

User's Guide

Pacific Tsunami Warning Center Enhanced Products for the CARIBE-EWS

Version 1.2
October 8, 2015

TABLE OF CONTENTS

OVERVIEW	3
PTWC Capabilities and Procedures.....	5
RIFT FORECAST MODEL DESCRIPTION AND LIMITATIONS.....	8
RIFT Description	8
RIFT Limitations	9
DESCRIPTION OF NEW PRODUCTS	11
Text Products	11
Forecast Polygon Map	12
Forecast Polygon Table.....	12
Energy Forecast Map	13
Coastal Forecast Map.....	13
Coastal Forecast KMZ File.....	13
Example New PTWC Products for the CARIBE-EWS.....	14
Tsunami Information Statement (shallow Mw 6.4 Caribbean earthquake).....	14
Initial and usually Only Product	14
Tsunami Information Statement (deep Mw 6.4 Caribbean earthquake).....	16
Initial and usually Only Product	16
Tsunami Threat Message (large Caribbean earthquake)	18
Initial Products (potential threat area).....	18
Second Product – Includes Forecast	21
Third or Larger Product – Includes Sea Level Readings	29
Final Product (threat ended).....	33
Tsunami Threat Message (Atlantic earthquake with a tsunami threat)	36
Initial Products (initial forecast)	36
Second Product – Includes Forecast	38
Supplemental Products (updated forecast and observations).....	46
Supplemental Products (updated forecast and observations).....	50
Final Product	54
Appendix I. List of Places Covered in PTWC Caribbean Products	57
Appendix II. List of Forecast Polygons	58
Appendix III. List of Forecast Points for Expected Arrival Times.....	60

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 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. <i>[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.]</i>
00h02m to 00h07m	Using a combination of automatic and interactive analyses, duty analysts complete their preliminary determination of the earthquake epicenter, depth, and magnitude. These parameters are sent to the US Geological Survey and get immediately displayed on the CISN Display used by many NUTCs. 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.

Region	Earthquake			Product	
	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
		< 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.

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

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

The offshore ocean depth can vary from about 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 gauge.
4. The RIFT forecast coastal amplitude is not necessarily indicative of inundation depth, which is a function of the local topography. A 30-meter coastal amplitude from Green's Law does not mean the inundation depth will reach 30 meters. But it does indicate a very major tsunami impact.
5. In the near field, Green's law amplitude does not necessarily take into account wave propagation and dissipation. Thus, a coastal amplitude of 20-30 meters can be misleading, it should also simply be interpreted as a major tsunami.

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

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

1. The forecast is sensitive to the earthquake magnitude. A difference of 0.2 in the earthquake magnitude results in factor of two in the tsunami wave amplitude.
2. The forecast is sensitive to the earthquake focal mechanism. For example, two earthquakes of magnitude 7.5 with different focal mechanisms can give vastly different results, easily by a factor of two or more. 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.

Key Assumptions of Green's Law

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

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

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

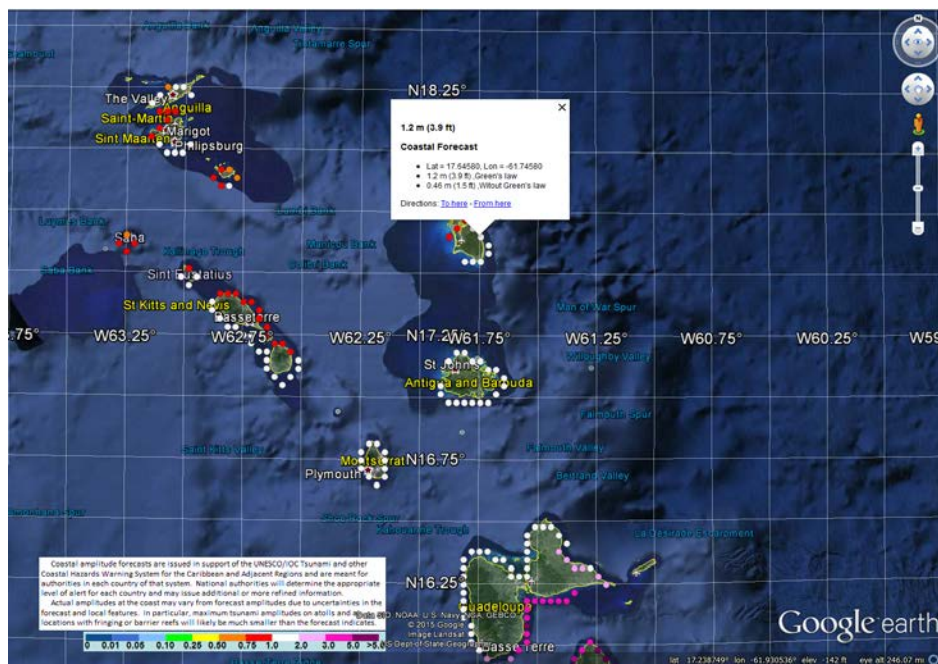
The energy map shows the maximum tsunami amplitude at each place in the deep ocean. It shows how the tsunami is directed away from the earthquake, how it is focused and defocused by the shape of the seafloor, and how it diminishes by spreading. It is useful for understanding why some areas may be more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

Tsunami Information Statement (shallow Mw 6.4 Caribbean earthquake)

Initial and usually Only Product

Text Product

ZCZC
WECA43 PHEB 012110
TIBCAX

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

...TSUNAMI INFORMATION STATEMENT...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

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

RECOMMENDED ACTIONS

* NO ACTION IS REQUIRED.

NEXT UPDATE AND ADDITIONAL INFORMATION

-
- * THIS WILL BE THE ONLY STATEMENT ISSUED FOR THIS EVENT UNLESS
ADDITIONAL DATA ARE RECEIVED OR THE SITUATION CHANGES.
 - * AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S.
GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT
EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.
 - * FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT
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 NTC.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 NTC.ARH.NOAA.GOV.

\$\$

Tsunami Information Statement (deep Mw 6.4 Caribbean earthquake)

Initial and usually Only Product

Text Product

ZCZC
WECA43 PHEB 012117
TIBCAX

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

...TSUNAMI INFORMATION STATEMENT...

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

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 ****

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

* BASED ON ALL AVAILABLE DATA... THERE IS NO TSUNAMI THREAT
FROM THIS EARTHQUAKE.

RECOMMENDED ACTIONS

* NO ACTION IS REQUIRED.

NEXT UPDATE AND ADDITIONAL INFORMATION

* THIS WILL BE THE ONLY STATEMENT ISSUED FOR THIS EVENT UNLESS
ADDITIONAL DATA ARE RECEIVED OR THE SITUATION CHANGES.

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

* FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT
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 NTC.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 NTC.ARH.NOAA.GOV.

\$\$

Tsunami Threat Message (large Caribbean earthquake)

Initial Products (potential threat area)

Text Product

ZCZC
WECA41 PHEB 021657
TSUCAX

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

...TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

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

TSUNAMI THREAT FORECAST

* 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

- * 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 SWEEPED OUT TO SEA.

NEXT UPDATE AND ADDITIONAL INFORMATION

- * THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- * AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.
- * FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.
- * COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO 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.

\$\$

Second Product – Includes Forecast

Text Product

ZCZC
WECA41 PHEB 021704
TSUCAX

TSUNAMI MESSAGE NUMBER 2
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... MONTSEERRAT...
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 SWEEPED OUT TO SEA.

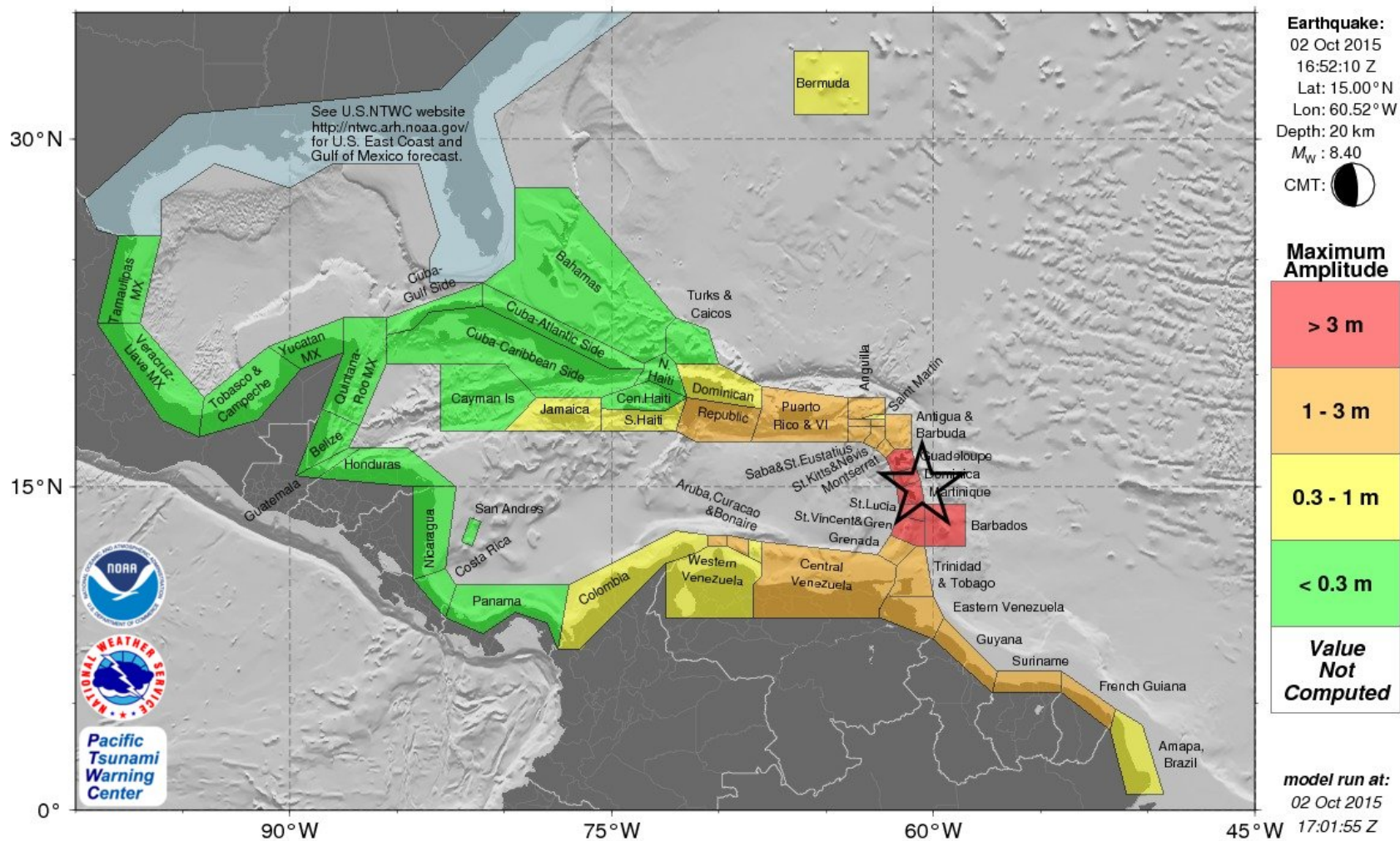
NEXT UPDATE AND ADDITIONAL INFORMATION

- * THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- * AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.
- * FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.
- * COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO 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.

\$\$

Forecast Polygons

PTWC Forecast Polygons *EXPERIMENTAL - Not For Distribution*



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

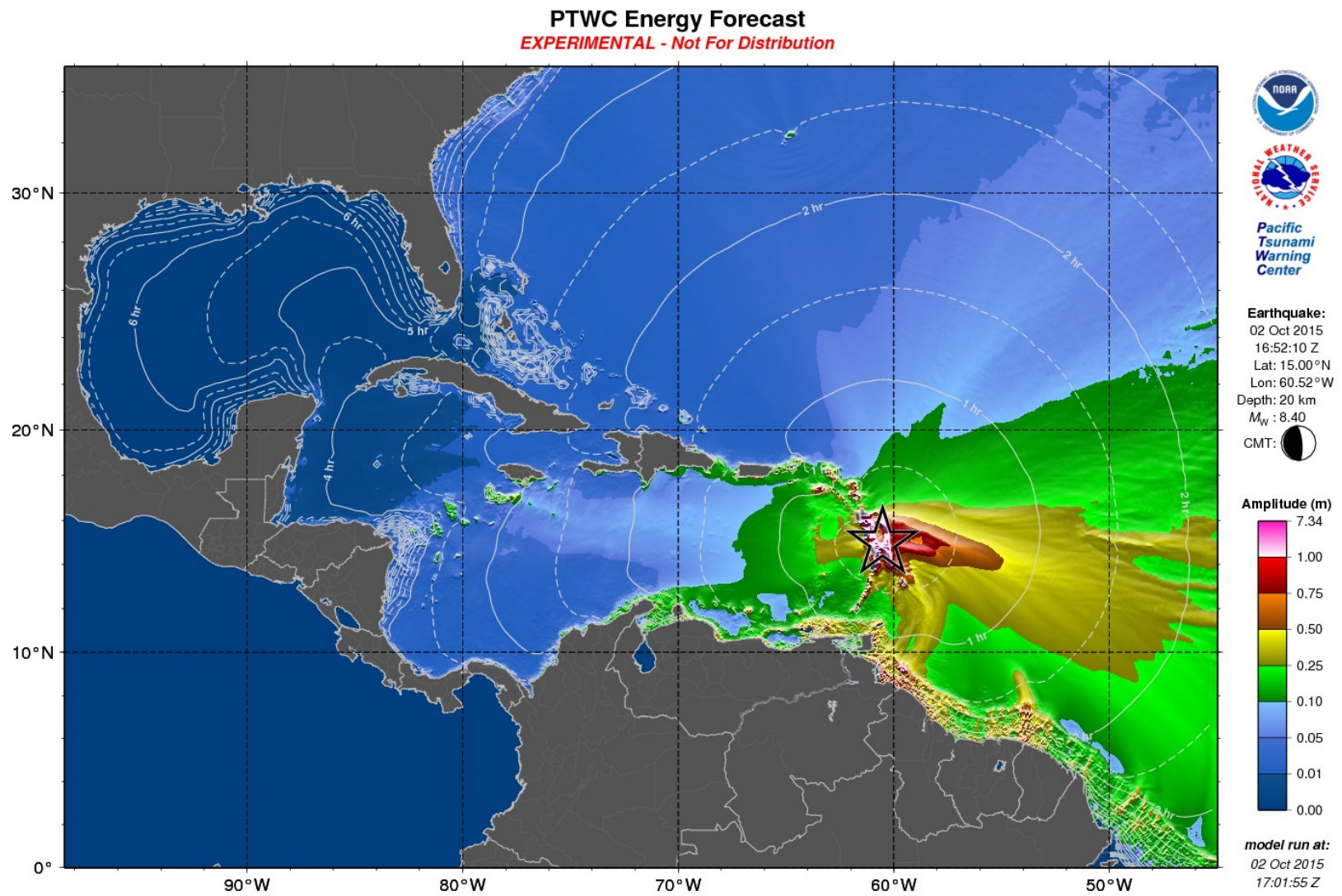
This table is issued for information only in support the UNESCO/IOC Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions and is meant for national authorities in each country of that system. National authorities will determine the appropriate level of alert for each 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.

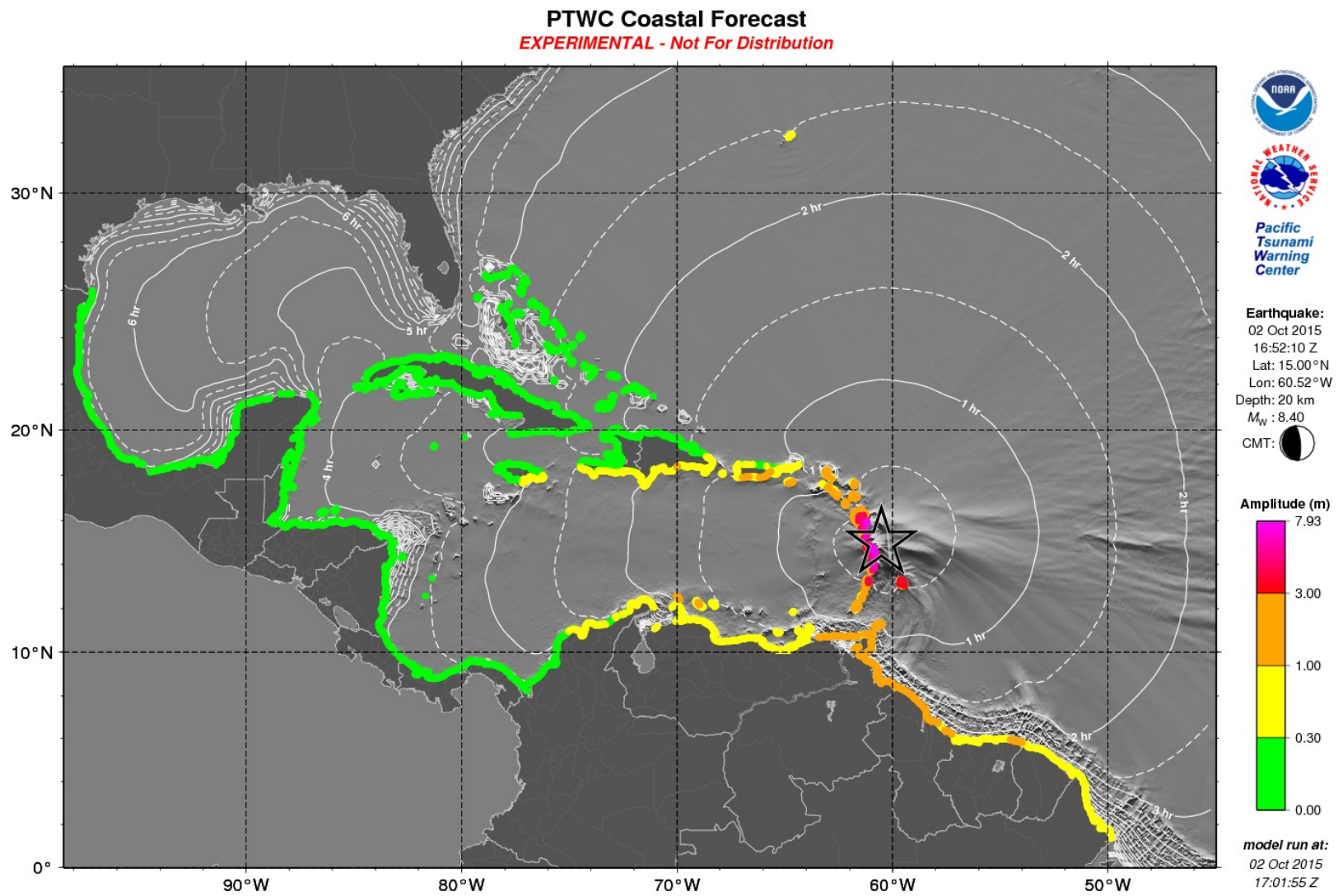
Region_Name	Coastal Forecast (meters)				Offshore Forecast (meters)				Total Points
	Maximum	Mean	Median	STD	Maximum	Mean	Median	STD	
Martinique	7.9	4.80	4.90	1.90	7.3	2.20	1.60	1.60	41
Guadeloupe	7.8	3.00	2.10	1.80	2.8	1.20	1.00	0.71	71
Saint_Lucia	7.0	4.00	3.70	2.00	5.8	1.50	1.50	1.10	26
Dominica	6.7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

Aruba	1.1	1.00	1.00	0.14	0.46	0.33	0.33	0.11	8
Anguilla	1.0	0.97	1.00	0.09	1.2	0.77	0.72	0.25	8
Bonaire	0.92	0.73	0.72	0.09	0.98	0.38	0.30	0.21	15
Jamaica	0.87	0.28	0.21	0.19	0.43	0.13	0.10	0.09	146
Western_Coast_of_Venezuela	0.82	0.63	0.63	0.07	1.1	0.47	0.45	0.19	100
Saint_Martin	0.82	0.82	0.82	0.00	0.86	0.74	0.69	0.09	3
Amapa_Brazil	0.66	0.59	0.58	0.06	0.58	0.16	0.13	0.09	119
Atlantic_Coast_of_Dominican_Republic	0.65	0.20	0.18	0.11	1.0	0.13	0.07	0.17	129
Caribbean_Coast_of_Colombia	0.58	0.27	0.27	0.12	0.53	0.18	0.16	0.09	255
Caribbean_Coast_of_Haiti	0.50	0.36	0.36	0.07	0.28	0.14	0.12	0.06	89
Bermuda	0.39	0.39	0.39	0.01	0.33	0.17	0.14	0.07	7
Turks_and_Caicos_Islands	0.28	0.17	0.17	0.06	0.12	0.06	0.06	0.02	46
Gulf_of_Gonave_Coast_of_Haiti	0.28	0.18	0.18	0.03	0.20	0.06	0.05	0.03	139
Caribbean_Coast_of_Cuba	0.24	0.08	0.07	0.05	0.11	0.03	0.02	0.02	472
Caribbean_Coast_of_Panama	0.24	0.15	0.15	0.03	0.20	0.09	0.09	0.03	179
Atlantic_Coast_of_Haiti	0.21	0.15	0.14	0.04	0.09	0.05	0.04	0.02	66
Caribbean_Coast_of_Costa_Rica	0.20	0.16	0.17	0.02	0.17	0.10	0.09	0.03	48
Caribbean_Coast_of_Nicaragua	0.19	0.14	0.13	0.02	0.15	0.06	0.06	0.03	139
Mainland-Gulf	0.18	0.04	0.00	0.06	0.17	0.02	0.00	0.03	1148
Bahamas	0.18	0.09	0.09	0.03	0.29	0.04	0.04	0.03	442
Atlantic_Coast_of_Cuba	0.14	0.07	0.08	0.04	0.08	0.02	0.02	0.01	267
San_Andres_and_Providencia	0.12	0.11	0.11	0.01	0.05	0.05	0.05	0.00	2
Cayman_Islands	0.08	0.07	0.07	0.01	0.04	0.03	0.03	0.01	5
Quintana_Roo_Mexico	0.07	0.04	0.04	0.02	0.11	0.02	0.02	0.01	166
Gulf_of_Mexico_Coast_of_Cuba	0.05	0.01	0.01	0.00	119				
Caribbean_Coast_of_Honduras	0.05	0.04	0.04	0.01	0.08	0.02	0.02	0.01	185
Belize	0.05	0.04	0.04	0.00	0.03	0.02	0.01	0.01	90
Caribbean_Coast_of_Guatemala	0.04	0.04	0.04	0.00	0.03	0.01	0.01	0.00	13

Energy Forecast Map



Coastal Forecast Map



Third or Larger Product – Includes Sea Level Readings

Text Product

ZCZC
WECA41 PHEB 021731
TSUCAX

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

...TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST...UPDATED

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

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

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

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

SINT MAARTEN... AND TRINIDAD AND TOBAGO.

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

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

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

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

RECOMMENDED ACTIONS

- * 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
MONTIGO 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 SWEEPED OUT TO SEA.

TSUNAMI OBSERVATIONS

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

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

\$\$

Final Product (threat ended)

Text Product

ZCZC
WECA41 PHEB 021945
TSUCAX

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

...FINAL TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

- * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED IN
THE LEEWARD ISLANDS AT 1652 UTC ON FRIDAY OCTOBER 2 2015.
- * BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS
EARTHQUAKE HAS PASSED AND THERE IS NO FURTHER THREAT.

TSUNAMI THREAT FORECAST...UPDATED

- * THE TSUNAMI THREAT HAS NOW LARGELY PASSED.

RECOMMENDED ACTIONS

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

POTENTIAL IMPACTS

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

TSUNAMI OBSERVATIONS

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

GAUGE LOCATION	GAUGE COORDINATES		TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
	LAT	LON			
PORT OF SPAIN TT	10.6N	61.5W	1924	0.96M/ 3.1FT	26
JACMEL HT	18.2N	72.5W	1912	0.38M/ 1.2FT	16
CAP HAITIEN HT	19.8N	72.2W	1901	0.13M/ 0.4FT	22
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1853	0.71M/ 2.3FT	22
PORT SAN ANDRES DO	18.4N	69.6W	1846	0.63M/ 2.1FT	18
PUERTO PLATA DO	19.8N	70.7W	1848	0.12M/ 0.4FT	28
BULLEN BAY CURACAO	12.2N	69.0W	1850	1.03M/ 3.4FT	24
PUNTA CANA DO	18.5N	68.4W	1838	0.82M/ 2.7FT	14
MONA ISLAND PR	18.1N	67.9W	1836	0.59M/ 1.9FT	26
MAYAGUEZ PR	18.2N	67.2W	1832	0.54M/ 1.8FT	28
DART 41420	23.5N	67.3W	1830	0.03M/ 0.1FT	28
DART 42407	15.3N	68.2W	1823	0.09M/ 0.3FT	16
MAGUEYES ISLAND PR	18.0N	67.0W	1827	0.88M/ 2.9FT	22
YABUCOA PR	18.1N	65.8W	1819	1.16M/ 3.8FT	16
SAN JUAN PR	18.5N	66.1W	1818	0.25M/ 0.8FT	18
DART 41421	23.4N	63.9W	1815	0.05M/ 0.2FT	20
LIMETREE VI	17.7N	64.8W	1810	1.27M/ 4.2FT	24
ST CROIX VI	17.7N	64.7W	1812	0.87M/ 2.9FT	26
PARHAM AT	17.1N	61.8W	1803	1.60M/ 5.2FT	26
PRICKLEY BAY GD	12.0N	61.8W	1753	1.30M/ 4.3FT	26
CHARLOTTEVILLE TT	11.3N	60.5W	1800	1.83M/ 6.0FT	26
CALLIAQUA VC	13.1N	61.2W	1741	1.49M/ 4.9FT	20
DESHAIES GUADELOUPE	16.3N	61.8W	1742	1.37M/ 4.5FT	22
POINT A PITRE GP	16.2N	61.5W	1730	4.97M/16.3FT	16
PORT ST CHARLES BB	13.3N	59.6W	1729	2.88M/ 9.5FT	24
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

* 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.

Tsunami Threat Message (Atlantic earthquake with a tsunami threat)

Initial Products (initial forecast)

Text Product

ZCZC
WECA43 PHEB 012110
TIBCAX

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

...TSUNAMI INFORMATION STATEMENT...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

* THE TSUNAMI THREAT TO THE CARIBBEAN REGION FROM THIS
EARTHQUAKE IS STILL UNDER INVESTIGATION. FURTHER
INFORMATION ON THE THREAT WILL BE ISSUED AS SOON AS
POSSIBLE.

RECOMMENDED ACTIONS

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

NEXT UPDATE AND ADDITIONAL INFORMATION

* FURTHER STATEMENTS ON THE TSUNAMI THREAT TO THE CARIBBEAN
REGION FROM THIS EARTHQUAKE WILL BE ISSUED AS SOON AS

INFORMATION BECOMES AVAILABLE OR IN NO MORE THAN ONE HOUR.

- * AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.
- * FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT 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 NTC.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 NTC.ARH.NOAA.GOV.

\$\$

Second Product – Includes Forecast

Text Product

ZCZC
WECA41 PHEB 021756
TSUCAX

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

...TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

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

TSUNAMI THREAT FORECAST...UPDATED

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

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

- * FOR ALL OTHER AREAS COVERED BY THIS MESSAGE... THERE IS NO

TSUNAMI THREAT ALTHOUGH SMALL SEA LEVEL CHANGES MAY OCCUR.

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

RECOMMENDED ACTIONS

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

ESTIMATED TIMES OF ARRIVAL

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

LOCATION	REGION	COORDINATES		ETA(UTC)	
RUTHS BAY	BERMUDA	32.4N	64.6W	0045	10/03
ROSEAU	DOMINICA	15.3N	61.4W	0110	10/03
BRIDGETOWN	BARBADOS	13.1N	59.6W	0111	10/03
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	0113	10/03
CASTRIES	SAINT LUCIA	14.0N	61.0W	0114	10/03
BASSE TERRE	GUADELOUPE	16.0N	61.7W	0115	10/03
SABA	SABA	17.6N	63.2W	0117	10/03
PLYMOUTH	MONTSEERRAT	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

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

NEXT UPDATE AND ADDITIONAL INFORMATION

- * THE NEXT MESSAGE WILL BE ISSUED IN ONE HOUR... OR SOONER IF THE SITUATION WARRANTS.
- * AUTHORITATIVE INFORMATION ABOUT THE EARTHQUAKE FROM THE U.S. GEOLOGICAL SURVEY CAN BE FOUND ON THE INTERNET AT EARTHQUAKE.USGS.GOV/EARTHQUAKES -ALL IN LOWERCASE LETTERS-.
- * FURTHER INFORMATION ABOUT THIS EVENT MAY BE FOUND AT PTWC.WEATHER.GOV AND AT WWW.TSUNAMI.GOV.
- * COASTAL REGIONS OF PUERTO RICO... THE U.S. VIRGIN ISLANDS... AND THE BRITISH VIRGIN ISLANDS SHOULD REFER TO 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.

\$\$

Forecast Polygons

PTWC Forecast Polygons *EXPERIMENTAL - Not For Distribution*

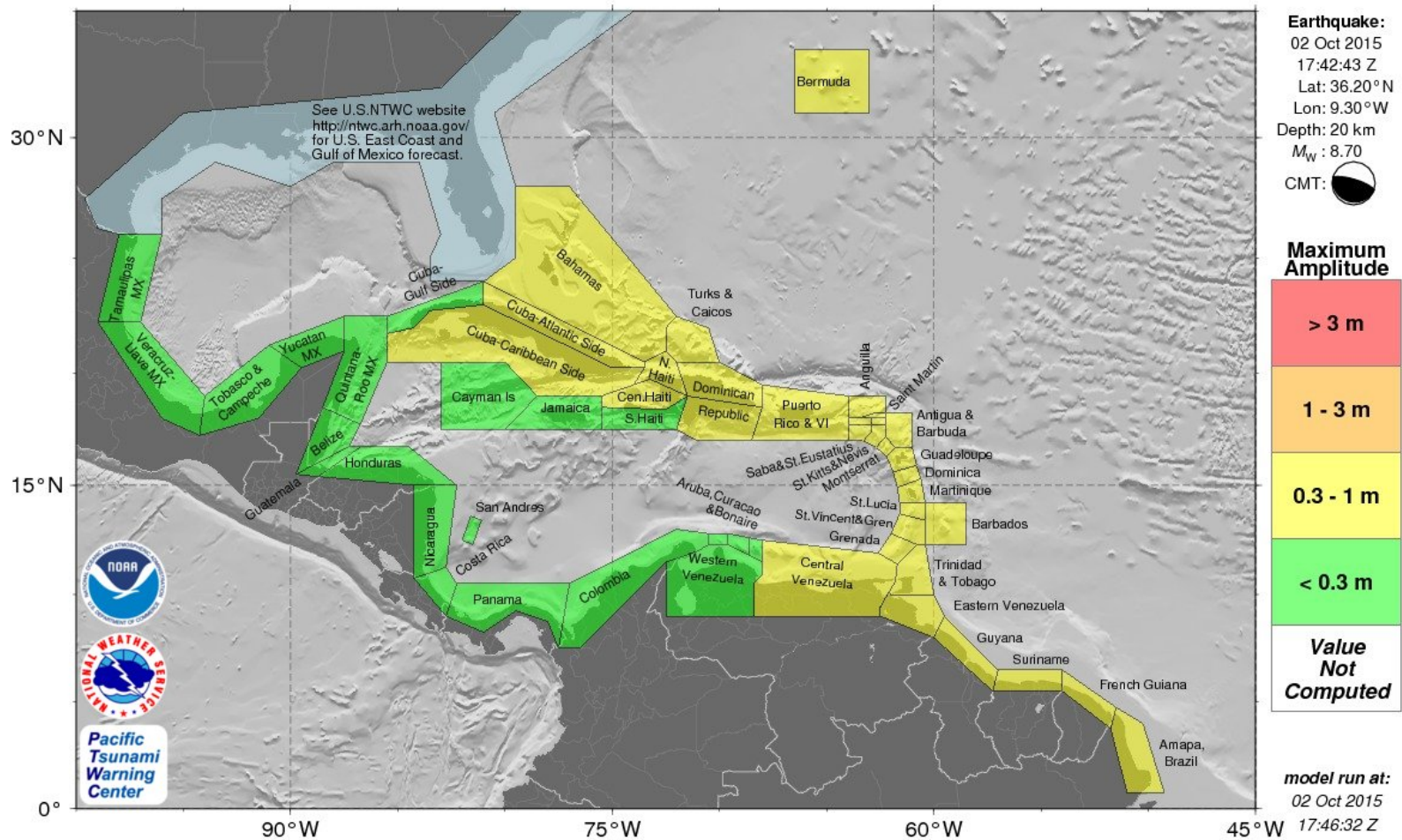


Table of Statistics

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

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

This table is issued for information only in support the UNESCO/IOC Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions and is meant for national authorities in each country of that system. National authorities will determine the appropriate level of alert for each country and may issue additional or more refined information.

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

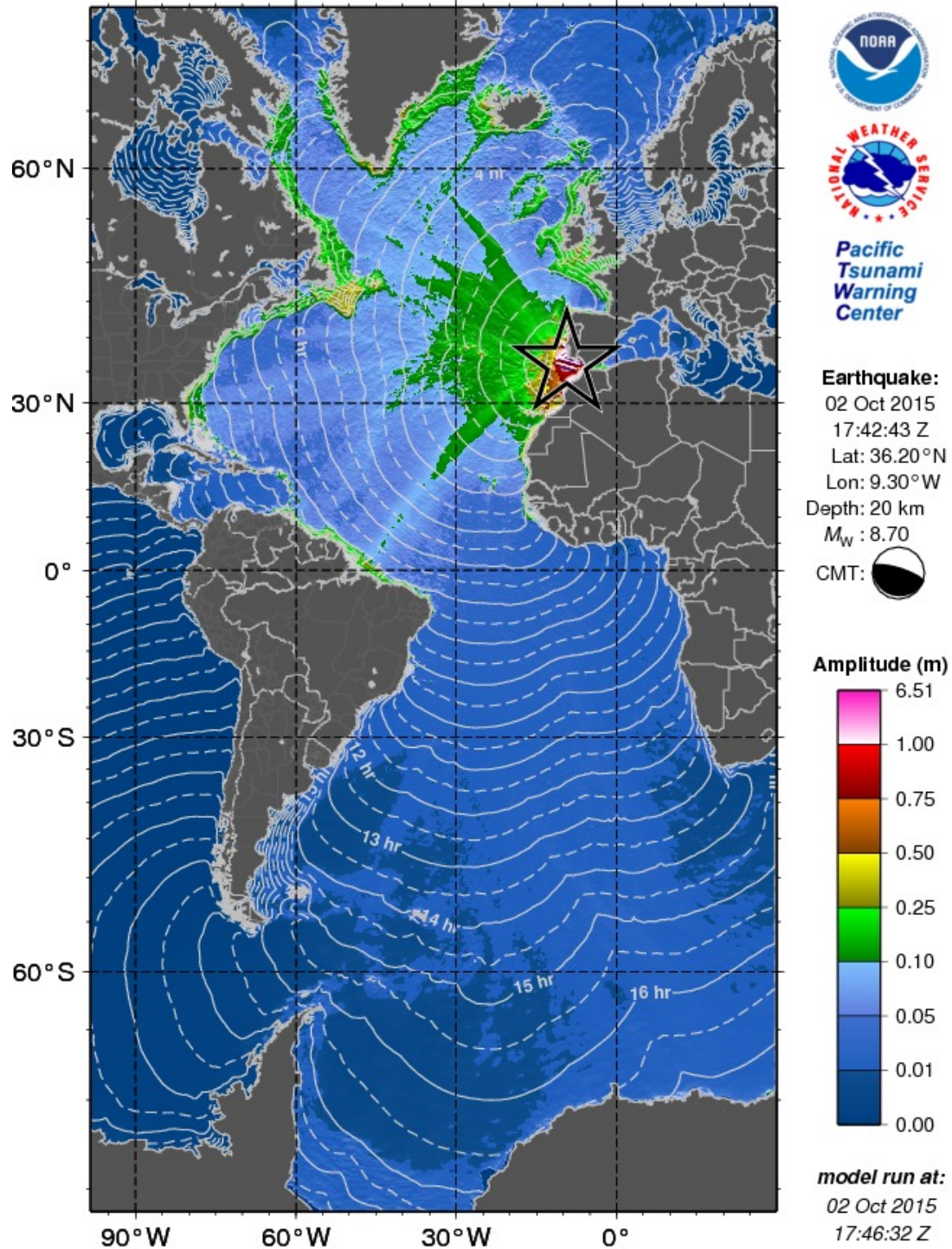
Points	Region_Name	Coastal Forecast (meters)				Offshore Forecast (meters)				Total
		Maximum	Mean	Median	STD	Maximum	Mean	Median	STD	
	Bahamas	0.92	0.58	0.56	0.15	0.61	0.28	0.26	0.12	110
	Amapa_Brazil	0.76	0.59	0.59	0.06	0.44	0.23	0.21	0.06	58
	Mainland-Gulf	0.73	0.22	0.06	0.23	0.61	0.10	0.03	0.12	686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

Anguilla	0.56	0.56	0.56	0.00	0.29	0.29	0.29	0.00	1
Sint_Maarten	0.56	0.56	0.56	0.00	0.37	0.35	0.35	0.02	2
Saint_Martin	0.56	0.56	0.56	0.00	0.37	0.37	0.37	0.00	1
Atlantic_Coast_of_Cuba	0.54	0.35	0.37	0.15	0.41	0.12	0.11	0.07	100
Saint_Vincent_and_the_Grenadines	0.52	0.37	0.34	0.08	0.45	0.17	0.13	0.11	12
Saba_and_Saint_Eustatius	0.49	0.49	0.49	0.00	0.15	0.13	0.13	0.02	2
Grenada	0.47	0.38	0.37	0.06	0.34	0.16	0.16	0.08	11
Caribbean_Coast_of_Dominican_Republic	0.46	0.23	0.20	0.08	0.39	0.12	0.10	0.07	63
Caribbean_Coast_of_Cuba	0.45	0.11	0.09	0.08	0.13	0.04	0.03	0.02	189
Saint_Kitts_and_Nevis	0.43	0.41	0.43	0.03	0.27	0.17	0.15	0.05	8
Central_Coast_of_Venezuela	0.39	0.23	0.22	0.06	0.27	0.13	0.12	0.05	122
Gulf_of_Gonave_Coast_of_Haiti	0.37	0.29	0.29	0.04	0.17	0.08	0.07	0.03	74
Jamaica	0.24	0.15	0.15	0.04	0.14	0.05	0.05	0.02	73
Western_Coast_of_Venezuela	0.24	0.20	0.19	0.02	0.20	0.11	0.11	0.04	62
Aruba	0.24	0.24	0.24	0.00	0.06	0.06	0.06	0.00	1
Bonaire	0.23	0.22	0.22	0.02	0.10	0.08	0.07	0.01	4
Curacao	0.23	0.23	0.23	0.00	0.17	0.17	0.17	0.00	1
Caribbean_Coast_of_Haiti	0.20	0.13	0.13	0.02	0.09	0.04	0.04	0.02	43
Caribbean_Coast_of_Colombia	0.19	0.11	0.11	0.03	0.12	0.05	0.05	0.02	130
Caribbean_Coast_of_Costa_Rica	0.13	0.12	0.11	0.01	0.05	0.03	0.03	0.01	23
Caribbean_Coast_of_Panama	0.12	0.09	0.09	0.01	0.07	0.04	0.04	0.01	87
Caribbean_Coast_of_Nicaragua	0.11	0.10	0.09	0.01	0.08	0.04	0.04	0.01	60
San_Andres_and_Providencia	0.10	0.09	0.09	0.01	0.03	0.02	0.02	0.00	2
Belize	0.09	0.07	0.06	0.02	0.03	0.02	0.02	0.00	37
Caribbean_Coast_of_Honduras	0.09	0.06	0.05	0.01	0.08	0.03	0.02	0.01	87
Caribbean_Coast_of_Guatemala	0.09	0.09	0.09	0.00	0.03	0.03	0.02	0.00	7
Quintana_Roo_Mexico	0.08	0.06	0.06	0.01	0.13	0.03	0.03	0.02	64
Gulf_of_Mexico_Coast_of_Cuba	0.08	0.05	0.05	0.01	0.04	0.01	0.01	0.01	59
Cayman_Islands	0.06	0.05	0.05	0.01	0.01	0.01	0.01	0.00	2
Yucatan_Mexico	0.04	0.02	0.01	0.01	0.02	0.01	0.01	0.00	31
Tabasco_and_Campeche_Mexico	0.02	0.01	0.01	0.00	0.01	0.01	0.00	0.00	86
Veracruz_Mexico	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	86
Tamaulipas_Mexico	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	64

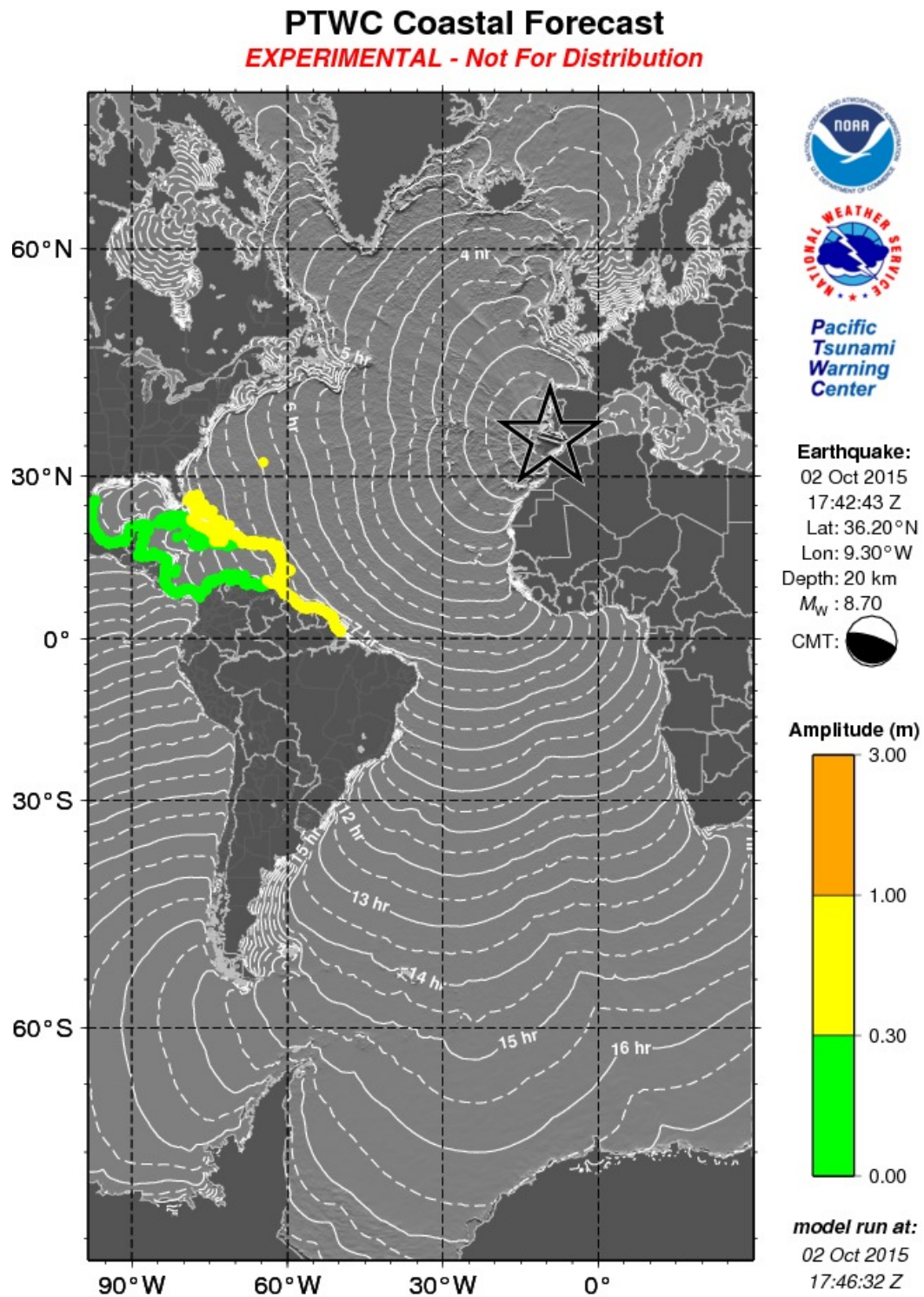
Energy Forecast Map

PTWC Energy Forecast

EXPERIMENTAL - Not For Distribution



Coastal Forecast Map



Supplemental Products (updated forecast and observations)

Text Product

ZCZC
WECA41 PHEB 022130
TSUCAX

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

...TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

* 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 GIBALTAR

EVALUATION

- * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED
WEST OF GIBALTAR 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...
MONTSEERRAT... 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	MONTSEERRAT	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
FREEPOR	BAHAMAS	26.5N	78.8W	0248	10/03
CUMANA	VENEZUELA	10.5N	64.2W	0250	10/03
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	0306	10/03
GIBARA	CUBA	21.1N	76.1W	0318	10/03
BIMINI	BAHAMAS	25.8N	79.3W	0320	10/03
JEREMIE	HAITI	18.6N	74.1W	0323	10/03
CIENFUEGOS	CUBA	22.0N	80.5W	0333	10/03
PARAMARIBO	SURINAME	5.9N	55.2W	0400	10/03
PORT AU PRINCE	HAITI	18.5N	72.4W	0412	10/03
GEORGETOWN	GUYANA	6.8N	58.2W	0438	10/03
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0528	10/03
SANTA CRZ D SUR	CUBA	20.7N	78.0W	0538	10/03
PORLAMAR	VENEZUELA	10.9N	63.8W	0638	10/03
NUEVA GERONA	CUBA	21.9N	82.8W	0703	10/03

POTENTIAL IMPACTS

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

TSUNAMI OBSERVATIONS

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

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

NEXT UPDATE AND ADDITIONAL INFORMATION

- * 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 NTC.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 NTC.ARH.NOAA.GOV.

\$\$

Supplemental Products (updated forecast and observations)

Text Product

ZCZC
WECA41 PHEB 030130
TSUCAX

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

...TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

* 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
FREEPOR	BAHAMAS	26.5N	78.8W	0248	10/03
CUMANA	VENEZUELA	10.5N	64.2W	0250	10/03
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	0306	10/03
GIBARA	CUBA	21.1N	76.1W	0318	10/03
BIMINI	BAHAMAS	25.8N	79.3W	0320	10/03
JEREMIE	HAITI	18.6N	74.1W	0323	10/03
CIENFUEGOS	CUBA	22.0N	80.5W	0333	10/03
PARAMARIBO	SURINAME	5.9N	55.2W	0400	10/03
PORT AU PRINCE	HAITI	18.5N	72.4W	0412	10/03
GEORGETOWN	GUYANA	6.8N	58.2W	0438	10/03
ILHA DE MARACA	BRAZIL	2.2N	50.5W	0528	10/03
SANTA CRZ D SUR	CUBA	20.7N	78.0W	0538	10/03
PORLAMAR	VENEZUELA	10.9N	63.8W	0638	10/03
NUEVA GERONA	CUBA	21.9N	82.8W	0703	10/03

POTENTIAL IMPACTS

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

TSUNAMI OBSERVATIONS

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

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

- * 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.

\$\$

Final Product

Text Product

ZCZC
WECA41 PHEB 030530
TSUCAX

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

...FINAL TSUNAMI THREAT MESSAGE...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS

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

EVALUATION

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

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

TSUNAMI THREAT FORECAST...UPDATED

- * THE TSUNAMI THREAT HAS NOW LARGELY PASSED.

RECOMMENDED ACTIONS

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

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

* REMAIN OBSERVANT AND EXERCISE NORMAL CAUTION NEAR THE SEA.

POTENTIAL IMPACTS

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

TSUNAMI OBSERVATIONS

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

GAUGE LOCATION	GAUGE COORDINATES		TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
	LAT	LON			
KEY WEST FL	24.6N	81.8W	0523	0.06M/ 0.2FT	24
DART 42429	27.4N	85.7W	0518	0.00M/ 0.0FT	16
DART 42409	26.7N	85.8W	0505	0.00M/ 0.0FT	26
PUERTO MORELOS MX	21.4N	86.8W	0504	0.04M/ 0.1FT	24
LIMON CR	10.0N	83.0W	0447	0.13M/ 0.4FT	14
ISLA MUJERES	21.2N	86.7W	0448	0.05M/ 0.2FT	16
EL PORVENIR PM	9.6N	78.9W	0442	0.08M/ 0.3FT	20
SAN ANDRES CO	12.6N	81.7W	0421	0.10M/ 0.3FT	20
POINTE NOIRE CO	4.8S	11.8E	0415	0.12M/ 0.4FT	18
SANTA MARTA CO	11.2N	74.2W	0408	0.14M/ 0.5FT	28
NEW LONDON CT	41.4N	72.1W	0402	0.37M/ 1.2FT	22
PORT SONARA CM	4.0N	9.1E	0346	0.09M/ 0.3FT	28
GEORGE TOWN CY	19.3N	81.4W	0343	0.04M/ 0.1FT	24
PORT OF SPAIN TT	10.6N	61.5W	0316	0.45M/ 1.5FT	14
DUCK PIER NC	36.2N	75.7W	0256	0.52M/ 1.7FT	28
SAINT HELENA UK	15.9S	5.7W	0300	0.19M/ 0.6FT	24
JACMEL HT	18.2N	72.5W	0244	0.14M/ 0.4FT	28
LAGOS NG	6.4N	3.4E	0239	0.08M/ 0.3FT	16
BULLEN BAY CURACAO	12.2N	69.0W	0240	0.23M/ 0.8FT	18
ILE ROYAL GUIANA FR	5.3N	52.6W	0230	0.57M/ 1.9FT	28
HATTERAS NC	35.2N	75.7W	0225	0.49M/ 1.6FT	26
PORT SAN ANDRES DO	18.4N	69.6W	0217	0.17M/ 0.6FT	26
CAP HAITIEN HT	19.8N	72.2W	0218	0.48M/ 1.6FT	22
LAMESHURBAYSTJOHNVI	18.3N	64.7W	0215	0.39M/ 1.3FT	24
TAKORADI GA	4.9N	1.7W	0209	0.14M/ 0.5FT	20
DART 42407	15.3N	68.2W	0201	0.02M/ 0.1FT	26
PUERTO PLATA DO	19.8N	70.7W	0154	0.49M/ 1.6FT	20
PRICKLEY BAY GD	12.0N	61.8W	0201	0.40M/ 1.3FT	16
PUNTA CANA DO	18.5N	68.4W	0159	0.41M/ 1.4FT	20
MAGUEYES ISLAND PR	18.0N	67.0W	0156	0.31M/ 1.0FT	20
MONA ISLAND PR	18.1N	67.9W	0148	0.36M/ 1.2FT	18
MAYAGUEZ PR	18.2N	67.2W	0141	0.51M/ 1.7FT	24
CHARLOTTEVILLE TT	11.3N	60.5W	0140	0.51M/ 1.7FT	18
YABUCOA PR	18.1N	65.8W	0139	0.31M/ 1.0FT	28
CALLIAQUA VC	13.1N	61.2W	0141	0.29M/ 1.0FT	20
PARHAM AT	17.1N	61.8W	0135	0.65M/ 2.1FT	26
LIMETREE VI	17.7N	64.8W	0132	0.28M/ 0.9FT	22
DART 41424	32.9N	72.5W	0129	0.05M/ 0.2FT	24
SAN JUAN PR	18.5N	66.1W	0129	0.53M/ 1.7FT	28
ST CROIX VI	17.7N	64.7W	0125	0.31M/ 1.0FT	18
OTRANTO IT	40.1N	18.5E	0124	0.01M/ 0.0FT	24
FORT DE FRANCE MQ	14.6N	61.1W	0124	0.36M/ 1.2FT	26
ROSEAU DM	15.3N	61.4W	0121	0.35M/ 1.2FT	22
LE ROBERT MARTINIQUE	14.7N	60.9W	0121	0.67M/ 2.2FT	26
GAVDOS GR	34.8N	24.1E	0118	0.01M/ 0.0FT	16
DART 41420	23.5N	67.3W	0118	0.05M/ 0.2FT	22
DESHAIES GUADELOUPE	16.3N	61.8W	0118	0.46M/ 1.5FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	0118	0.35M/ 1.2FT	22
DART 44402	39.4N	70.9W	0114	0.04M/ 0.1FT	18
PORT ST CHARLES BB	13.3N	59.6W	0118	0.68M/ 2.2FT	24
DESIRADE GUADELOUPE	16.3N	61.1W	0105	0.54M/ 1.8FT	14
DART 41421	23.4N	63.9W	0059	0.06M/ 0.2FT	26

CATANIA IT	37.5N	15.1E	0024	0.02M/	0.1FT	28
REYKJAVIK IS	64.2N	21.9W	0010	0.44M/	1.4FT	22
LAMPEDUSA IT	35.5N	12.6E	2319	0.06M/	0.2FT	16
DART 44401	37.5N	50.0W	2255	0.06M/	0.2FT	28
MALIN HEAD IE	55.4N	7.3W	2244	0.40M/	1.3FT	22
NAPOLI IT	40.8N	14.3E	2240	0.06M/	0.2FT	28
GENOVA IT	44.4N	8.9E	2213	0.15M/	0.5FT	16
CAGLIARI IT	39.2N	9.1E	2208	0.13M/	0.4FT	18
PALMEIRA CAPE VERDE	16.8N	23.0W	2127	0.70M/	2.3FT	20
HORTA	38.5N	28.6W	2031	1.43M/	4.7FT	26
PONTA DELGADA PT	37.7N	25.7W	2003	1.61M/	5.3FT	18
FERROL ES	43.5N	8.3W	1953	0.85M/	2.8FT	26
SANTA MARIA	36.9N	25.1W	1946	1.56M/	5.1FT	26
LAGOMERA ES	28.1N	17.1W	1944	1.49M/	4.9FT	26
LA PALMA ES	28.7N	17.8W	1929	1.86M/	6.1FT	20
GIBRALTAR UK	36.1N	5.3W	1929	0.87M/	2.9FT	22
LASPALMAS ES	28.1N	15.4W	1923	2.13M/	7.0FT	16
LEIXOES	41.2N	8.7W	1908	1.49M/	4.9FT	24
CASCAIS	38.7N	9.4W	1905	6.98M/	22.9FT	14
CASCAIS PT	38.7N	9.4W	1906	6.98M/	22.9FT	20
FUNCHAL	32.6N	16.9W	1856	2.39M/	7.9FT	24
PENICHE	39.3N	9.4W	1844	3.47M/	11.4FT	22
SINES	38.0N	8.9W	1820	8.57M/	28.1FT	16

NEXT UPDATE AND ADDITIONAL INFORMATION

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

\$\$

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 ISLANDS
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
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