# User's Guide

## Pacific Tsunami Warning Center
## Enhanced Products for the CARIBE-EWS

Version 1.2
August 20, 2015

Table of Contents

## OVERVIEW

The Pacific Tsunami Warning Center (PTWC) operated by the United States National Weather Service has served since 2005 as the Interim Tsunami Service Provider 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). The suite of text products issued by PTWC since 2005 to countries around the Caribbean in support of this mission has evolved over time as supporting data, analysis methods, computational capabilities, and communications have all improved. It is now time to make a significant change to the existing PTWC products for the CARIBE-EWS in order to take advantage of new capabilities – particularly the ability to forecast tsunami impacts in real time using numerical forecast models.

There are some important differences between the existing and new products. Existing products use the term "Watch" that implies a level of alert. A country is designated by PTWC as being in a Watch based upon the tsunami threat presented by the event as well as the time remaining until impact. In recent years, however, use of alert-level terms has caused confusion when a country's independently-derived levels of alert are in conflict with those of PTWC. For this reason, the new products will avoid such terms but will instead provide forecast levels of impact. Alert levels will be the sole responsibility of each country's National Tsunami Warning Center.

Further, procedures for designating initial levels of alert in existing products are based primarily upon limited historical earthquake and tsunami data. At the time they were conceived and approved by the Intergovernmental Coordination Group for the CARIBE-EWS, numerical-model tsunami forecasting for the Caribbean in real time was not possible. As a consequence, current procedures are extremely conservative and most places that come under a Watch alert do not ultimately experience a destructive tsunami. Numerical forecasts provided in the new product suite will still be conservative but should significantly reduce over-warning. In addition, by giving an expected level of impact they allow local authorities to design appropriate levels of response. For example, the response for a smaller tsunami might be to just clear beaches and harbors versus evacuating the entire coastal zone.

Lastly, the new product suite includes graphical products – maps that show the forecast directionality of the tsunami energy, the forecast position of the initial wave through time, as well as the expected maximum wave amplitudes at the coast. Graphical products provide more information at a much greater level of detail than is possible with text products. They are also helpful for communicating the threat quickly when time is of the essence.

It is important to note that while the new products and the procedures behind them represent a significant improvement over the current ones, there are still limitations that should be recognized and understood. The science of forecasting tsunamis in real time is still developing. The greatest degree of uncertainty about a tsunami in real-time is the detailed character of the source. How did the seafloor deform? How was it displaced up or down and over what areas to generate the tsunami? Models all make assumptions about the source based upon the seismic analysis or later upon nearby sea level gauge readings. But they only

approximate the real source. The second limitation is in observing the tsunami prior to impact – not only to confirm and measure the waves but to help constrain the forecast models. There are still too few sea level gauges in some areas of the Caribbean and for many sources only one or two readings may be possible before the tsunami crosses the sea. The third greatest limitation is how the tsunami will interact with the coast. In most cases a general approximation must be used. Simulating 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 these reasons, the forecast model information provided in the new products should be viewed with some caution, taking into consideration limitations generally described here and explained further in this document.

## PTWC Capabilities and Procedures

The new 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 new 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 center and begin to analyze the event. [*PTWC currently monitors over 500 seismic stations from around the world, with data collected at most of those stations reaching PTWC within a minute of when it is collected.*] |
| 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 NTWCs. These parameters also trigger the W-phase Centroid Moment Tensor (WCMT) earthquake fault parameter analysis. |
| 00h03m to 00h10m | Based on the preliminary earthquake parameters, 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 near the epicenter in accordance with the Table 2 criteria. |
| 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 completes. This analysis not only gives an accurate estimate of the earthquake centroid, depth and magnitude, but also 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 0.3m 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 0.3m 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.

| | Earthquake | | | Product | |
|---|---|---|---|---|---|
| Region | Location | Depth | Magnitude (Mw) | 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 | | ≥ 6.0 | 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. |

## 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: z2p=maximum absolute value of RIFT zero to peak wave amplitude
z2t=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:

$$A_{max} = 0.5 * (z2p + z2t) \text{ in meters}$$

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.

Green's Law: $A_{coast}=A_{offshore} * ( D_{offshore} / D_{coast} )^{¼}$

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 15m 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 guage.
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 takes 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.

<u>Detailed explanation of Green's law and the limitations of model forecast.</u>

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. For the initial forecast without a computed mechanism, RIFT assumes the earthquake is of the shallow-thrust type to be conservative, even if the earthquake is located in regions of historical strike-slip earthquakes.
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.

<u>Key Assumptions of Green's Law</u>

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.

**DESCRIPTION OF NEW 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 Product ID and issue date/time, an AWIPS ID, a product type line, an issuing office line, and an issuance date/time line.

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 that the product is intended for. The products are for most of the Pacific 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 Pacific covered by the product are enclosed within a set of polygons. 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**

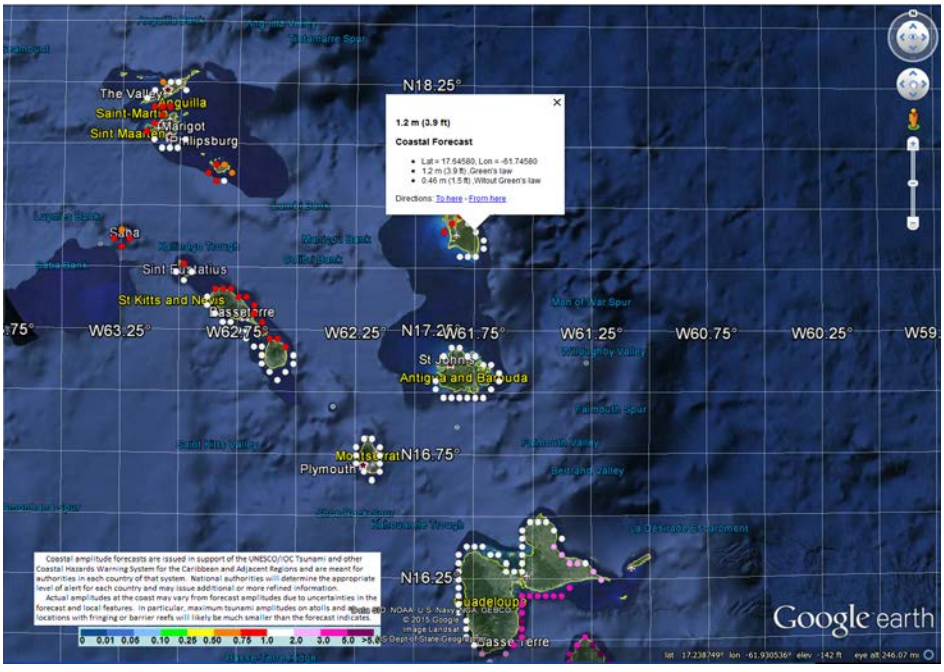
The energy map shows the maximum tsunami amplitude at each place in the deep ocean. It shows how the tsunami is directed away from the earthquake, how it is focused and defocused by the shape of the seafloor, and how it diminishes by spreading. It is useful for understanding why some areas may be more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

**Example New PTWC Products for the CARIBE-EWS**

A. Tsunami Information Statement (shallow Mw 6.4 Caribbean earthquake)

a. Initial and usually Only Product

```
EXPERIMENTAL TSUNAMI INFORMATION STATEMENT NUMBER 1
NOT FOR DISTRIBUTION
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
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  * 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
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  * NO ACTION IS REQUIRED.


NEXT UPDATE AND ADDITIONAL INFORMATION
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  * 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
  PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS...
  AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL
  TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE
  PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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B. Tsunami Information Statement (deep Mw 6.4 Caribbean earthquake)

a. Initial and usually Only Product

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EXPERIMENTAL TSUNAMI INFORMATION STATEMENT NUMBER 1
NOT FOR DISTRIBUTION
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
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  * 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
    PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

  * COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS...
    AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL
    TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE
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PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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C. Tsunami Threat Message (large Caribbean earthquake)

a. Initial Products (potential threat area)

i. Text Product

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 1
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1657 UTC FRI OCT 2 2015

...TSUNAMI THREAT MESSAGE...


**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****

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

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

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****


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


EVALUATION
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  * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN
    THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.

  * BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD
    HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.


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

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


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

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

## ESTIMATED TIMES OF ARRIVAL

* 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 |
| BARACOA | 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
---

* 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 SWEPT OUT TO SEA.

NEXT UPDATE AND ADDITIONAL INFORMATION
---

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

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

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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b. Second Product – Includes Forecast

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 2
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1704 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 ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE
    FORECAST FOR SOME COASTS.


TSUNAMI THREAT FORECAST...UPDATED
---------------------------------

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

      BARBADOS... DOMINICA... GUADELOUPE... MARTINIQUE... SAINT
      LUCIA... AND SAINT VINCENT AND THE GRENADINES.


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

      DOMINICAN REPUBLIC... FRENCH GUIANA... GUYANA...
      SURINAME... VENEZUELA... ANGUILLA... ANTIGUA AND
      BARBUDA... ARUBA... CURACAO... GRENADA... MONTSERRAT...
      PUERTO RICO AND VIRGIN ISLANDS... SABA AND SAINT
      EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND NEVIS...
      SINT MAARTEN... AND TRINIDAD AND TOBAGO.


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

      BRAZIL... COLOMBIA... HAITI... BERMUDA... BONAIRE...
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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

* 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) |
|---|---|---|---|---|
| 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 |

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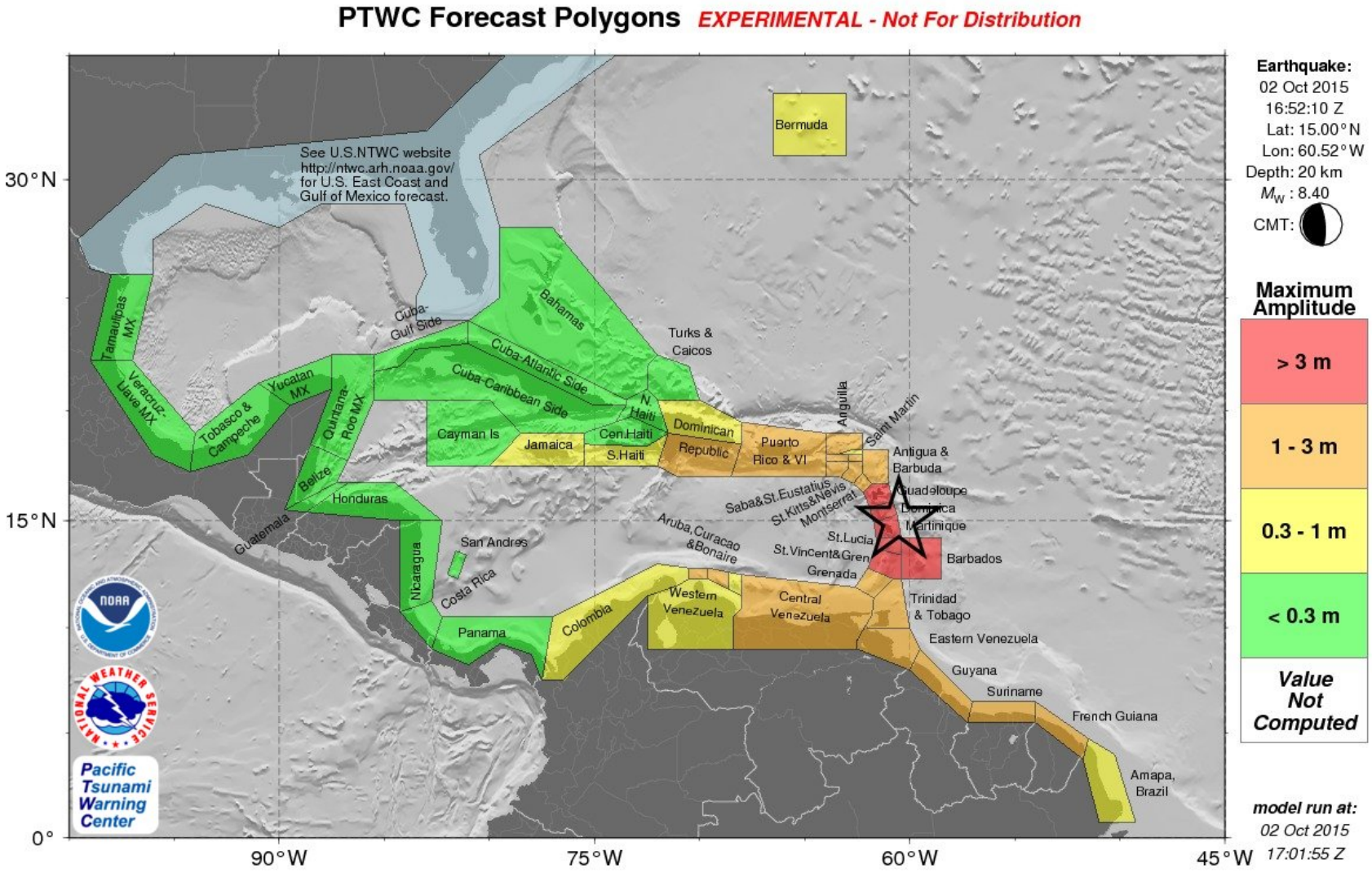



i. Forecast Polygons Table

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

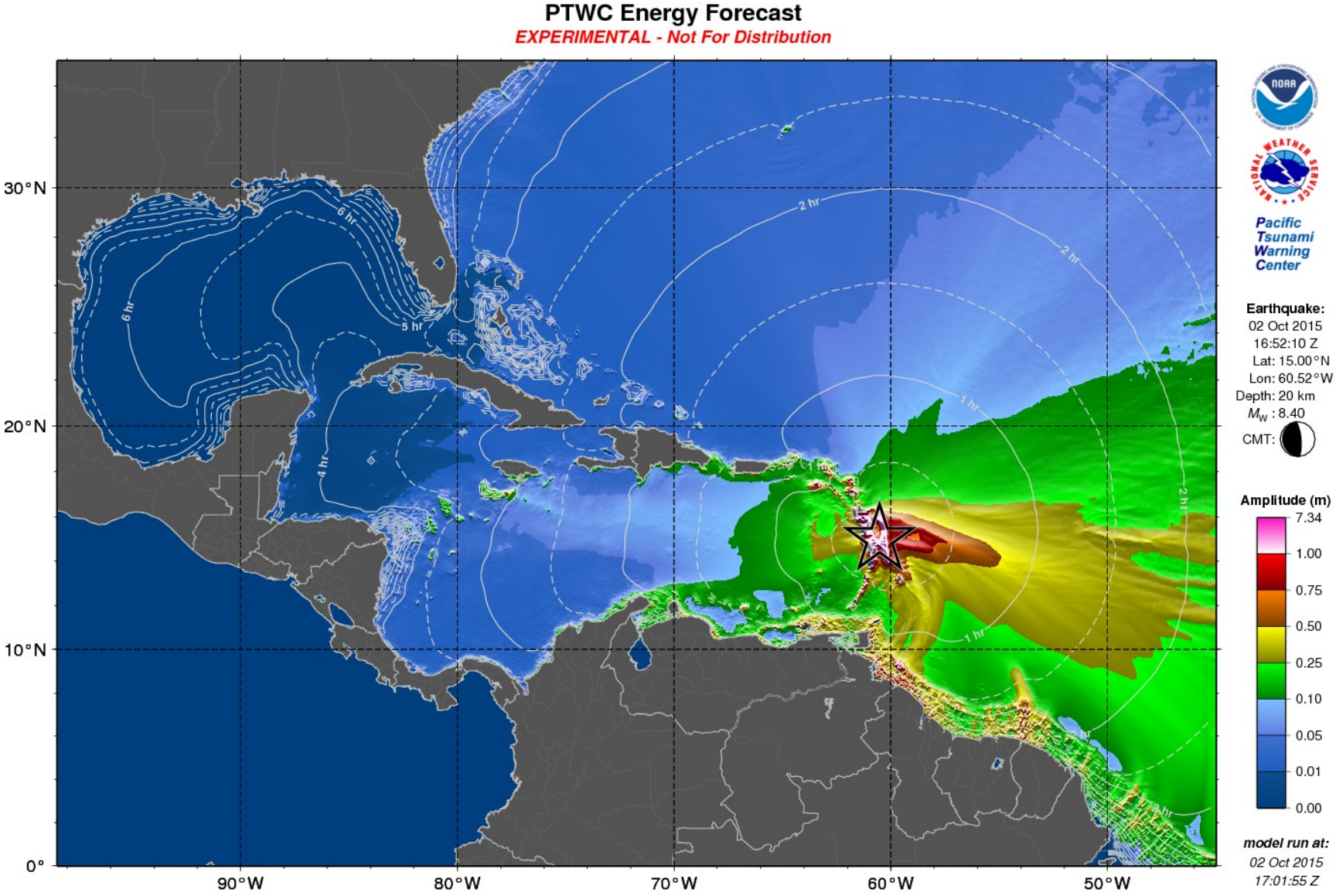
Earthquake - Origin: 10/02/2015 16:52:10 UTC  Coordinates: 15.0N  60.5W  Depth: 020km  Magnitude: 8.4

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.

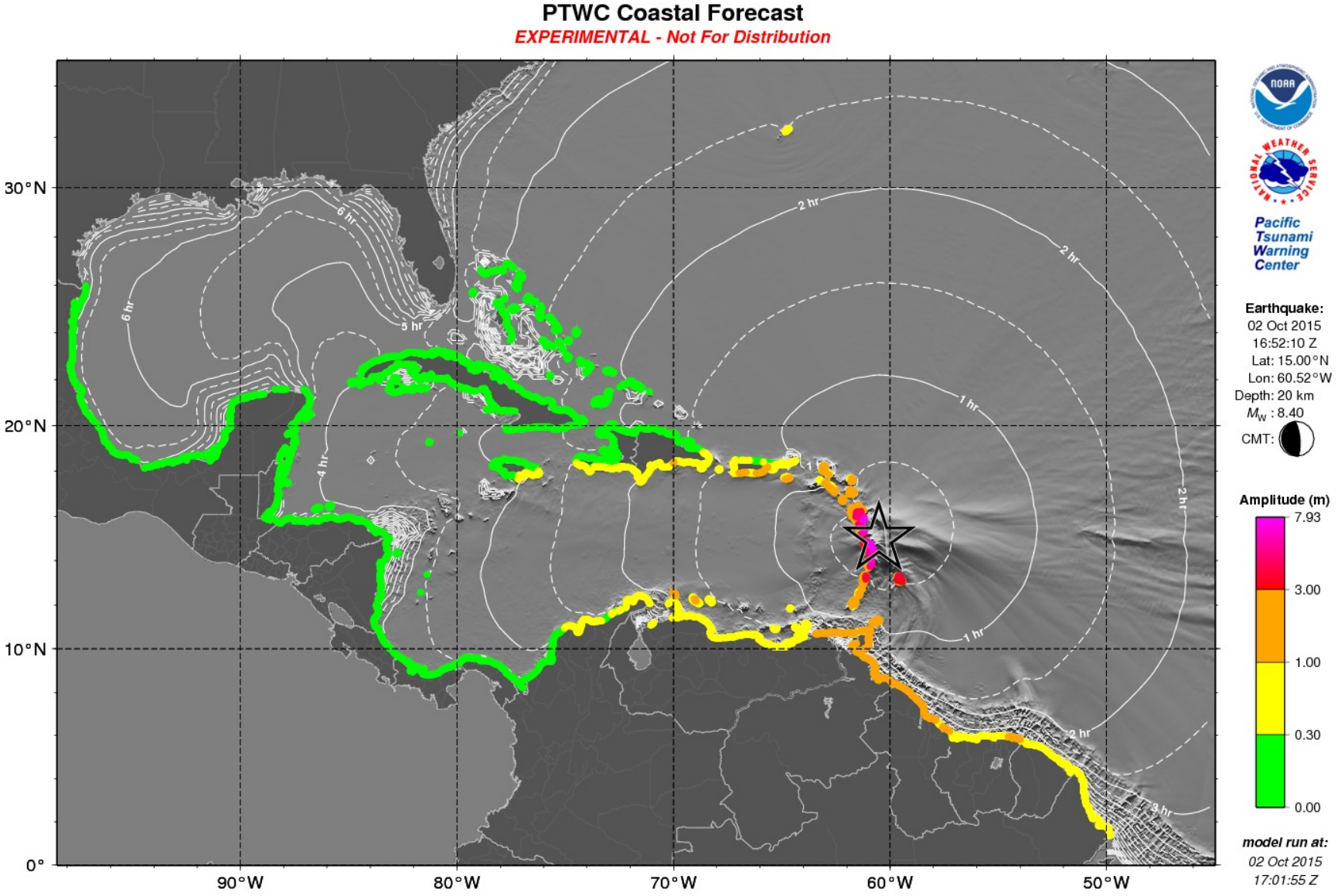
Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on atolls or small islands with fringing or barrier reefs will likely be much smaller than the forecast indicates.

| | Coastal Forecast (meters) | | | | Offshore Forecast (meters) | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Region_Name | Maximum | Mean | Median | STD | Maximum | Mean | Median | STD | Points |
| 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 |




D. Energy Forecast Map


PTWC Coastal Forecast
EXPERIMENTAL - Not For Distribution
30°N
20°N
10°N
0°
90°W
80°W
70°W
60°W
50°W
6 hr
5 hr
4 hr
2 hr
1 hr
NOAA
NATIONAL WEATHER SERVICE
Pacific Tsunami Warning Center
Earthquake:
02 Oct 2015
16:52:10 Z
Lat: 15.00°N
Lon: 60.52°W
Depth: 20 km
$M_W$ : 8.40
CMT:
Amplitude (m)
7.93
3.00
1.00
0.30
0.00
model run at:
02 Oct 2015
17:01:55 Z

a. Third or Larger Product – Include Sea Level Readings

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 3
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1731 UTC FRI OCT 2 2015

...TSUNAMI THREAT MESSAGE...


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 ALERT FOR EACH COUNTRY AND MAY ISSUE ADDITIONAL OR MORE REFINED
 INFORMATION.

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****


PRELIMINARY EARTHQUAKE PARAMETERS
---------------------------------

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


EVALUATION
----------

  * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN
    THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.

  * TSUNAMI WAVES HAVE BEEN OBSERVED.

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


TSUNAMI THREAT FORECAST...UPDATED
---------------------------------

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

      BARBADOS... DOMINICA... GUADELOUPE... MARTINIQUE... SAINT
      LUCIA... AND SAINT VINCENT AND THE GRENADINES.


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

      DOMINICAN REPUBLIC... FRENCH GUIANA... GUYANA...
      SURINAME... VENEZUELA... ANGUILLA... ANTIGUA AND
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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

* 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) |
|---|---|---|---|---|
| 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

* 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 SWEPT OUT TO SEA.

## TSUNAMI OBSERVATIONS

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

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

## NEXT UPDATE AND ADDITIONAL INFORMATION

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

* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT

EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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b. Final Product (threat ended)

i. Text Product

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 4
NOT FOR DISTRIBUTION
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
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  * 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 LAT | LON | TIME OF MEASURE (UTC) | MAXIMUM TSUNAMI HEIGHT | WAVE PERIOD (MIN) |
|---|---|---|---|---|---|
| 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 |
| 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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* THIS WILL BE THE FINAL STATEMENT ISSUED FOR THIS EVENT UNLESS NEW INFORMATION IS RECEIVED OR THE SITUATION CHANGES.

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

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

E. Tsunami Threat Message (Atlantic earthquake with a tsunami threat)

a. Initial Products (initial forecast)

i. Text Product

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EXPERIMENTAL TSUNAMI INFORMATION STATEMENT NUMBER 1
NOT FOR DISTRIBUTION
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
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  * MAGNITUDE      8.7
  * ORIGIN TIME    1743 UTC OCT 2 2015
  * COORDINATES    36.2 NORTH  9.3 WEST
  * DEPTH          20 KM / 12 MILES
  * LOCATION       WEST OF GIBRALTAR


EVALUATION
----------

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

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

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

a. Second Product – Includes Forecast

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 2
NOT FOR DISTRIBUTION
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
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 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
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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 SWEPT OUT TO SEA.

NEXT UPDATE AND ADDITIONAL INFORMATION
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* THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.

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

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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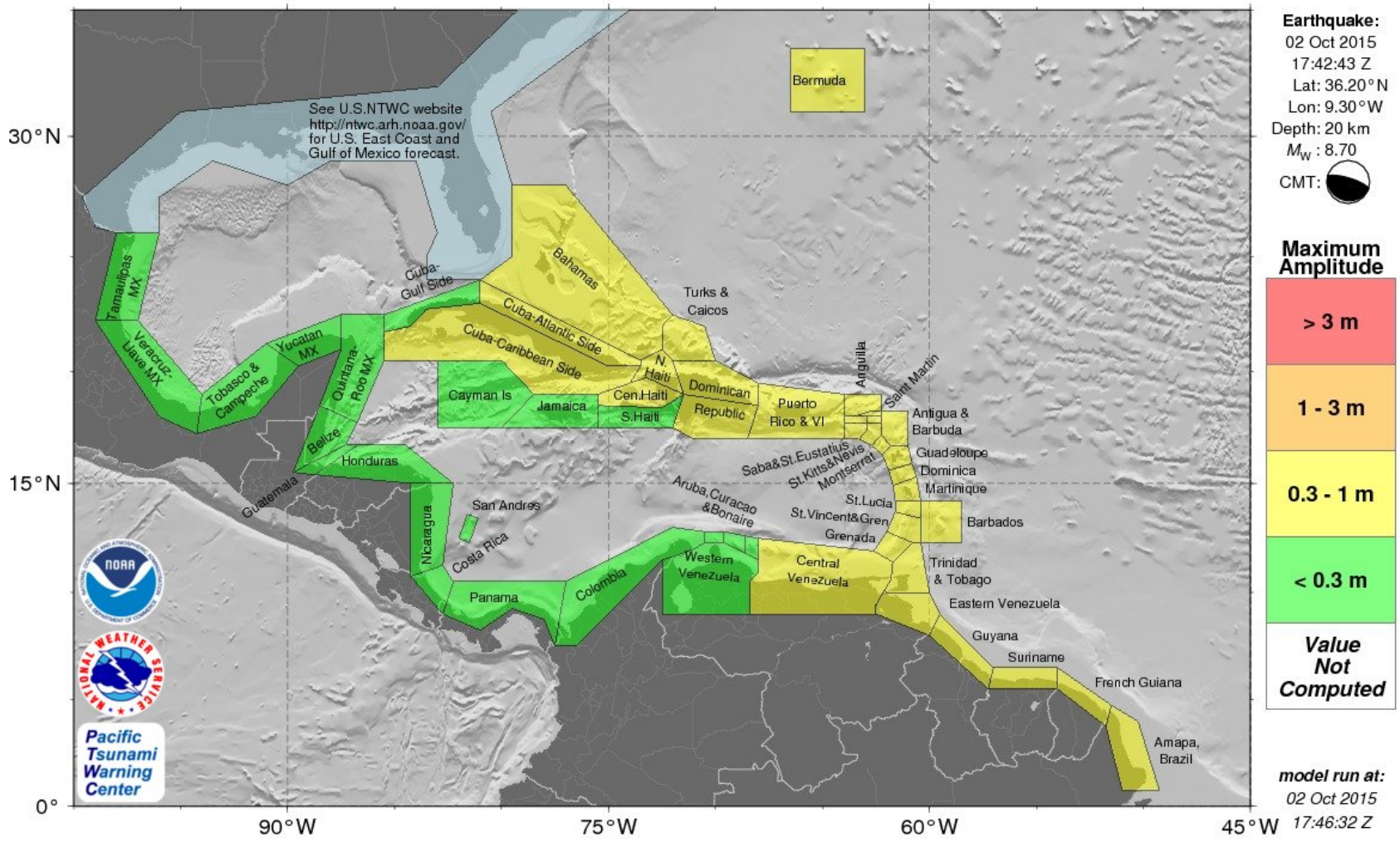
# PTWC Forecast Polygons *EXPERIMENTAL - Not For Distribution*




**Earthquake:**
02 Oct 2015
17:42:43 Z
Lat: 36.20°N
Lon: 9.30°W
Depth: 20 km
$M_W$ : 8.70
CMT:

**Maximum Amplitude**

| |
|---|
| **> 3 m** |
| **1 - 3 m** |
| **0.3 - 1 m** |
| **< 0.3 m** |
| ***Value Not Computed*** |

***model run at:***
*02 Oct 2015*
*17:46:32 Z*

Pacific Tsunami Warning Center

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.

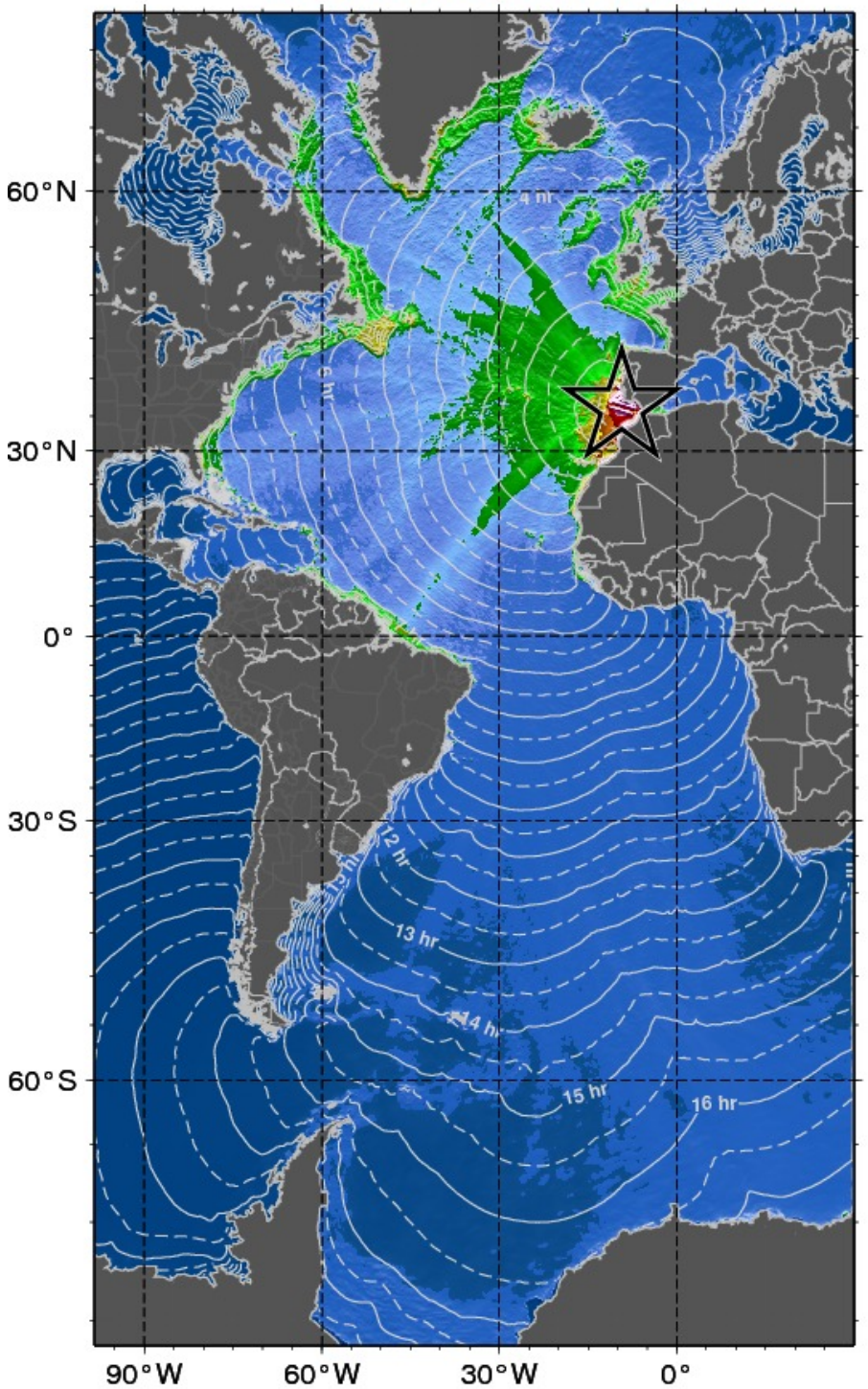
Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on small islands will likely be much smaller than the forecast indicates.

| | Coastal Forecast (meters) | | | | Offshore Forecast (meters) | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Region_Name | Maximum | Mean | Median | STD | Maximum | Mean | Median | STD | Points |
| 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 |

# PTWC Energy Forecast

***EXPERIMENTAL - Not For Distribution***




NOAA

NATIONAL WEATHER SERVICE

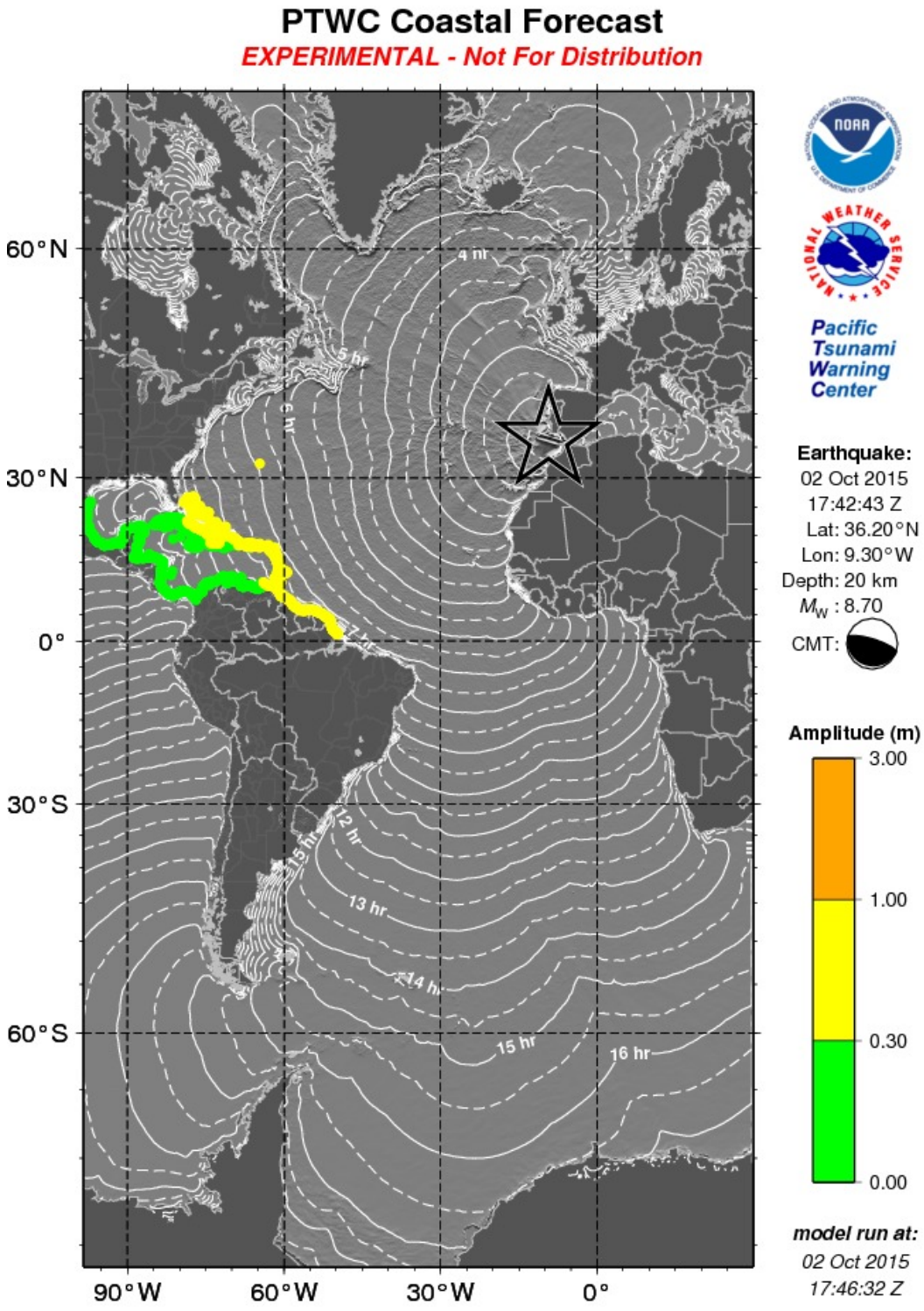
**Pacific Tsunami Warning Center**

**Earthquake:**
02 Oct 2015
17:42:43 Z
Lat: 36.20°N
Lon: 9.30°W
Depth: 20 km
$M_W$ : 8.70
CMT:

**Amplitude (m)**

6.51
1.00
0.75
0.50
0.25
0.10
0.05
0.01
0.00

***model run at:***
*02 Oct 2015*
*17:46:32 Z*


PTWC Coastal Forecast
EXPERIMENTAL - Not For Distribution
60°N
30°N
0°
30°S
60°S
90°W
60°W
30°W
0°
4 hr
5 hr
6 hr
7 hr
12 hr
13 hr
14 hr
15 hr
16 hr
NOAA
NATIONAL WEATHER SERVICE
Pacific Tsunami Warning Center
Earthquake:
02 Oct 2015
17:42:43 Z
Lat: 36.20°N
Lon: 9.30°W
Depth: 20 km
$M_W$ : 8.70
CMT:
Amplitude (m)
3.00
1.00
0.30
0.00
model run at:
02 Oct 2015
17:46:32 Z

a. Supplemental Products (updated forecast and observations)

ii. Text Product

```
EXPERIMENTAL TSUNAMI MESSAGE NUMBER 3
NOT FOR DISTRIBUTION
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
---------------------------------

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


EVALUATION
----------

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

  * TSUNAMI WAVES HAVE BEEN OBSERVED.

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


TSUNAMI THREAT FORECAST
-----------------------

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

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


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

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

## RECOMMENDED ACTIONS

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

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

## ESTIMATED TIMES OF ARRIVAL

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

| LOCATION | REGION | COORDINATES | | ETA(UTC) |
|---|---|---|---|---|
| RUTHS BAY | BERMUDA | 32.4N | 64.6W | 0045 10/03 |
| ROSEAU | DOMINICA | 15.3N | 61.4W | 0110 10/03 |
| BRIDGETOWN | BARBADOS | 13.1N | 59.6W | 0111 10/03 |
| FORT DE FRANCE | MARTINIQUE | 14.6N | 61.1W | 0113 10/03 |
| CASTRIES | SAINT LUCIA | 14.0N | 61.0W | 0114 10/03 |
| BASSE TERRE | GUADELOUPE | 16.0N | 61.7W | 0115 10/03 |
| SABA | SABA | 17.6N | 63.2W | 0117 10/03 |
| PLYMOUTH | MONTSERRAT | 16.7N | 62.2W | 0117 10/03 |
| PALMETTO POINT | BARBUDA | 17.6N | 61.9W | 0117 10/03 |
| SINT EUSTATIUS | SINT EUSTATIUS | 17.5N | 63.0W | 0118 10/03 |
| BASSETERRE | SAINT KITTS | 17.3N | 62.7W | 0119 10/03 |
| SIMPSON BAAI | SINT MAARTEN | 18.0N | 63.1W | 0125 10/03 |
| KINGSTOWN | SAINT VINCENT | 13.1N | 61.2W | 0126 10/03 |
| THE VALLEY | ANGUILLA | 18.3N | 63.1W | 0128 10/03 |
| SAINT JOHNS | ANTIGUA | 17.1N | 61.9W | 0130 10/03 |
| PIRATES BAY | TRINIDAD TOBAGO | 11.3N | 60.6W | 0133 10/03 |
| SAINT BARTHELEM | SAINT BARTHELEMY | 17.9N | 62.8W | 0138 10/03 |
| CABO ENGANO | DOMINICAN REP | 18.6N | 68.3W | 0139 10/03 |
| BAIE GRAND CASE | SAINT MARTIN | 18.1N | 63.1W | 0141 10/03 |
| BAIE LUCAS | SAINT MARTIN | 18.1N | 63.0W | 0142 10/03 |
| SAINT GEORGES | GRENADA | 12.0N | 61.8W | 0147 10/03 |
| PUERTO PLATA | DOMINICAN REP | 19.8N | 70.7W | 0149 10/03 |
| GRAND TURK | TURKS N CAICOS | 21.5N | 71.1W | 0150 10/03 |
| BAIE BLANCHE | SAINT MARTIN | 18.1N | 63.0W | 0153 10/03 |
| MAYAGUANA | BAHAMAS | 22.3N | 73.0W | 0157 10/03 |
| WEST CAICOS | TURKS N CAICOS | 21.7N | 72.5W | 0200 10/03 |
| SAN SALVADOR | BAHAMAS | 24.1N | 74.5W | 0201 10/03 |
| CROOKED ISLAND | BAHAMAS | 22.7N | 74.1W | 0202 10/03 |
| CAP HAITEN | HAITI | 19.8N | 72.2W | 0204 10/03 |
| LONG ISLAND | BAHAMAS | 23.3N | 75.1W | 0208 10/03 |
| SANTO DOMINGO | DOMINICAN REP | 18.5N | 69.9W | 0208 10/03 |
| GREAT INAGUA | BAHAMAS | 20.9N | 73.7W | 0215 10/03 |
| EXUMA | BAHAMAS | 23.6N | 75.9W | 0215 10/03 |
| ABACO ISLAND | BAHAMAS | 26.6N | 77.1W | 0218 10/03 |
| 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 SWEPT OUT TO SEA.

TSUNAMI OBSERVATIONS
---

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

| | GAUGE COORDINATES | | TIME OF MEASURE | MAXIMUM TSUNAMI | WAVE PERIOD |
|---|---|---|---|---|---|
| GAUGE LOCATION | LAT | LON | (UTC) | HEIGHT | (MIN) |
| 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 PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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a. Supplemental Products (updated forecast and observations)

iii. Text Product

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 4
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
0130 UTC SAT OCT 3 2015

...TSUNAMI THREAT MESSAGE...


**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****

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

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

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****


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


EVALUATION
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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.
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* 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) |
|---|---|---|---|---|
| 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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## 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 COORDINATES | | TIME OF MEASURE | MAXIMUM TSUNAMI | WAVE PERIOD |
|---|---|---|---|---|---|
| GAUGE LOCATION | LAT | LON | (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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* AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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## i. Final Text Product

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EXPERIMENTAL TSUNAMI MESSAGE NUMBER 5
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
0530 UTC SAT OCT 3 2015

...FINAL TSUNAMI THREAT MESSAGE...


**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****

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

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

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE *****


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


EVALUATION
----------

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

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

  * REMAIN OBSERVANT AND EXERCISE NORMAL CAUTION NEAR THE SEA.


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

## TSUNAMI OBSERVATIONS

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| GAUGE LOCATION | GAUGE COORDINATES LAT | LON | TIME OF MEASURE (UTC) | MAXIMUM TSUNAMI HEIGHT | WAVE PERIOD (MIN) |
|---|---|---|---|---|---|
| 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 |

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

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

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

* COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO U.S. NATIONAL TSUNAMI WARNING CENTER MESSAGES SPECIFICALLY FOR THOSE PLACES THAT CAN BE FOUND AT NTWC.ARH.NOAA.GOV.

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

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# Appendix I. List of Places Covered in PTWC Caribbean 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 GUIANA
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 SAINT EUSTATIUS
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 ISLANDSBRAZIL
42. VENEZUELA

# Appendix II. List of Forecast Polygons

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 Guiana
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. USA-Mainland-Gulf and East Coasts
52. Venezuela-Atlantic Coast of Venezuela
53. Venezuela-Central Coast of Venezuela
54. Venezuela-Western Coast of Venezuela

# Appendix III. List of Forecast Points for Expected Arrival Times

| COUNTRY OR REGION | PLACE | LATITUDE | LONGITUDE |
|---|---|---|---|
| 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 | FREEPORT | 26.514 | -78.782 |
| BAHAMAS | NASSAU | 25.094 | -77.351 |
| BAHAMAS | ELEUTHERA ISLAND | 25.157 | -76.124 |
| BAHAMAS | SAN SALVADOR | 24.066 | -74.547 |
| BAHAMAS | CROOKED ISLAND | 22.747 | -74.141 |
| BAHAMAS | LONG ISLAND | 23.272 | -75.082 |
| BAHAMAS | MAYAGUANA | 22.330 | -72.999 |
| BAHAMAS | EXUMA | 23.570 | -75.851 |
| BAHAMAS | CAT ISLAND | 24.401 | -75.532 |
| BAHAMAS | ANDROS ISLAND | 25.030 | -77.901 |
| BAHAMAS | BIMINI | 25.761 | -79.287 |
| BAHAMAS | GREAT INAGUA | 20.948 | -73.684 |
| BARBADOS | BRIDGETOWN | 13.091 | -59.622 |
| BARBUDA | PALMETTO POINT | 17.578 | -61.863 |
| BELIZE | BELIZE CITY | 17.503 | -88.178 |
| BERMUDA | RUTHS BAY | 32.356 | -64.637 |
| BONAIRE | ONIMA | 12.256 | -68.309 |
| BR VIRGIN ISLANDS | TORTOLA | 18.407 | -64.601 |
| BRAZIL | FORTALEZA | -3.707 | -38.480 |
| BRAZIL | SAO LUIS | -2.470 | -44.309 |
| BRAZIL | ILHA DE MARACA | 2.208 | -50.488 |
| CAYMAN ISLANDS | CAYMAN BRAC | 19.681 | -79.883 |
| CAYMAN ISLANDS | GRAND CAYMAN | 19.297 | -81.342 |
| COLOMBIA | RIOHACHA | 11.554 | -72.920 |
| COLOMBIA | SANTA MARTA | 11.247 | -74.225 |
| COLOMBIA | BARRANQUILLA | 11.070 | -74.866 |
| COLOMBIA | CARTAGENA | 10.412 | -75.563 |
| COLOMBIA | PUNTA CARIBANA | 8.624 | -76.898 |
| COSTA RICA | PUERTO LIMON | 10.001 | -83.013 |
| CUBA | NUEVA GERONA | 21.922 | -82.797 |
| CUBA | CIENFUEGOS | 22.007 | -80.465 |
| CUBA | SANTA CRZ D SUR | 20.682 | -77.959 |
| CUBA | LA HABANA | 23.151 | -82.364 |
| CUBA | GIBARA | 21.119 | -76.122 |
| CUBA | BARACOA | 20.356 | -74.498 |
| 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 GUIANA | CAYENNE | 4.931 | -52.350 |
| 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 | JEREMIE | 18.641 | -74.107 |
| HAITI | CAP HAITEN | 19.792 | -72.188 |
| HAITI | PORT AU PRINCE | 18.544 | -72.369 |
| HAITI | JACAMEL | 18.100 | -72.500 |
| HONDURAS | TRUJILLO | 15.931 | -85.958 |
| HONDURAS | PUERTO CORTES | 15.850 | -87.973 |
| JAMAICA | MONTEGO BAY | 18.471 | -77.933 |
| JAMAICA | KINGSTON | 17.913 | -76.854 |
| MARTINIQUE | FORT DE FRANCE | 14.598 | -61.082 |
| MEXICO | COZUMEL | 20.516 | -86.955 |
| MEXICO | CAMPECHE | 19.867 | -90.539 |
| MEXICO | VERACRUZ | 19.201 | -96.116 |
| MEXICO | MADERO | 22.291 | -97.785 |
| MEXICO | TEXAS BORDER | 25.972 | -97.141 |
| MEXICO | PROGRESO | 21.300 | -89.660 |
| MONTSERRAT | PLYMOUTH | 16.706 | -62.234 |
| NICARAGUA | PUNTA GORDA | 11.437 | -83.793 |
| NICARAGUA | PUERTO CABEZAS | 14.019 | -83.374 |
| PANAMA | PUERTO OBALDIA | 8.667 | -77.417 |
| PANAMA | PUERTO CARRETO | 8.783 | -77.573 |
| PANAMA | ALIGANDI | 9.233 | -78.017 |
| PANAMA | COLON | 9.372 | -79.914 |
| PANAMA | BOCAS DEL TORO | 9.351 | -82.242 |
| PUERTO RICO | FAJARDO | 18.346 | -65.626 |
| PUERTO RICO | PONCE | 17.966 | -66.637 |
| PUERTO RICO | MAYAGUEZ | 18.204 | -67.173 |
| PUERTO RICO | SAN JUAN | 18.489 | -66.168 |
| 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 | SAN ANDRES | 13.380 | -81.390 |
| SAN ANDRES PROVID | PROVIDENCIA | 12.590 | -81.680 |
| SINT EUSTATIUS | SINT EUSTATIUS | 17.500 | -62.975 |

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|---|---|---|---|
| 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 | WEST CAICOS | 21.671 | -72.487 |
| TURKS N CAICOS | GRAND TURK | 21.468 | -71.107 |
| US VIRGIN ISLANDS | ST JOHN | 18.333 | -64.810 |
| US VIRGIN ISLANDS | ST CROIX | 17.761 | -64.709 |
| US VIRGIN ISLANDS | ST THOMAS | 18.315 | -64.930 |
| VENEZUELA | PORLAMAR | 10.948 | -63.842 |
| VENEZUELA | CUMANA | 10.469 | -64.197 |
| VENEZUELA | MAIQUETIA | 10.608 | -66.966 |
| VENEZUELA | PUNTO FIJO | 11.707 | -70.232 |
| VENEZUELA | GOLFO VENEZUELA | 11.399 | -71.245 |