

**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**

**User's Guide  
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Tsunami and other Coastal Hazards  
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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

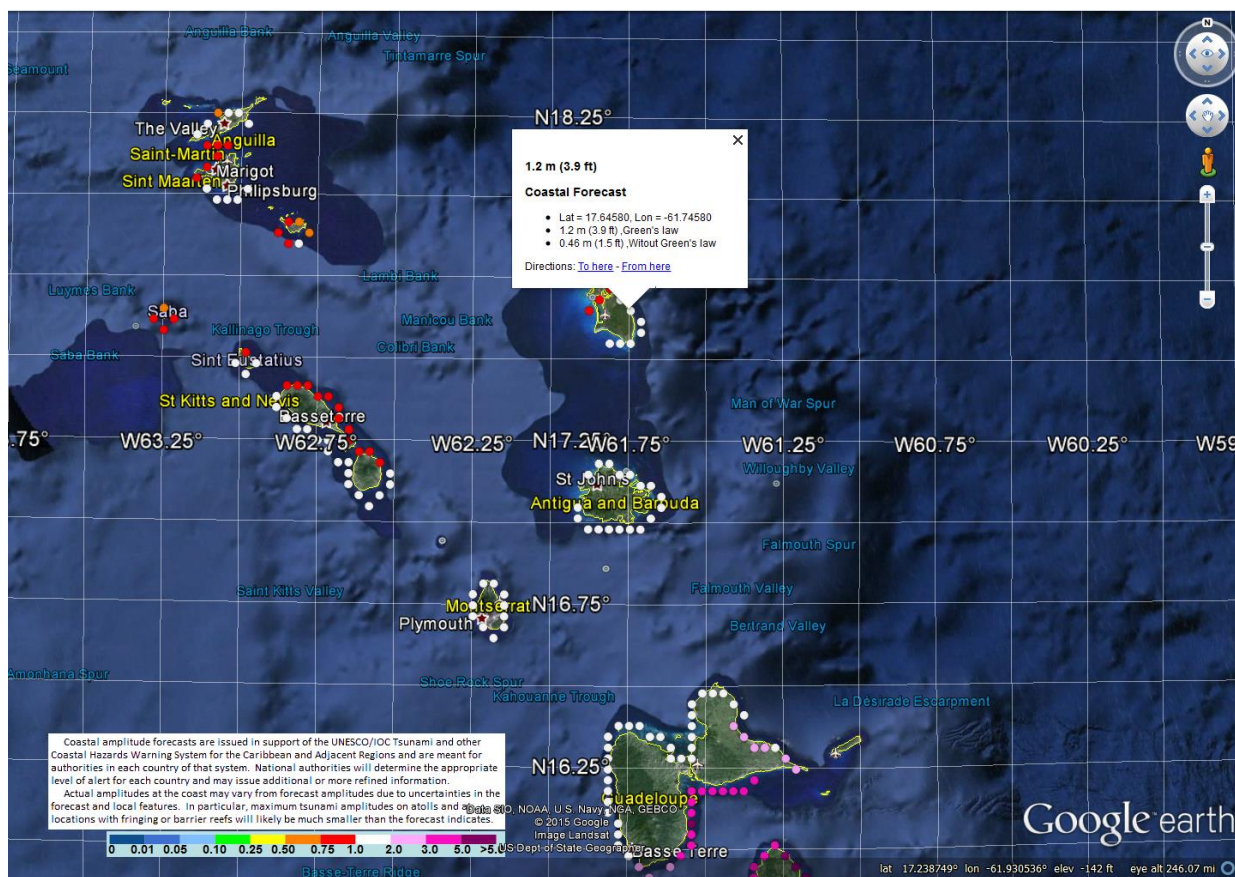
The energy map shows the maximum tsunami amplitude at each place in the deep ocean. It shows how the tsunami is directed away from the earthquake, how it is focused and defocused by the shape of the seafloor, and how it diminishes by spreading. It is useful for understanding why some areas may be more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

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              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 -----

|               |                      |
|---------------|----------------------|
| * 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 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        | 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 |
| 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 |
| 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 |
| 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 |
| 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 |

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

\*\*\*\* 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

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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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- \* 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.
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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)  |
|-----------------|------------------|-------------|-------|------------|
| 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 |
| 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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- \* 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

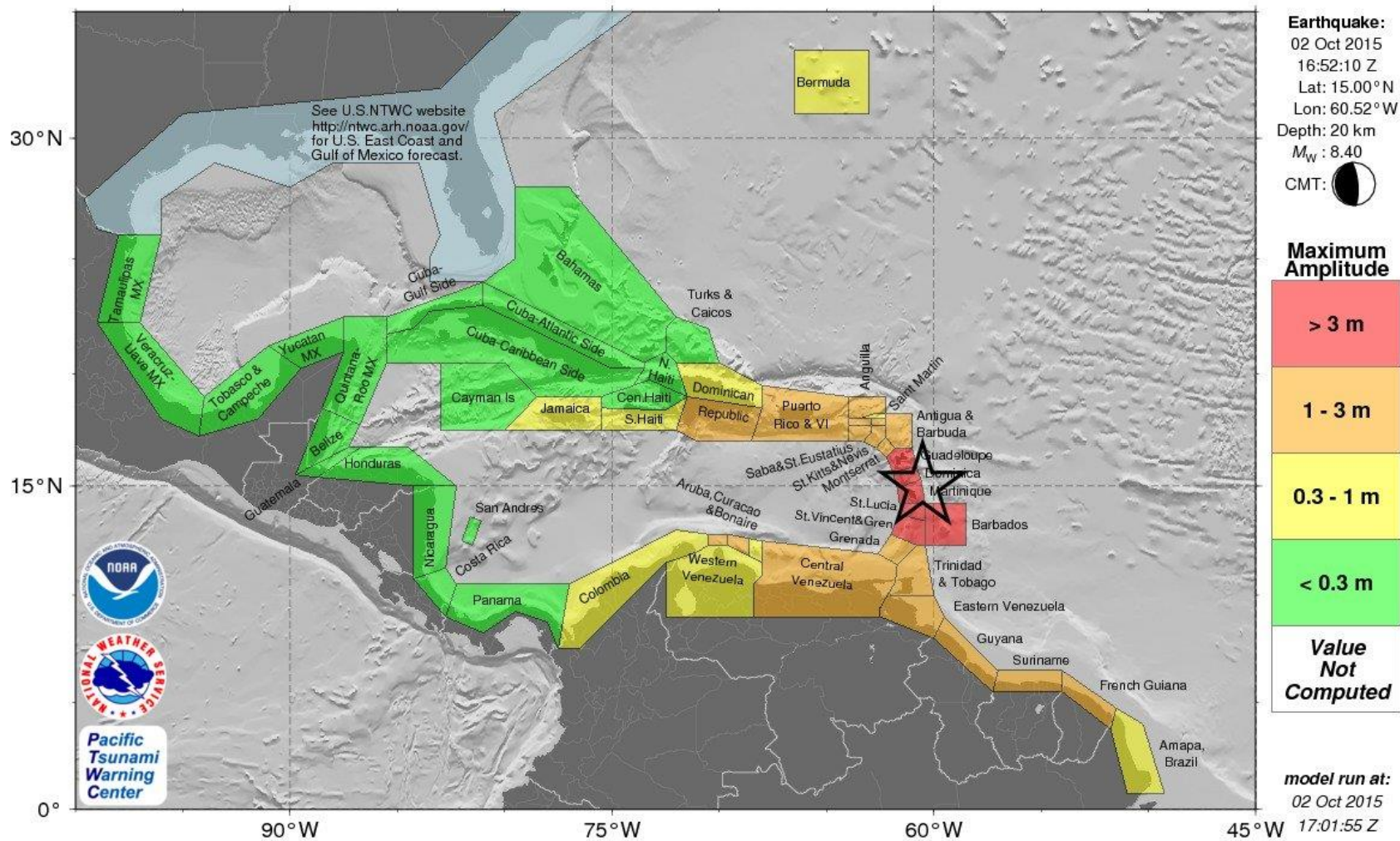
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**Forecast Polygons Map**

**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.

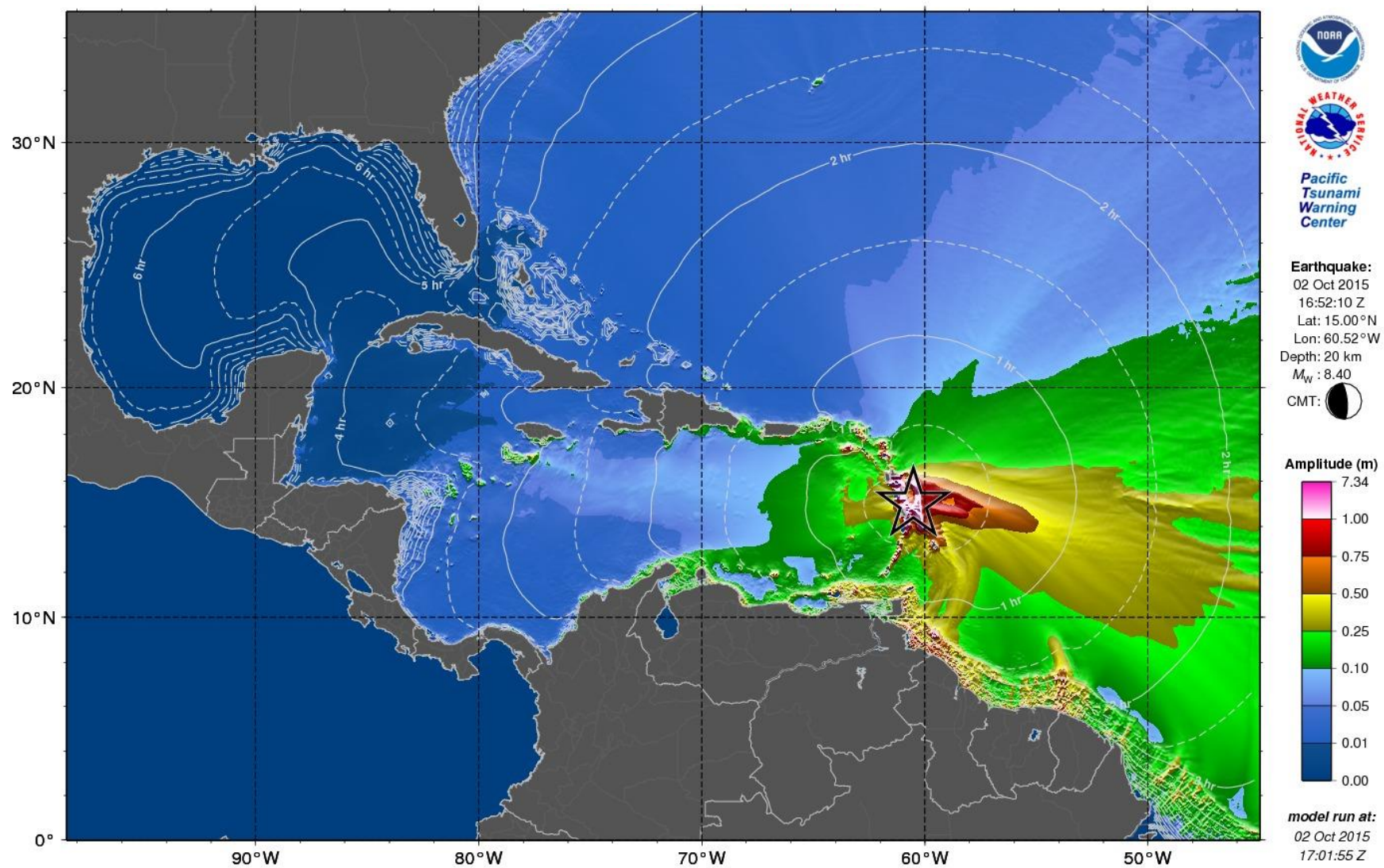
| Region Name                           | Coastal Forecast (meters) |      |        |      | Offshore Forecast (meters) |      |        |      | Total Points |
|---------------------------------------|---------------------------|------|--------|------|----------------------------|------|--------|------|--------------|
|                                       | 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   |

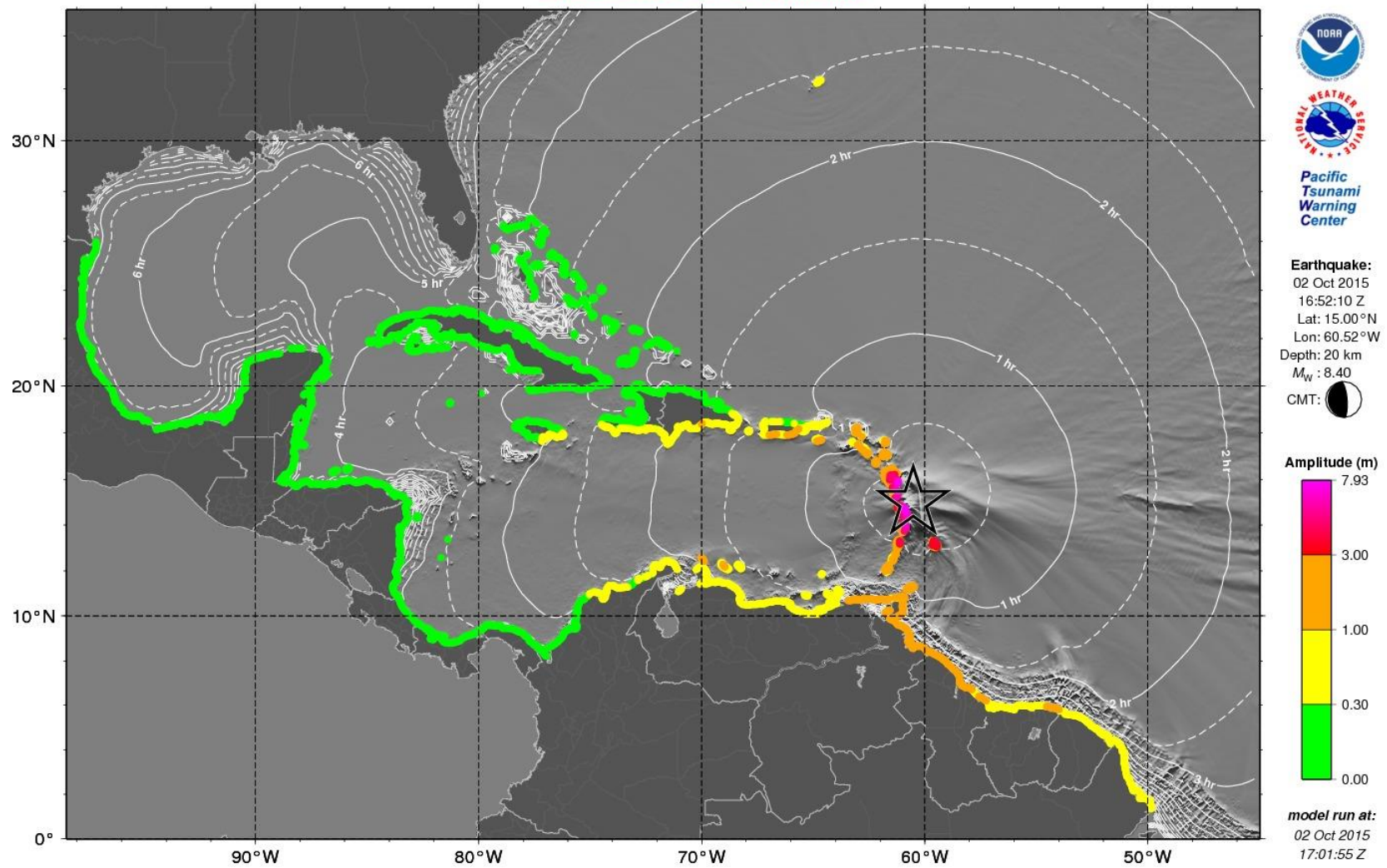
Energy Forecast Map

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

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

#### TSUNAMI THREAT FORECAST...UPDATED

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- \* 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

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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.

\$\$

### 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

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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   |                       | M                      | F      |                   |
| 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  
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- \* THIS WILL BE THE FINAL STATEMENT ISSUED FOR THIS EVENT UNLESS NEW INFORMATION IS RECEIVED OR THE SITUATION CHANGES.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.
- \* 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  
TIBCAx

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.

\* 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 |
| 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.

NEXT UPDATE AND ADDITIONAL INFORMATION

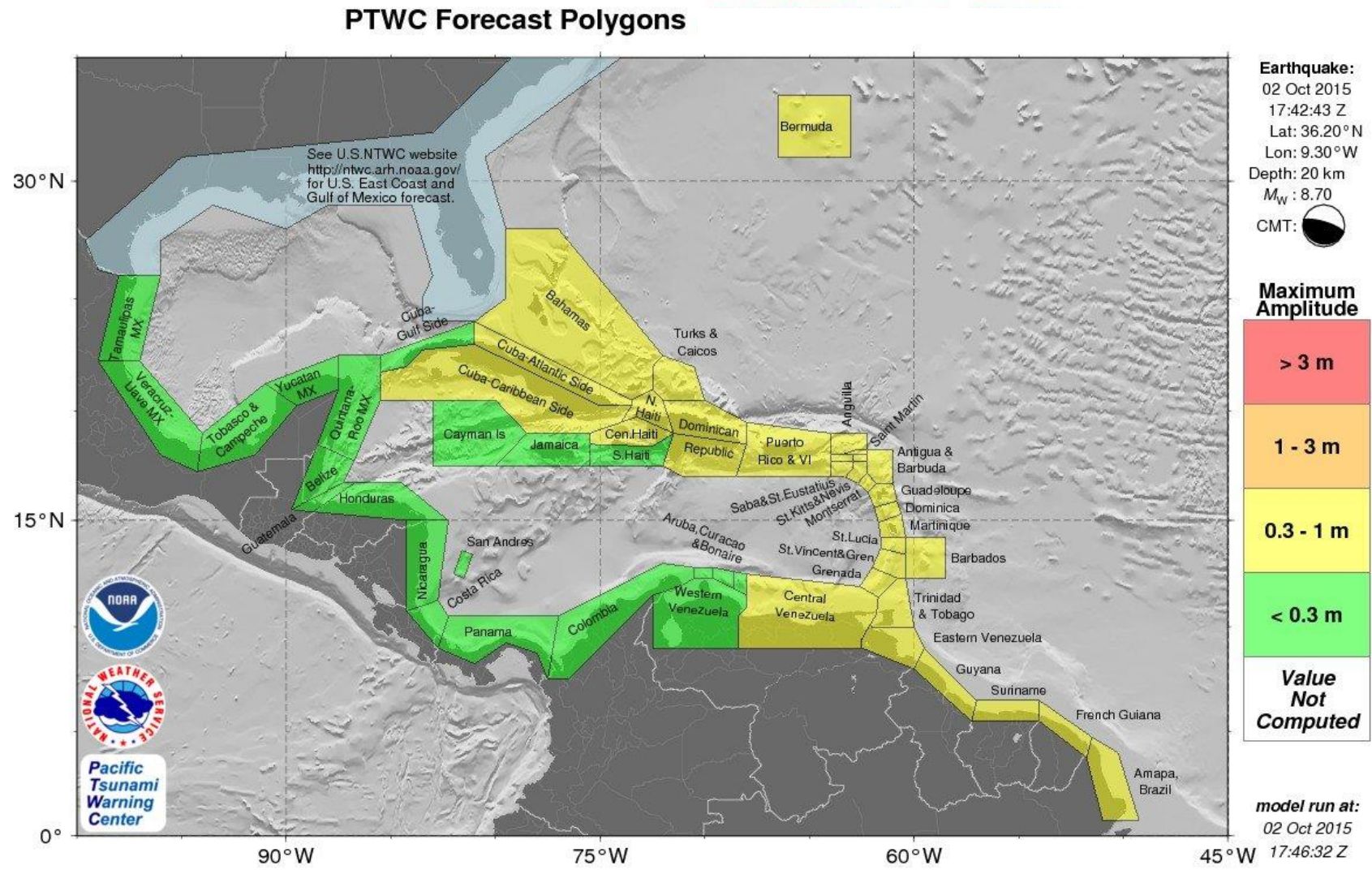
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- \* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- \* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT [EARTHQUAKE.USGS.GOV/EARTHQUAKES](http://EARTHQUAKE.USGS.GOV/EARTHQUAKES)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

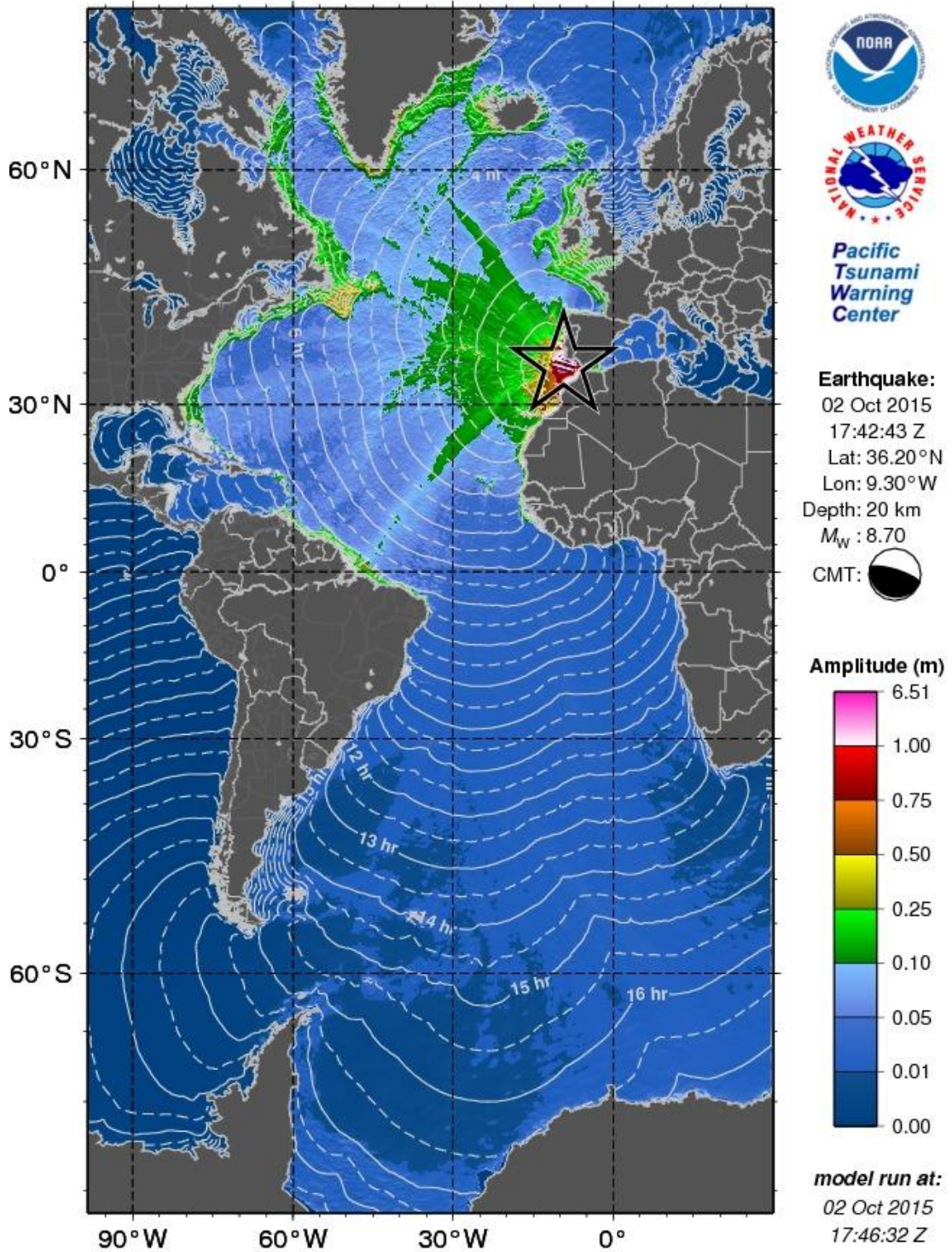
| Region_Name                          | Coastal Forecast (meters) |      |        |      | Offshore Forecast (meters) |      |        |      | Total Points |
|--------------------------------------|---------------------------|------|--------|------|----------------------------|------|--------|------|--------------|
|                                      | 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

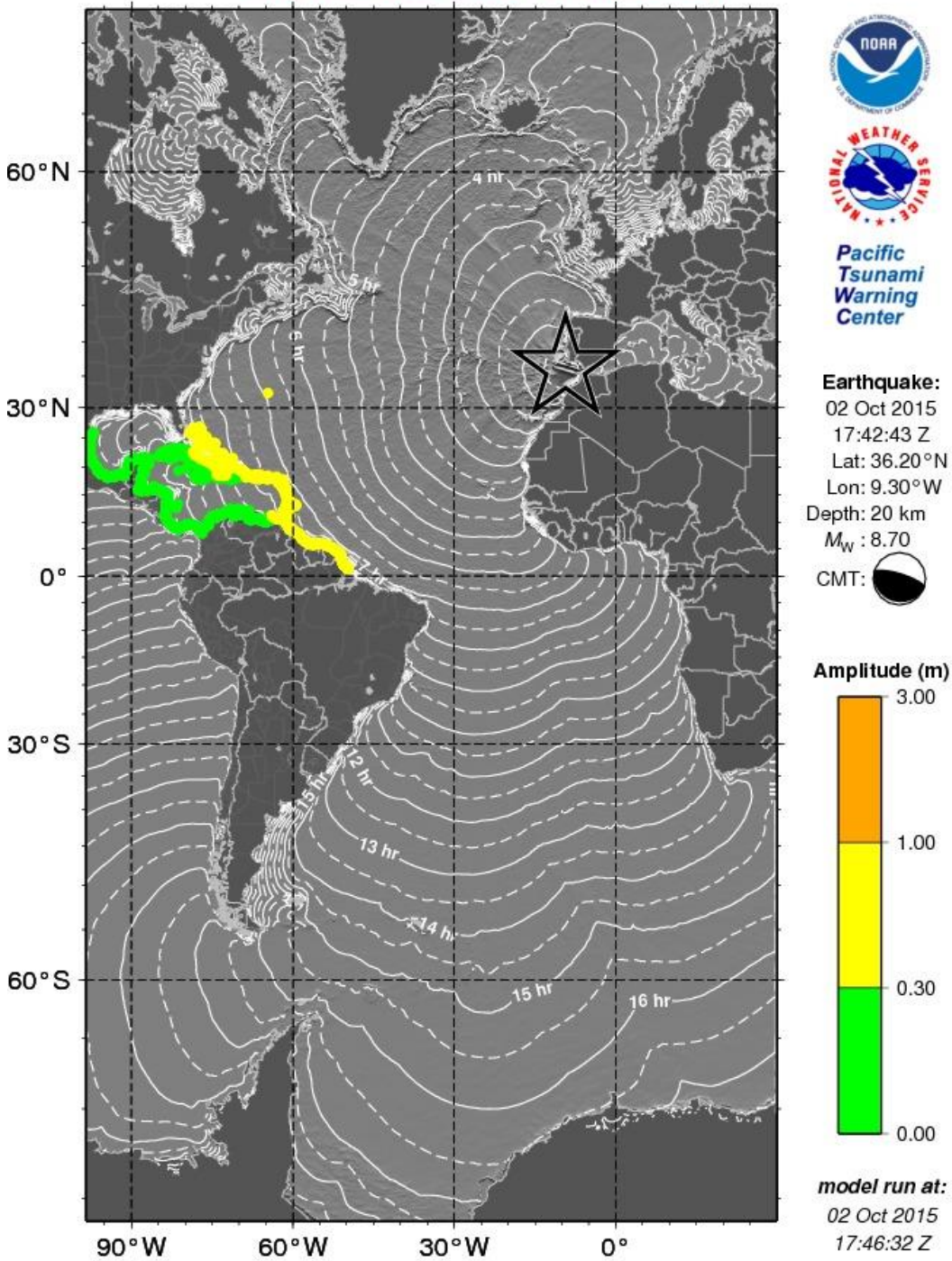
### PTWC Energy Forecast





**Coastal Amplitudes Forecast Map**

**PTWC Coastal Forecast**



#### 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 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 |
| 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

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\* DEPTH              20 KM / 12 MILES  
\* LOCATION           WEST OF GIBRALTAR

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GUYANA... HAITI... SURINAME... VENEZUELA... ANGUILLA...  
ANTIGUA AND BARBUDA... BAHAMAS... BARBADOS... BERMUDA...  
DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE...  
MONTSEERRAT... PUERTO RICO AND VIRGIN ISLANDS... SABA AND  
SAINT EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND  
NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT MARTIN...  
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| LOCATION        | REGION           | COORDINATES |       | ETA (UTC) |       |
|-----------------|------------------|-------------|-------|-----------|-------|
| RUTHS BAY       | BERMUDA          | 32.4N       | 64.6W | 0045      | 10/03 |
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| 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 |
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| 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

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  - \* 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 | 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  
-----

|               |                     |
|---------------|---------------------|
| * 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... 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   |                       |                        |                   |
| 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

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- \* 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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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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