0.3-1 meter, 1-3 meters, and greater than 3 meters above the normal tide level.

#### Evaluation

The evaluation section always includes a narrative statement describing the key earthquake parameters. It may also include one or two short statements about the tsunami threat.

### Recommended Actions

This section gives brief statements about recommended actions. Since the product is intended primarily for government agencies and not the public, the recommended actions are left very general to avoid conflicting with actions directed by the local authoritative government agencies.

### Estimated Times of Arrival

Within this section are listed, in table form, estimated first tsunami wave arrival times for specific points within or near areas identified with a tsunami threat of at least 0.3 meters above the tide. These times should only be viewed as approximate. For a long-duration event, estimated arrival times more than an hour in the past are removed from the list.

### Potential Impacts

This section contains brief statements about tsunami behavior and the hazard presented by each level of threat.

### Tsunami Observations

Within this section are readings of the maximum tsunami height recorded so far on certain coastal and/or deep-ocean sea-level gauges.

### Preliminary Earthquake Parameters

The earthquake parameters, origin time, epicenter coordinates, depth, magnitude, and descriptive location are provided here in bulleted form.

### Next Update and Additional Information

This final section indicates when the next product, if any, can be expected. It is usually within an hour. It also tells where additional information about the event may be found.

## **Forecast Polygon Map**

The forecast polygon map provides a quick and general view of the tsunami threat. All coastal areas of the Caribbean covered by the product are enclosed within a set of polygons ([APPENDIX III: LIST OF FORECATS POLYGONS USED IN THE PTWC FORECATS POLYGON MAP AND TABLE](#)).

Some countries or places are covered by a single polygon and some by multiple polygons. Each polygon is given a color depending upon its maximum level of threat. Some polygons are uncolored because either 1) the forecast model domain did not include those areas, or 2) the forecast model could not make a forecast because its resolution was insufficient in areas of shallow water.

## **Forecast Polygon Table**

The forecast polygon table shows, for each polygon with a threat, the maximum, mean, and median forecast coastal tsunami height as well as the maximum, mean, and median offshore tsunami height. Offshore heights are translated to coastal heights using Green's Law. For places like islands that have dimensions much smaller than the tsunami wavelength, Green's Law overestimates and the offshore height may be more appropriate. In all cases, height is

measured relative to the tide level. Also provided are the standard deviation of the values, the total number of forecast points within each polygon, and a descriptive name for each polygon.

### Energy Forecast Map

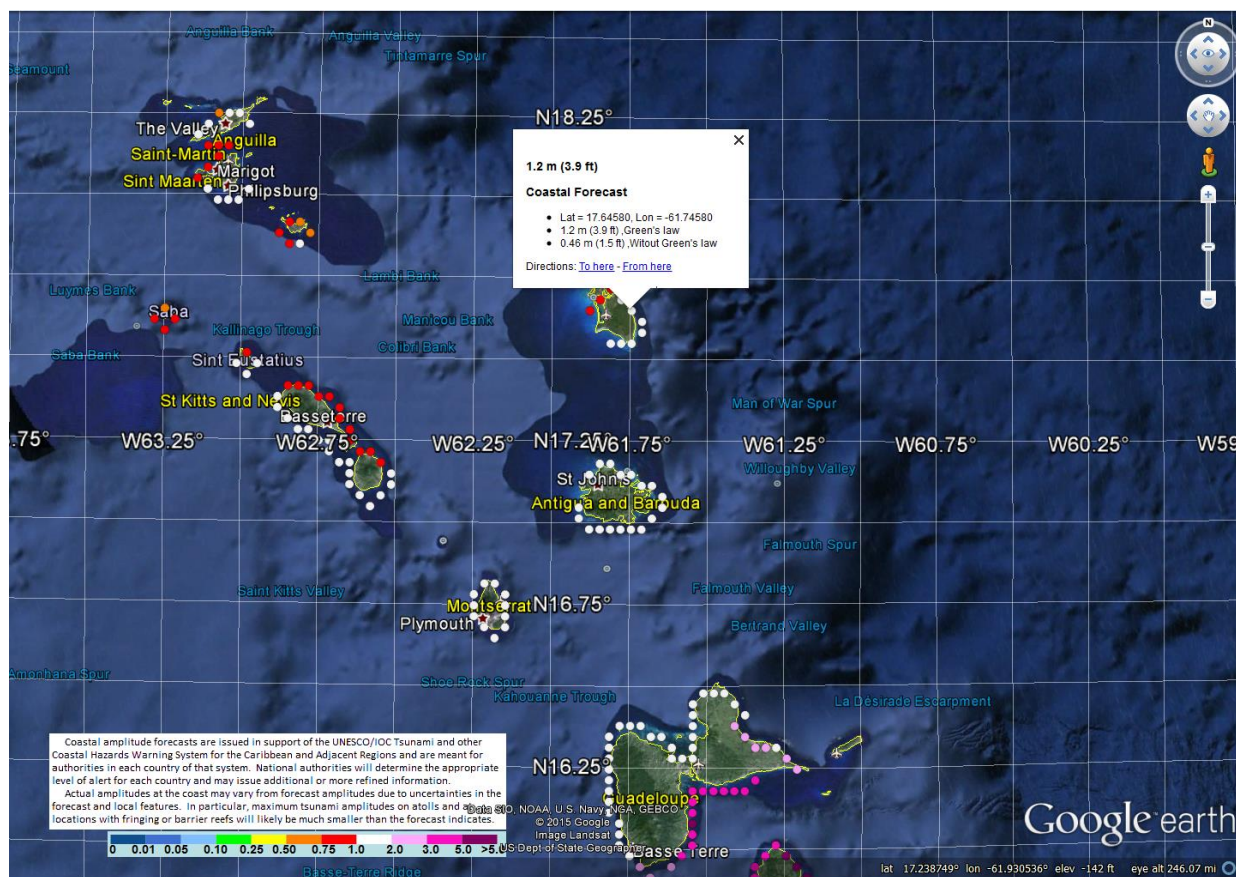
The energy map shows the maximum tsunami amplitude at each place in the deep ocean. It shows how the tsunami is directed away from the earthquake, how it is focused and defocused by the shape of the seafloor, and how it diminishes by spreading. It is useful for understanding why some areas may be more threatened because they are in a “beam” of directed tsunami energy.

### Coastal Forecast Map

This map shows the individual coastal forecast points colored according to the forecast tsunami height at each point. It provides significantly more spatial detail than the polygons. This can be useful for identifying when only part of a coast within a polygon is under threat. The accuracy of individual points, however, is less than points as a group.

### Coastal Forecast KMZ File

Also provided with each forecast is a kmz file containing the individual tsunami forecast height values for each coastal grid point. When combined with a program like GoogleEarth, the user can drill down into the forecast to examine individual forecast points. Again, however, the accuracy of individual points is less than points as a group, and may not be appropriate for some coastal configurations.



*GoogleEarth screenshot of sample RIFT coastal tsunami forecast points around some of the Leeward Islands. By mousing over and clicking on a forecast point, the metadata for the point is shown.*

## **IV. EXAMPLE PTWC PRODUCTS FOR THE CARIBE-EWS**

### **IV.1 Tsunami Information Statement (shallow Mw 6.4 Caribbean earthquake)**

#### **IV.1.1 Initial and Usually Only Product**

##### ***Text Product***

ZCZC  
WECA43 PHEB 012110  
TIBCAZ

TSUNAMI INFORMATION STATEMENT NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
2110 UTC THU OCT 1 2015

...TSUNAMI INFORMATION STATEMENT...

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

THIS STATEMENT 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           6.4  
\* ORIGIN TIME        2107 UTC OCT 1 2015  
\* COORDINATES        15.0 NORTH 60.5 WEST  
\* DEPTH               20 KM / 12 MILES  
\* LOCATION           LEEWARD ISLANDS

##### EVALUATION

-----  
\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 6.4 OCCURRED IN THE LEEWARD ISLANDS AT 2107 UTC ON THURSDAY OCTOBER 1 2015.

\* BASED ON ALL AVAILABLE DATA... THERE IS NO SIGNIFICANT TSUNAMI THREAT FROM THIS EARTHQUAKE. HOWEVER... THERE IS A VERY SMALL POSSIBILITY OF TSUNAMI WAVES ALONG CARIBBEAN COASTS LOCATED NEAREST THE EPICENTER.

##### RECOMMENDED ACTIONS

-----  
\* NO ACTION IS REQUIRED.

##### NEXT UPDATE AND ADDITIONAL INFORMATION

-----  
\* THIS WILL BE THE ONLY STATEMENT ISSUED FOR THIS EVENT UNLESS ADDITIONAL DATA ARE 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  
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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

\$\$

## IV.2 Tsunami Information Statement (deep Mw 6.4 Caribbean earthquake)

### IV.2.1 Initial and usually Only Product

#### Text Product

ZCZC  
WECA43 PHEB 012117  
TIBCAX

TSUNAMI INFORMATION STATEMENT NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
2117 UTC THU OCT 1 2015

...TSUNAMI INFORMATION STATEMENT...

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

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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           6.4  
\* ORIGIN TIME        2107 UTC OCT 1 2015  
\* COORDINATES        15.0 NORTH 60.5 WEST  
\* DEPTH              120 KM / 75 MILES  
\* LOCATION           LEEWARD ISLANDS

#### EVALUATION

- 
- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 6.4 OCCURRED IN  
THE LEEWARD ISLANDS AT 2107 UTC ON THURSDAY OCTOBER 1 2015.
  - \* BASED ON ALL AVAILABLE DATA... THERE IS NO TSUNAMI THREAT  
FROM THIS EARTHQUAKE.

#### RECOMMENDED ACTIONS

-----



\* NO ACTION IS REQUIRED.

NEXT UPDATE AND ADDITIONAL INFORMATION  
-----

- \* THIS WILL BE THE ONLY STATEMENT ISSUED FOR THIS EVENT UNLESS ADDITIONAL DATA ARE 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 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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

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### IV.3 Tsunami Threat Message (large Caribbean earthquake)

#### IV.3.1 Initial Product with the Potential Threat Area

##### **Text Product**

ZCZC  
WECA41 PHEB 021657  
TSUCAX

TSUNAMI MESSAGE NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1657 UTC FRI OCT 2 2015

...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  
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* MAGNITUDE	8.4
* ORIGIN TIME	1652 UTC OCT 2 2015
* COORDINATES	15.0 NORTH 60.5 WEST
* DEPTH	20 KM / 12 MILES
* LOCATION	LEEWARD ISLANDS

EVALUATION  
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- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.
- \* BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.

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

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

RECOMMENDED ACTIONS  
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- \* 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  
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- \* 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)
ROSEAU	DOMINICA	15.3N	61.4W	1711 10/02
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1712 10/02
CASTRIES	SAINTE LUCIA	14.0N	61.0W	1714 10/02
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1721 10/02
BRIDGETOWN	BARBADOS	13.1N	59.6W	1723 10/02
KINGSTOWN	SAINTE VINCENT	13.1N	61.2W	1726 10/02
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1739 10/02
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1745 10/02
SAINTE GEORGES	GRENADA	12.0N	61.8W	1747 10/02
PALMETTO POINT	BARBUDA	17.6N	61.9W	1748 10/02
BASSETERRE	SAINTE KITTS	17.3N	62.7W	1753 10/02
SABA	SABA	17.6N	63.2W	1754 10/02
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1755 10/02
SAINTE JOHNS	ANTIGUA	17.1N	61.9W	1757 10/02
ST CROIX	US VIRGIN ISLAND	17.8N	64.7W	1800 10/02
FAJARDO	PUERTO RICO	18.3N	65.6W	1804 10/02
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1805 10/02
THE VALLEY	ANGUILLA	18.3N	63.1W	1808 10/02
SAN JUAN	PUERTO RICO	18.5N	66.2W	1808 10/02
PONCE	PUERTO RICO	18.0N	66.6W	1811 10/02
SAINTE BARTHELEM	SAINTE BARTHELEMY	17.9N	62.8W	1814 10/02
BAIE LUCAS	SAINTE MARTIN	18.1N	63.0W	1819 10/02
BAIE GRAND CASE	SAINTE MARTIN	18.1N	63.1W	1820 10/02
MAYAGUEZ	PUERTO RICO	18.2N	67.2W	1822 10/02
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1826 10/02
ONIMA	BONAIRE	12.3N	68.3W	1828 10/02

BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1831	10/02
WILLEMSTAD	CURACAO	12.1N	68.9W	1836	10/02
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1836	10/02
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1841	10/02
TORTOLA	BR VIRGIN ISLAND	18.4N	64.6W	1842	10/02
ST THOMAS	US VIRGIN ISLAND	18.3N	64.9W	1846	10/02
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1847	10/02
ORANJESTAD	ARUBA	12.5N	70.0W	1848	10/02
MAIQUETIA	VENEZUELA	10.6N	67.0W	1849	10/02
ST JOHN	US VIRGIN ISLAND	18.3N	64.8W	1849	10/02
CUMANA	VENEZUELA	10.5N	64.2W	1850	10/02
CAP HAITEN	HAITI	19.8N	72.2W	1852	10/02
MAYAGUANA	BAHAMAS	22.3N	73.0W	1859	10/02
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1900	10/02
JACAMEL	HAITI	18.1N	72.5W	1902	10/02
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1905	10/02
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1907	10/02
BARAOA	CUBA	20.4N	74.5W	1910	10/02
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1912	10/02
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1914	10/02
LONG ISLAND	BAHAMAS	23.3N	75.1W	1915	10/02
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1925	10/02
RUTHS BAY	BERMUDA	32.4N	64.6W	1927	10/02
EXUMA	BAHAMAS	23.6N	75.9W	1927	10/02
RIOHACHA	COLOMBIA	11.6N	72.9W	1930	10/02
CAT ISLAND	BAHAMAS	24.4N	75.5W	1931	10/02
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1936	10/02
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1938	10/02
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1944	10/02
MORTEGO BAY	JAMAICA	18.5N	77.9W	1946	10/02
CARTAGENA	COLOMBIA	10.4N	75.6W	1953	10/02
KINGSTON	JAMAICA	17.9N	76.9W	1953	10/02

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 -ALL IN LOWERCASE LETTERS-.
- \* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND 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 WWW.TSUNAMI.GOV.
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### **IV.3.2 Second Product that Includes the Tsunami Forecast**

#### **Text Product**

ZCZC  
WECA41 PHEB 021717  
TSUCAX

TSUNAMI MESSAGE NUMBER 2  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1717 UTC FRI OCT 2 2015

...TSUNAMI THREAT MESSAGE...

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#### PRELIMINARY EARTHQUAKE PARAMETERS

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\* MAGNITUDE           8.4  
\* ORIGIN TIME        1652 UTC OCT 2 2015  
\* COORDINATES        15.0 NORTH 60.5 WEST  
\* DEPTH              20 KM / 12 MILES  
\* LOCATION           LEEWARD ISLANDS

#### EVALUATION

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN  
THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.  
  
\* 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  
  
  BARBADOS... DOMINICA... GUADELOUPE... MARTINIQUE... SAINT  
  LUCIA... AND SAINT VINCENT AND THE GRENADINES.  
  
\* TSUNAMI WAVES REACHING 1 TO 3 METERS ABOVE THE TIDE LEVEL ARE  
POSSIBLE ALONG SOME COASTS OF  
  
  DOMINICAN REPUBLIC... FRENCH GUIANA... GUYANA...  
  SURINAME... VENEZUELA... ANGUIILLA... ANTIGUA AND  
  BARBUDA... ARUBA... CURACAO... GRENADA... MONTSERRAT...  
  PUERTO RICO AND VIRGIN ISLANDS... SABA AND SAINT  
  EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND NEVIS...  
  SINT MAARTEN... AND TRINIDAD AND TOBAGO.  
  
\* TSUNAMI WAVES REACHING 0.3 TO 1 METERS ABOVE THE TIDE LEVEL  
ARE POSSIBLE FOR SOME COASTS OF  
  
  BRAZIL... COLOMBIA... HAITI... BERMUDA... BONAIRE...  
  JAMAICA... AND SAINT MARTIN.

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

\* 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 AND AT LOCATIONS WITH FRINGING OR BARRIER REEFS WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

RECOMMENDED ACTIONS  
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SABA	SABA	17.6N	63.2W	1754 10/02
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1755 10/02
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1757 10/02
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1805 10/02
THE VALLEY	ANGUILLA	18.3N	63.1W	1808 10/02
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1814 10/02
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	1819 10/02
BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	1820 10/02
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CARTAGENA	COLOMBIA	10.4N	75.6W	1953 10/02
KINGSTON	JAMAICA	17.9N	76.9W	1953 10/02
SANTA MARTA	COLOMBIA	11.2N	74.2W	2016 10/02
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	2029 10/02
PUNTO FIJO	VENEZUELA	11.7N	70.2W	2043 10/02

CAYENNE	FRENCH GUIANA	4.9N	52.3W	2054	10/02
PARAMARIBO	SURINAME	5.9N	55.2W	2120	10/02
GEORGETOWN	GUYANA	6.8N	58.2W	2142	10/02
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2221	10/02
PORLAMAR	VENEZUELA	10.9N	63.8W	2238	10/02
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0000	10/03

POTENTIAL IMPACTS

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NEXT UPDATE AND ADDITIONAL INFORMATION

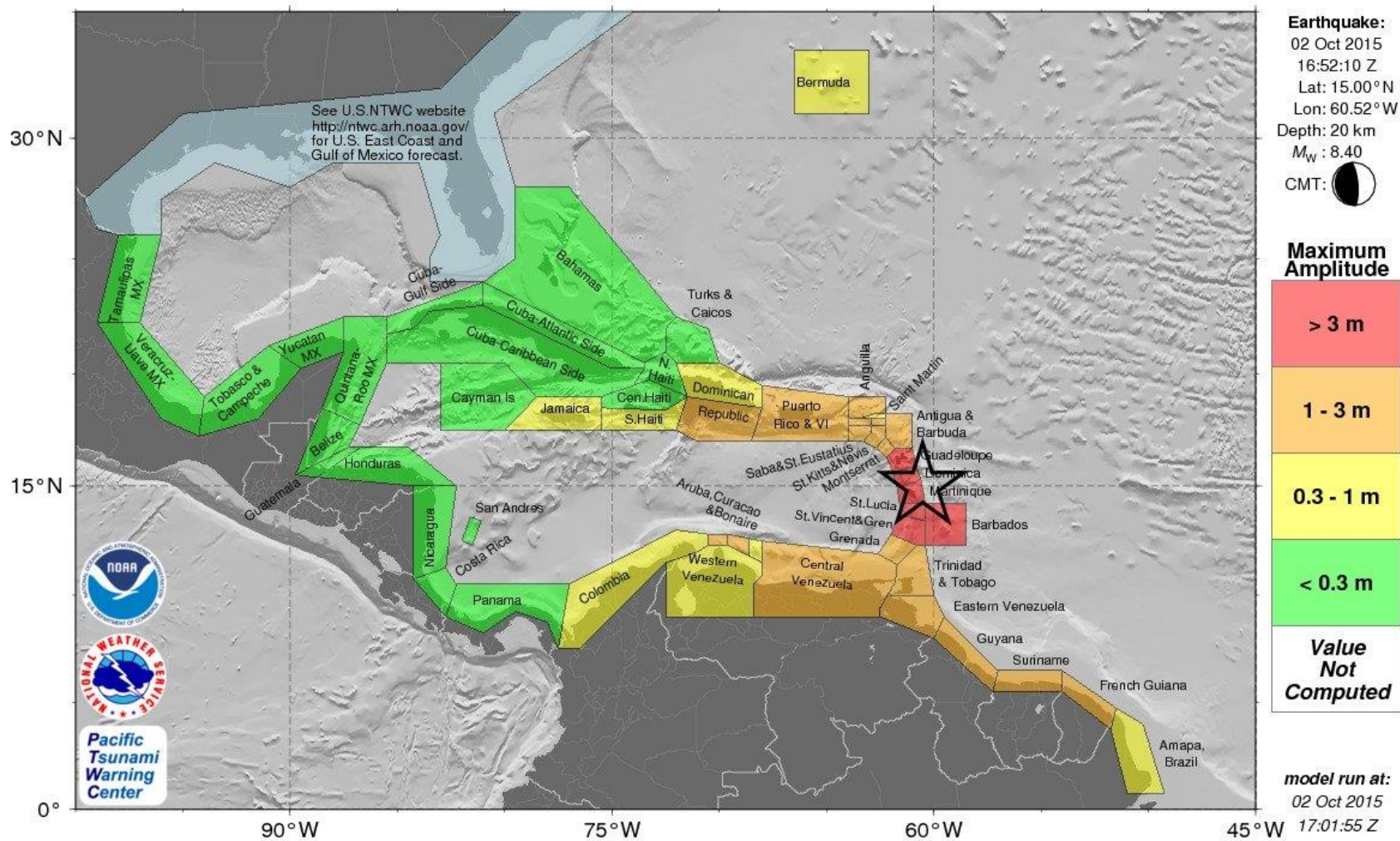
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**Forecast Polygons Map**

**PTWC Forecast Polygons**



**Table of Forecast Statistics**

PTWC TABLE OF FORECAST STATISTICS FOR REGIONAL POLYGONS - RUN ID 20151002170155  
(for internal use only - not for distribution)

Earthquake - Origin: 10/02/2015 16:52:10 UTC Coordinates: 15.0N 60.5W Depth: 020km Magnitude: 8.4

This table is issued for information only in support 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.

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 with fringing or barrier reefs will likely be much smaller than the forecast indicates.

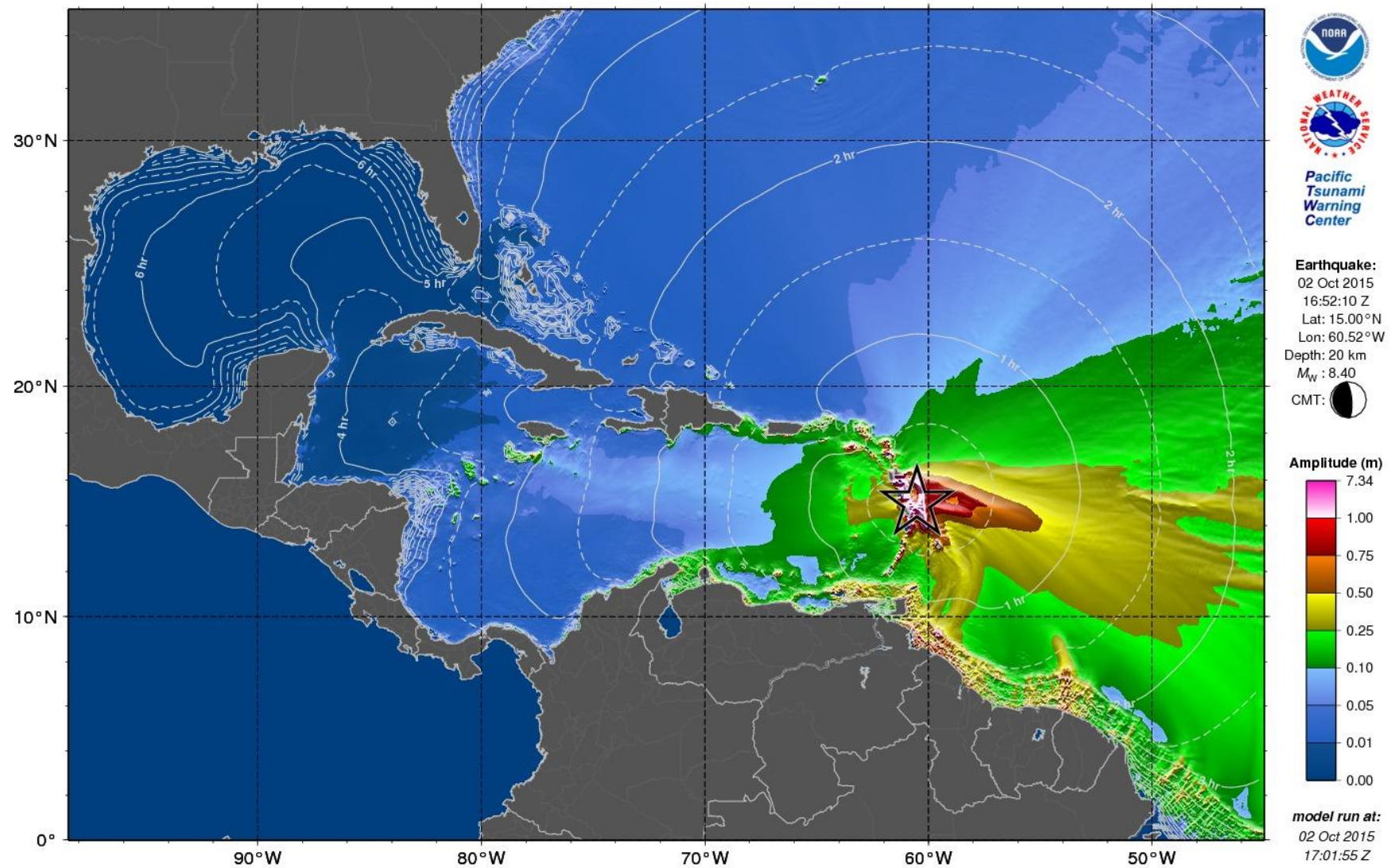
Region Name	Coastal Forecast (meters)				Offshore Forecast (meters)				Total Points
	Maximum	Mean	Median	STD	Maximum	Mean	Median	STD	
Martinique	7.9	4.80	4.90	1.90	7.3	2.20	1.60	1.60	41
Guadeloupe	7.8	3.00	2.10	1.80	2.8	1.20	1.00	0.71	71
Saint_Lucia	7.0	4.00	3.70	2.00	5.8	1.50	1.50	1.10	26
Dominica	6.7	4.10	4.50	1.90	4.0	1.20	0.92	0.87	31
Saint_Vincent_and_the_Grenadines	4.4	1.80	1.30	1.00	2.1	0.77	0.63	0.48	33
Barbados	3.9	3.10	3.10	0.48	1.6	1.00	1.00	0.24	22
Atlantic_Coast_of_Venezuela	2.4	1.80	1.70	0.27	1.5	0.73	0.72	0.25	82
Guyana	2.2	1.40	1.30	0.35	1.8	0.63	0.59	0.27	101
Trinidad_and_Tobago	1.9	1.30	1.20	0.31	1.8	0.64	0.60	0.27	77
Antigua_and_Barbuda	1.9	1.40	1.40	0.29	2.1	0.92	0.82	0.50	28
Saba_and_Saint_Eustatius	1.6	1.00	0.95	0.26	0.46	0.28	0.23	0.10	8
Central_Coast_of_Venezuela	1.5	0.75	0.66	0.33	0.93	0.37	0.36	0.17	244
Saint_Kitts_and_Nevis	1.5	1.20	1.20	0.23	1.0	0.44	0.34	0.24	29
French_Guiana	1.4	0.60	0.59	0.10	1.3	0.35	0.26	0.25	84
Puerto_Rico_and_Virgin_Islands	1.4	0.66	0.69	0.32	0.94	0.32	0.29	0.18	189
Suriname	1.4	0.89	0.83	0.18	1.0	0.37	0.32	0.16	109
Grenada	1.4	1.10	1.00	0.12	1.2	0.62	0.63	0.29	29
Montserrat	1.4	1.20	1.20	0.10	0.74	0.42	0.35	0.15	11
Saint_Barthelemy	1.2	0.85	0.83	0.16	0.76	0.69	0.69	0.05	6
Sint_Maarten	1.2	1.10	1.10	0.12	0.88	0.60	0.54	0.18	6
Curacao	1.1	0.73	0.59	0.21	0.41	0.24	0.25	0.08	27
Caribbean_Coast_of_Dominican_Republic	1.1	0.62	0.61	0.17	0.85	0.31	0.29	0.14	148



Aruba	1.1	1.00	1.00	0.14	0.46	0.33	0.33	0.11	8
Anguilla	1.0	0.97	1.00	0.09	1.2	0.77	0.72	0.25	8
Bonaire	0.92	0.73	0.72	0.09	0.98	0.38	0.30	0.21	15
Jamaica	0.87	0.28	0.21	0.19	0.43	0.13	0.10	0.09	146
Western Coast of Venezuela	0.82	0.63	0.63	0.07	1.1	0.47	0.45	0.19	100
Saint Martin	0.82	0.82	0.82	0.00	0.86	0.74	0.69	0.09	3
Amapa Brazil	0.66	0.59	0.58	0.06	0.58	0.16	0.13	0.09	119
Atlantic Coast of Dominican Republic	0.65	0.20	0.18	0.11	1.0	0.13	0.07	0.17	129
Caribbean Coast of Colombia	0.58	0.27	0.27	0.12	0.53	0.18	0.16	0.09	255
Caribbean Coast of Haiti	0.50	0.36	0.36	0.07	0.28	0.14	0.12	0.06	89
Bermuda	0.39	0.39	0.39	0.01	0.33	0.17	0.14	0.07	7
Turks and Caicos Islands	0.28	0.17	0.17	0.06	0.12	0.06	0.06	0.02	46
Gulf of Gonave Coast of Haiti	0.28	0.18	0.18	0.03	0.20	0.06	0.05	0.03	139
Caribbean Coast of Cuba	0.24	0.08	0.07	0.05	0.11	0.03	0.02	0.02	472
Caribbean Coast of Panama	0.24	0.15	0.15	0.03	0.20	0.09	0.09	0.03	179
Atlantic Coast of Haiti	0.21	0.15	0.14	0.04	0.09	0.05	0.04	0.02	66
Caribbean Coast of Costa Rica	0.20	0.16	0.17	0.02	0.17	0.10	0.09	0.03	48
Caribbean Coast of Nicaragua	0.19	0.14	0.13	0.02	0.15	0.06	0.06	0.03	139
Mainland-Gulf	0.18	0.04	0.00	0.06	0.17	0.02	0.00	0.03	1148
Bahamas	0.18	0.09	0.09	0.03	0.29	0.04	0.04	0.03	442
Atlantic Coast of Cuba	0.14	0.07	0.08	0.04	0.08	0.02	0.02	0.01	267
San Andres and Providencia	0.12	0.11	0.11	0.01	0.05	0.05	0.05	0.00	2
Cayman Islands	0.08	0.07	0.07	0.01	0.04	0.03	0.03	0.01	5
Quintana Roo Mexico	0.07	0.04	0.04	0.02	0.11	0.02	0.02	0.01	166
Gulf of Mexico Coast of Cuba	0.05	0.01	0.01	0.00	119				
Caribbean Coast of Honduras	0.05	0.04	0.04	0.01	0.08	0.02	0.02	0.01	185
Belize	0.05	0.04	0.04	0.00	0.03	0.02	0.01	0.01	90
Caribbean Coast of Guatemala	0.04	0.04	0.04	0.00	0.03	0.01	0.01	0.00	13

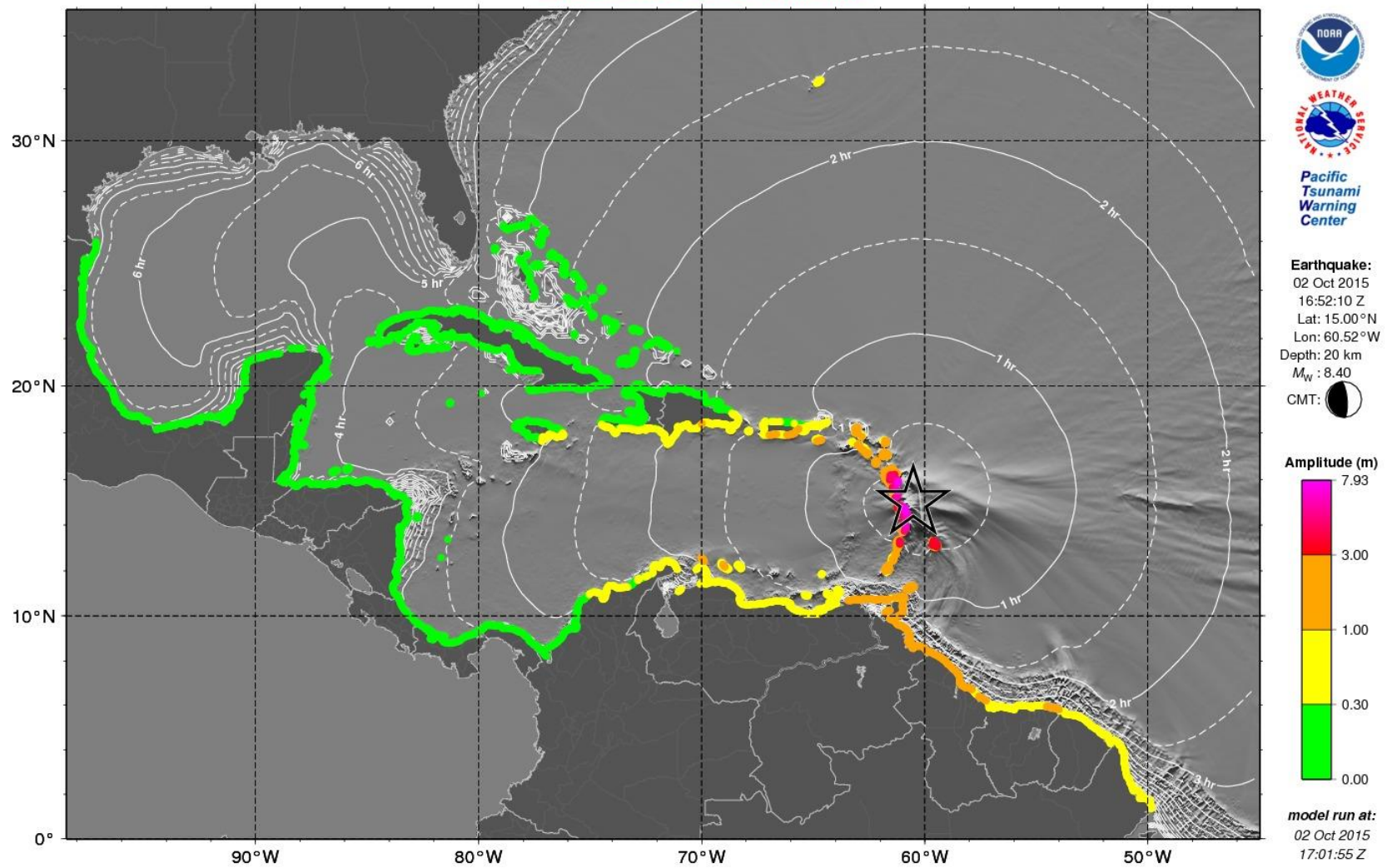
Energy Forecast Map

PTWC Energy Forecast



**Coastal Forecast Map**

**PTWC Coastal Forecast**



### IV.3.3 Third or Later Product that Includes Sea Level Readings

#### **Text Product**

ZCZC  
WECA41 PHEB 021731  
TSUCAX

TSUNAMI MESSAGE NUMBER 3  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1731 UTC FRI OCT 2 2015

...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           8.4  
\* ORIGIN TIME        1652 UTC OCT 2 2015  
\* COORDINATES        15.0 NORTH 60.5 WEST  
\* DEPTH              20 KM / 12 MILES  
\* LOCATION           LEEWARD ISLANDS

#### EVALUATION

-----

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN  
THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.
- \* 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  
  
BARBADOS... DOMINICA... GUADELOUPE... MARTINIQUE... SAINT  
LUCIA... AND SAINT VINCENT AND THE GRENADINES.
- \* TSUNAMI WAVES REACHING 1 TO 3 METERS ABOVE THE TIDE LEVEL ARE  
POSSIBLE ALONG SOME COASTS OF  
  
DOMINICAN REPUBLIC... FRENCH GUIANA... GUYANA...  
SURINAME... VENEZUELA... ANGUILLA... ANTIGUA AND  
BARBUDA... ARUBA... CURACAO... GRENADA... MONTSERRAT...  
PUERTO RICO AND VIRGIN ISLANDS... SABA AND SAINT  
EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND NEVIS...  
SINT MAARTEN... AND TRINIDAD AND TOBAGO.

- \* TSUNAMI WAVES REACHING 0.3 TO 1 METERS ABOVE THE TIDE LEVEL

ARE POSSIBLE FOR SOME COASTS OF

BRAZIL... COLOMBIA... HAITI... BERMUDA... BONAIRE...  
JAMAICA... AND SAINT MARTIN.

- \* FOR ALL OTHER AREAS COVERED BY THIS MESSAGE... THERE IS NO TSUNAMI THREAT ALTHOUGH SMALL SEA LEVEL CHANGES MAY OCCUR.
- \* 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 AND AT LOCATIONS WITH FRINGING OR BARRIER REEFS WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

RECOMMENDED ACTIONS

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- \* 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

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- \* 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)
ROSEAU	DOMINICA	15.3N 61.4W	1711 10/02
FORT DE FRANCE	MARTINIQUE	14.6N 61.1W	1712 10/02
CASTRIES	SAINT LUCIA	14.0N 61.0W	1714 10/02
BASSE TERRE	GUADELOUPE	16.0N 61.7W	1721 10/02
BRIDGETOWN	BARBADOS	13.1N 59.6W	1723 10/02
KINGSTOWN	SAINT VINCENT	13.1N 61.2W	1726 10/02
PLYMOUTH	MONTSERRAT	16.7N 62.2W	1739 10/02
PIRATES BAY	TRINIDAD TOBAGO	11.3N 60.6W	1745 10/02
SAINT GEORGES	GRENADA	12.0N 61.8W	1747 10/02
PALMETTO POINT	BARBUDA	17.6N 61.9W	1748 10/02
BASSETERRE	SAINT KITTS	17.3N 62.7W	1753 10/02
SABA	SABA	17.6N 63.2W	1754 10/02
SINT EUSTATIUS	SINT EUSTATIUS	17.5N 63.0W	1755 10/02
SAINT JOHNS	ANTIGUA	17.1N 61.9W	1757 10/02
SIMPSON BAAI	SINT MAARTEN	18.0N 63.1W	1805 10/02
THE VALLEY	ANGUILLA	18.3N 63.1W	1808 10/02
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N 62.8W	1814 10/02
BAIE LUCAS	SAINT MARTIN	18.1N 63.0W	1819 10/02
BAIE GRAND CASE	SAINT MARTIN	18.1N 63.1W	1820 10/02
CABO ENGANO	DOMINICAN REP	18.6N 68.3W	1826 10/02
ONIMA	BONAIRE	12.3N 68.3W	1828 10/02
BAIE BLANCHE	SAINT MARTIN	18.1N 63.0W	1831 10/02
WILLEMSTAD	CURACAO	12.1N 68.9W	1836 10/02
PUERTO PLATA	DOMINICAN REP	19.8N 70.7W	1836 10/02
SANTO DOMINGO	DOMINICAN REP	18.5N 69.9W	1841 10/02
ORANJESTAD	ARUBA	12.5N 70.0W	1848 10/02
MAIQUETIA	VENEZUELA	10.6N 67.0W	1849 10/02
CUMANA	VENEZUELA	10.5N 64.2W	1850 10/02
JACAMEL	HAITI	18.1N 72.5W	1902 10/02
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N 61.5W	1914 10/02
RUTHS BAY	BERMUDA	32.4N 64.6W	1927 10/02
RIOHACHA	COLOMBIA	11.6N 72.9W	1930 10/02
BARRANQUILLA	COLOMBIA	11.1N 74.9W	1936 10/02
MONTEGO BAY	JAMAICA	18.5N 77.9W	1946 10/02
CARTAGENA	COLOMBIA	10.4N 75.6W	1953 10/02

KINGSTON	JAMAICA	17.9N	76.9W	1953	10/02
SANTA MARTA	COLOMBIA	11.2N	74.2W	2016	10/02
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	2029	10/02
PUNTO FIJO	VENEZUELA	11.7N	70.2W	2043	10/02
CAYENNE	FRENCH GUIANA	4.9N	52.3W	2054	10/02
PARAMARIBO	SURINAME	5.9N	55.2W	2120	10/02
GEORGETOWN	GUYANA	6.8N	58.2W	2142	10/02
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2221	10/02
FORLAMAR	VENEZUELA	10.9N	63.8W	2238	10/02
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0000	10/03

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 LOCATION	GAUGE COORDINATES		TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
	LAT	LON			
POINT A PITRE GP	16.2N	61.5W	1730	4.97M/16.3FT	16
PORT ST CHARLES BB	13.3N	59.6W	1729	2.88M/ 9.5FT	24
DESIRADE GUADELOUPE	16.3N	61.1W	1731	1.65M/ 5.4FT	14
FORT DE FRANCE MQ	14.6N	61.1W	1726	2.32M/ 7.6FT	20
ROSEAU DM	15.3N	61.4W	1717	1.74M/ 5.7FT	24
LE ROBERT MARTINIQU	14.7N	60.9W	1717	7.93M/26.0FT	22
LE PRECHEUR MARTINI	14.8N	61.2W	1712	3.09M/10.1FT	16

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 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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

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### IV.3.4 Final Product - Threat Ended

#### **Text Product**

ZCZC  
WECA41 PHEB 021945  
TSUCAX

TSUNAMI MESSAGE NUMBER 4  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1945 UTC FRI OCT 2 2015

...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           8.4  
\* ORIGIN TIME        1652 UTC OCT 2 2015  
\* COORDINATES        15.0 NORTH 60.5 WEST  
\* DEPTH              20 KM / 12 MILES  
\* LOCATION           LEEWARD ISLANDS

#### EVALUATION

-----

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN  
THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.
- \* 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 (UTC)	MAXIMUM TSUNAMI HEIGHT		WAVE PERIOD (MIN)
	LAT	LON				
PORT OF SPAIN TT	10.6N	61.5W	1924	0.96M/	3.1FT	26
JACMEL HT	18.2N	72.5W	1912	0.38M/	1.2FT	16
CAP HAITIEN HT	19.8N	72.2W	1901	0.13M/	0.4FT	22
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1853	0.71M/	2.3FT	22
PORT SAN ANDRES DO	18.4N	69.6W	1846	0.63M/	2.1FT	18
PUERTO PLATA DO	19.8N	70.7W	1848	0.12M/	0.4FT	28
BULLEN BAY CURACAO	12.2N	69.0W	1850	1.03M/	3.4FT	24
PUNTA CANA DO	18.5N	68.4W	1838	0.82M/	2.7FT	14
MONA ISLAND PR	18.1N	67.9W	1836	0.59M/	1.9FT	26
MAYAGUEZ PR	18.2N	67.2W	1832	0.54M/	1.8FT	28
DART 41420	23.5N	67.3W	1830	0.03M/	0.1FT	28
DART 42407	15.3N	68.2W	1823	0.09M/	0.3FT	16
MAGUEYES ISLAND PR	18.0N	67.0W	1827	0.88M/	2.9FT	22
YABUCOA PR	18.1N	65.8W	1819	1.16M/	3.8FT	16
SAN JUAN PR	18.5N	66.1W	1818	0.25M/	0.8FT	18
DART 41421	23.4N	63.9W	1815	0.05M/	0.2FT	20
LIMETREE VI	17.7N	64.8W	1810	1.27M/	4.2FT	24
ST CROIX VI	17.7N	64.7W	1812	0.87M/	2.9FT	26
PARHAM AT	17.1N	61.8W	1803	1.60M/	5.2FT	26
PRICKLEY BAY GD	12.0N	61.8W	1753	1.30M/	4.3FT	26
CHARLOTTEVILLE TT	11.3N	60.5W	1800	1.83M/	6.0FT	26
CALLIAQUA VC	13.1N	61.2W	1741	1.49M/	4.9FT	20
DESHAIES GUADELOUPE	16.3N	61.8W	1742	1.37M/	4.5FT	22
POINT A PITRE GP	16.2N	61.5W	1730	4.97M/	16.3FT	16
PORT ST CHARLES BB	13.3N	59.6W	1729	2.88M/	9.5FT	24
DESRADE GUADELOUPE	16.3N	61.1W	1731	1.65M/	5.4FT	14
FORT DE FRANCE MQ	14.6N	61.1W	1726	2.32M/	7.6FT	20
ROSEAU DM	15.3N	61.4W	1717	1.74M/	5.7FT	24
LE ROBERT MARTINIQU	14.7N	60.9W	1717	7.93M/	26.0FT	22
LE PRECHEUR MARTINI	14.8N	61.2W	1712	3.09M/	10.1FT	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 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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.



## IV.4 Tsunami Threat Message (Atlantic earthquake with a tsunami threat)

### IV.4.1 Initial Product – Threat Under Evaluation

#### Text Product

ZCZC  
WECA43 PHEB 021743  
TIBCAH

TSUNAMI INFORMATION STATEMENT NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1743 UTC FRI OCT 2 2015

...TSUNAMI INFORMATION STATEMENT...

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

THIS STATEMENT 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           8.7  
\* ORIGIN TIME        1743 UTC OCT 2 2015  
\* COORDINATES        36.2 NORTH  9.3 WEST  
\* DEPTH               20 KM / 12 MILES  
\* LOCATION           WEST OF GIBRALTAR

#### EVALUATION

- 
- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED WEST OF GIBRALTAR AT 1743 UTC ON FRIDAY OCTOBER 2 2015.
  - \* THE TSUNAMI THREAT TO THE CARIBBEAN REGION FROM THIS EARTHQUAKE IS STILL UNDER INVESTIGATION. FURTHER INFORMATION ON THE THREAT WILL BE ISSUED AS SOON AS POSSIBLE.

#### RECOMMENDED ACTIONS

- 
- \* CONSIDER AND PREPARE FOR THE POSSIBILITY OF A TSUNAMI THREAT TO THE CARIBBEAN REGION FROM THIS EARTHQUAKE.

#### NEXT UPDATE AND ADDITIONAL INFORMATION

- 
- \* FURTHER STATEMENTS ON THE TSUNAMI THREAT TO THE CARIBBEAN REGION FROM THIS EARTHQUAKE WILL BE ISSUED AS SOON AS INFORMATION BECOMES AVAILABLE OR IN NO MORE THAN ONE HOUR.
  - \* 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 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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

#### **IV.4.2 Second Product that Includes the Tsunami Forecast**

##### **Text Product**

ZCZC  
WECA41 PHEB 021756  
TSUCAX

TSUNAMI MESSAGE NUMBER 2  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
1756 UTC FRI OCT 2 2015

...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           8.7  
\* ORIGIN TIME        1743 UTC OCT 2 2015  
\* COORDINATES        36.2 NORTH  9.3 WEST  
\* DEPTH              20 KM / 12 MILES  
\* LOCATION           WEST OF GIBRALTAR

##### EVALUATION

-----

\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED  
WEST OF GIBRALTAR AT 1743 UTC ON FRIDAY OCTOBER 2 2015.

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

##### TSUNAMI THREAT FORECAST...UPDATED

-----

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

BRAZIL... CUBA... DOMINICAN REPUBLIC... FRENCH GUIANA...  
GUYANA... HAITI... SURINAME... VENEZUELA... ANGUILLA...  
ANTIGUA AND BARBUDA... BAHAMAS... BARBADOS... BERMUDA...  
DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE...  
MONTSERRAT... PUERTO RICO AND VIRGIN ISLANDS... SABA AND  
SAINT EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND  
NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT MARTIN...  
SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO...  
AND TURKS AND CAICOS ISLANDS.

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ESTIMATED TIMES OF ARRIVAL  
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LOCATION	REGION	COORDINATES	ETA (UTC)
RUTHS BAY	BERMUDA	32.4N 64.6W	0045 10/03
ROSEAU	DOMINICA	15.3N 61.4W	0110 10/03
BRIDGETOWN	BARBADOS	13.1N 59.6W	0111 10/03
FORT DE FRANCE	MARTINIQUE	14.6N 61.1W	0113 10/03
CASTRIES	SAINT LUCIA	14.0N 61.0W	0114 10/03
BASSE TERRE	GUADELOUPE	16.0N 61.7W	0115 10/03
SABA	SABA	17.6N 63.2W	0117 10/03
PLYMOUTH	MONTserrat	16.7N 62.2W	0117 10/03
PALMETTO POINT	BARBUDA	17.6N 61.9W	0117 10/03
SINT EUSTATIUS	SINT EUSTATIUS	17.5N 63.0W	0118 10/03
BASSETERRE	SAINT KITTS	17.3N 62.7W	0119 10/03
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SAINT BARTHELEM	SAINT BARTHELEMY	17.9N 62.8W	0138 10/03
CABO ENGANO	DOMINICAN REP	18.6N 68.3W	0139 10/03
BAIE GRAND CASE	SAINT MARTIN	18.1N 63.1W	0141 10/03
BAIE LUCAS	SAINT MARTIN	18.1N 63.0W	0142 10/03
SAINT GEORGES	GRENADA	12.0N 61.8W	0147 10/03
PUERTO PLATA	DOMINICAN REP	19.8N 70.7W	0149 10/03
GRAND TURK	TURKS N CAICOS	21.5N 71.1W	0150 10/03
BAIE BLANCHE	SAINT MARTIN	18.1N 63.0W	0153 10/03
MAYAGUANA	BAHAMAS	22.3N 73.0W	0157 10/03
WEST CAICOS	TURKS N CAICOS	21.7N 72.5W	0200 10/03
SAN SALVADOR	BAHAMAS	24.1N 74.5W	0201 10/03
CROOKED ISLAND	BAHAMAS	22.7N 74.1W	0202 10/03
CAP HAITEN	HAITI	19.8N 72.2W	0204 10/03
LONG ISLAND	BAHAMAS	23.3N 75.1W	0208 10/03
SANTO DOMINGO	DOMINICAN REP	18.5N 69.9W	0208 10/03
GREAT INAGUA	BAHAMAS	20.9N 73.7W	0215 10/03
EXUMA	BAHAMAS	23.6N 75.9W	0215 10/03
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NASSAU	BAHAMAS	25.1N	77.4W	0246	10/03
MAIQUETIA	VENEZUELA	10.6N	67.0W	0246	10/03
FREEPORT	BAHAMAS	26.5N	78.8W	0248	10/03
CUMANA	VENEZUELA	10.5N	64.2W	0250	10/03
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GIBARA	CUBA	21.1N	76.1W	0318	10/03
BIMINI	BAHAMAS	25.8N	79.3W	0320	10/03
JEREMIE	HAITI	18.6N	74.1W	0323	10/03
CIENFUEGOS	CUBA	22.0N	80.5W	0333	10/03
PARAMARIBO	SURINAME	5.9N	55.2W	0400	10/03
PORT AU PRINCE	HAITI	18.5N	72.4W	0412	10/03
GEORGETOWN	GUYANA	6.8N	58.2W	0438	10/03
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0528	10/03
SANTA CRZ D SUR	CUBA	20.7N	78.0W	0538	10/03
PORLAMAR	VENEZUELA	10.9N	63.8W	0638	10/03
NUEVA GERONA	CUBA	21.9N	82.8W	0703	10/03

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

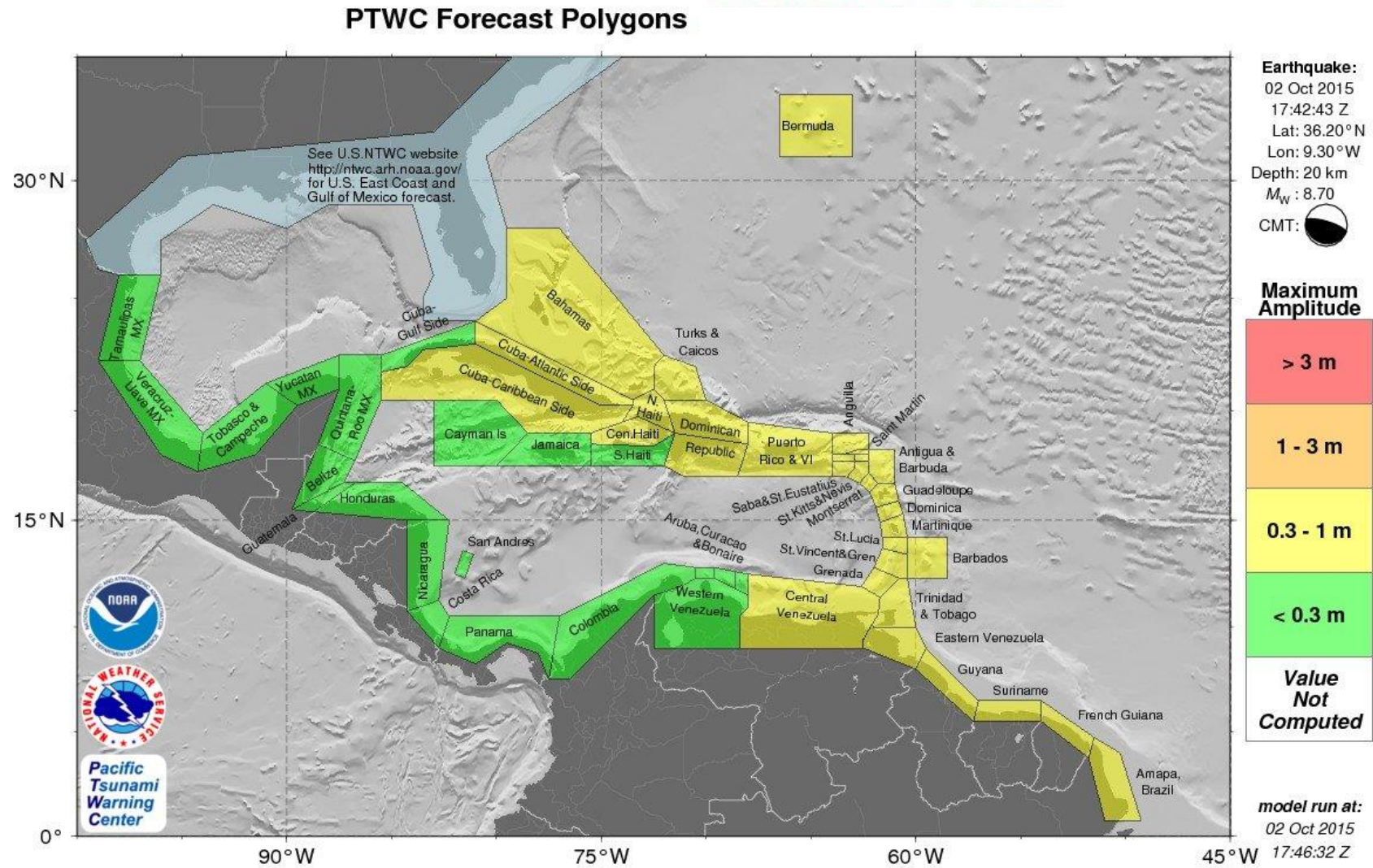
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- \* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES)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

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**Forecast Polygons Map**



**Table of Forecast Statistics**

PTWC TABLE OF FORECAST STATISTICS FOR REGIONAL POLYGONS - RUN ID 20151002174632  
(for internal use only - not for distribution)

Earthquake - Origin: 10/02/2015 17:42:43 UTC Coordinates: 36.2N 9.3W Depth: 020km Magnitude: 8.7

This table is issued for information only in support 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.

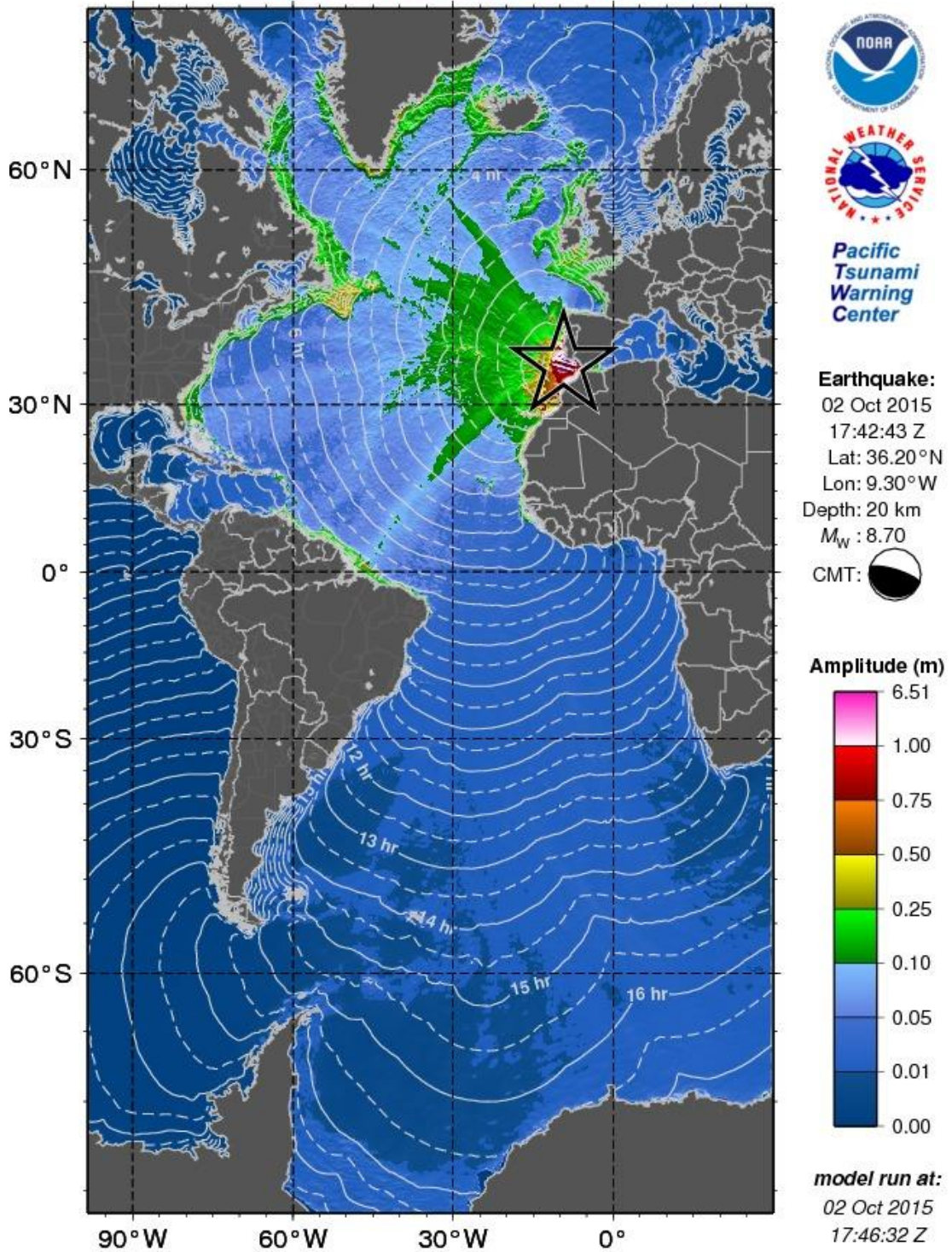
Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on small islands will likely be much smaller than the forecast indicates.

Region_Name	Coastal Forecast (meters)				Offshore Forecast (meters)				Total Points
	Maximum	Mean	Median	STD	Maximum	Mean	Median	STD	
Bahamas	0.92	0.58	0.56	0.15	0.61	0.28	0.26	0.12	110
Amapa_Brazil	0.76	0.59	0.59	0.06	0.44	0.23	0.21	0.06	58
Mainland-Gulf	0.73	0.22	0.06	0.23	0.61	0.10	0.03	0.12	686
Bermuda	0.69	0.69	0.69	0.00	0.58	0.58	0.58	0.00	1
Barbados	0.68	0.57	0.59	0.06	0.36	0.23	0.19	0.07	9
Saint_Barthelemy	0.68	0.68	0.68	0.00	0.39	0.39	0.39	0.00	1
Martinique	0.67	0.49	0.45	0.12	0.58	0.24	0.19	0.15	18
Antigua_and_Barbuda	0.67	0.58	0.53	0.07	0.57	0.33	0.30	0.09	10
Guadeloupe	0.64	0.51	0.48	0.10	0.64	0.24	0.20	0.14	19
Guyana	0.64	0.57	0.57	0.05	0.29	0.21	0.20	0.04	52
French_Guiana	0.64	0.59	0.58	0.02	0.42	0.23	0.23	0.05	41
Atlantic_Coast_of_Haiti	0.63	0.45	0.40	0.09	0.41	0.19	0.17	0.08	28
Dominica	0.63	0.46	0.42	0.11	0.24	0.13	0.13	0.04	14
Atlantic_Coast_of_Dominican_Republic	0.62	0.53	0.53	0.05	0.60	0.25	0.26	0.10	65
Trinidad_and_Tobago	0.60	0.53	0.53	0.05	0.48	0.25	0.24	0.07	35
Puerto_Rico_and_Virgin_Islands	0.59	0.40	0.39	0.11	0.44	0.20	0.20	0.09	78
Atlantic_Coast_of_Venezuela	0.59	0.52	0.51	0.04	0.38	0.25	0.24	0.05	33
Saint_Lucia	0.59	0.48	0.51	0.08	0.32	0.19	0.20	0.06	13
Suriname	0.59	0.52	0.51	0.05	0.48	0.22	0.19	0.08	48
Turks_and_Caicos_Islands	0.57	0.52	0.52	0.05	0.13	0.13	0.13	0.00	2
Montserrat	0.56	0.47	0.44	0.05	0.28	0.15	0.12	0.08	4
Anguilla	0.56	0.56	0.56	0.00	0.29	0.29	0.29	0.00	1
Sint_Maarten	0.56	0.56	0.56	0.00	0.37	0.35	0.35	0.02	2
Saint_Martin	0.56	0.56	0.56	0.00	0.37	0.37	0.37	0.00	1
Atlantic_Coast_of_Cuba	0.54	0.35	0.37	0.15	0.41	0.12	0.11	0.07	100
Saint_Vincent_and_the_Grenadines	0.52	0.37	0.34	0.08	0.45	0.17	0.13	0.11	12
Saba_and_Saint_Eustatius	0.49	0.49	0.49	0.00	0.15	0.13	0.13	0.02	2
Grenada	0.47	0.38	0.37	0.06	0.34	0.16	0.16	0.08	11

Caribbean_Coast_of_Dominican_Republic	0.46	0.23	0.20	0.08	0.39	0.12	0.10	0.07	63
Caribbean_Coast_of_Cuba	0.45	0.11	0.09	0.08	0.13	0.04	0.03	0.02	189
Saint_Kitts_and_Nevis	0.43	0.41	0.43	0.03	0.27	0.17	0.15	0.05	8
Central_Coast_of_Venezuela	0.39	0.23	0.22	0.06	0.27	0.13	0.12	0.05	122
Gulf_of_Gonave_Coast_of_Haiti	0.37	0.29	0.29	0.04	0.17	0.08	0.07	0.03	74
Jamaica	0.24	0.15	0.15	0.04	0.14	0.05	0.05	0.02	73
Western_Coast_of_Venezuela	0.24	0.20	0.19	0.02	0.20	0.11	0.11	0.04	62
Aruba	0.24	0.24	0.24	0.00	0.06	0.06	0.06	0.00	1
Bonaire	0.23	0.22	0.22	0.02	0.10	0.08	0.07	0.01	4
Curacao	0.23	0.23	0.23	0.00	0.17	0.17	0.17	0.00	1
Caribbean_Coast_of_Haiti	0.20	0.13	0.13	0.02	0.09	0.04	0.04	0.02	43
Caribbean_Coast_of_Colombia	0.19	0.11	0.11	0.03	0.12	0.05	0.05	0.02	130
Caribbean_Coast_of_Costa_Rica	0.13	0.12	0.11	0.01	0.05	0.03	0.03	0.01	23
Caribbean_Coast_of_Panama	0.12	0.09	0.09	0.01	0.07	0.04	0.04	0.01	87
Caribbean_Coast_of_Nicaragua	0.11	0.10	0.09	0.01	0.08	0.04	0.04	0.01	60
San_Andres_and_Providencia	0.10	0.09	0.09	0.01	0.03	0.02	0.02	0.00	2
Belize	0.09	0.07	0.06	0.02	0.03	0.02	0.02	0.00	37
Caribbean_Coast_of_Honduras	0.09	0.06	0.05	0.01	0.08	0.03	0.02	0.01	87
Caribbean_Coast_of_Guatemala	0.09	0.09	0.09	0.00	0.03	0.03	0.02	0.00	7
Quintana_Roo_Mexico	0.08	0.06	0.06	0.01	0.13	0.03	0.03	0.02	64
Gulf_of_Mexico_Coast_of_Cuba	0.08	0.05	0.05	0.01	0.04	0.01	0.01	0.01	59
Cayman_Islands	0.06	0.05	0.05	0.01	0.01	0.01	0.01	0.00	2
Yucatan_Mexico	0.04	0.02	0.01	0.01	0.02	0.01	0.01	0.00	31
Tabasco_and_Campeche_Mexico	0.02	0.01	0.01	0.00	0.01	0.01	0.00	0.00	86
Veracruz_Mexico	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	86
Tamaulipas_Mexico	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	64

Energy Forecast Map

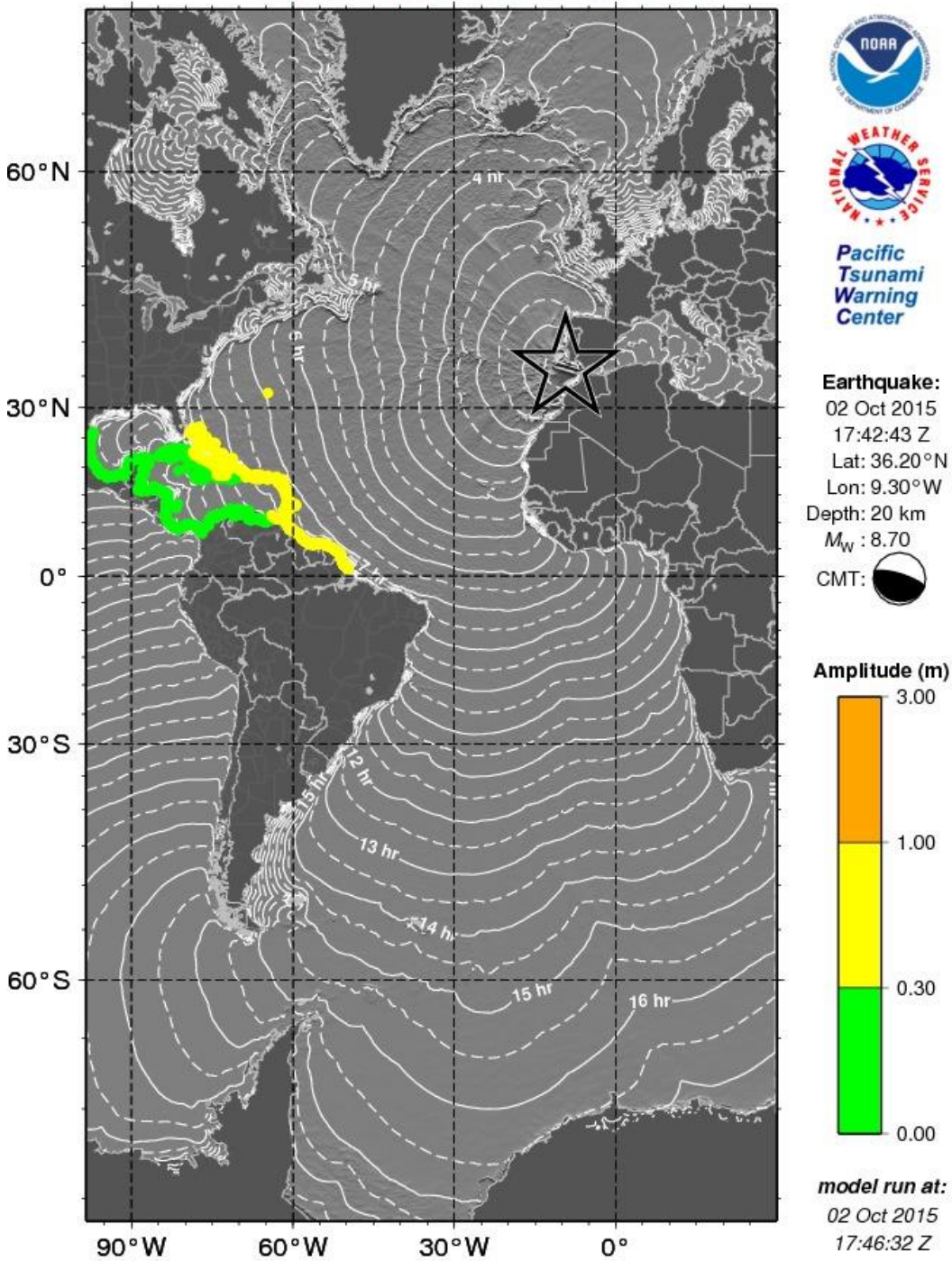
PTWC Energy Forecast





**Coastal Amplitudes Forecast Map**

**PTWC Coastal Forecast**



**Pacific  
Tsunami  
Warning  
Center**

#### IV.4.3 Supplemental Products with any Forecast Updates and Current Observations

##### **Text Product**

ZCZC  
WECA41 PHEB 021657  
TSUCAX

TSUNAMI MESSAGE NUMBER 3  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
2130 UTC FRI OCT 2 2015

...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

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\* MAGNITUDE           8.7  
\* ORIGIN TIME        1743 UTC OCT 2 2015  
\* COORDINATES        36.2 NORTH  9.3 WEST  
\* DEPTH              20 KM / 12 MILES  
\* LOCATION           WEST OF GIBRALTAR

##### EVALUATION

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- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED  
WEST OF GIBRALTAR AT 1743 UTC ON FRIDAY OCTOBER 2 2015.
- \* TSUNAMI WAVES HAVE BEEN OBSERVED.
- \* BASED ON ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE  
FORECAST FOR SOME COASTS.

##### TSUNAMI THREAT FORECAST

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

BRAZIL... CUBA... DOMINICAN REPUBLIC... FRENCH GUIANA...  
GUYANA... HAITI... SURINAME... VENEZUELA... ANGUILLA...  
ANTIGUA AND BARBUDA... BAHAMAS... BARBADOS... BERMUDA...  
DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE...  
MONTSERRAT... PUERTO RICO AND VIRGIN ISLANDS... SABA AND  
SAINT EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND  
NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT MARTIN...  
SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO...  
AND TURKS AND CAICOS ISLANDS.

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

AND AT LOCATIONS WITH FRINGING OR BARRIER REEFS WILL LIKELY  
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PLYMOUTH	MONTSERRAT	16.7N	62.2W	0117	10/03
PALMETTO POINT	BARBUDA	17.6N	61.9W	0117	10/03
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	0118	10/03
BASSETERRE	SAINT KITTS	17.3N	62.7W	0119	10/03
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	0125	10/03
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	0126	10/03
THE VALLEY	ANGUILLA	18.3N	63.1W	0128	10/03
SAINT JOHNS	ANTIGUA	17.1N	61.9W	0130	10/03
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BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	0141	10/03
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	0142	10/03
SAINT GEORGES	GRENADA	12.0N	61.8W	0147	10/03
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	0149	10/03
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	0150	10/03
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	0153	10/03
MAYAGUANA	BAHAMAS	22.3N	73.0W	0157	10/03
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	0200	10/03
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ABACO ISLAND	BAHAMAS	26.6N	77.1W	0218	10/03
BARACOA	CUBA	20.4N	74.5W	0219	10/03
CAT ISLAND	BAHAMAS	24.4N	75.5W	0219	10/03
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	0229	10/03
SANTIAGO D CUBA	CUBA	19.9N	75.8W	0238	10/03
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	0244	10/03
CAYENNE	FRENCH GUIANA	4.9N	52.3W	0245	10/03
NASSAU	BAHAMAS	25.1N	77.4W	0246	10/03
MAIQUETIA	VENEZUELA	10.6N	67.0W	0246	10/03
FREEPORT	BAHAMAS	26.5N	78.8W	0248	10/03
CUMANA	VENEZUELA	10.5N	64.2W	0250	10/03
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	0306	10/03
GIBARA	CUBA	21.1N	76.1W	0318	10/03
BIMINI	BAHAMAS	25.8N	79.3W	0320	10/03
JEREMIE	HAITI	18.6N	74.1W	0323	10/03

CIENFUEGOS	CUBA	22.0N	80.5W	0333	10/03
PARAMARIBO	SURINAME	5.9N	55.2W	0400	10/03
PORT AU PRINCE	HAITI	18.5N	72.4W	0412	10/03
GEORGETOWN	GUYANA	6.8N	58.2W	0438	10/03
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0528	10/03
SANTA CRZ D SUR	CUBA	20.7N	78.0W	0538	10/03
PORLAMAR	VENEZUELA	10.9N	63.8W	0638	10/03
NUEVA GERONA	CUBA	21.9N	82.8W	0703	10/03

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 LOCATION	GAUGE COORDINATES		TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
	LAT	LON			
PALMEIRA CAPE VERDE	16.8N	23.0W	2127	0.70M/ 2.3FT	20
HORTA	38.5N	28.6W	2031	1.43M/ 4.7FT	26
PONTA DELGADA PT	37.7N	25.7W	2003	1.61M/ 5.3FT	18
FERROL ES	43.5N	8.3W	1953	0.85M/ 2.8FT	26
SANTA MARIA	36.9N	25.1W	1946	1.56M/ 5.1FT	26
LAGOMERA ES	28.1N	17.1W	1944	1.49M/ 4.9FT	26
LA PALMA ES	28.7N	17.8W	1929	1.86M/ 6.1FT	20
GIBRALTAR UK	36.1N	5.3W	1929	0.87M/ 2.9FT	22
LASPALMAS ES	28.1N	15.4W	1923	2.13M/ 7.0FT	16
LEIXOES	41.2N	8.7W	1908	1.49M/ 4.9FT	24
CASCAIS	38.7N	9.4W	1905	6.98M/22.9FT	14
CASCAIS PT	38.7N	9.4W	1906	6.98M/22.9FT	20
FUNCHAL	32.6N	16.9W	1856	2.39M/ 7.9FT	24
PENICHE	39.3N	9.4W	1844	3.47M/11.4FT	22
SINES	38.0N	8.9W	1820	8.57M/28.1FT	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-.
- \* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND 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 [WWW.TSUNAMI.GOV](http://WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

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### Text Product

TSUNAMI MESSAGE NUMBER 4  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
0130 UTC SAT OCT 3 2015

...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

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\* MAGNITUDE           8.7  
\* ORIGIN TIME        1743 UTC OCT 2 2015  
\* COORDINATES        36.2 NORTH  9.3 WEST  
\* DEPTH              20 KM / 12 MILES  
\* LOCATION           WEST OF GIBRALTAR

#### EVALUATION

- 
- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED  
WEST OF GIBRALTAR AT 1743 UTC ON FRIDAY OCTOBER 2 2015.
  - \* TSUNAMI WAVES HAVE BEEN OBSERVED.
  - \* BASED ON ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE  
FORECAST FOR SOME COASTS.

#### TSUNAMI THREAT FORECAST

- 
- \* TSUNAMI WAVES REACHING 0.3 TO 1 METERS ABOVE THE TIDE LEVEL  
ARE POSSIBLE FOR SOME COASTS OF  
  
BRAZIL... CUBA... DOMINICAN REPUBLIC... FRENCH GUIANA...  
GUYANA... HAITI... SURINAME... VENEZUELA... ANGUILLA...  
ANTIGUA AND BARBUDA... BAHAMAS... BARBADOS... BERMUDA...  
DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE...  
MONTSERRAT... PUERTO RICO AND VIRGIN ISLANDS... SABA AND  
SAINT EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND  
NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT MARTIN...  
SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO...  
AND TURKS AND CAICOS ISLANDS.
  - \* FOR ALL OTHER AREAS COVERED BY THIS MESSAGE... THERE IS NO  
TSUNAMI THREAT ALTHOUGH SMALL SEA LEVEL CHANGES MAY OCCUR.
  - \* 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 AND AT LOCATIONS WITH FRINGING OR BARRIER REEFS WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

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)	
RUTHS BAY	BERMUDA	32.4N	64.6W	0045	10/03
ROSEAU	DOMINICA	15.3N	61.4W	0110	10/03
BRIDGETOWN	BARBADOS	13.1N	59.6W	0111	10/03
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	0113	10/03
CASTRIES	SAINT LUCIA	14.0N	61.0W	0114	10/03
BASSE TERRE	GUADELOUPE	16.0N	61.7W	0115	10/03
SABA	SABA	17.6N	63.2W	0117	10/03
PLYMOUTH	MONTSERRAT	16.7N	62.2W	0117	10/03
PALMETTO POINT	BARBUDA	17.6N	61.9W	0117	10/03
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	0118	10/03
BASSETERRE	SAINT KITTS	17.3N	62.7W	0119	10/03
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	0125	10/03
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	0126	10/03
THE VALLEY	ANGUILLA	18.3N	63.1W	0128	10/03
SAINT JOHNS	ANTIGUA	17.1N	61.9W	0130	10/03
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	0133	10/03
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	0138	10/03
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	0139	10/03
BAIE GRAND CASE	SAINT MARTIN	18.1N	63.1W	0141	10/03
BAIE LUCAS	SAINT MARTIN	18.1N	63.0W	0142	10/03
SAINT GEORGES	GRENADA	12.0N	61.8W	0147	10/03
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	0149	10/03
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	0150	10/03
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	0153	10/03
MAYAGUANA	BAHAMAS	22.3N	73.0W	0157	10/03
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	0200	10/03
SAN SALVADOR	BAHAMAS	24.1N	74.5W	0201	10/03
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	0202	10/03
CAP HAITEN	HAITI	19.8N	72.2W	0204	10/03
LONG ISLAND	BAHAMAS	23.3N	75.1W	0208	10/03
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	0208	10/03
GREAT INAGUA	BAHAMAS	20.9N	73.7W	0215	10/03
EXUMA	BAHAMAS	23.6N	75.9W	0215	10/03
ABACO ISLAND	BAHAMAS	26.6N	77.1W	0218	10/03
BARAOA	CUBA	20.4N	74.5W	0219	10/03
CAT ISLAND	BAHAMAS	24.4N	75.5W	0219	10/03
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	0229	10/03
SANTIAGO D CUBA	CUBA	19.9N	75.8W	0238	10/03
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	0244	10/03
CAYENNE	FRENCH GUIANA	4.9N	52.3W	0245	10/03
NASSAU	BAHAMAS	25.1N	77.4W	0246	10/03
MAIQUETIA	VENEZUELA	10.6N	67.0W	0246	10/03
FREEPORT	BAHAMAS	26.5N	78.8W	0248	10/03
CUMANA	VENEZUELA	10.5N	64.2W	0250	10/03
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	0306	10/03
GIBARA	CUBA	21.1N	76.1W	0318	10/03
BIMINI	BAHAMAS	25.8N	79.3W	0320	10/03

JEREMIE	HAITI	18.6N	74.1W	0323	10/03
CIENFUEGOS	CUBA	22.0N	80.5W	0333	10/03
PARAMARIBO	SURINAME	5.9N	55.2W	0400	10/03
PORT AU PRINCE	HAITI	18.5N	72.4W	0412	10/03
GEORGETOWN	GUYANA	6.8N	58.2W	0438	10/03
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0528	10/03
SANTA CRZ D SUR	CUBA	20.7N	78.0W	0538	10/03
PORLAMAR	VENEZUELA	10.9N	63.8W	0638	10/03
NUEVA GERONA	CUBA	21.9N	82.8W	0703	10/03

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.

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	LOE	(UTC)	HEIGHT	(MIN)
DART 41424	32.9N	72.5W	0129	0.05M/	0.2FT 24
SAN JUAN PR	18.5N	66.1W	0129	0.53M/	1.7FT 28
ST CROIX VI	17.7N	64.7W	0125	0.31M/	1.0FT 18
OTRANTO IT	40.1N	18.5E	0124	0.01M/	0.0FT 24
FORT DE FRANCE MQ	14.6N	61.1W	0124	0.36M/	1.2FT 26
ROSEAU DM	15.3N	61.4W	0121	0.35M/	1.2FT 22
LE ROBERT MARTINIQU	14.7N	60.9W	0121	0.67M/	2.2FT 26
GAVDOS GR	34.8N	24.1E	0118	0.01M/	0.0FT 16
DART 41420	23.5N	67.3W	0118	0.05M/	0.2FT 22
DESHAIES GUADELOUPE	16.3N	61.8W	0118	0.46M/	1.5FT 26
LE PRECHEUR MARTINI	14.8N	61.2W	0118	0.35M/	1.2FT 22
DART 44402	39.4N	70.9W	0114	0.04M/	0.1FT 18
PORT ST CHARLES BB	13.3N	59.6W	0118	0.68M/	2.2FT 24
DESIRADE GUADELOUPE	16.3N	61.1W	0105	0.54M/	1.8FT 14
DART 41421	23.4N	63.9W	0059	0.06M/	0.2FT 26
CATANIA IT	37.5N	15.1E	0024	0.02M/	0.1FT 28
REYKJAVIK IS	64.2N	21.9W	0010	0.44M/	1.4FT 22
LAMPEDUSA IT	35.5N	12.6E	2319	0.06M/	0.2FT 16
DART 44401	37.5N	50.0W	2255	0.06M/	0.2FT 28
MALIN HEAD IE	55.4N	7.3W	2244	0.40M/	1.3FT 22
NAPOLI IT	40.8N	14.3E	2240	0.06M/	0.2FT 28
GENOVA IT	44.4N	8.9E	2213	0.15M/	0.5FT 16
CAGLIARI IT	39.2N	9.1E	2208	0.13M/	0.4FT 18
PALMEIRA CAPE VERDE	16.8N	23.0W	2127	0.70M/	2.3FT 20
HORTA	38.5N	28.6W	2031	1.43M/	4.7FT 26
PONTA DELGADA PT	37.7N	25.7W	2003	1.61M/	5.3FT 18
FERROL ES	43.5N	8.3W	1953	0.85M/	2.8FT 26
SANTA MARIA	36.9N	25.1W	1946	1.56M/	5.1FT 26
LAGOMERA ES	28.1N	17.1W	1944	1.49M/	4.9FT 26
LA PALMA ES	28.7N	17.8W	1929	1.86M/	6.1FT 20
GIBRALTAR UK	36.1N	5.3W	1929	0.87M/	2.9FT 22
LASPALMAS ES	28.1N	15.4W	1923	2.13M/	7.0FT 16
LEIXOES	41.2N	8.7W	1908	1.49M/	4.9FT 24
CASCAIS	38.7N	9.4W	1905	6.98M/	22.9FT 14
CASCAIS PT	38.7N	9.4W	1906	6.98M/	22.9FT 20

FUNCHAL	32.6N	16.9W	1856	2.39M/ 7.9FT	24
PENICHE	39.3N	9.4W	1844	3.47M/11.4FT	22
SINES	38.0N	8.9W	1820	8.57M/28.1FT	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 -ALL IN LOWERCASE LETTERS-.
- \* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND 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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

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#### **IV.4.4 Final Product – Threat Ended**

##### ***Text Product***

TSUNAMI MESSAGE NUMBER 5  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
0530 UTC SAT OCT 3 2015

...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  
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* MAGNITUDE	8.7
* ORIGIN TIME	1743 UTC OCT 2 2015
* COORDINATES	36.2 NORTH 9.3 WEST
* DEPTH	20 KM / 12 MILES
* LOCATION	WEST OF GIBRALTAR

EVALUATION  
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- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED WEST OF GIBRALTAR AT 1743 UTC ON FRIDAY OCTOBER 2 2015.
- \* BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS



EARTHQUAKE HAS PASSED AND THERE IS NO FURTHER THREAT.

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

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

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 LOCATION	GAUGE COORDINATES		TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
	LAT	LON			
KEY WEST FL	24.6N	81.8W	0523	0.06M/	0.2FT 24
DART 42429	27.4N	85.7W	0518	0.00M/	0.0FT 16
DART 42409	26.7N	85.8W	0505	0.00M/	0.0FT 26
PUERTO MORELOS MX	21.4N	86.8W	0504	0.04M/	0.1FT 24
LIMON CR	10.0N	83.0W	0447	0.13M/	0.4FT 14
ISLA MUJERES	21.2N	86.7W	0448	0.05M/	0.2FT 16
EL PORVENIR PM	9.6N	78.9W	0442	0.08M/	0.3FT 20
SAN ANDRES CO	12.6N	81.7W	0421	0.10M/	0.3FT 20
POINTE NOIRE CO	4.8S	11.8E	0415	0.12M/	0.4FT 18
SANTA MARTA CO	11.2N	74.2W	0408	0.14M/	0.5FT 28
NEW LONDON CT	41.4N	72.1W	0402	0.37M/	1.2FT 22
PORT SONARA CM	4.0N	9.1E	0346	0.09M/	0.3FT 28
GEORGE TOWN CY	19.3N	81.4W	0343	0.04M/	0.1FT 24
PORT OF SPAIN TT	10.6N	61.5W	0316	0.45M/	1.5FT 14
DUCK PIER NC	36.2N	75.7W	0256	0.52M/	1.7FT 28
SAINT HELENA UK	15.9S	5.7W	0300	0.19M/	0.6FT 24
JACMEL HT	18.2N	72.5W	0244	0.14M/	0.4FT 28
LAGOS NG	6.4N	3.4E	0239	0.08M/	0.3FT 16
BULLEN BAY CURACAO	12.2N	69.0W	0240	0.23M/	0.8FT 18
ILE ROYAL GUIANA FR	5.3N	52.6W	0230	0.57M/	1.9FT 28
HATTERAS NC	35.2N	75.7W	0225	0.49M/	1.6FT 26
PORT SAN ANDRES DO	18.4N	69.6W	0217	0.17M/	0.6FT 26
CAP HAITIEN HT	19.8N	72.2W	0218	0.48M/	1.6FT 22
LAMESHURBAYSTJOHNVI	18.3N	64.7W	0215	0.39M/	1.3FT 24
TAKORADI GA	4.9N	1.7W	0209	0.14M/	0.5FT 20
DART 42407	15.3N	68.2W	0201	0.02M/	0.1FT 26
PUERTO PLATA DO	19.8N	70.7W	0154	0.49M/	1.6FT 20
PRICKLEY BAY GD	12.0N	61.8W	0201	0.40M/	1.3FT 16
PUNTA CANA DO	18.5N	68.4W	0159	0.41M/	1.4FT 20
MAGUEYES ISLAND PR	18.0N	67.0W	0156	0.31M/	1.0FT 20
MONA ISLAND PR	18.1N	67.9W	0148	0.36M/	1.2FT 18
MAYAGUEZ PR	18.2N	67.2W	0141	0.51M/	1.7FT 24
CHARLOTTEVILLE TT	11.3N	60.5W	0140	0.51M/	1.7FT 18
YABUCOA PR	18.1N	65.8W	0139	0.31M/	1.0FT 28

CALLIAQUA VC	13.1N	61.2W	0141	0.29M/	1.0FT	20
PARHAM AT	17.1N	61.8W	0135	0.65M/	2.1FT	26
LIMETREE VI	17.7N	64.8W	0132	0.28M/	0.9FT	22
DART 41424	32.9N	72.5W	0129	0.05M/	0.2FT	24
SAN JUAN PR	18.5N	66.1W	0129	0.53M/	1.7FT	28
ST CROIX VI	17.7N	64.7W	0125	0.31M/	1.0FT	18
OTRANTO IT	40.1N	18.5E	0124	0.01M/	0.0FT	24
FORT DE FRANCE MQ	14.6N	61.1W	0124	0.36M/	1.2FT	26
ROSEAU DM	15.3N	61.4W	0121	0.35M/	1.2FT	22
LE ROBERT MARTINIQU	14.7N	60.9W	0121	0.67M/	2.2FT	26
GAVDOS GR	34.8N	24.1E	0118	0.01M/	0.0FT	16
DART 41420	23.5N	67.3W	0118	0.05M/	0.2FT	22
DESHAIES GUADELOUPE	16.3N	61.8W	0118	0.46M/	1.5FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	0118	0.35M/	1.2FT	22
DART 44402	39.4N	70.9W	0114	0.04M/	0.1FT	18
PORT ST CHARLES BB	13.3N	59.6W	0118	0.68M/	2.2FT	24
DESIRADE GUADELOUPE	16.3N	61.1W	0105	0.54M/	1.8FT	14
DART 41421	23.4N	63.9W	0059	0.06M/	0.2FT	26
CATANIA IT	37.5N	15.1E	0024	0.02M/	0.1FT	28
REYKJAVIK IS	64.2N	21.9W	0010	0.44M/	1.4FT	22
LAMPEDUSA IT	35.5N	12.6E	2319	0.06M/	0.2FT	16
DART 44401	37.5N	50.0W	2255	0.06M/	0.2FT	28
MALIN HEAD IE	55.4N	7.3W	2244	0.40M/	1.3FT	22
NAPOLI IT	40.8N	14.3E	2240	0.06M/	0.2FT	28
GENOVA IT	44.4N	8.9E	2213	0.15M/	0.5FT	16
CAGLIARI IT	39.2N	9.1E	2208	0.13M/	0.4FT	18
PALMEIRA CAPE VERDE	16.8N	23.0W	2127	0.70M/	2.3FT	20
HORTA	38.5N	28.6W	2031	1.43M/	4.7FT	26
PONTA DELGADA PT	37.7N	25.7W	2003	1.61M/	5.3FT	18
FERROL ES	43.5N	8.3W	1953	0.85M/	2.8FT	26
SANTA MARIA	36.9N	25.1W	1946	1.56M/	5.1FT	26
LAGOMERA ES	28.1N	17.1W	1944	1.49M/	4.9FT	26
LA PALMA ES	28.7N	17.8W	1929	1.86M/	6.1FT	20
GIBRALTAR UK	36.1N	5.3W	1929	0.87M/	2.9FT	22
LASPALMAS ES	28.1N	15.4W	1923	2.13M/	7.0FT	16
LEIXOES	41.2N	8.7W	1908	1.49M/	4.9FT	24
CASCAIS	38.7N	9.4W	1905	6.98M/22.9FT	14	
CASCAIS PT	38.7N	9.4W	1906	6.98M/22.9FT	20	
FUNCHAL	32.6N	16.9W	1856	2.39M/	7.9FT	24
PENICHE	39.3N	9.4W	1844	3.47M/11.4FT	22	
SINES	38.0N	8.9W	1820	8.57M/28.1FT	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 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 WWW.TSUNAMI.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 WWW.TSUNAMI.GOV.

\$\$

APPENDIX I

**CARIBE EWS MEMBER STATES**

1. Antigua and Barbuda\*
2. Bahamas
3. Barbados
4. Belize
5. Brazil\*\*
6. Colombia
7. Costa Rica
8. Cuba
9. Dominica
10. Dominican Republic
11. France (Guadeloupe, Guyane, Martinique, Saint Martin, St Barthelemy)
12. Grenada
13. Guatemala
14. Guyana
15. Haiti
16. Honduras
17. Jamaica
18. Mexico
19. Netherlands (Aruba\*\*\*, Bonaire, Curacao\*\*\*, Saba, Sint Maarten\*\*\*, Sint Eustaius).
20. Nicaragua
21. Panama
22. Saint Kitts and Nevis
23. Saint Lucia
24. Saint Vincent and the Grenadines
25. Suriname
26. Trinidad and Tobago
27. United Kingdom of Great Britain & Northern Ireland (Anguilla\*\*\*, Bermuda, British Virgin Islands\*\*\*, Cayman Islands\*\*\*, Montserrat\*\*\*, Turks and Caicos)
28. United States (Puerto Rico and US Virgin Islands)
29. Venezuela (Bolivarian Republic of)

\*not an IOC Member State

\*\*Designation of Tsunami National Contact and Tsunami Warning Focal Point pending

\*\*\*UNESCO Associate Member States participating at IOC CARIBE-EWS

Observer Member States of IOC CARIBE-EWS

1. Canada
2. Peru

APPENDIX II

**GEOGRAPHICAL AREAS USED IN TARGET AREA SECTION OF THE PTWC TEXT  
PRODUCTS**

1. ANGUILLA
2. ANTIGUA\_AND\_BARBUDA
3. ARUBA
4. BAHAMAS
5. BARBADOS
6. BELIZE
7. BERMUDA
8. BONAIRE
9. BRAZIL
10. CAYMAN\_ISLANDS
11. COLOMBIA
12. COSTA\_RICA
13. CUBA
14. CURACAO
15. DOMINICA
16. DOMINICAN\_REPUBLIC
17. FRENCH\_GUYANE
18. GRENADA
19. GUADELOUPE
20. GUATEMALA
21. GUYANA
22. HAITI
23. HONDURAS
24. JAMAICA
25. MARTINIQUE
26. MEXICO
27. MONTSERRAT
28. NICARAGUA
29. PANAMA
30. PUERTO\_RICO\_AND\_VIRGIN\_ISLANDS
31. SABA\_AND\_SAINTEUSTATIUS
32. SAINT\_BARTHELEMY
33. SAINT\_KITTS\_AND\_NEVIS
34. SAINT\_LUCIA
35. SAINT\_MARTIN
36. SAINT\_VINCENT\_AND\_THE\_GRENADINES
37. SAN\_ANDRES\_AND\_PROVIDENCIA
38. SINT\_MAARTEN
39. SURINAME
40. TRINIDAD\_AND\_TOBAGO
41. TURKS\_AND\_CAICOS\_ISLANDS
42. VENEZUELA

APPENDIX III

**LIST OF FORECAST POLYGONS USED  
IN THE PTWC FORECASTS POLYGON MAP AND TABLE**

1. Anguilla
2. Antigua and Barbuda
3. Aruba
4. Bahamas
5. Barbados
6. Belize
7. Bermuda
8. Bonaire
9. Brazil-Amapa Brazil
10. Cayman Islands
11. Colombia-Caribbean Coast of Colombia
12. Costa Rica-Caribbean Coast of Costa Rica
13. Cuba-Atlantic Coast of Cuba
14. Cuba-Caribbean Coast of Cuba
15. Cuba-Gulf of Mexico Coast of Cuba
16. Curacao
17. Dominica
18. Dominican Republic-Atlantic Coast of Dominican Republic
19. Dominican Republic-Caribbean Coast of Dominican Republic
20. French Guyane
21. Grenada
22. Guadeloupe
23. Guatemala-Caribbean Coast of Guatemala
24. Guyana
25. Haiti-Atlantic Coast of Haiti
26. Haiti-Caribbean Coast of Haiti
27. Haiti-Gulf of Gonave Coast of Haiti
28. Honduras-Caribbean Coast of Honduras
29. Jamaica
30. Martinique
31. Mexico-Quintana Roo Mexico
32. Mexico-Tabasco and Campeche Mexico
33. Mexico-Tamaulipas Mexico
34. Mexico-Veracruz Mexico
35. Mexico-Yucatan Mexico
36. Montserrat
37. Nicaragua-Caribbean Coast of Nicaragua
38. Panama-Caribbean Coast of Panama
39. Puerto Rico and Virgin Islands
40. Saba and Saint Eustatius
41. Saint Barthelemy
42. Saint Kitts and Nevis

43. Saint Lucia
44. Saint Martin
45. Saint Vincent and the Grenadines
46. San Andres and Providencia
47. Sint Maarten
48. Suriname
49. Trinidad and Tobago
50. Turks and Caicos Islands
51. Venezuela-Atlantic Coast of Venezuela
52. Venezuela-Central Coast of Venezuela
53. Venezuela-Western Coast of Venezuela

APPENDIX IV

**LIST OF FORECAST POINTS FOR EXPECTED ARRIVAL TIMES**

<b>COUNTRY / TERRITORY</b>	<b>PLACE</b>	<b>LATITUDE</b>	<b>LONGITUDE</b>
ANGUILLA	THE_VALLEY	18.252	-63.051
ANTIGUA	SAINT_JOHNS	17.131	-61.874
ARUBA	ORANJESTAD	12.506	-70.042
BAHAMAS	ABACO_ISLAND	26.556	-77.079
BAHAMAS	ANDROS_ISLAND	25.030	-77.901
BAHAMAS	BIMINI	25.761	-79.287
BAHAMAS	CAT_ISLAND	24.401	-75.532
BAHAMAS	CROOKED_ISLAND	22.747	-74.141
BAHAMAS	ELEUTHERA_ISLAND	25.157	-76.124
BAHAMAS	EXUMA	23.570	-75.851
BAHAMAS	FREEPORT	26.514	-78.782
BAHAMAS	GREAT_INAGUA	20.948	-73.684
BAHAMAS	LONG_ISLAND	23.272	-75.082
BAHAMAS	MAYAGUANA	22.330	-72.999
BAHAMAS	NASSAU	25.094	-77.351
BAHAMAS	SAN_SALVADOR	24.066	-74.547
BARBADOS	BRIDGETOWN	13.091	-59.622
BARBUDA	PALMETTO_POINT	17.578	-61.863
BELIZE	BELIZE_CITY	17.503	-88.178
BERMUDA	ESSO_PIER	32.373	-64.703
BONAIRE	ONIMA	12.256	-68.309
BRAZIL	FORTALEZA	-3.707	-38.480
BRAZIL	ILHA_DE_MARACA	2.208	-50.488
BRAZIL	SAO_LUIS	-2.470	-44.309
CAYMAN_ISLANDS	CAYMAN_BRAC	19.681	-79.883
CAYMAN_ISLANDS	GRAND_CAYMAN	19.297	-81.342
COLOMBIA	BARRANQUILLA	11.070	-74.866
COLOMBIA	CARTAGENA	10.412	-75.563
COLOMBIA	PUNTA_CARIBANA	8.624	-76.898
COLOMBIA	RIOHACHA	11.554	-72.920
COLOMBIA	SANTA_MARTA	11.247	-74.225
COSTA_RICA	PUERTO_LIMON	10.001	-83.013
CUBA	BARACOA	20.356	-74.498
CUBA	CIENFUEGOS	22.007	-80.465
CUBA	GIBARA	21.119	-76.122
CUBA	LA_HABANA	23.151	-82.364
CUBA	NUEVA_GERONA	21.922	-82.797
CUBA	SANTA_CRZ_D_SUR	20.682	-77.959
CUBA	SANTIAGO_D_CUBA	19.947	-75.850
CURACAO	WILLEMSTAD	12.094	-68.934
DOMINICA	ROSEAU	15.297	-61.396
DOMINICAN_REP	CABO_ENGANO	18.612	-68.290
DOMINICAN_REP	PUERTO_PLATA	19.813	-70.692
DOMINICAN_REP	SANTO_DOMINGO	18.455	-69.893
FRENCH_GUYANE	CAYENNE	4.931	-52.350

COUNTRY / TERRITORY	PLACE	LATITUDE	LONGITUDE
GRENADA	SAINT_GEORGES	12.046	-61.754
GUADELOUPE	BASSE_TERRE	15.982	-61.737
GUATEMALA	PUERTO_BARRIOS	15.745	-88.597
GUYANA	GEORGETOWN	6.840	-58.196
HAITI	CAP_HAITEN	19.792	-72.188
HAITI	JACAMEL	18.100	-72.500
HAITI	JEREMIE	18.641	-74.107
HAITI	PORT_AU_PRINCE	18.544	-72.369
HONDURAS	PUERTO_CORTES	15.850	-87.973
HONDURAS	TRUJILLO	15.931	-85.958
JAMAICA	KINGSTON	17.913	-76.854
JAMAICA	MONTEGO_BAY	18.471	-77.933
MARTINIQUE	FORT_DE_FRANCE	14.598	-61.082
MEXICO	CAMPECHE	19.867	-90.539
MEXICO	COZUMEL	20.516	-86.955
MEXICO	MADERO	22.291	-97.785
MEXICO	PROGRESO	21.300	-89.660
MEXICO	TEXAS_BORDER	25.972	-97.141
MEXICO	VERACRUZ	19.201	-96.116
MONTSERRAT	PLYMOUTH	16.706	-62.234
NICARAGUA	PUERTO_CABEZAS	14.019	-83.374
NICARAGUA	PUNTA_GORDA	11.437	-83.793
PANAMA	ALIGANDI	9.233	-78.017
PANAMA	BOCAS_DEL_TORO	9.351	-82.242
PANAMA	COLON	9.372	-79.914
PANAMA	PUERTO_CARRETO	8.783	-77.573
PANAMA	PUERTO_OBALDIA	8.667	-77.417
SABA	SABA	17.640	-63.220
SAINT_BARTHELEMY	SAINT_BARTHELEMY	17.910	-62.825
SAINT_KITTS	BASSETERRE	17.290	-62.718
SAINT_LUCIA	CASTRIES	14.017	-61.031
SAINT_MARTIN	BAIE_BLANCHE	18.115	-62.992
SAINT_MARTIN	BAIE_GRAND_CASE	18.110	-63.060
SAINT_MARTIN	BAIE_LUCAS	18.060	-63.008
SAINT_VINCENT	KINGSTOWN	13.136	-61.214
SAN_ANDRES_PROVID	PROVIDENCIA	12.590	-81.680
SAN_ANDRES_PROVID	SAN_ANDRES	13.380	-81.390
SINT_EUSTATIUS	SINT_EUSTATIUS	17.500	-62.975
SINT_MAARTEN	SIMPSON_BAAI	18.034	-63.104
SURINAME	PARAMARIBO	5.934	-55.198
TRINIDAD_TOBAGO	PIRATES_BAY	11.327	-60.559
TRINIDAD_TOBAGO	PORT_OF_SPAIN	10.641	-61.528
TURKS_N_CAICOS	GRAND_TURK	21.468	-71.107
TURKS_N_CAICOS	WEST_CAICOS	21.671	-72.487
VENEZUELA	CUMANA	10.469	-64.197
VENEZUELA	GOLFO_VENEZUELA	11.399	-71.245
VENEZUELA	MAIQUETIA	10.608	-66.966
VENEZUELA	PORLAMAR	10.948	-63.842
VENEZUELA	PUNTO_FIJO	11.707	-70.232



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81	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – Implementation Plan for Regional Tsunami Watch Providers (RTWP). 2008	E only
82	Exercise Pacific Wave 08 – A Pacific-wide Tsunami Warning and Communication Exercise, 28–30 October 2008. 2008	E only
83.	<i>Cancelled</i>	
84.	Global Open Oceans and Deep Seabed (GOODS) Bio-geographic Classification. 2009	E only
85.	Tsunami Glossary	E, F, S
86	Pacific Tsunami Warning System (PTWS) Implementation Plan	<i>Electronic publication</i>

(continued)

87.	Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) – Second Edition. 2011	E only
88.	Exercise Indian Ocean Wave 2009 (IOWave09) – An Indian Ocean-wide Tsunami Warning and Communication Exercise – 14 October 2009. 2009	E only
89.	Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. 2009	E only
90.	12 January 2010 Haiti Earthquake and Tsunami Event Post-Event Assessment of CARIBE EWS Performance. 2010	E only
91.	Compendium of Definitions and Terminology on Hazards, Disasters, Vulnerability and Risks in a coastal context	<i>Under preparation</i>
92.	27 February 2010 Chile Earthquake and Tsunami Event – Post-Event Assessment of PTWS Performance (Pacific Tsunami Warning System). 2010	E only
93.	Exercise CARIBE WAVE 11 / LANTEX 11—A Caribbean Tsunami Warning Exercise, 23 March 2011	
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