Intergovernmental Oceanographic Commission
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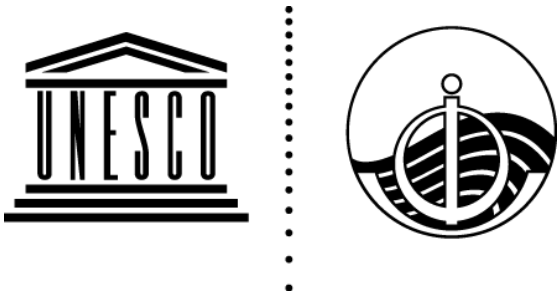

EXERCISE CARIBE WAVE 16

A Caribbean and Adjacent Regions Tsunami Warning Exercise

17 March 2016 (Venezuela and Northern Hispaniola Scenarios)

Volume 1 Participant Handbook

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NOTE: The contents of this handbook are patterned after the CARIBE WAVE 2011, 2013, 2014 and 2015 Exercises by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Intergovernmental Oceanographic Commission (IOC). *Exercise Caribe Wave 11*: A Caribbean Tsunami Warning Exercise, 23 March 2011, IOC Technical Series, 93 Vol. 1, Paris, UNESCO 2010 (English, French and Spanish). *Exercise Caribe Wave/Lantex 13*: A Caribbean Tsunami Warning Exercise, 20 March 2013, IOC Technical Series, 101, vol. 1, Paris, UNESCO 2012. *Exercise Caribe Wave/Lantex 14:* A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 26 March 2014, IOC Technical Series, 109, vol. 1, Paris, UNESCO 2013 (English and Spanish). *Exercise Caribe Wave/Lantex 15:* A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 25 March 2015, IOC Technical Series, 118, vol. 1, Paris, UNESCO 2014. These CARIBE WAVE handbooks followed the Pacific Wave 08 manual published by the Intergovernmental Oceanographic Commission (*Exercise Pacific Wave 08:* A Pacific-wide Tsunami Warning and Communication Exercise, 28-30 October 2008, IOC Technical Series, 82, Paris, UNESCO 2008). The UNESCO *How to Plan, Conduct and Evaluate Tsunami Wave Exercises*, IOC Manuals and Guides, 58 rev., Paris, UNESCO 2013 (English and Spanish) is another important reference.

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(English)

Report prepared by: Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS)

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Summary

The Intergovernmental Coordination Group for Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS) of the United National Educational, Scientific, and Cultural Organization's (UNESCO) Intergovernmental Oceanographic Commission (IOC), the U.S. National Oceanic and Atmospheric Administration (NOAA), and the Caribbean Regional Stakeholders (CEPREDENAC, CDEMA, and EMIZ) will be conducting a tsunami exercise on March 17, 2016. The purpose of this exercise is to advance tsunami preparedness efforts in the Caribbean and Adjacent Regions, based on Venezuela and Northern Hispaniola scenarios.

Two exercise scenarios are planned. The first scenario described in this handbook simulates a tsunami generated by a magnitude 8.4 earthquake located in Venezuela, in the southern Caribbean Sea. The second scenario is a tsunami generated by a magnitude 8.7 earthquake located in North of Hispaniola, in the Atlantic Ocean. The initial dummy messages will be issued by the U.S. Pacific Tsunami Warning Center (PTWC) on March 17, 2016 at 1405 UTC (Venezuela) and at 1505 UTC (Northern Hispaniola) and disseminated over all its standard broadcast channels. The dummy messages are issued to test communications with Tsunami Warning Focal Points (TWFPs) and National Tsunami Warning Centers (NTWCs), and to start the exercise. These will be the only exercise messages broadcasts from the PTWC, excluding the emails with the tsunami products to officially designated TWFPs and NTWCs. Each country and territory will decide if and how to disseminate messages within its areas of responsibility.

The manual includes the tsunami and earthquake scenarios information, time lines, and the enhanced PTWC exercise messages. High levels of vulnerability and risk to life and livelihoods from tsunamis along the Caribbean coast should provide a strong incentive for countries and local jurisdictions to prepare for a tsunami and participate in this exercise.

1. BACKGROUND

1.1 EXERCISE JUSTIFICATION AND FRAMEWORK

This tsunami exercise is being conducted to assist tsunami preparedness efforts throughout the Caribbean region. Recent tsunamis, such as those in the Indian Ocean (2004), Samoa (2009), Haiti (2010), Chile (2010, 2014, 2015), and Japan (2011), attest to the importance of proper planning for tsunami response.

Historical tsunami records from sources such as the NOAA National Centers for Environmental Information (NCEI) show that over 75 tsunamis have been observed in the Caribbean over the past 500 years (Figure 1). These represent approximately 7-10% of the world's oceanic tsunamis. Earthquake, landslide, and volcanic tsunami sources have all impacted the region. In the past 500 years almost 4,561 people have lost their lives to tsunamis in the Caribbean and Adjacent Regions. Since the most recent devastating tsunami of 1946, there has been an explosive population growth and influx of tourists along the Caribbean and Western Atlantic coasts increasing the tsunami vulnerability of the region (von Hillebrandt-Andrade, 2013). In addition to tsunamis, the region also has a long history of destructive earthquakes. Historical records show that major earthquakes have struck the Caribbean region many times during the past 500 years. Within the region there are multiple fault segments and submarine features that could be the source of earthquake and landslide generated tsunamis (Figure 2). The perimeter of the Caribbean plate is bordered by no fewer than four major plates (North America, South America, Nazca, and Cocos). Subduction occurs along the eastern and northeastern Atlantic margins of the Caribbean plate. Normal,

transform and strike slip faulting characterize northern South America, eastern Central America, the Cayman Ridge and Trench and the northern plate boundary (Benz et al, 2011). In addition to the local and regional sources, the region is also threatened by tele tsunamis/trans-Atlantic tsunamis, like that of 1755. With nearly 160 million people (Caribbean, Central America and Northern South America) now living in this region and a major earthquake occurring about every 50 years, the question is not if another major tsunami will happen, but when it happens will the region be prepared for the impact. The risk of earthquakes generating tsunamis in the Caribbean is real and should be taken seriously.

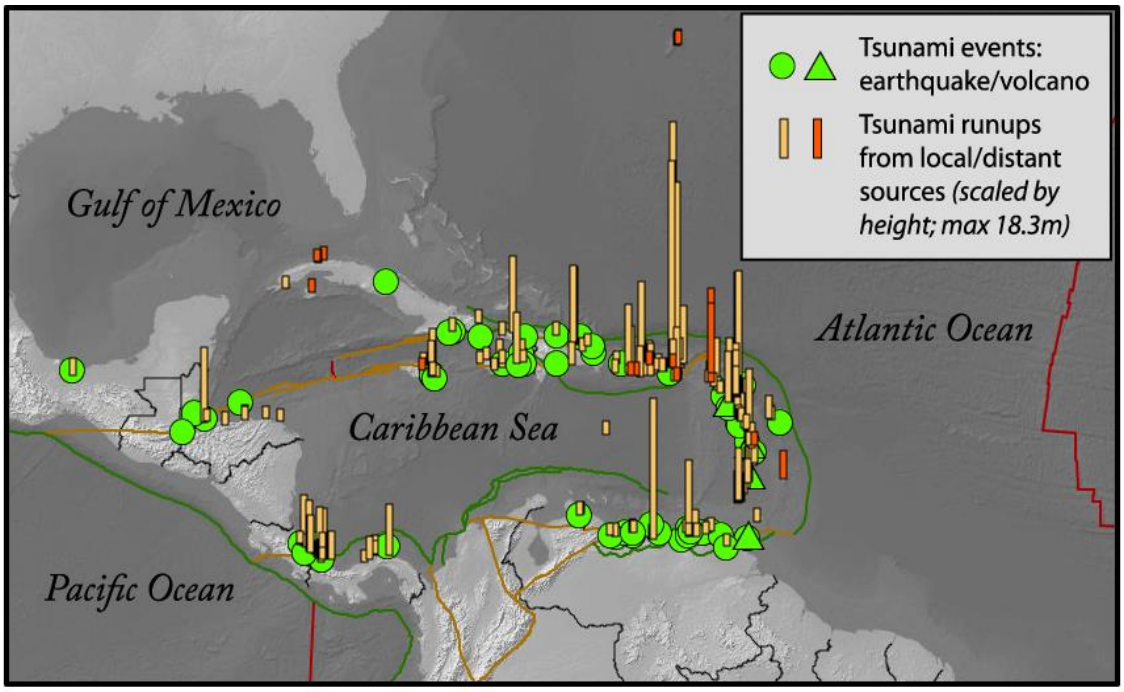

Figure 1. Map of tsunami run-ups in the Caribbean 1493-2013 (National Centers for Environmental Information, http://www.ngdc.noaa.gov/hazards/tsu.shtml). Artist: Jessee Varner; originally published in von Hillebrandt-Andrade, 2013.

Tsunami services for the Caribbean and Adjacent Regions within the UNESCO IOC CARIBE EWS framework are currently provided by the PTWC in Honolulu. AS of March 1st, 2016 the enhanced tsunami products for CARIBE EWS have been implemented. April 1st, 2016 is the target date for the transfer of domestic tsunami warning services from the U.S. National Tsunami Warning Center in Alaska to PTWC for Puerto Rico, the US Virgin Islands and the British Virgin Islands. The PTWC issues tsunami products approximately two to ten minutes after an earthquake's occurrence. The PTWC international products now include tsunami information and threat messages (no longer watch messages). Primary recipients of the PTWC messages include TWFPs and al NTWCs. These agencies are responsible to disseminate the corresponding warning messages within their area of responsibility according to established protocols. The Puerto Rico Seismic Network (PRSN) of the University of Puerto Rico at Mayagüez, Seismic Research Centre in Trinidad and Tobago, Instituto Nicaraguense de Estudios Territoriales (INETER) in Nicaragua, Fundación Venezolana de Investigaciones Sismológicas (FUNVISIS) in Venezuela, and other national and regional institutions also provide and/or disseminate earthquake and tsunami information for their areas of responsibility.

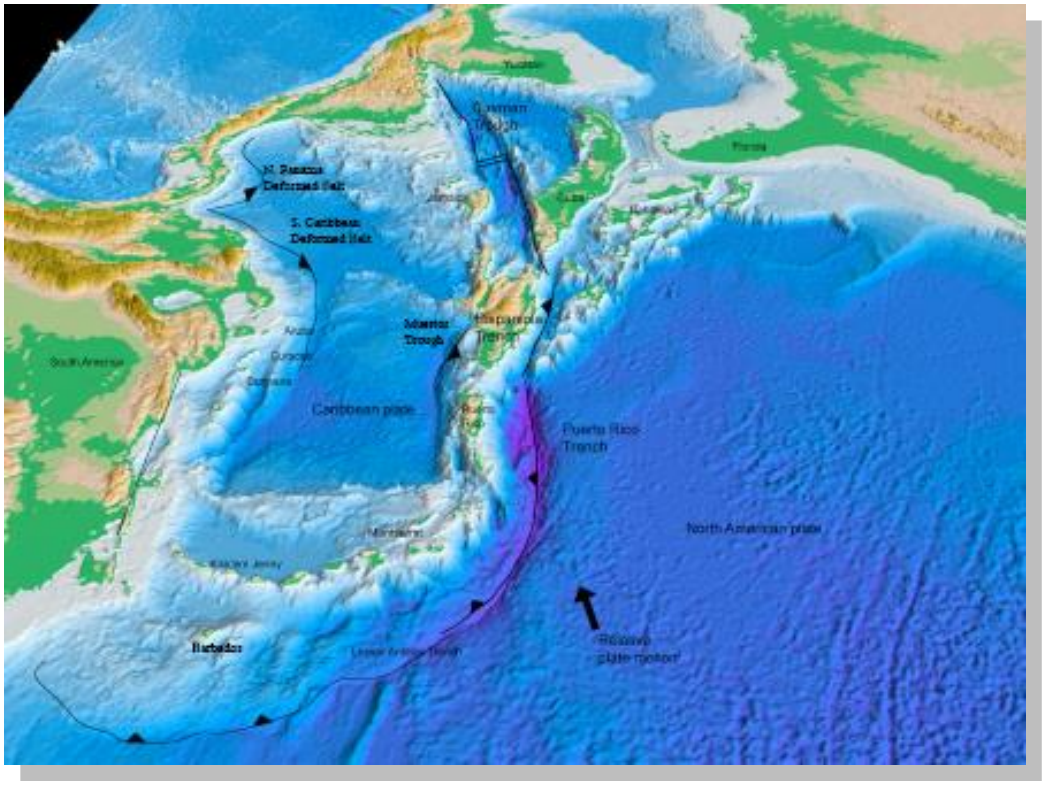

Figure 2. Tectonic features in the Caribbean (ten Brink et al., 2008).

1.2 EXERCISE EARTHQUAKE AND TSUNAMI SCENARIO

This exercise will provide simulated tsunami threat messages from the PTWC based on a hypothetical magnitude 8.4 earthquake located in Venezuela an 8.7 earthquake located in Northern Hispaniola (Figure 3). The earthquakes, would produce a red alert for Hispaniola, Turks and Caicos Islands and the East of Cuba for the Northern Hispaniola scenario; and the coast of Venezuela for the Venezuela scenario. In terms of population exposed to earthquake shaking, it is estimated that almost 5.5 million people for Northern Hispaniola scenario and 7.7 million people for Venezuela scenario would be exposed to Modified Mercalli intensities from VI up to VIII.

1.2.1 Venezuela Scenario

The Caribbean-South America Plate boundary (CSPB), located offshore of Venezuela (between longitudes -68º to -64º), has been the cause of several earthquakes that have generated significant tsunamis in the Caribbean (ten Brink, et al, 2008). The CSPB is an active compressional right-lateral strike-slip fault system focused mainly along the following faults: Boconó, San Sebastián, El Pilar, Los Bajos and Warm Spring fault (Colon, et al, 2015). On October 29, 1900, a tsunami with water height up to 10 meters damaged the coast of Mancuto, Venezuela (National Center for Environmental Information, 2015). This tsunami was generated by a 7.6 Mw earthquake that was originated along the San Sebastian fault (Colon, et al, 2015). Another tsunami event in this region occurred on July 15, 1853, when a 6.9 Mw earthquake generated a tsunami with water height up to 5 meters and impacted the area of Cumaná (NCEI, 2015). These events are evidence of the capacity of the CSPB system to generated destructive tsunamis in the Caribbean. For this exercise, the fault plane is divided in two segments 317 km long, 60 Km wide and 15 km deep. The scenario produces intensities up to VIII on the Mercalli Modified Scale, based on ShakeMap (Appendix D).

1.2.2 Northern Hispaniola Scenario

The North Hispaniola thrust fault (NHTF) is an oblique thrust fault system that extends over ~600 Km from the east of Cuba, parallel to the North of Hispaniola and to the west of Puerto Rico (Lat:18.5º to 20.5º, Long: -68º to -74º). This fault system has been the cause of several earthquakes that generated significant tsunamis in this region. On May 7, 1842, near the shore of Cap-Haitien an earthquake with an estimated magnitude of 8.1 Mw triggered a destructive tsunami that generated wave heights up to 5 meters. Approximately 5,000 people were killed due to this earthquake and another 300 people by the tsunami (Grilli, et al., 2015; National Center for Environmental Information, 2015) (Meeting of Experts Port-au-Prince, Haiti, 2013). For this exercise, the fault plane is divided in three segments and is 623 Km long, 59 km wide and 20 km deep. The scenario produces intensities up to VIII on the Mercalli Modified Scale, based on ShakeMap (Appendix D).

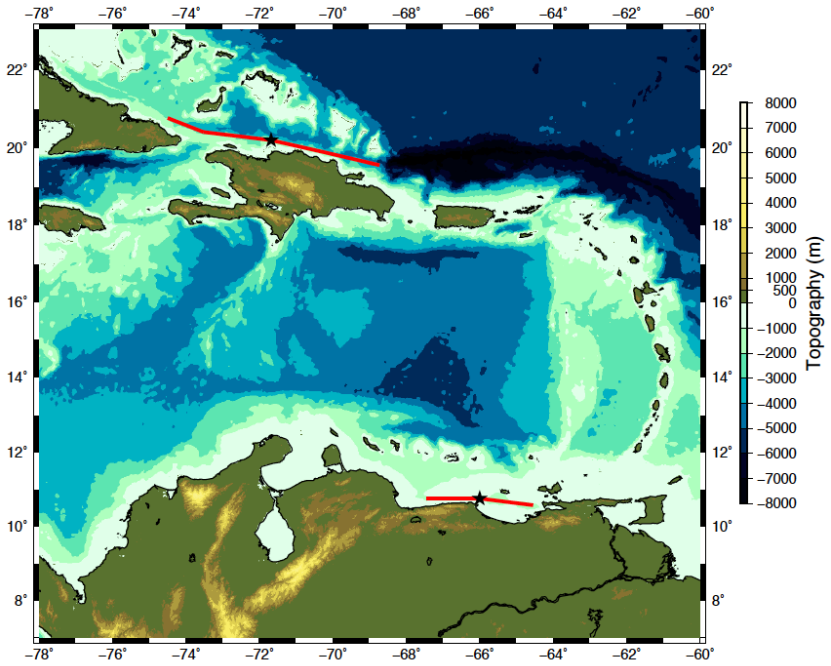

Figure 3. CARIBE WAVE 16 southwestern Caribbean scenario map indicating both epicenters and fault segments, elaborated using etopo1 model (Amante and Eakins, 2009).

For many countries, in addition to knowing the potential impact from the tsunami, it is also important to consider the potential earthquake impact. This is especially important for those in the near field. In consideration of this, the United States Geological Survey (USGS) provided for CARIBE WAVE 16 the scenario outputs of their ShakeMap and the Prompt Assessment of Global Earthquakes for Response (PAGER) products. These results provide emergency responders, government, aid agencies and the media the scope of the potential earthquake related disaster. ShakeMap illustrates the ground shaking levels close to the earthquake source depending on a set of parameters such as distance to the source, rock and soil behavior and seismic wave propagation through the crust (http://earthquake.usgs.gov/research/shakemap/). PAGER is based on the earthquake shaking (via ShakeMap) and analyses of the population exposed to each level of shaking intensity with models of economic and fatality losses based on past earthquakes in each country or region of the world (http://earthquake.usgs.gov/research/pager/). For the CARIBE WAVE 16 scenario, the USGS estimated that significant casualties and damage are likely from the earthquakes themselves which would require regional or national level response.

According to the PAGER results, the countries that are going to receive the greatest impact from the earthquakes are Venezuela, Dominican Republic and Haiti. Complete information about the PAGER output for the exercise scenario is available in the Annex D of this handbook.

Exercises like this will help ensure that Caribbean and Northwest Atlantic coasts are ready to respond in the event of a dangerous tsunami. Similar recent exercises in the Caribbean and Adjacent Regions (CARIBE WAVE and LANTEX) as well as the Pacific and Northeast Atlantic and Mediterranean Basins have proven effective in strengthening preparedness levels of emergency management organizations.

2. EXERCISE CONCEPT

2.1 PURPOSE

The purpose of the exercise is to improve Tsunami Warning System effectiveness along the Caribbean coasts. The exercise provides an opportunity for emergency management organizations throughout the region to exercise their operational lines of communications, review their tsunami response procedures, and promote tsunami preparedness. Regular exercising of response plans is critical to maintain readiness for an emergency. This is particularly true for the Caribbean, where tsunamis are infrequent but can be of very high impact. Every emergency management organization (EMO) is encouraged to participate.

2.2 OBJECTIVES

Each organization can develop its objectives for the exercise depending on its level of involvement in the scenario. The following are the exercise's overarching objectives.

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

2.3 TYPE OF EXERCISE

The exercise should be carried out such that communications and decision making at various organizational levels are exercised and conducted without alarming the general public. Offices of Emergency Management (OEM) are, however, encouraged to exercise down to the level of testing local notification systems such as the Emergency Alert System (EAS), sirens, or loudspeakers.

Exercises stimulate the development, training, testing, and evaluation of Disaster Plans and Standard Operating Procedures (SOP). Most countries in the region have participated in SOP workshops in 2013 and 2014, and should use the materials and expertise acquired to help guide exercise preparation and conduct. Annex A gives an overview of SOPs. Exercise participants may use their own past multi-hazard drills (e.g. flood, hurricane, tsunami, earthquake, etc.) as a framework to conduct CARIBE WAVE 16.

Exercises can be conducted at various scales of magnitude and sophistication. The following are examples of types of exercises conducted by EMOs:

1. **Orientation Exercise (Seminar):** An Orientation Exercise lays the groundwork for a comprehensive exercise program. It is a planned event, developed to bring together individuals and officials with a role or interest in multi-hazard response planning, problem solving, development of standard operational procedures (SOPs), and resource integration and coordination. An Orientation Exercise will have a specific goal and written objectives and result in an agreed upon Plan of Action.

2. **Drill:** The Drill is a planned activity that tests, develops, and/or maintains skills in a single or limited emergency response procedure. Drills generally involve operational response of single departments or agencies. Drills can involve internal notifications and/or field activities.

3. **Tabletop Exercise:** The Tabletop Exercise is a planned activity in which local officials, key staff, and organizations with disaster management responsibilities are presented with simulated emergency situations. It is usually informal, in a conference room environment, and is designed to elicit constructive discussion from the participants. Participants will examine and attempt to resolve problems, based on plans and procedures, if they exist. Individuals are encouraged to discuss decisions in depth with emphasis on slow-paced problem solving, rather than rapid, real time decision-making. A Tabletop Exercise should have specific goals, objectives, and a scenario narrative (see Annex B for a Sample Tabletop Exercise Outline).

4. **Functional Exercise:** A Functional Exercise is a planned activity designed to test and evaluate organizational capacities. It is also utilized to evaluate the capability of a community's emergency management system by testing the Emergency Operations Plan (EOP). It is based on a simulation of a realistic emergency situation that includes a description of the situation (narrative) with communications between players and simulators. The Functional Exercise gives the players (decision-makers) a fully simulated experience of being in a major disaster event. It should take place at the appropriate coordination location (i.e. emergency operations center, emergency command center, command post, master control center, etc.) and involve all the appropriate members designated by the plan. Both internal and external agencies (government, private sector, and volunteer agencies) should be involved. It requires players, controllers, simulators, and evaluators. Message traffic will be simulated and inserted by the control team for player response/actions, under real time constraints. It may or may not include public evacuations. A Functional Exercise should have specific goals, objectives, and a scenario narrative.

5. **Full-scale Exercise:** A Full-scale Exercise is the culmination of a progressive exercise program that has grown with the capacity of the community to conduct exercises. A Full-Scale Exercise is a planned activity in a "challenging" environment that encompasses a majority of the emergency management functions. This type of exercise involves the actual mobilization and deployment of the appropriate personnel and resources needed to demonstrate operational capabilities. EOCs and other command centers are required to be activated. A Full-scale Exercise is the largest, costliest, and most complex exercise type. It may or may not include public evacuations.

Example Time Frames for Different Exercise Types

Style	Planning Period	Duration	Comments
Orientation Exercise	2 weeks	Hours	Individual or mixed groups
Drill	2 months	1 day	Individual technical groups generally
Tabletop Exercise	1 month	1-3 days	Single or multiple agency
Functional Exercise	> 3 months	1-5 days	Multiple Agency participation
Full-scale Exercise	>6 months	1 day/ week	Multiple Agency participation

2.4 TIMELINE

The following timeline highlights actions to be taken, before, during and after CARIBE WAVE16.

ACTION	DUE DATE
Draft Circulated among ICG CARIBE EWS TNC/TWFP	Sep-15
Deadline for Comments	18-Sep-15
Final Exercise Handbook Available Online	Oct-15
Circular Letter Issued by IOC to MS	Nov-15
1st Webinar CW	19 - Jan- 2016 -English 20 - Jan- 2016 -Spanish 21 - Jan- 2016 -French
2nd Webinar CW	1- Mar- 2016 -English 2- Mar- 2016 -Spanish 3- Mar- 2016 -French
Exercise	17-Mar-16
Exercise Evaluation Due	23-Mar-16
Draft Final Caribe 16 Report	1- Apr- 16
Discussion of Exercise ICG CARIBE EWS 11th Session	5-7- Apr-16

3. PTWC ENHANCED PRODUCTS

As of March 1st, 2016 the CARIBE EWS will fully transition to the PTWC Enhanced Products. These products are threat-based on tsunami wave forecasts, rather than on earthquake magnitude thresholds and travel time. Several levels of tsunami threat have been established, and forecast threat levels are assigned to polygons representing segments of extended coastlines or to island groups. These improvements should greatly reduce the number of areas warned unnecessarily and also provide some advance notice of potential local tsunamis. Details on the PTWC Enhanced Products for the CARIBE EWS are provided in the "User's Guide for the Pacific Tsunami Warning Center Enhanced Products for the CARIBE EWS" (http://www.caribewave.info). For the CARIBE EWS, enhanced graphical products will be disseminated by email to officially designated TWFPs and NTWCs.

There are important differences between PTWC's current (thru February 29th, 2016) and its enhanced products. Previous products used the term "watch" to indicate that there was a potential threat to the countries within the watch. Specifically, a country was designated by PTWC as being in a Tsunami Watch depending upon the tsunami threat presented by the event (e.g. earthquake magnitude and location), as well as the time remaining until the potential tsunami impact. Over the last several years, however, the use of the term "Watch" has caused concern that the PTWC-designated level of alert could conflict with a country's independently derived level of alert. As each country is sovereign and thus responsible for the safety of its own population, the PTWC enhanced products as of March 1st, 2016, and will not use the "watch" term but instead provide forecasted wave heights along coasts.

At its Seventh Session, the ICG/CARIBE EWS (2012) started the process of evaluating the tsunami products issued by the PTWC for CARIBE EWS. After testing the enhanced products in the Caribe Wave 13, 14 and 15 exercises and considering the successful implementation of the enhanced products for the Pacific Tsunami Warning System at the Eleventh Session of the ICG/CARIBE EWS (May 2015), Member States approved the final products and agreed on the target changeover date of 1 March 2016. Member States further decided that the public text product will continue, and that additional forecast guidance products be only sent to country TWFPs and NTWCs to assist them in assessing their national threat. Therefore as of 1 March 2016 0000Z, the PTWC will retire its existing products for CARIBE EWS and start the issuance of its enhanced products.

For CARIBE WAVE 16 the PTWC will send via email all the simulated enhanced products (text and graphical) to the designated TWFP and NTWC. These products have also been included in Annexes C and F.

4. EXERCISE OUTLINE

4.1 GENERAL

Tsunami messages for this exercise are issued by the PTWC based on two hypothetical earthquakes with the following hypocenter parameters:

Venezuela Earthquake Scenario:

- Origin Time 14:00:00 UTC March 17, 2016
- Latitude 10.8°N
- Longitude 66.0°W
- Magnitude 8.4 – Mw
- Depth 15 km

Northern Hispaniola Earthquake Scenario:

- Origin Time 15:00:00 UTC March 17, 2016
- Latitude 20.2°N
- Longitude 71.7°W
- Magnitude 8.7 – Mw
- Depth 20km

Expected impacts for this event are determined from pre-computed tsunami forecast models. The models indicate a significant tsunami along many coasts in the Caribbean Sea, but with less or no impact in Western Caribbean and Gulf of Mexico. Based on the models, the areas under threat for the exercise are limited to the Eastern Caribbean and Northwest Atlantic. Annex C provides model results.

Pacific Tsunami Warning Center:

Tsunami Threat – Threats are issued by the PTWC based on tsunami wave forecasts, rather than based upon seismic information. Tsunami threat forecasts indicate the levels of threat that have been forecast and to which countries or places they apply. The levels are tsunami heights of 0.3-1 meter, 1-3 meters, and greater than 3 meters above the normal tide level are determined. The threats are updated usually within an hour.

The PTWC will not issue live messages over broadcast dissemination channels other than to issue initial dummy messages to start the exercise at 1405 UTC and 1505 UTC on March 17, 2016. However, all simulated enhanced tsunami products will be disseminated thru email to TWFP, and NTWC. Further dissemination will be the responsibility of the corresponding national and local authorities. The content of the dummy messages is given in Annex E. The dummy messages indicate that exercise participants should refer to the first message provided in this handbook or sent by PTWC (in the case of TWFP and NTWC).

The initial dummy messages will be disseminated over all standard TWC broadcast channels and the World Meteorological Organization (WMO) and Advanced Weather Interactive Processing System (AWIPS) headers used in the dummy messages are listed in Table 1. These are being issued to test communications with TWFPs and NTWCs, and to start the exercise. All simulated enhanced products (text and graphical) will be disseminated thru email to TWFPs and NTWCs. Further dissemination will be the responsibility of the corresponding national and local authorities.. *Please note that the* PTWC *dummy messages are being issued with the WMO/AWIPS IDs WECA41 PHEB/TSUCAX.*

Dummy:

Yes Dummy Message Issued
No Dummy Message Not Issued

Email:

Yes Message disseminated to TWFPs and NTWCs

Table 1. Product Types Issued for Dummy Message with Transmission Methods

Center	WMO ID	AWIPS ID	NWWS	GTS	EMWIN	AISR	Fax	Email
PTWC	WECA41 PHEB	TSUCAX	Yes	Yes	Yes	Yes	Yes	Yes

NWWS	NOAA Weather Wire Service
GTS	Global Telecommunications System
EMWIN	Emergency Manager's Weather Information Network
AISR	Aeronautical Information System Replacement

Participants should follow the schedule in Tables 2 and 3, for each scenario, to look at new messages. Those tables include the timelines for when messages would be issued by the PTWC if this were a real event, and can be used by EMOs to drive the exercise timing. The messages (as shown in Annex F) cover between a 5 minutes and 6-hour period from earthquake origin time, though in an actual event they would likely continue much longer.

Participants may elect to exercise using their own timelines in order to achieve their particular objectives. For example, a particular EMO's Exercise Controller may choose to feed the TWC bulletins into the exercise at times of their own choosing, or alternatively put them in envelopes with the time they must be opened written on each, with each key participant agency having their own set of envelopes. The messages, provided in Annex F, will facilitate this approach.

EMOs can modify estimated arrival times and/or wave amplitudes to suit their exercise – for example, to have the tsunami arrive sooner and with larger amplitude. Other exercise injects, such as tsunami damage reports, are also encouraged.

4.2 MASTER SCHEDULE (EXERCISE SCRIPT)

4.2.1 Venezuela Scenario

Tsunami generated by a magnitude 8.4 earthquake with epicenter at 10.8ºN, 66.0ºW occurring on March 17, 2016 at 1400 UTC. The initial alert is disseminated at 1405 UTC.

Table 2. Timeline Messages issued by PTWC

Date (UTC)	Time (UTC)	PTWC Message			
		#	Type	Dummy	Email
03/17/2016	1400	- - - - E a r t h q u a k e O c c u r s - - - -			
03/17/2016	1405	01	Threat	Yes	Yes
03/17/2016	1425	02	Threat	No	Yes
03/17/2016	1510	03	Threat	No	Yes
03/17/2016	1545	04	Threat	No	Yes
03/17/2016	1645	05	Threat	No	Yes
03/17/2016	1745	06	Threat	No	Yes
03/17/2016	1845	07	Threat	No	Yes
03/17/2016	1945	08	Final Threat	No	Yes

4.2.2 Northern Hispaniola Earthquake Scenario

Tsunami generated by a magnitude 8.7 earthquake with epicenter at 20.2ºN, 71.7ºW occurring on March 17, 2016 at 1500 UTC. The initial alert is disseminated at 1505 UTC.

Table 3. Timeline Messages issued by PTWC

Date (UTC)	Time (UTC)	PTWC Message			
		#	Type	Dummy	Email
03/17/2016	1500	- - - - E a r t h q u a k e O c c u r s - - - -			
03/17/2016	1505	01	Threat	Yes	Yes
03/17/2016	1525	02	Threat	No	Yes
03/17/2016	1600	03	Threat	No	Yes
03/17/2016	1630	04	Threat	No	Yes
03/17/2016	1700	05	Threat	No	Yes
03/17/2016	1800	06	Threat	No	Yes
03/17/2016	1900	07	Threat	No	Yes
03/17/2016	2000	08	Final Threat	No	Yes

4.3 ACTIONS IN CASE OF A REAL EVENT

In the case of a real event occurring during the exercise, the PTWC will issue the corresponding messages for the event. Such messages will be given full priority and a decision will be made by the PTWC whether to issue the dummy messages and to send email messages to corresponding recipients. Smaller earthquakes that only trigger a Tsunami Information Statement will not disrupt the exercise. All documentation and correspondence relating to this exercise is to be clearly identified as "**CARIBE WAVE 16"** and "**Exercise**."

4.4 PROCEDURE FOR FALSE ALARM

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

4.5 RESOURCES

Although EMOs will have advance notice of the exercise and may elect to stand up a special dedicated shift to allow normal core business to continue uninterrupted, it is requested that realistic resource levels be deployed in order to reflect some of the issues that are likely to be faced in a real event.

Questions on the exercise can be addressed to the members of the Caribe Wave 16 Task Team (Table 4).

4.6 COMMUNITY REGISTRATION

For Caribe Wave 16, the Caribe EWS has teamed up with TsunamiZone.org for online registration. Under the Caribbean Zone Region Tab participants will be able to sign up and choose among the following community categories: individuals, businesses, schools, faith-based organizations, community groups, government agencies, individuals. The link for registration is http://tsunamizone.org/caribbean. After registering, they will receive a confirmation email. If desired, participants can also opt to be listed in the "Who is participating?" section of the TsunamiZone website, along with participants in tsunami preparedness activities worldwide. The EMOs will thus have real time access to the status of registration of participants within their areas of responsibility. EMOs are encouraged to promote this registration system.

Table 4. Members of the Caribe Wave 16 Task Team

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4.7 MEDIA ARRANGEMENTS

One advantage in conducting exercises is that it provides a venue to promote tsunami awareness. Many residents along the CARIBE EWS coast may not realize that a regional tsunami warning system exists, nor that that national authorities have protocols in place to issue tsunami alerts, let alone the proper response for individuals. Therefore communities may wish to invite their local media to the exercise and to promote the awareness of the local tsunami hazard and protocols. Within all countries the media can also provide support in building awareness leading up to the exercise and avoid false alarms. The media should be provided with available informational brochures prepared by the local, regional and

international agencies. It is also a good opportunity to distribute or prepare Media Guides like that of the Puerto Rico Seismic Network (PRSN) (http://www.prsn.uprm.edu/mediakit/) and the Seismic Research (http://www.uwiseismic.com) as additional guidance. Annex G contains a sample press release which can be adapted as necessary.

Social media has been recognized as a very important means for disseminating tsunami information and products. CARIBE EWS countries and territories are encouraged to share information on the exercise Caribe Wave 16 through this medium. Furthermore, it is recommended that the hashtag **#CaribeWave**, be used by the participants before and during the exercise.

5. POST-EXERCISE EVALUATION

Each CARIBE EWS member state and territory is requested to provide feedback on the exercise. This feedback will assist the ICG/CARIBE-EWS in the evaluation of Caribe Wave 16 and the development of subsequent exercises, and help response agencies document lessons learned. To facilitate feedback the online evaluation survey can be accessed at the following link: https://www.surveymonkey.com/r/CaribeWave16. The deadline for completing the evaluation is **March 23, 2016.**

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Annex A. Standard Operating Procedures

END-TO-END TSUNAMI WARNING for Tsunami Warning Focal Points and Tsunami Emergency Response Operations– AN OVERVIEW
September 2008 (updated 2012)
UNESCO IOC Tsunami Unit (Paris) with ITIC (Hawaii)

This overview summarizes an end-to-end tsunami warning. In event time, it covers activities for event monitoring, detection, threat evaluation and warning, alert dissemination, emergency response, and public action. An effective tsunami warning system is achieved when all people in vulnerable coastal communities are prepared to respond appropriately and in a timely manner upon recognizing that a potential destructive tsunami may be approaching. Meeting this challenge requires round-the-clock monitoring with real-time data streams and rapid alerting, as well as prepared communities, a strong emergency management system, and close and effective cooperation and coordination between all stakeholders. To warn without preparing, and further, to warn without providing a public safety message that is understandable to every person about what to do and where to go, is clearly useless. While alerts are the technical trigger for warning, any system will ultimately be judged by its ability to save lives, and by whether people move out of harm's way before a big tsunami hits. Towards these ends, education and awareness are clearly essential activities for successful early warning.

An end-to-end tsunami warning involves a number of stakeholders who must be able to work together and with good understanding of each other's roles, responsibilities, authorities, and action during a tsunami event. Planning and preparedness, and practicing in advance of the real event, helps to familiarize agencies and their staff with the steps and decision-making that need to be carried out without hesitation in a real emergency. Tsunami resilience is built upon a community's preparedness in tsunami knowledge, planning, warning, and awareness. All responding stakeholders should have a basic understanding of earthquake and tsunami science, and be familiar with warning concepts, detection, threat evaluation, and alerting methods, and emergency response and evacuation operations. The key components, requirements, and operations to enable an effective and timely warning and evacuation are covered in the following topics of end to-end tsunami warning:

- Tsunami Science and Hazard Assessment
- Tsunami Risk Reduction Strategy and community-based disaster risk management
- Stakeholders, Roles & Responsibilities, and Standard Operating Procedures (SOPs) and their Linkages
- End-to-end Tsunami Response and SOPs
- Tsunami Warning Focal Point (TWFP) and National Tsunami Warning Centre (NTWC) operations
- Tsunami Emergency Response (TER) operations
- Public Alerting
- The Role of Media
- Evacuation and Signage
- Use of Exercises to Build Preparedness
- Awareness and Education

To ensure the long-term sustainability of a tsunami warning system, it should be noted that:

- Tsunamis should be part of an all-hazards (natural and man-made) strategy.
- System redundancy is required to ensure reliability.
- Clearly understood TWFP/TWC and TER public safety messages are essential.

Media partnerships for warning, as well as preparedness, are important.
- Awareness must be continuous forever. Tsunamis are low frequency, high impact natural disasters that are also unpredictable.
- National, provincial, and local Tsunami Coordination Committees ensure stakeholder coordination and implementation of the end-to-end tsunami warning.

For specific details and algorithms and for actual descriptions of tsunami warning and emergency response operations, including data networks and data collection, methods of evaluation and criteria for action, products issued and methods of communication of alerts, and evacuation, original source references or plans should be consulted. These are the high-level system descriptions or concepts of operation, agency operations manuals, and user's guides of each regional and national system.

Basic references providing a comprehensive summary on tsunami warning center and emergency response operations considerations are:

- ITIC IOC Manual on Tsunami Warning Centre Standard Operating Procedures (Guidance and Samples), version 2010 (distributed as part of 2013 SOP capacity building).
- ITIC IOC Manual on Tsunami Emergency Response Standard Operating Procedures (Guidance and Samples), version 2010 (distributed as part of 2013 SOP capacity building)

For a description of the Caribbean tsunami warning system, consult the Pacific Tsunami Warning Center Enhanced Products for the CARIBE-EWS Users Guide (version 1.2 October 8, 2015). It can be accessed at: NWS/CTWP http://caribewave.info.

TRAINING

In order to assist countries in strengthening their warning systems, the IOC has compiled and developed a Training Manual containing references, best practices, decision support tools, and guidance materials summarizing key components, requirements, and operations to enable an effective and timely warning and evacuation against tsunamis. The materials were developed under the lead of the ITIC and in close partnership with experienced practitioners in tsunami warning and emergency response, and have been used in numerous training courses since the 2004 Indian Ocean tsunami.

The Manual includes session plans, lectures (in Power Point), exercises, and multi-media materials. Together, they represent part of the IOC's collaborative contribution to national capacity building and training on end-to-end tsunami warning and tsunami standard operating procedures to countries of the Indian Ocean, Pacific, Southeast Asia, and the Caribbean. For more information, please contact Laura Kong, Director, ITIC (laura.kong@noaa.gov), Bernardo Aliaga, IOC b.aliaga@unesco.org), Christa von Hillebrandt, US NWS Caribbean Tsunami Warning Program (christa.vonh@noaa.gov), or Alison Brome (a.brome@unesco.org). The tables presented below can be used as a guide for preparing the timeline for the exercise.

Tsunami Evacuation Responsibilities Checklist for Government Disaster Response Agencies		
This is a simple checklist to use when doing an evacuation. List the agency(ies) / department(s) responsible for actions and recommended number of minutes (e.g. +10 minutes) after earthquake origin time.	Earthquake Origin Time: 0000	
	Agency(ies) / Department(s):	Time (mins):
Strong and/or long duration earthquake is felt (vary depending distance from source)	_____	+__
Tsunami message received from tsunami service provider (NTWCs)	_____	+__
Call in staff	_____	+__
Activate emergency centers / Notify public safety agencies	_____	+__
Coordinate sounding of public sirens and alarm notifications	_____	+__
Initiate media notifications and evacuation announcements	_____	+__
Initiate evacuation of people away from coast (Tsunami Evacuation Maps)	_____	+__
Put boats/ships out to sea if wave impact time permits	_____	+__
Setup road-blocks and evacuation routes	_____	+__
Guide people through traffic points to shelter	_____	+__
Initiate recall of disaster response workers	_____	+__
Open and operate refuge centers	_____	+__
Prepare to start electrical generators	_____	+__
If your facility is located in a tsunami evacuation zone: -Prepare to shutoff utilities (e.g. electrical, gas, water) -Protect key equipment (e.g. computers) -Remove key documents (e.g. financial, personal information)	_____	+__

Determine if tsunami has caused coastal damage / injuries and the need to initiate search and rescue operations	_____	+__
Determine when to declare the “all clear”	_____	+__
Prepare for post tsunami impact operations	_____	+__
Do roll call for workers ___ and volunteers ____	_____	+__

Table A1. Table to be used as a guide the timing, actions, authority, communication means and target audiences for a tsunami event.

EVENT	TIME (WHEN)	ACTIVITY (WHAT INFO)	AUTHORITY (WHO)	MEDIUM (HOW)	TO (TARGET)
EQ Occurs					
Tsunami might come					
Evacuate					
Tsunami comes					
Safe to return					

Annex B. Example Table Top Exercise

Tabletop Exercise Development Steps

Original Source: California Office of Emergency Services

A Tabletop Exercise is a planned activity in which local officials, key staff, and organizations with disaster management responsibilities are presented with simulated emergency situations. It is usually informal and slow paced, in a conference room environment, and is designed to elicit constructive discussion from the participants to assess plans, policies, and procedures. Participants will examine and attempt to resolve problems, based on plans and procedures, if they exist. Individuals are encouraged to discuss decisions in depth based on their organization's Standard Operating Procedures (SOPs), with emphasis on slow-paced problem solving, rather than rapid, real time decision-making. An Exercise Controller (moderator) introduces a simulated tsunami scenario to participants via written message, simulated telephone or radio call, or by other means. Exercise problems and activities (injects) are further introduced. Participants conduct group discussions where resolution is generally agreed upon and then summarized by a group leader. A Tabletop Exercise should have specific goals, objectives, and a scenario narrative.

The following provides a Tabletop Exercise structure with sample text and example.

1. Vulnerability Analysis: Problem Statement

An example for a hurricane might be:
Due to the recent Hurricane incidents in the Southeast region of the United States, an awareness of the threat risk involved in these disasters has become more apparent, therefore the need for evacuation system is vital. The state of Louisiana continues its ongoing tasks of planning, preparing, and training for Hurricane preparedness.

2. Purpose (Mission): Intent, what you plan to accomplish (Policy Statement)

An example for a hurricane might be:
The State of Louisiana has realized and recognizes the need for a more efficient and effective evacuation system, and is responding with this Comprehensive Exercise Plan. These events will include seminars, workshops, a tabletop exercise, functional and full-scale exercises within an 18-month time frame, under the State Homeland Security grant program.

3. Scope: Exercise Activities
Agencies Involved
Hazard Type
Geographic Impact Area

An example might be:
Emergency Services coordinators at local levels of government will identify representative jurisdictions from each of the six mutual aid regions located throughout the State to participate as host jurisdictions in a series of disaster preparedness exercises. These host jurisdictions will develop a progressive series of exercises each type building upon the previous type of exercise. The process will begin with a vulnerability analysis for each jurisdiction and continue through a progression of exercise activities including: orientation seminars, workshops, and tabletop and functional exercises. The eventual objective of these activities will be to reduce disaster impacts to their populations and city infrastructure. All events will be evaluated utilizing US

Homeland Security Exercise Evaluation Program (HSEEP) after action reporting (AAR) standards. Steps for corrective actions will be made a part of the after action process and report. Surrounding jurisdictions in the mutual aid area will act as exercise design team members, exercise evaluators, or exercise observers for the purpose of information transfer to increase their operational readiness. Jurisdictions will participate on a rotational basis every two years to provide the opportunity for multiple jurisdiction participation.

4. Goals and Objectives:

Criteria for good objectives: Think SMART

- Simple (concise)
- Measurable
- Achievable (can this be done during the exercise?)
- Realistic (and challenging)
- Task Oriented (oriented to functions)

An example might be:

Comprehensive Exercise Program (CEP) Objectives

- *To improve operational readiness*
- *To improve multi-agency coordination and response capabilities for effective disaster response*
- *To identify communication pathways and problem areas pre-event between local jurisdictions and operational area, regional and state emergency operations centers*
- *To establish uniform methods for resource ordering, tracking, and supply for agencies involved at all levels of government.*

5. Narrative:

The Narrative should describe the following:

- Triggering emergency/disaster event
- Describe the environment at the time the exercise begins
- Provide necessary background information
- Prepare participants for the exercise
- Discovery, report: how do you find out?
- Advance notice?
- Time, location, extent or level of damage

6. Evaluation:

The Evaluation should describe the following:

- Objectives Based
- Train Evaluation Teams
- Develop Evaluation Forms

7. After Action Report (AAR): The AAR should be compiled using the evaluation reports

8. Improvement Plan (IP): The IP should reduce vulnerabilities.

Annex C. Tsunami Source Scenario Description

Venezuela Earthquake Scenario

The scenario consists of a rupture of two fault segments along the coast of Venezuela with hypocenter at:

- Origin Time 14:00:00 UTC March 17, 2016
- Latitude 10.8°
- Longitude -66.0°
- Depth 15km
- Magnitude 8.4 – Mw (total for two segments)
- Slip 8 m
- Shear modulus: 3E11 dyne/cm^2
- Seismic Moment: 5.01E28 dyne-cm

Segment 1

- End Point A
  - Latitude: 10.570°
  - Longitude: -64.547°
- End Point B
  - Latitude: 10.750°
  - Longitude: -66.000°
- Depth: 15km
- Strike: 97°
- Dip: 50°
- Rake: 90°
- Length: 157 km
- Width: 60km

Segment 2

- End Point A
  - Latitude: 10.750°
  - Longitude: -66.000°
- End Point B
  - Latitude: 10.750°
  - Longitude: -67.434°
- Depth: 15km
- Strike: 90°
- Dip: 50°
- Rake: 90°
- Length: 160 km
- Width: 60km

Northern Hispaniola Earthquake Scenario

The scenario consists of a rupture of three fault segments in Northern Hispaniola with hypocenter at:

- Origin Time 15:00:00 UTC March 17, 2016
- Latitude 20.2°
- Longitude -71.7°
- Depth 20km
- Magnitude 8.7 – Mw (total for three segments)
- Slip 10m
- Shear modulus: 3E11 dyne/cm2

- Seismic Moment: 1.21E29 dyne-cm

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Segment 1
- End Point A
  - Latitude: 20.7674°
  - Longitude: -74.4984°
- End Point B
  - Latitude: 20.4069°
  - Longitude: -73.5201°
- Depth: 20 km
- Strike: 111.0°
- Dip: 21°
- Rake: 90°
- Length: 111 km
- Width: 59km

Segment 2
- End Point A
  - Latitude: 20.4069°
  - Longitude: -73.5201°
- End Point B
  - Latitude: 20.1982°
  - Longitude: -71.6834°
- Depth: 20 km
- Strike: 97.0°
- Dip: 21°
- Rake: 90°
- Length: 195 km
- Width: 59km

Segment 3
- End Point A
  - Latitude: 20.1982°
  - Longitude: -71.6834°
- End Point B
  - Latitude: 19.5541°
  - Longitude: -68.7327°
- Depth: 20 km
- Strike: 103.0°
- Dip: 21°
- Rake: 90°
- Length: 317 km
- Width: 59km

Tsunami models were computed using the Rapid Inundation Forecasting of Tsunamis (RIFT) model to generate expected impacts throughout the region.

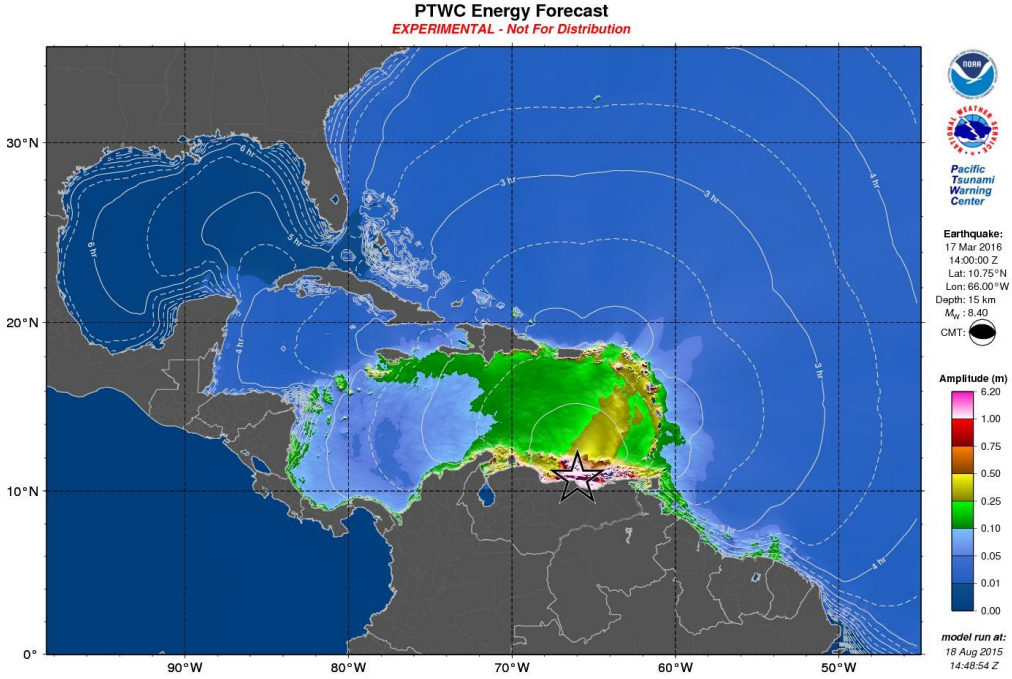


Figure C1. RIFT maximum amplitude map for the western Atlantic basin based on the SW Caribbean scenario for Venezuela. During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

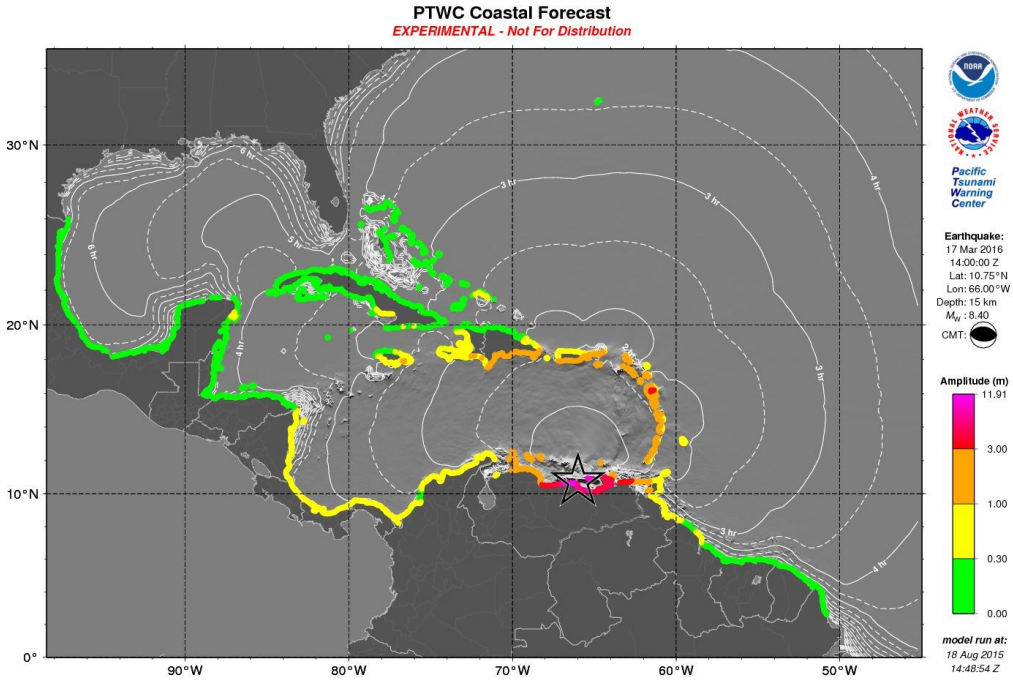


Figure C2. RIFT coastal tsunami amplitude map for the Caribbean Sea based on the SW Caribbean scenario for Venezuela. During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

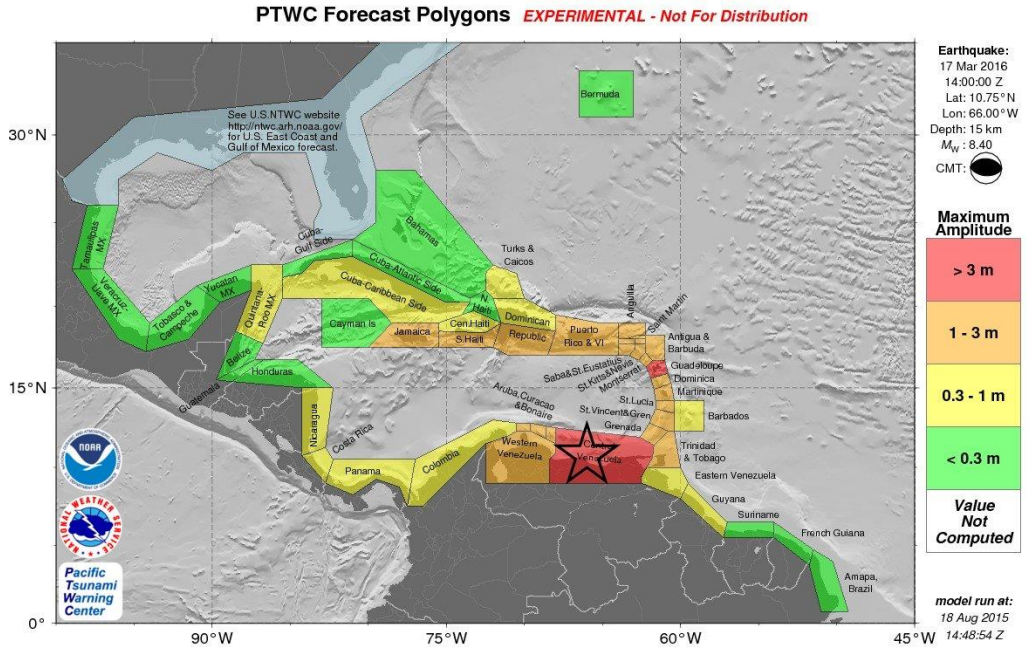


Figure C3. RIFT forecast polygons for the Caribbean region on the Venezuela scenario. During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

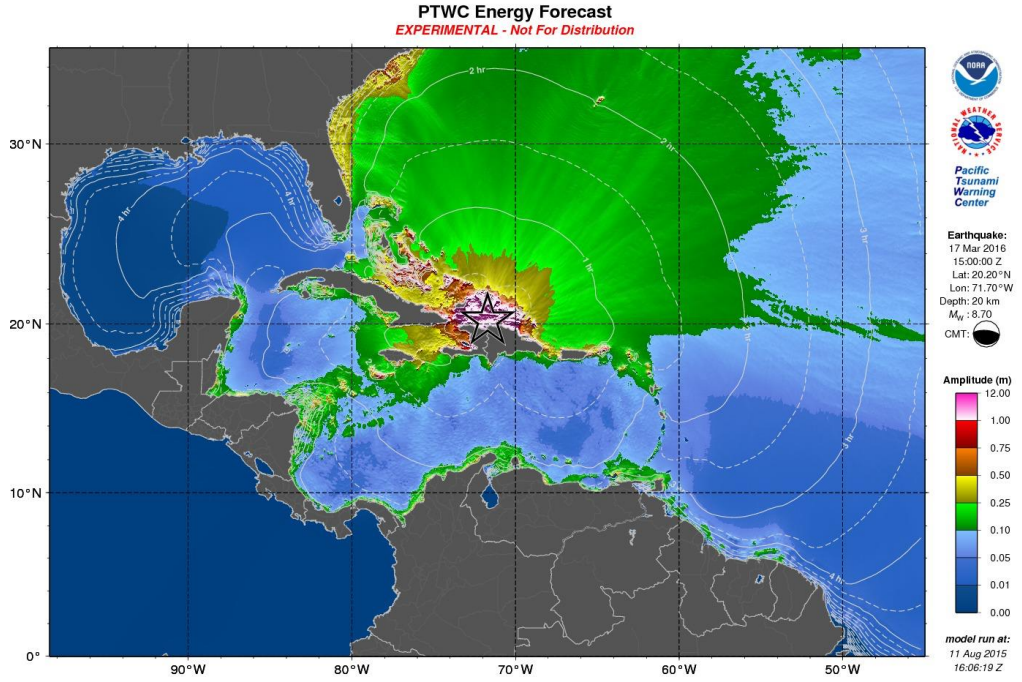


Figure C4. RIFT maximum amplitude map for the western Atlantic basin based on the SW Caribbean scenario for Northern Hispaniola. During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

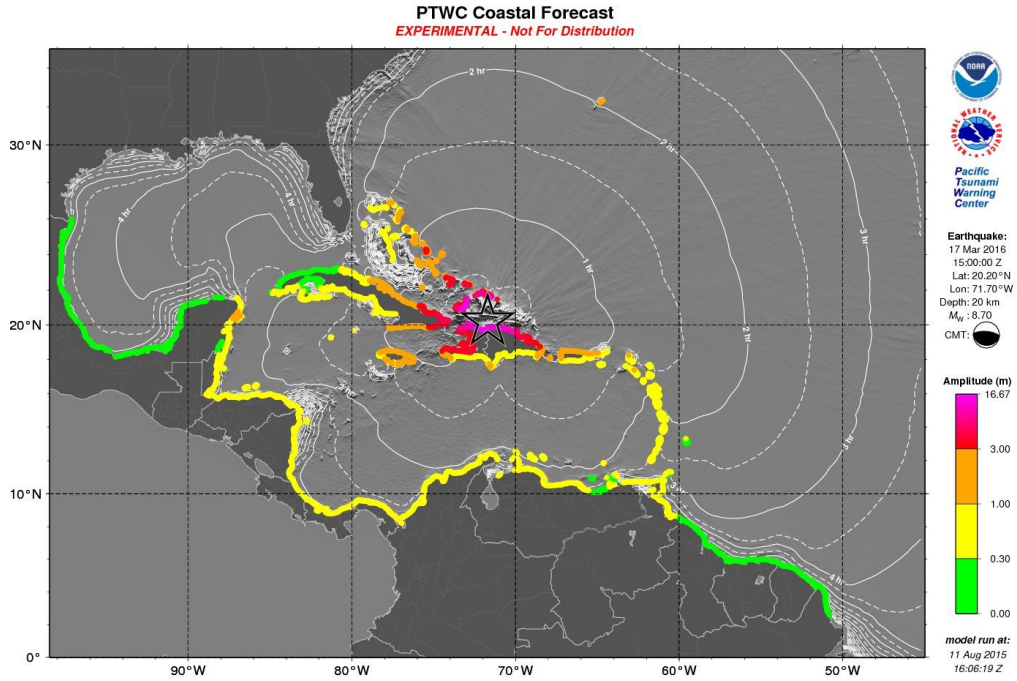


Figure C5. RIFT coastal tsunami amplitude map for the Caribbean Sea based on the SW Caribbean scenario for Northern Hispaniola. During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami.

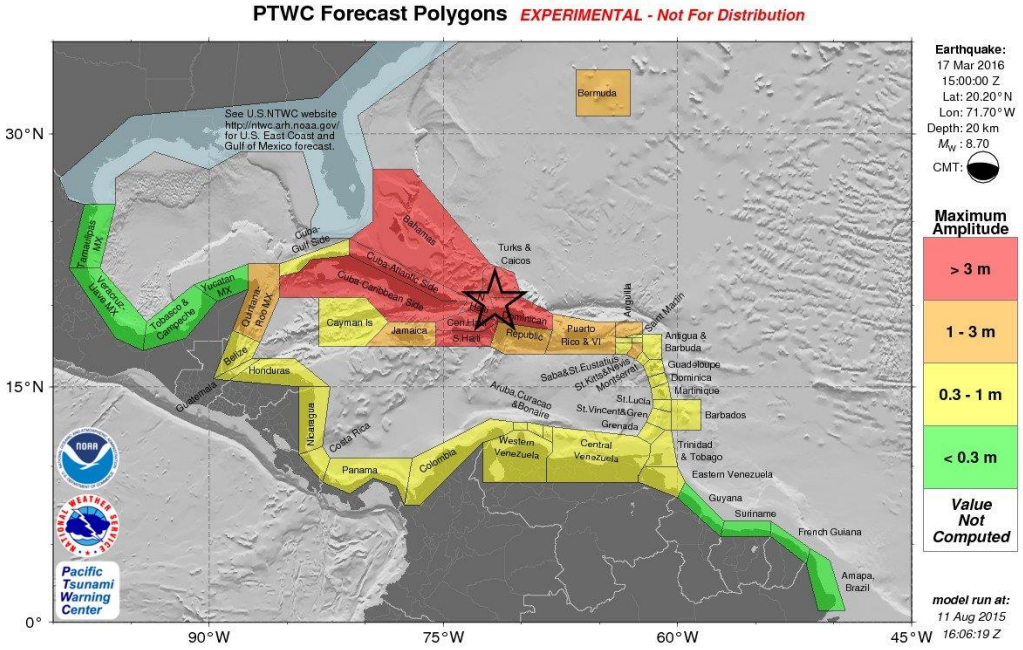


Figure C6. RIFT forecast polygons for the Caribbean region on the Northern Hispaniola scenario. During a real event this product will only be made available to officially designated Tsunami Warning Focal Points and National Tsunami Warning Centers.

Forecast maximum wave heights above sea level are provided in the Tables C1 and Table C2. Note that the highest tsunami run-up elevation on the shore could be double that of the model outputs since model outputs are determined at the coast.

Table C1. Maximum Amplitude and travel time forecasts based on RIFT model for the Venezuela scenario (TTTs and MTAs based on data provided by PTWC Message #8)**.**

Location	Tsunami Travel Time to Listed Location (hours)	Maximum Tsunami Amplitude (m)
ILE ROYAL GUIANA FR	5.4	0.2
DART 42429	5.1	0
DART 42409	4.9	0
PUERTO MORELOS MX	4.9	0.14
ISLA MUJERES	4.7	0.18
DART 41424	3.8	0.02
LIMON CR	3.6	0.69
GEORGE TOWN CY	3.5	0.12
EL PORVENIR PM	3.5	0.46
SAN ANDRES CO	3.3	0.45
SANTA MARTA CO	3.0	0.94
CAP HAITIEN HT	2.7	0.24
PARHAM AT	2.5	0.82
DART 41420	2.4	0.03
DART 41421	2.4	0.03
LAMESHURBAYSTJOHNVI	2.4	2.05
PUERTO PLATA DO	2.3	0.25
DESIRADE GUADELOUPE	2.2	0.96
SAN JUAN PR	2.2	0.41
JACMEL HT	2.3	1.47
CHARLOTTEVILLE TT	2.1	0.75
LE ROBERT MARTINIQU	2.0	1.16
BRIDGEPORT BB	1.9	0.78
PORT ST CHARLES BB	1.9	0.88
POINT A PITRE GP	1.9	4.3
PUNTA CANA DO	1.8	1.91
DESHAIES GUADELOUPE	1.7	3.03
ESPERANZA VIEQUES P	1.7	1.69
PORT SAN ANDRES DO	1.8	1.68
MAYAGUEZ PR	1.7	1.42
ROSEAU DM	1.7	2.74
LE PRECHEUR MARTINI	1.6	2.55
FORT DE FRANCE MQ	1.7	2.97
MONA ISLAND PR	1.6	1.38
CALLIAQUA VC	1.7	1.87
LIMETREE VI	1.6	2.42
ST CROIX VI	1.6	2.27
MAGUEYES ISLAND PR	1.6	1.38
PENUELAS PR	1.6	1.91
PRICKLEY BAY GD	1.4	1.76
BULLEN BAY CURACAO	1.2	2.18
DART 42407	1.1	0.22

Table C2. Maximum Amplitude and travel time forecasts based on RIFT model for Northern Hispaniola scenario (TTTs and MTAs based on data provided by PTWC Message #8)**.**

Location	Tsunami Travel Time to Listed Location (hours)	Maximum Tsunami Amplitude (m)
PILOTS STATION LA	4.4	0.08
KEY WEST FL	3.9	0.2
TRIDENT PIER FL	3.9	1.26
DART 42429	3.3	0.01
LIMON CR	3.3	0.71
CHARLOTTEVILLE TT	3.2	0.28
DART 42409	3.2	0.01
PUERTO MORELOS MX	3.1	0.38
ISLA MUJERES	3.0	0.68
EL PORVENIR PM	2.9	0.87
PRICKLEY BAY GD	2.8	0.47
SAN ANDRES CO	2.9	0.57
CALLIAQUA VC	2.6	0.5
BRIDGEPORT BB	2.5	0.31
PORT ST CHARLES BB	2.4	0.31
SANTA MARTA CO	2.4	0.89
FORT DE FRANCE MQ	2.3	0.62
LE ROBERT MARTINIQU	2.2	0.31
ROSEAU DM	2.2	0.46
LE PRECHEUR MARTINI	2.2	0.54
BULLEN BAY CURACAO	2.2	0.89
POINT A PITRE GP	2.0	0.6
DART 41424	2.1	0.19
LAMESHURBAYSTJOHNVI	2.0	0.83
DESHAIES GUADELOUPE	2.0	0.62
PORT SAN ANDRES DO	1.9	1.14
PARHAM AT	1.8	0.42
DESIRADE GUADELOUPE	1.9	0.38
ESPERANZA VIEQUES P	1.7	0.73
GEORGE TOWN CY	1.7	0.47
LIMETREE VI	1.6	0.77
ST CROIX VI	1.5	0.8
DART 42407	1.5	0.07
JACMEL HT	1.5	0.78
MAGUEYES ISLAND PR	1.4	0.91
PENUELAS PR	1.4	0.94
DART 41421	1.3	0.19
MONA ISLAND PR	1.2	2.74
PUNTA CANA DO	1.1	3.47
SAN JUAN PR	1.0	2.03
MAYAGUEZ PR	1.1	3.55

Location	Tsunami Travel Time to Listed Location (hours)	Maximum Tsunami Amplitude (m)
DART 41420	0.9	0.24
PUERTO PLATA DO	0.4	15.27
CAP HAITIEN HT	0.2	17.74

Annex D. Earthquake Impact Scenario

When planning for a tsunami it is important to also take into consideration the potential earthquake impact in areas close to the source, as these impacts can affect tsunami response and increase the tsunami impact by hindering evacuation and contributing debris to be carried by the waves. For earthquake impact, the USGS has developed ShakeMap and the Prompt Assessment of Global Earthquakes for Response (PAGER). The main purpose of ShakeMap is to display the levels of ground shaking produced by the earthquake. The ground shaking events levels in the region are studied depending on the magnitude of the earthquake, distance from the earthquake source, rock and soil behavior in the region and propagation of the seismic waves through the Earth's crust. Based on the output of ShakeMap, PAGER estimates the population exposed to earthquake shaking, fatalities and economic losses.

Earthquake Event

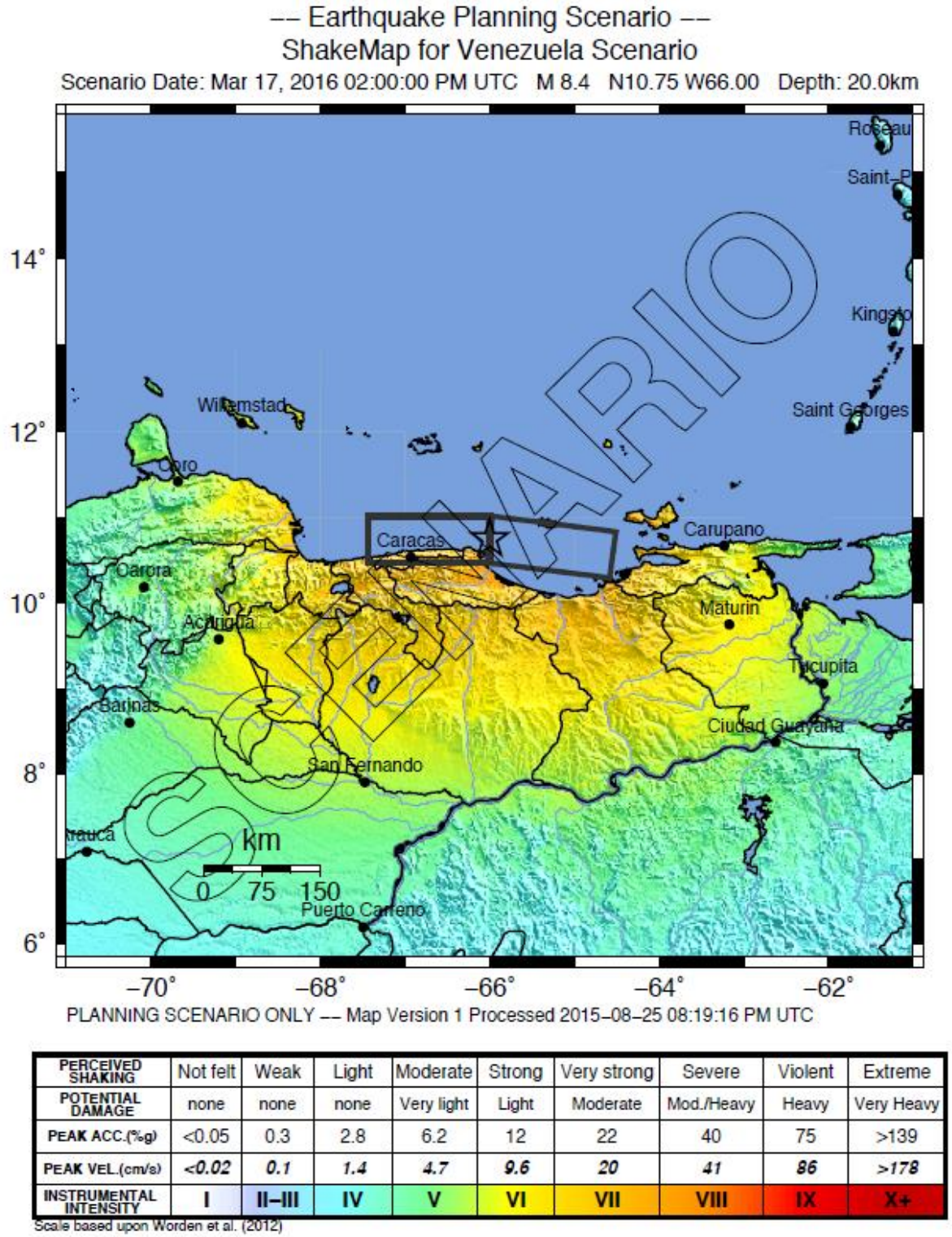
The input information for ShakeMap and PAGER are the four corners of the boxes from the fault plane and the depths at each of these four corners. For the case of Caribe Wave 16, the fault plane is divided in two segments for the Venezuela scenario and three segments for Northern Hispaniola Scenario. The Venezuela fault plane is 320km long, 60km wide and 20km depth. The Northern Hispaniola fault plane is 620km long, 59km wide and 20km deep.

For the Venezuela scenario the ShakeMap show intensities up to VIII on the Mercalli Modified Scale (Figure D1). The strongest ground shaking is predicted for the coast of Venezuela and the intensity decreases further in land. According to the ShakeMap for the Northern Hispaniola scenario (Figure D3), intensities of up to VII on the Mercalli Modified Scale could be observed. The strongest ground shaking is predicted for the North of Hispaniola, Turks and Caicos Islands and the east of Cuba, while the South of Hispaniola Puerto Rico, the ground shaking is moderate.

According to PAGER, (Figure D2 and D4) the earthquakes in both scenarios used for Caribe Wave 16, would produce red alert. A red alert means that high casualties and extensive damage are probable and the disaster from the earthquake is likely widespread. For the Venezuela scenario the red alert would be for the north coast of Venezuela while for the Northern Hispaniola scenario, a red alert would be for Northern Dominican Republic, Northern Haiti, Turks and Caicos Islands and the East of Cuba.

In terms of population exposed to earthquake shaking, it is estimated that almost 7.7 million people for Venezuela scenario and 5.5 million people for Northern Hispaniola scenario would be exposed to Modified Mercalli intensities from VI up to VIII. Figures D1, D2, D3, and D4 shows ShakeMap and PAGER show outputs for the Caribe Wave 16 earthquake scenarios.

Venezuela Earthquake Scenario



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

Scale based upon Worden et al. (2012)

Figure D1. Shake map output for the CARIBE WAVE 16 Venezuela earthquake scenario.

USGS science for a changing world

Earthquake Shaking — Red Alert

USAID FROM THE AMERICAN PEOPLE

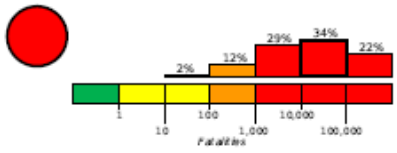
GSN ANSS

M 8.4, Venezuela

Origin Time: Thu 2016-03-17 14:00:00 UTC (09:30:00 local)
Location: 10.75°N 66.00°W Depth: 20 km
FOR TSUNAMI INFORMATION, SEE: tsunami.gov

PAGER
Version 1
Created: 25 minutes, 0 seconds after earthquake

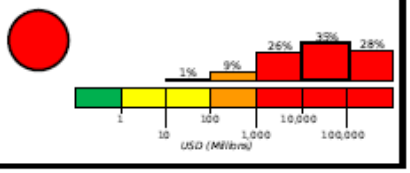
Estimated Fatalities



Red alert for shaking-related fatalities and economic losses. High casualties and extensive damage are probable and the disaster is likely widespread. Past red alerts have required a national or international response.

Estimated economic losses are 3-20% GDP of Bolivarian Republic of Venezuela.

Estimated Economic Losses



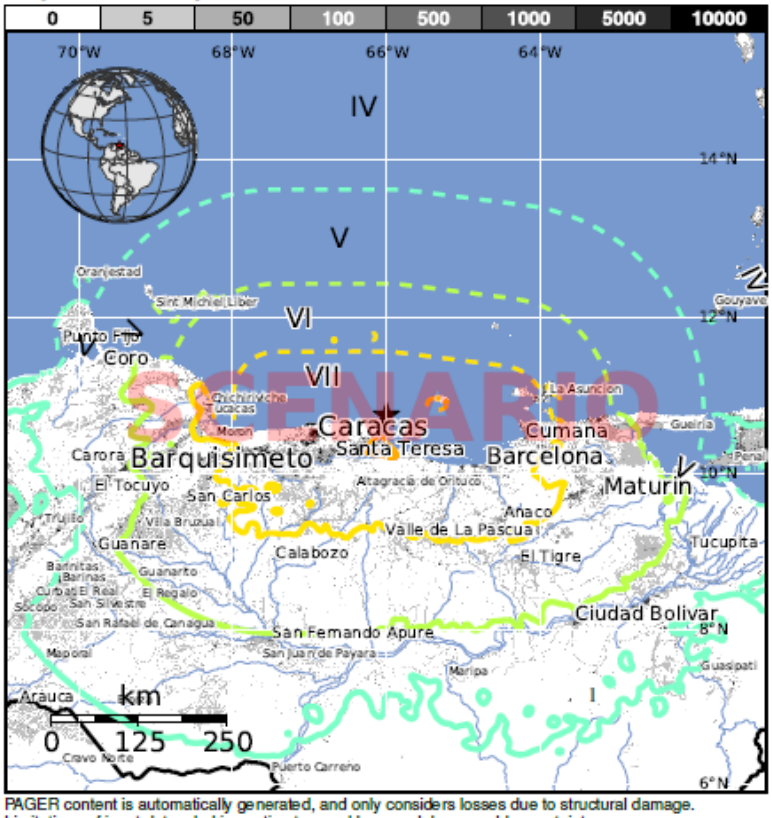
Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)		- -*	- -*	2,141k*	6,296k	4,893k	11,690k	478k	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY		I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

*Estimated exposure only includes population within the map area

Population Exposure

population per 1 sq. km from Landscan



PAGER content is automatically generated, and only considers losses due to structural damage. Limitations of input data, shaking estimates, and loss models may add uncertainty.

Structures:
Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist. The predominant vulnerable building types are unreinforced brick masonry and adobe construction.

Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max MMI(#)	Shaking Deaths
1983-04-11	359	6.1	VIII(2k)	0
1974-06-12	281	6.5	IX(12k)	5
1997-07-09	271	6.9	VIII(2k)	81

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

Selected City Exposure

from GeoNames.org

MMI	City	Population
VIII	Puerto La Cruz	370k
VIII	Guanta	<1k
VIII	Lecherias	<1k
VIII	Rio Chico	<1k
VIII	San Jose de B.	<1k
VIII	Boca de Uchire	<1k
VII	**Barcelona**	**425k**
VII	**Caracas**	**3,000k**
VII	Maracay	1,754k
VII	Valencia	1,385k
VI	**Barquisimeto**	**809k**

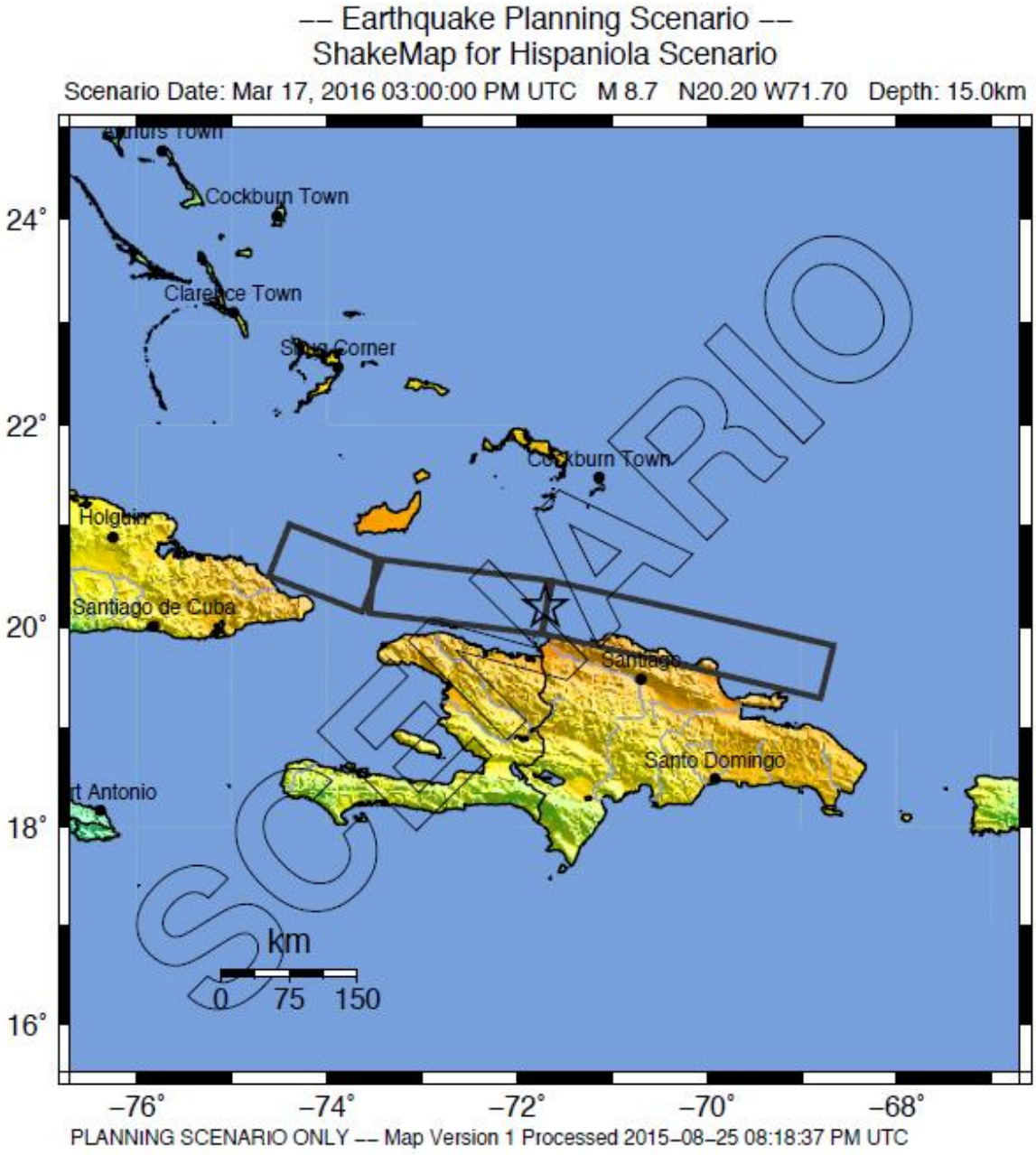
bold cities appear on map (k = x1000)

http://earthquake.usgs.gov/pager

Event ID: usvenezuela_se

Figure D2. PAGER output for CARIBE WAVE 16 Venezuela earthquake scenario (USGS).

Northern Hispaniola Earthquake Scenario



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

Scale based upon Worden et al. (2012)

Figure D3. Shake map output for the CARIBE WAVE 16 Northern Hispaniola scenario (USGS).

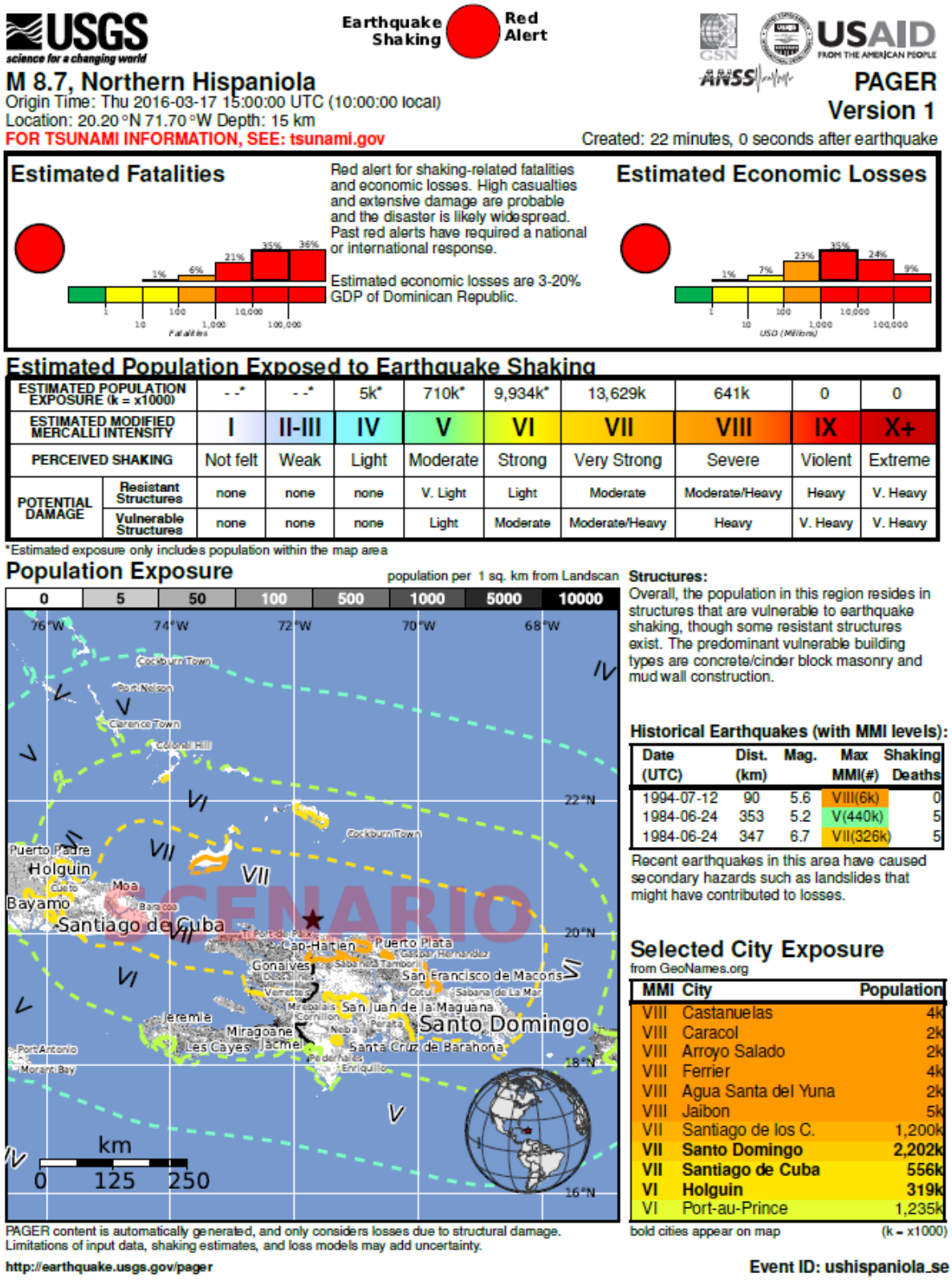


Figure D4. PAGER output for CARIBE WAVE 16 Northern Hispaniola earthquake scenario (USGS).

Annex E. TWC Dummy (Start of Exercise) Messages

Venezuela Earthquake Scenario

PTWC

```
WECA41 PHEB 171405
TSUCAX

TEST...TSUNAMI EXERCISE MESSAGE NUMBER 1...TEST
NWS PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 1405Z 17 MAR 2016

...CARIBEWAVE 16 TSUNAMI EXERCISE MESSAGE. REFER TO PTWC MESSAGE 1 IN THE
EXERCISE HANDBOOK. THIS IS AN EXERCISE ONLY...

THIS MESSAGE IS BEING USED TO START THE CARIBEWAVE 16 CARIBBEAN TSUNAMI EXERCISE
VENEZUELA SCENARIO. THIS WILL BE THE ONLY EXERCISE MESSAGE BROADCAST FROM THE
PACIFIC TSUNAMI WARNING CENTER EXCLUDING SPECIAL EMAIL MESSAGES DISCUSSED IN THE
HANDBOOK. THE HANDBOOK IS AVAILABLE AT THE WEB SITE CARIBEWAVE.INFO. THE
EXERCISE PURPOSE IS TO PROVIDE EMERGENCY MANAGEMENT A REALISTIC SCENARIO TO TEST
TSUNAMI RESPONSE PLANS.

THIS IS ONLY AN EXERCISE.

$$
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Northern Hispaniola Earthquake Scenario

PTWC

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WECA41 PHEB 171505
TSUCAX

TEST...TSUNAMI EXERCISE MESSAGE NUMBER 1...TEST
NWS PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 1505Z 17 MAR 2016

...CARIBEWAVE 16 TSUNAMI EXERCISE MESSAGE. REFER TO PTWC MESSAGE 1 IN THE
EXERCISE HANDBOOK. THIS IS AN EXERCISE ONLY...

THIS MESSAGE IS BEING USED TO START THE CARIBEWAVE 16 CARIBBEAN TSUNAMI EXERCISE
NORTHERN HISPANIOLA SCENARIO. THIS WILL BE THE ONLY EXERCISE MESSAGE BROADCAST
FROM THE PACIFIC TSUNAMI WARNING CENTER EXCLUDING SPECIAL EMAIL MESSAGES
DISCUSSED IN THE HANDBOOK. THE HANDBOOK IS AVAILABLE AT THE WEB SITE
CARIBEWAVE.INFO. THE EXERCISE PURPOSE IS TO PROVIDE EMERGENCY MANAGEMENT A
REALISTIC SCENARIO TO TEST TSUNAMI RESPONSE PLANS.

THIS IS ONLY AN EXERCISE.

$$
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Annex F. TWC Exercise Messages

Venezuela Earthquake Scenario

The following messages created for the CARIBE WAVE 16 tsunami exercise are representative of the official standard products issued by the PTWC during a large magnitude 8.4 earthquake and tsunami originating in Venezuela. During a real event, NTWC and TWFP would be sent via email the graphical products. The alerts would persist longer during a real event than is depicted in this exercise.

PTWC Message #1

```
WECA41 PHEB 171405
TSUCAX

TSUNAMI MESSAGE NUMBER 1
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1405 UTC THU MAR 17 2016

...TSUNAMI THREAT MESSAGE...


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

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

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

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


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

  * MAGNITUDE      8.5
  * ORIGIN TIME    1400 UTC MAR 17 2016
  * COORDINATES    10.8 NORTH  66.0 WEST
  * DEPTH          15 KM / 9 MILES
  * LOCATION       NEAR THE COAST OF VENEZUELA


EVALUATION
----------

  * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.5 OCCURRED
    NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17
    2016.

  * 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

      VENEZUELA... BONAIRE... CURACAO... ARUBA... SAINT
      VINCENT... GRENADA... PUERTO RICO... SAINT LUCIA... US
      VIRGIN ISLANDS... MARTINIQUE... DOMINICA... GUADELOUPE...
      DOMINICAN REP... SABA... MONTSERRAT... SAINT KITTS... SINT
      EUSTATIUS... BARBADOS... HAITI... TRINIDAD TOBAGO... SINT
      MAARTEN... COLOMBIA... ANGUILLA... ANTIGUA... BR VIRGIN
```

ISLANDS... BARBUDA... SAINT BARTHELEMY... TURKS N CAICOS... CUBA... SAINT MARTIN... JAMAICA... BAHAMAS... PANAMA AND CAYMAN ISLANDS

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 LISTED 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)
CUMANA	VENEZUELA	10.5N	64.2W	1438 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1448 03/17
ONIMA	BONAIRE	12.3N	68.3W	1455 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1501 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1519 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1519 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1519 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1524 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1527 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1529 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1532 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1538 03/17
SABA	SABA	17.6N	63.2W	1541 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1543 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1544 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1545 03/17
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1546 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1548 03/17
JACAMEL	HAITI	18.1N	72.5W	1552 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1553 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1554 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1605 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1611 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1613 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1614 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1618 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1624 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1625 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1627 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1628 03/17
CAP HAITEN	HAITI	19.8N	72.2W	1629 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1631 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1632 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1635 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1638 03/17
MAYAGUANA	BAHAMAS	22.3N	73.0W	1639 03/17
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1642 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1645 03/17
BARACOA	CUBA	20.4N	74.5W	1647 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1647 03/17
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1647 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1649 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1652 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1652 03/17
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1652 03/17
LONG ISLAND	BAHAMAS	23.3N	75.1W	1656 03/17
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1702 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1704 03/17

POTENTIAL IMPACTS
---

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

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

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

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

NEXT UPDATE AND ADDITIONAL INFORMATION
---

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

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

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

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

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

$$

PTWC Message #2

WECA41 PHEB 171425
TSUCAX

TSUNAMI MESSAGE NUMBER 2
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1425 UTC THU MAR 17 2016

...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 *****

UPDATES
----

* THE ESTIMATED MAGNITUDE OF THE EARTHQUAKE IS REDUCED FROM 8.5 TO 8.4.

* FORECAST TSUNAMI AMPLITUDES ARE NOW INCLUDED.

PRELIMINARY EARTHQUAKE PARAMETERS
----

* MAGNITUDE 8.4
* ORIGIN TIME 1400 UTC MAR 17 2016
* COORDINATES 10.8 NORTH 66.0 WEST
* DEPTH 15 KM / 9 MILES
* LOCATION NEAR THE COAST OF VENEZUELA

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

* 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

  GUADELOUPE... AND VENEZUELA.

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

  ARUBA... COLOMBIA... DOMINICAN REPUBLIC... HAITI... PUERTO RICO AND VIRGIN IS... ANGUILLA... ANTIGUA AND BARBUDA... DOMINICA... GRENADA... JAMAICA... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TRINIDAD AND TOBAGO.

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

  COSTA RICA... CUBA... GUYANA... MEXICO... NICARAGUA... PANAMA... BARBADOS... AND TURKS AND CAICOS ISLANDS.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT

YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS
NECESSARY IN SUBSEQUENT PRODUCTS.

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)
CUMANA	VENEZUELA	10.5N	64.2W	1438 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1448 03/17
ONIMA	BONAIRE	12.3N	68.3W	1455 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1501 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1519 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1519 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1519 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1524 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1527 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1529 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1532 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1538 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1543 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1544 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1545 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1548 03/17
JACAMEL	HAITI	18.1N	72.5W	1552 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1553 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1554 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1605 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1611 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1613 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1614 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1618 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1624 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1625 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1627 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1628 03/17
CAP HAITEN	HAITI	19.8N	72.2W	1629 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1631 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1632 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1635 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1638 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1645 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1647 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1649 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1652 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1652 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1704 03/17
JEREMIE	HAITI	18.6N	74.1W	1713 03/17

PUNTO FIJO	VENEZUELA	11.7N	70.2W	1715 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1716 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1725 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1729 03/17
COLON	PANAMA	9.4N	79.9W	1749 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1803 03/17
COZUMEL	MEXICO	20.5N	87.0W	1811 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1815 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1816 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1855 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1930 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	1931 03/17
GEORGETOWN	GUYANA	6.8N	58.2W	2014 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2055 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2154 03/17

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

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

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

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

NEXT UPDATE AND ADDITIONAL INFORMATION
---

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

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

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

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

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

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PTWC Message #3

WECA41 PHEB 171510
TSUCAX

TSUNAMI MESSAGE NUMBER 3
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI

1510 UTC THU MAR 17 2016

...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 *****

UPDATES
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* TSUNAMI WAVE OBSERVATIONS ARE NOW INCLUDED.

PRELIMINARY EARTHQUAKE PARAMETERS
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* MAGNITUDE 8.4
* ORIGIN TIME 1400 UTC MAR 17 2016
* COORDINATES 10.8 NORTH 66.0 WEST
* DEPTH 15 KM / 9 MILES
* LOCATION NEAR THE COAST OF VENEZUELA

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
----

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

  GUADELOUPE... AND VENEZUELA.

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

  ARUBA... COLOMBIA... DOMINICAN REPUBLIC... HAITI... PUERTO RICO AND VIRGIN IS... ANGUILLA... ANTIGUA AND BARBUDA... DOMINICA... GRENADA... JAMAICA... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TRINIDAD AND TOBAGO.

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

  COSTA RICA... CUBA... GUYANA... MEXICO... NICARAGUA... PANAMA... BARBADOS... AND TURKS AND CAICOS ISLANDS.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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

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

ESTIMATED TIMES OF ARRIVAL
---

* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN 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)
CUMANA	VENEZUELA	10.5N	64.2W	1438 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1448 03/17
ONIMA	BONAIRE	12.3N	68.3W	1455 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1501 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1519 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1519 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1519 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1524 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1527 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1529 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1532 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1538 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1543 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1544 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1545 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1548 03/17
JACAMEL	HAITI	18.1N	72.5W	1552 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1553 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1554 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1605 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1611 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1613 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1614 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1618 03/17

PALMETTO POINT	BARBUDA	17.6N	61.9W	1624 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1625 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1627 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1628 03/17
CAP HAITEN	HAITI	19.8N	72.2W	1629 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1631 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1632 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1635 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1638 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1645 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1647 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1649 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1652 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1652 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1704 03/17
JEREMIE	HAITI	18.6N	74.1W	1713 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1715 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1716 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1725 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1729 03/17
COLON	PANAMA	9.4N	79.9W	1749 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1803 03/17
COZUMEL	MEXICO	20.5N	87.0W	1811 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1815 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1816 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1855 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1930 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	1931 03/17
GEORGETOWN	GUYANA	6.8N	58.2W	2014 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2055 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2154 03/17

POTENTIAL IMPACTS
---

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

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

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

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

TSUNAMI OBSERVATIONS
---

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
DART 42407	15.3N	68.2W	1507	0.22M/ 0.7FT	16

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

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

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

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

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

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PTWC Message #4

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WECA41 PHEB 171545
TSUCAX

TSUNAMI MESSAGE NUMBER 4
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1545 UTC THU MAR 17 2016

...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 *****


UPDATES
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  * TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.


PRELIMINARY EARTHQUAKE PARAMETERS
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  * MAGNITUDE      8.4
  * ORIGIN TIME    1400 UTC MAR 17 2016
  * COORDINATES    10.8 NORTH  66.0 WEST
  * DEPTH          15 KM / 9 MILES
  * LOCATION       NEAR THE COAST OF VENEZUELA
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EVALUATION
---

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
---

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

  GUADELOUPE... AND VENEZUELA.

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

  ARUBA... COLOMBIA... DOMINICAN REPUBLIC... HAITI... PUERTO RICO AND VIRGIN IS... ANGUILLA... ANTIGUA AND BARBUDA... DOMINICA... GRENADA... JAMAICA... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TRINIDAD AND TOBAGO.

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

  COSTA RICA... CUBA... GUYANA... MEXICO... NICARAGUA... PANAMA... BARBADOS... AND TURKS AND CAICOS ISLANDS.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
MAIQUETIA	VENEZUELA	10.6N	67.0W	1448 03/17
ONIMA	BONAIRE	12.3N	68.3W	1455 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1501 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1519 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1519 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1519 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1524 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1527 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1529 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1532 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1538 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1543 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1544 03/17
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PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1553 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1554 03/17
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WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1638 03/17
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JEREMIE	HAITI	18.6N	74.1W	1713 03/17
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COZUMEL	MEXICO	20.5N	87.0W	1811 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1815 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1816 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1855 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1930 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	1931 03/17
GEORGETOWN	GUYANA	6.8N	58.2W	2014 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2055 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2154 03/17

POTENTIAL IMPACTS
---

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

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
DESHAIES GUADELOUPE	16.3N	61.8W	1544	3.03M/ 9.9FT	20
ESPERANZA VIEQUES P	18.1N	65.5W	1542	1.69M/ 5.6FT	24
MAYAGUEZ PR	18.2N	67.2W	1541	1.42M/ 4.7FT	18
ROSEAU DM	15.3N	61.4W	1540	2.74M/ 9.0FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	1534	2.55M/ 8.4FT	26
FORT DE FRANCE MQ	14.6N	61.1W	1541	2.97M/ 9.7FT	26
MONA ISLAND PR	18.1N	67.9W	1538	1.38M/ 4.5FT	20
CALLIAQUA VC	13.1N	61.2W	1540	1.87M/ 6.1FT	22
LIMETREE VI	17.7N	64.8W	1538	2.42M/ 7.9FT	22
ST CROIX VI	17.7N	64.7W	1535	2.27M/ 7.5FT	24
MAGUEYES ISLAND PR	18.0N	67.0W	1534	1.38M/ 4.5FT	14
PENUELAS PR	18.0N	66.8W	1535	1.91M/ 6.3FT	20
PRICKLEY BAY GD	12.0N	61.8W	1525	1.76M/ 5.8FT	24
BULLEN BAY CURACAO	12.2N	69.0W	1512	2.18M/ 7.2FT	22
DART 42407	15.3N	68.2W	1507	0.22M/ 0.7FT	16

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

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

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

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

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

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PTWC Message #5

WECA41 PHEB 171645
TSUCAX

TSUNAMI MESSAGE NUMBER 5
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1645 UTC THU MAR 17 2016

...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 *****

UPDATES
----

* TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
----

* MAGNITUDE 8.4
* ORIGIN TIME 1400 UTC MAR 17 2016
* COORDINATES 10.8 NORTH 66.0 WEST
* DEPTH 15 KM / 9 MILES
* LOCATION NEAR THE COAST OF VENEZUELA

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
----

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

GUADELOUPE... AND VENEZUELA.

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

  ARUBA... COLOMBIA... DOMINICAN REPUBLIC... HAITI... PUERTO RICO AND VIRGIN IS... ANGUILLA... ANTIGUA AND BARBUDA... DOMINICA... GRENADA... JAMAICA... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TRINIDAD AND TOBAGO.

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

  COSTA RICA... CUBA... GUYANA... MEXICO... NICARAGUA... PANAMA... BARBADOS... AND TURKS AND CAICOS ISLANDS.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
BASSETERRE	SAINT KITTS	17.3N	62.7W	1545 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1548 03/17
JACAMEL	HAITI	18.1N	72.5W	1552 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1553 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1554 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1605 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1611 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1613 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1614 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1618 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1624 03/17

SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1625 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1627 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1628 03/17
CAP HAITEN	HAITI	19.8N	72.2W	1629 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1631 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1632 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1635 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1638 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1645 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1647 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1649 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1652 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1652 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1704 03/17
JEREMIE	HAITI	18.6N	74.1W	1713 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1715 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1716 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1725 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1729 03/17
COLON	PANAMA	9.4N	79.9W	1749 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1803 03/17
COZUMEL	MEXICO	20.5N	87.0W	1811 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1815 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1816 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1855 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1930 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	1931 03/17
GEORGETOWN	GUYANA	6.8N	58.2W	2014 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2055 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2154 03/17

POTENTIAL IMPACTS

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

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

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

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

TSUNAMI OBSERVATIONS

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
CAP HAITIEN HT	19.8N	72.2W	1640	0.24M/ 0.8FT	26
PARHAM AT	17.1N	61.8W	1628	0.82M/ 2.7FT	16
DART 41420	23.5N	67.3W	1625	0.03M/ 0.1FT	22
DART 41421	23.4N	63.9W	1625	0.03M/ 0.1FT	26
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1623	2.05M/ 6.7FT	22
PUERTO PLATA DO	19.8N	70.7W	1620	0.25M/ 0.8FT	18

DESIRADE GUADELOUPE	16.3N	61.1W	1609	0.96M/ 3.2FT	28
SAN JUAN PR	18.5N	66.1W	1611	0.41M/ 1.4FT	24
JACMEL HT	18.2N	72.5W	1600	1.47M/ 4.8FT	14
CHARLOTTEVILLE TT	11.3N	60.5W	1606	0.75M/ 2.4FT	26
LE ROBERT MARTINIQU	14.7N	60.9W	1559	1.16M/ 3.8FT	28
BRIDGEPORT BB	13.1N	59.6W	1554	0.78M/ 2.6FT	22
PORT ST CHARLES BB	13.3N	59.6W	1555	0.88M/ 2.9FT	16
POINT A PITRE GP	16.2N	61.5W	1555	4.30M/14.1FT	28
PUNTA CANA DO	18.5N	68.4W	1547	1.91M/ 6.3FT	18
DESHAIES GUADELOUPE	16.3N	61.8W	1544	3.03M/ 9.9FT	20
ESPERANZA VIEQUES P	18.1N	65.5W	1542	1.69M/ 5.6FT	24
PORT SAN ANDRES DO	18.4N	69.6W	1548	1.68M/ 5.5FT	26
MAYAGUEZ PR	18.2N	67.2W	1541	1.42M/ 4.7FT	18
ROSEAU DM	15.3N	61.4W	1540	2.74M/ 9.0FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	1534	2.55M/ 8.4FT	26
FORT DE FRANCE MQ	14.6N	61.1W	1541	2.97M/ 9.7FT	26
MONA ISLAND PR	18.1N	67.9W	1538	1.38M/ 4.5FT	20
CALLIAQUA VC	13.1N	61.2W	1540	1.87M/ 6.1FT	22
LIMETREE VI	17.7N	64.8W	1538	2.42M/ 7.9FT	22
ST CROIX VI	17.7N	64.7W	1535	2.27M/ 7.5FT	24
MAGUEYES ISLAND PR	18.0N	67.0W	1534	1.38M/ 4.5FT	14
PENUELAS PR	18.0N	66.8W	1535	1.91M/ 6.3FT	20
PRICKLEY BAY GD	12.0N	61.8W	1525	1.76M/ 5.8FT	24
BULLEN BAY CURACAO	12.2N	69.0W	1512	2.18M/ 7.2FT	22
DART 42407	15.3N	68.2W	1507	0.22M/ 0.7FT	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 PACIFIC TSUNAMI WARNING CENTER MESSAGES FOR THOSE PLACES THAT CAN BE FOUND AT PTWC.WEATHER.GOV.

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PTWC Message #6

WECA41 PHEB 171745
TSUCAX

TSUNAMI MESSAGE NUMBER 6
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1745 UTC THU MAR 17 2016

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

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AUTHORITIES IN EACH COUNTRY OF THAT SYSTEM.

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

UPDATES
----

* TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
----

* MAGNITUDE 8.4
* ORIGIN TIME 1400 UTC MAR 17 2016
* COORDINATES 10.8 NORTH 66.0 WEST
* DEPTH 15 KM / 9 MILES
* LOCATION NEAR THE COAST OF VENEZUELA

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
----

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

  GUADELOUPE... AND VENEZUELA.

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

  ARUBA... COLOMBIA... DOMINICAN REPUBLIC... HAITI... PUERTO RICO AND VIRGIN IS... ANGUILLA... ANTIGUA AND BARBUDA... DOMINICA... GRENADA... JAMAICA... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TRINIDAD AND TOBAGO.

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

  COSTA RICA... CUBA... GUYANA... MEXICO... NICARAGUA... PANAMA... BARBADOS... AND TURKS AND CAICOS ISLANDS.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
ALIGANDI	PANAMA	9.2N	78.0W	1645 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1647 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1649 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1652 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1652 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1704 03/17
JEREMIE	HAITI	18.6N	74.1W	1713 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1715 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1716 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1725 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1729 03/17
COLON	PANAMA	9.4N	79.9W	1749 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1803 03/17
COZUMEL	MEXICO	20.5N	87.0W	1811 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1815 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1816 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	1855 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1930 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	1931 03/17
GEORGETOWN	GUYANA	6.8N	58.2W	2014 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2055 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2154 03/17

POTENTIAL IMPACTS
---

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

* IMPACTS CAN VARY SIGNIFICANTLY FROM ONE SECTION OF COAST TO

THE NEXT DUE TO LOCAL BATHYMETRY AND THE SHAPE AND ELEVATION OF THE SHORELINE.

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

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

TSUNAMI OBSERVATIONS
---

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
LIMON CR	10.0N	83.0W	1735	0.69M/ 2.3FT	18
GEORGE TOWN CY	19.3N	81.4W	1732	0.12M/ 0.4FT	24
EL PORVENIR PM	9.6N	78.9W	1732	0.46M/ 1.5FT	26
SAN ANDRES CO	12.6N	81.7W	1716	0.45M/ 1.5FT	22
SANTA MARTA CO	11.2N	74.2W	1702	0.94M/ 3.1FT	22
CAP HAITIEN HT	19.8N	72.2W	1640	0.24M/ 0.8FT	26
PARHAM AT	17.1N	61.8W	1628	0.82M/ 2.7FT	16
DART 41420	23.5N	67.3W	1625	0.03M/ 0.1FT	22
DART 41421	23.4N	63.9W	1625	0.03M/ 0.1FT	26
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1623	2.05M/ 6.7FT	22
PUERTO PLATA DO	19.8N	70.7W	1620	0.25M/ 0.8FT	18
DESIRADE GUADELOUPE	16.3N	61.1W	1609	0.96M/ 3.2FT	28
SAN JUAN PR	18.5N	66.1W	1611	0.41M/ 1.4FT	24
JACMEL HT	18.2N	72.5W	1600	1.47M/ 4.8FT	14
CHARLOTTEVILLE TT	11.3N	60.5W	1606	0.75M/ 2.4FT	26
LE ROBERT MARTINIQU	14.7N	60.9W	1559	1.16M/ 3.8FT	28
BRIDGEPORT BB	13.1N	59.6W	1554	0.78M/ 2.6FT	22
PORT ST CHARLES BB	13.3N	59.6W	1555	0.88M/ 2.9FT	16
POINT A PITRE GP	16.2N	61.5W	1555	4.30M/14.1FT	28
PUNTA CANA DO	18.5N	68.4W	1547	1.91M/ 6.3FT	18
DESHAIES GUADELOUPE	16.3N	61.8W	1544	3.03M/ 9.9FT	20
ESPERANZA VIEQUES P	18.1N	65.5W	1542	1.69M/ 5.6FT	24
PORT SAN ANDRES DO	18.4N	69.6W	1548	1.68M/ 5.5FT	26
MAYAGUEZ PR	18.2N	67.2W	1541	1.42M/ 4.7FT	18
ROSEAU DM	15.3N	61.4W	1540	2.74M/ 9.0FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	1534	2.55M/ 8.4FT	26
FORT DE FRANCE MQ	14.6N	61.1W	1541	2.97M/ 9.7FT	26
MONA ISLAND PR	18.1N	67.9W	1538	1.38M/ 4.5FT	20
CALLIAQUA VC	13.1N	61.2W	1540	1.87M/ 6.1FT	22
LIMETREE VI	17.7N	64.8W	1538	2.42M/ 7.9FT	22
ST CROIX VI	17.7N	64.7W	1535	2.27M/ 7.5FT	24
MAGUEYES ISLAND PR	18.0N	67.0W	1534	1.38M/ 4.5FT	14
PENUELAS PR	18.0N	66.8W	1535	1.91M/ 6.3FT	20
PRICKLEY BAY GD	12.0N	61.8W	1525	1.76M/ 5.8FT	24
BULLEN BAY CURACAO	12.2N	69.0W	1512	2.18M/ 7.2FT	22
DART 42407	15.3N	68.2W	1507	0.22M/ 0.7FT	16

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

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

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

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

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

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

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PTWC Message #7

WECA41 PHEB 171845
TSUCAX

TSUNAMI MESSAGE NUMBER 7
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1845 UTC THU MAR 17 2016

...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 *****

UPDATES
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* TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
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* MAGNITUDE 8.4
* ORIGIN TIME 1400 UTC MAR 17 2016
* COORDINATES 10.8 NORTH 66.0 WEST
* DEPTH 15 KM / 9 MILES
* LOCATION NEAR THE COAST OF VENEZUELA

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
---

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

  GUADELOUPE... AND VENEZUELA.

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

  ARUBA... COLOMBIA... DOMINICAN REPUBLIC... HAITI... PUERTO RICO AND VIRGIN IS... ANGUILLA... ANTIGUA AND BARBUDA... DOMINICA... GRENADA... JAMAICA... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TRINIDAD AND TOBAGO.

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

  COSTA RICA... CUBA... GUYANA... MEXICO... NICARAGUA... PANAMA... BARBADOS... AND TURKS AND CAICOS ISLANDS.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
COLON	PANAMA	9.4N 79.9W	1749 03/17
BOCAS DEL TORO	PANAMA	9.4N 82.2W	1803 03/17
COZUMEL	MEXICO	20.5N 87.0W	1811 03/17
PUNTA GORDA	NICARAGUA	11.4N 83.8W	1815 03/17
PORT AU PRINCE	HAITI	18.5N 72.4W	1816 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N 71.2W	1855 03/17
SANTA CRZ D SUR	CUBA	20.7N 78.0W	1930 03/17
PORLAMAR	VENEZUELA	10.9N 63.8W	1931 03/17
GEORGETOWN	GUYANA	6.8N 58.2W	2014 03/17
NUEVA GERONA	CUBA	21.9N 82.8W	2055 03/17
PUERTO CABEZAS	NICARAGUA	14.0N 83.4W	2154 03/17

POTENTIAL IMPACTS

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

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

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

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

TSUNAMI OBSERVATIONS

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

GAUGE LOCATION	GAUGE COORDINATES LAT	LON	TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
ISLA MUJERES	21.2N	86.7W	1839	0.18M/ 0.6FT	18
DART 41424	32.9N	72.5W	1746	0.02M/ 0.1FT	14
LIMON CR	10.0N	83.0W	1735	0.69M/ 2.3FT	18
GEORGE TOWN CY	19.3N	81.4W	1732	0.12M/ 0.4FT	24
EL PORVENIR PM	9.6N	78.9W	1732	0.46M/ 1.5FT	26
SAN ANDRES CO	12.6N	81.7W	1716	0.45M/ 1.5FT	22
SANTA MARTA CO	11.2N	74.2W	1702	0.94M/ 3.1FT	22
CAP HAITIEN HT	19.8N	72.2W	1640	0.24M/ 0.8FT	26
PARHAM AT	17.1N	61.8W	1628	0.82M/ 2.7FT	16
DART 41420	23.5N	67.3W	1625	0.03M/ 0.1FT	22
DART 41421	23.4N	63.9W	1625	0.03M/ 0.1FT	26
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1623	2.05M/ 6.7FT	22
PUERTO PLATA DO	19.8N	70.7W	1620	0.25M/ 0.8FT	18
DESIRADE GUADELOUPE	16.3N	61.1W	1609	0.96M/ 3.2FT	28
SAN JUAN PR	18.5N	66.1W	1611	0.41M/ 1.4FT	24
JACMEL HT	18.2N	72.5W	1600	1.47M/ 4.8FT	14
CHARLOTTEVILLE TT	11.3N	60.5W	1606	0.75M/ 2.4FT	26
LE ROBERT MARTINIQU	14.7N	60.9W	1559	1.16M/ 3.8FT	28
BRIDGEPORT BB	13.1N	59.6W	1554	0.78M/ 2.6FT	22
PORT ST CHARLES BB	13.3N	59.6W	1555	0.88M/ 2.9FT	16
POINT A PITRE GP	16.2N	61.5W	1555	4.30M/14.1FT	28
PUNTA CANA DO	18.5N	68.4W	1547	1.91M/ 6.3FT	18

DESHAIES GUADELOUPE	16.3N	61.8W	1544	3.03M/ 9.9FT	20
ESPERANZA VIEQUES P	18.1N	65.5W	1542	1.69M/ 5.6FT	24
PORT SAN ANDRES DO	18.4N	69.6W	1548	1.68M/ 5.5FT	26
MAYAGUEZ PR	18.2N	67.2W	1541	1.42M/ 4.7FT	18
ROSEAU DM	15.3N	61.4W	1540	2.74M/ 9.0FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	1534	2.55M/ 8.4FT	26
FORT DE FRANCE MQ	14.6N	61.1W	1541	2.97M/ 9.7FT	26
MONA ISLAND PR	18.1N	67.9W	1538	1.38M/ 4.5FT	20
CALLIAQUA VC	13.1N	61.2W	1540	1.87M/ 6.1FT	22
LIMETREE VI	17.7N	64.8W	1538	2.42M/ 7.9FT	22
ST CROIX VI	17.7N	64.7W	1535	2.27M/ 7.5FT	24
MAGUEYES ISLAND PR	18.0N	67.0W	1534	1.38M/ 4.5FT	14
PENUELAS PR	18.0N	66.8W	1535	1.91M/ 6.3FT	20
PRICKLEY BAY GD	12.0N	61.8W	1525	1.76M/ 5.8FT	24
BULLEN BAY CURACAO	12.2N	69.0W	1512	2.18M/ 7.2FT	22
DART 42407	15.3N	68.2W	1507	0.22M/ 0.7FT	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 PACIFIC TSUNAMI WARNING CENTER MESSAGES FOR THOSE PLACES THAT CAN BE FOUND AT PTWC.WEATHER.GOV.

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

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PTWC Message #8

WECA41 PHEB 171945
TSUCAX

TSUNAMI MESSAGE NUMBER 8
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1945 UTC THU MAR 17 2016

...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 *****

UPDATES
----

  * THIS IS THE FINAL TSUNAMI THREAT MESSAGE FOR THIS EVENT.

  * TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
----

  * MAGNITUDE   8.4
  * ORIGIN TIME   1400 UTC MAR 17 2016
  * COORDINATES   10.8 NORTH 66.0 WEST
  * DEPTH   15 KM / 9 MILES
  * LOCATION   NEAR THE COAST OF VENEZUELA

EVALUATION
----

  * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NEAR THE COAST OF VENEZUELA AT 1400 UTC ON THURSDAY MARCH 17 2016.

  * BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS EARTHQUAKE HAS NOW LARGELY PASSED.

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 MAY PERSIST IN COASTAL AREAS AFFECTED BY THE TSUNAMI FOR SEVERAL HOURS OR LONGER.

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 LAT	LON	TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)

ILE ROYAL GUIANA FR	5.3N	52.6W	1922	0.20M/ 0.6FT	22
DART 42429	27.4N	85.7W	1908	0.00M/ 0.0FT	26
DART 42409	26.7N	85.8W	1856	0.00M/ 0.0FT	24
PUERTO MORELOS MX	21.4N	86.8W	1855	0.14M/ 0.5FT	28
ISLA MUJERES	21.2N	86.7W	1839	0.18M/ 0.6FT	18
DART 41424	32.9N	72.5W	1746	0.02M/ 0.1FT	14
LIMON CR	10.0N	83.0W	1735	0.69M/ 2.3FT	18
GEORGE TOWN CY	19.3N	81.4W	1732	0.12M/ 0.4FT	24
EL PORVENIR PM	9.6N	78.9W	1732	0.46M/ 1.5FT	26
SAN ANDRES CO	12.6N	81.7W	1716	0.45M/ 1.5FT	22
SANTA MARTA CO	11.2N	74.2W	1702	0.94M/ 3.1FT	22
CAP HAITIEN HT	19.8N	72.2W	1640	0.24M/ 0.8FT	26
PARHAM AT	17.1N	61.8W	1628	0.82M/ 2.7FT	16
DART 41420	23.5N	67.3W	1625	0.03M/ 0.1FT	22
DART 41421	23.4N	63.9W	1625	0.03M/ 0.1FT	26
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1623	2.05M/ 6.7FT	22
PUERTO PLATA DO	19.8N	70.7W	1620	0.25M/ 0.8FT	18
DESIRADE GUADELOUPE	16.3N	61.1W	1609	0.96M/ 3.2FT	28
SAN JUAN PR	18.5N	66.1W	1611	0.41M/ 1.4FT	24
JACMEL HT	18.2N	72.5W	1600	1.47M/ 4.8FT	14
CHARLOTTEVILLE TT	11.3N	60.5W	1606	0.75M/ 2.4FT	26
LE ROBERT MARTINIQU	14.7N	60.9W	1559	1.16M/ 3.8FT	28
BRIDGEPORT BB	13.1N	59.6W	1554	0.78M/ 2.6FT	22
PORT ST CHARLES BB	13.3N	59.6W	1555	0.88M/ 2.9FT	16
POINT A PITRE GP	16.2N	61.5W	1555	4.30M/14.1FT	28
PUNTA CANA DO	18.5N	68.4W	1547	1.91M/ 6.3FT	18
DESHAIES GUADELOUPE	16.3N	61.8W	1544	3.03M/ 9.9FT	20
ESPERANZA VIEQUES P	18.1N	65.5W	1542	1.69M/ 5.6FT	24
PORT SAN ANDRES DO	18.4N	69.6W	1548	1.68M/ 5.5FT	26
MAYAGUEZ PR	18.2N	67.2W	1541	1.42M/ 4.7FT	18
ROSEAU DM	15.3N	61.4W	1540	2.74M/ 9.0FT	26
LE PRECHEUR MARTINI	14.8N	61.2W	1534	2.55M/ 8.4FT	26
FORT DE FRANCE MQ	14.6N	61.1W	1541	2.97M/ 9.7FT	26
MONA ISLAND PR	18.1N	67.9W	1538	1.38M/ 4.5FT	20
CALLIAQUA VC	13.1N	61.2W	1540	1.87M/ 6.1FT	22
LIMETREE VI	17.7N	64.8W	1538	2.42M/ 7.9FT	22
ST CROIX VI	17.7N	64.7W	1535	2.27M/ 7.5FT	24
MAGUEYES ISLAND PR	18.0N	67.0W	1534	1.38M/ 4.5FT	14
PENUELAS PR	18.0N	66.8W	1535	1.91M/ 6.3FT	20
PRICKLEY BAY GD	12.0N	61.8W	1525	1.76M/ 5.8FT	24
BULLEN BAY CURACAO	12.2N	69.0W	1512	2.18M/ 7.2FT	22
DART 42407	15.3N	68.2W	1507	0.22M/ 0.7FT	16

NEXT UPDATE AND ADDITIONAL INFORMATION
---

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

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

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

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

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

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Northern Hispaniola Earthquake Scenario

The following messages created for the CARIBE WAVE 16 tsunami exercise are representative of the official standard products issued by the PTWC during a large magnitude 8.7 earthquake and tsunami originating just northern Hispaniola. During a real event, the TWCs would also issue graphical and html-based products to their web sites and via RSS. The alerts would persist longer during a real event than is depicted in this exercise.

PTWC Message #1

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WECA41 PHEB 171505
TSUCAX

TSUNAMI MESSAGE NUMBER 1
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1505 UTC THU MAR 17 2016

...TSUNAMI THREAT MESSAGE...


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

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

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

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


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

  * MAGNITUDE      8.5
  * ORIGIN TIME    1500 UTC MAR 17 2016
  * COORDINATES    20.2 NORTH  71.7 WEST
  * DEPTH          20 KM / 12 MILES
  * LOCATION       DOMINICAN REPUBLIC REGION


EVALUATION
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  * AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.5 OCCURRED IN
    THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17
    2016.

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


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

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

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 LISTED 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)
CAP HAITEN	HAITI	19.8N	72.2W	1509 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1514 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1521 03/17
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1524 03/17
MAYAGUANA	BAHAMAS	22.3N	73.0W	1527 03/17
BARACOA	CUBA	20.4N	74.5W	1529 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1529 03/17
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1542 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1544 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1546 03/17
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1549 03/17
LONG ISLAND	BAHAMAS	23.3N	75.1W	1551 03/17
EXUMA	BAHAMAS	23.6N	75.9W	1604 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1605 03/17
CAT ISLAND	BAHAMAS	24.4N	75.5W	1610 03/17
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1617 03/17
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1618 03/17
JACAMEL	HAITI	18.1N	72.5W	1619 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1620 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1623 03/17
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1623 03/17
SABA	SABA	17.6N	63.2W	1626 03/17
JEREMIE	HAITI	18.6N	74.1W	1629 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1633 03/17
GIBARA	CUBA	21.1N	76.1W	1634 03/17
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1636 03/17
SINT EUSTATIUS	SINT EUSTATIUS	17.5N	63.0W	1636 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1639 03/17
NASSAU	BAHAMAS	25.1N	77.4W	1640 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1642 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1642 03/17
FREEPORT	BAHAMAS	26.5N	78.8W	1643 03/17
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1644 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1651 03/17
ONIMA	BONAIRE	12.3N	68.3W	1653 03/17

BASSE TERRE	GUADELOUPE	16.0N	61.7W	1657 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1657 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1658 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1659 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1701 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1703 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1704 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1706 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1708 03/17
RUTHS BAY	BERMUDA	32.4N	64.6W	1710 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1711 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1713 03/17
BIMINI	BAHAMAS	25.8N	79.3W	1715 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1715 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1718 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1720 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1720 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1723 03/17
COZUMEL	MEXICO	20.5N	87.0W	1726 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1727 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1730 03/17
PUERTO CORTES	HONDURAS	15.9N	88.0W	1734 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1738 03/17
CUMANA	VENEZUELA	10.5N	64.2W	1739 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1742 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1747 03/17
TRUJILLO	HONDURAS	15.9N	86.0W	1753 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1755 03/17
LA HABANA	CUBA	23.2N	82.4W	1756 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1800 03/17

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

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

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

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

NEXT UPDATE AND ADDITIONAL INFORMATION
---

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

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

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

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

* COASTAL REGIONS OF THE US GULF COAST... US EAST COAST... AND

THE MARITIME PROVINCES OF CANADA SHOULD REFER TO U.S.
NATIONAL TSUNAMI WARNING CENTER MESSAGES THAT CAN BE FOUND
AT NTWC.ARH.NOAA.GOV.

$$

PTWC Message #2

WECA41 PHEB 171525
TSUCAX

TSUNAMI MESSAGE NUMBER 2
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1525 UTC THU MAR 17 2016

...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 *****

UPDATES
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* THE ESTIMATED MAGNITUDE OF THE EARTHQUAKE IS REVISED FROM
  8.5 TO 8.7.

* FORECAST TSUNAMI AMPLITUDES ARE NOW INCLUDED.

PRELIMINARY EARTHQUAKE PARAMETERS
----

* MAGNITUDE 8.7
* ORIGIN TIME 1500 UTC MAR 17 2016
* COORDINATES 20.2 NORTH 71.7 WEST
* DEPTH 20 KM / 12 MILES
* LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN
  THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17
  2016.

* 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

CUBA... DOMINICAN REPUBLIC... HAITI... BAHAMAS... AND TURKS AND CAICOS ISLANDS.

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

MEXICO... PUERTO RICO AND VIRGIN IS... ANGUILLA... BERMUDA... JAMAICA... AND SAINT KITTS AND NEVIS.

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

ARUBA... COLOMBIA... COSTA RICA... HONDURAS... GUATEMALA... NICARAGUA... PANAMA... ANTIGUA AND BARBUDA... BARBADOS... BELIZE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO... AND VENEZUELA.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
CAP HAITEN	HAITI	19.8N	72.2W	1509 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1512 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1521 03/17
MAYAGUANA	BAHAMAS	22.3N	73.0W	1526 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1526 03/17
BARACOA	CUBA	20.4N	74.5W	1530 03/17
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1531 03/17

JEREMIE	HAITI	18.6N	74.1W	1541	03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1544	03/17
GIBARA	CUBA	21.1N	76.1W	1547	03/17
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1551	03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1552	03/17
LONG ISLAND	BAHAMAS	23.3N	75.1W	1558	03/17
EXUMA	BAHAMAS	23.6N	75.9W	1606	03/17
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1607	03/17
CAT ISLAND	BAHAMAS	24.4N	75.5W	1609	03/17
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1615	03/17
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1616	03/17
JACAMEL	HAITI	18.1N	72.5W	1616	03/17
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1624	03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1625	03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1627	03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1631	03/17
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1632	03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1632	03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1634	03/17
NASSAU	BAHAMAS	25.1N	77.4W	1636	03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1638	03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1640	03/17
KINGSTON	JAMAICA	17.9N	76.9W	1643	03/17
FREEPORT	BAHAMAS	26.5N	78.8W	1648	03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1651	03/17
ONIMA	BONAIRE	12.3N	68.3W	1651	03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1652	03/17
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1652	03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1657	03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1657	03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1658	03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1700	03/17
BIMINI	BAHAMAS	25.8N	79.3W	1701	03/17
ROSEAU	DOMINICA	15.3N	61.4W	1703	03/17
RUTHS BAY	BERMUDA	32.4N	64.6W	1705	03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1707	03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1710	03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1710	03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1712	03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1718	03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1722	03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1723	03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1724	03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1724	03/17
COZUMEL	MEXICO	20.5N	87.0W	1729	03/17
PUERTO CORTES	HONDURAS	15.9N	88.0W	1733	03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1734	03/17
ALIGANDI	PANAMA	9.2N	78.0W	1740	03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1742	03/17
CUMANA	VENEZUELA	10.5N	64.2W	1745	03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1747	03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1748	03/17
LA HABANA	CUBA	23.2N	82.4W	1750	03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1800	03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1803	03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1804	03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1809	03/17
COLON	PANAMA	9.4N	79.9W	1814	03/17
TRUJILLO	HONDURAS	15.9N	86.0W	1819	03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1825	03/17
BELIZE CITY	BELIZE	17.5N	88.2W	1842	03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1857	03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1859	03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1902	03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1925	03/17
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	1926	03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2024	03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2039	03/17

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    PORLAMAR          VENEZUELA          10.9N  63.8W   2105 03/17
    PUERTO CABEZAS    NICARAGUA          14.0N  83.4W   2223 03/17


POTENTIAL IMPACTS
-----------------

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

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

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

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


NEXT UPDATE AND ADDITIONAL INFORMATION
--------------------------------------

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

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

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

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

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

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PTWC Message #3

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WECA41 PHEB 171600
TSUCAX

TSUNAMI MESSAGE NUMBER 3
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1600 UTC THU MAR 17 2016

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

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

UPDATES
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* TSUNAMI WAVE OBSERVATIONS ARE NOW INCLUDED.

PRELIMINARY EARTHQUAKE PARAMETERS
----

* MAGNITUDE 8.7
* ORIGIN TIME 1500 UTC MAR 17 2016
* COORDINATES 20.2 NORTH 71.7 WEST
* DEPTH 20 KM / 12 MILES
* LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
----

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

  CUBA... DOMINICAN REPUBLIC... HAITI... BAHAMAS... AND TURKS AND CAICOS ISLANDS.

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

  MEXICO... PUERTO RICO AND VIRGIN IS... ANGUILLA... BERMUDA... JAMAICA... AND SAINT KITTS AND NEVIS.

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

  ARUBA... COLOMBIA... COSTA RICA... HONDURAS... GUATEMALA... NICARAGUA... PANAMA... ANTIGUA AND BARBUDA... BARBADOS... BELIZE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO... AND VENEZUELA.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
CAP HAITEN	HAITI	19.8N	72.2W	1509 03/17
PUERTO PLATA	DOMINICAN REP	19.8N	70.7W	1512 03/17
WEST CAICOS	TURKS N CAICOS	21.7N	72.5W	1521 03/17
MAYAGUANA	BAHAMAS	22.3N	73.0W	1526 03/17
GRAND TURK	TURKS N CAICOS	21.5N	71.1W	1526 03/17
BARACOA	CUBA	20.4N	74.5W	1530 03/17
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1531 03/17
JEREMIE	HAITI	18.6N	74.1W	1541 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1544 03/17
GIBARA	CUBA	21.1N	76.1W	1547 03/17
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1551 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1552 03/17
LONG ISLAND	BAHAMAS	23.3N	75.1W	1558 03/17
EXUMA	BAHAMAS	23.6N	75.9W	1606 03/17
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1607 03/17
CAT ISLAND	BAHAMAS	24.4N	75.5W	1609 03/17
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1615 03/17
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1616 03/17
JACAMEL	HAITI	18.1N	72.5W	1616 03/17
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1624 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1625 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1627 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1631 03/17
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1632 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1632 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1634 03/17
NASSAU	BAHAMAS	25.1N	77.4W	1636 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1638 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1640 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1643 03/17
FREEPORT	BAHAMAS	26.5N	78.8W	1648 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1651 03/17
ONIMA	BONAIRE	12.3N	68.3W	1651 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1652 03/17

ABACO ISLAND	BAHAMAS	26.6N	77.1W	1652 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1657 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1657 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1658 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1700 03/17
BIMINI	BAHAMAS	25.8N	79.3W	1701 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1703 03/17
RUTHS BAY	BERMUDA	32.4N	64.6W	1705 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1707 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1710 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1710 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1712 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1718 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1722 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1723 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1724 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1724 03/17
COZUMEL	MEXICO	20.5N	87.0W	1729 03/17
PUERTO CORTES	HONDURAS	15.9N	88.0W	1733 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1734 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1740 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1742 03/17
CUMANA	VENEZUELA	10.5N	64.2W	1745 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1747 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1748 03/17
LA HABANA	CUBA	23.2N	82.4W	1750 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1800 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1803 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1804 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1809 03/17
COLON	PANAMA	9.4N	79.9W	1814 03/17
TRUJILLO	HONDURAS	15.9N	86.0W	1819 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1825 03/17
BELIZE CITY	BELIZE	17.5N	88.2W	1842 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1857 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1859 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1902 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1925 03/17
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	1926 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2024 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2039 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	2105 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2223 03/17

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

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

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

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

TSUNAMI OBSERVATIONS
---

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

GAUGE LOCATION	GAUGE COORDINATES LAT	LON	TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
DART 41420	23.5N	67.3W	1553	0.24M/ 0.8FT	24
PUERTO PLATA DO	19.8N	70.7W	1522	15.27M/50.1FT	22
CAP HAITIEN HT	19.8N	72.2W	1514	17.74M/58.2FT	16

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

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

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

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

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

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PTWC Message #4

WECA41 PHEB 171630
TSUCAX

TSUNAMI MESSAGE NUMBER 4
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1630 UTC THU MAR 17 2016

...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 *****

UPDATES
---

* TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
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* MAGNITUDE 8.7
* ORIGIN TIME 1500 UTC MAR 17 2016
* COORDINATES 20.2 NORTH 71.7 WEST
* DEPTH 20 KM / 12 MILES
* LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
---

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
---

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

  CUBA... DOMINICAN REPUBLIC... HAITI... BAHAMAS... AND TURKS AND CAICOS ISLANDS.

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

  MEXICO... PUERTO RICO AND VIRGIN IS... ANGUILLA... BERMUDA... JAMAICA... AND SAINT KITTS AND NEVIS.

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

  ARUBA... COLOMBIA... COSTA RICA... HONDURAS... GUATEMALA... NICARAGUA... PANAMA... ANTIGUA AND BARBUDA... BARBADOS... BELIZE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO... AND VENEZUELA.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
BARACOA	CUBA	20.4N	74.5W	1530 03/17
GREAT INAGUA	BAHAMAS	20.9N	73.7W	1531 03/17
JEREMIE	HAITI	18.6N	74.1W	1541 03/17
SANTIAGO D CUBA	CUBA	19.9N	75.8W	1544 03/17
GIBARA	CUBA	21.1N	76.1W	1547 03/17
SAN SALVADOR	BAHAMAS	24.1N	74.5W	1551 03/17
CABO ENGANO	DOMINICAN REP	18.6N	68.3W	1552 03/17
LONG ISLAND	BAHAMAS	23.3N	75.1W	1558 03/17
EXUMA	BAHAMAS	23.6N	75.9W	1606 03/17
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1607 03/17
CAT ISLAND	BAHAMAS	24.4N	75.5W	1609 03/17
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1615 03/17
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1616 03/17
JACAMEL	HAITI	18.1N	72.5W	1616 03/17
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1624 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1625 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1627 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1631 03/17
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1632 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1632 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1634 03/17
NASSAU	BAHAMAS	25.1N	77.4W	1636 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1638 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1640 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1643 03/17
FREEPORT	BAHAMAS	26.5N	78.8W	1648 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1651 03/17
ONIMA	BONAIRE	12.3N	68.3W	1651 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1652 03/17
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1652 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1657 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1657 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1658 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1700 03/17
BIMINI	BAHAMAS	25.8N	79.3W	1701 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1703 03/17
RUTHS BAY	BERMUDA	32.4N	64.6W	1705 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1707 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1710 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1710 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1712 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1718 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1722 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1723 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1724 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1724 03/17
COZUMEL	MEXICO	20.5N	87.0W	1729 03/17
PUERTO CORTES	HONDURAS	15.9N	88.0W	1733 03/17

BARRANQUILLA	COLOMBIA	11.1N	74.9W	1734 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1740 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1742 03/17
CUMANA	VENEZUELA	10.5N	64.2W	1745 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1747 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1748 03/17
LA HABANA	CUBA	23.2N	82.4W	1750 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1800 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1803 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1804 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1809 03/17
COLON	PANAMA	9.4N	79.9W	1814 03/17
TRUJILLO	HONDURAS	15.9N	86.0W	1819 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1825 03/17
BELIZE CITY	BELIZE	17.5N	88.2W	1842 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1857 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1859 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1902 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1925 03/17
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	1926 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2024 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2039 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	2105 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2223 03/17

POTENTIAL IMPACTS

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

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

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

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

TSUNAMI OBSERVATIONS

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
ST CROIX VI	17.7N	64.7W	1629	0.80M/ 2.6FT	24
DART 42407	15.3N	68.2W	1630	0.07M/ 0.2FT	18
JACMEL HT	18.2N	72.5W	1629	0.78M/ 2.5FT	26
MAGUEYES ISLAND PR	18.0N	67.0W	1621	0.91M/ 3.0FT	26
PENUELAS PR	18.0N	66.8W	1623	0.94M/ 3.1FT	26
DART 41421	23.4N	63.9W	1619	0.19M/ 0.6FT	20
MONA ISLAND PR	18.1N	67.9W	1610	2.74M/ 9.0FT	22
PUNTA CANA DO	18.5N	68.4W	1604	3.47M/11.4FT	22
SAN JUAN PR	18.5N	66.1W	1601	2.03M/ 6.7FT	16
MAYAGUEZ PR	18.2N	67.2W	1603	3.55M/11.6FT	14
DART 41420	23.5N	67.3W	1553	0.24M/ 0.8FT	24
PUERTO PLATA DO	19.8N	70.7W	1522	15.27M/50.1FT	22

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    CAP HAITIEN HT       19.8N  72.2W    1514  17.74M/58.2FT  16


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

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

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

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

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

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PTWC Message #5

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WECA41 PHEB 171700
TSUCAX

TSUNAMI MESSAGE NUMBER 5
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1700 UTC THU MAR 17 2016

...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 *****


UPDATES
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  * TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.


PRELIMINARY EARTHQUAKE PARAMETERS
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  * MAGNITUDE      8.7
  * ORIGIN TIME    1500 UTC MAR 17 2016
  * COORDINATES    20.2 NORTH  71.7 WEST
  * DEPTH          20 KM / 12 MILES
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* LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
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* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
---

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

  CUBA... DOMINICAN REPUBLIC... HAITI... BAHAMAS... AND TURKS AND CAICOS ISLANDS.

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

  MEXICO... PUERTO RICO AND VIRGIN IS... ANGUILLA... BERMUDA... JAMAICA... AND SAINT KITTS AND NEVIS.

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

  ARUBA... COLOMBIA... COSTA RICA... HONDURAS... GUATEMALA... NICARAGUA... PANAMA... ANTIGUA AND BARBUDA... BARBADOS... BELIZE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO... AND VENEZUELA.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
EXUMA	BAHAMAS	23.6N	75.9W	1606 03/17
CROOKED ISLAND	BAHAMAS	22.7N	74.1W	1607 03/17
CAT ISLAND	BAHAMAS	24.4N	75.5W	1609 03/17
ELEUTHERA ISLAN	BAHAMAS	25.2N	76.1W	1615 03/17
CAYMAN BRAC	CAYMAN ISLANDS	19.7N	79.9W	1616 03/17
JACAMEL	HAITI	18.1N	72.5W	1616 03/17
ANDROS ISLAND	BAHAMAS	25.0N	77.9W	1624 03/17
SANTO DOMINGO	DOMINICAN REP	18.5N	69.9W	1625 03/17
MONTEGO BAY	JAMAICA	18.5N	77.9W	1627 03/17
SIMPSON BAAI	SINT MAARTEN	18.0N	63.1W	1631 03/17
GRAND CAYMAN	CAYMAN ISLANDS	19.3N	81.3W	1632 03/17
THE VALLEY	ANGUILLA	18.3N	63.1W	1632 03/17
PORT AU PRINCE	HAITI	18.5N	72.4W	1634 03/17
NASSAU	BAHAMAS	25.1N	77.4W	1636 03/17
CIENFUEGOS	CUBA	22.0N	80.5W	1638 03/17
BASSETERRE	SAINT KITTS	17.3N	62.7W	1640 03/17
KINGSTON	JAMAICA	17.9N	76.9W	1643 03/17
FREEPORT	BAHAMAS	26.5N	78.8W	1648 03/17
PLYMOUTH	MONTSERRAT	16.7N	62.2W	1651 03/17
ONIMA	BONAIRE	12.3N	68.3W	1651 03/17
PALMETTO POINT	BARBUDA	17.6N	61.9W	1652 03/17
ABACO ISLAND	BAHAMAS	26.6N	77.1W	1652 03/17
BASSE TERRE	GUADELOUPE	16.0N	61.7W	1657 03/17
SAINT JOHNS	ANTIGUA	17.1N	61.9W	1657 03/17
SAINT BARTHELEM	SAINT BARTHELEMY	17.9N	62.8W	1658 03/17
ORANJESTAD	ARUBA	12.5N	70.0W	1700 03/17
BIMINI	BAHAMAS	25.8N	79.3W	1701 03/17
ROSEAU	DOMINICA	15.3N	61.4W	1703 03/17
RUTHS BAY	BERMUDA	32.4N	64.6W	1705 03/17
BAIE BLANCHE	SAINT MARTIN	18.1N	63.0W	1707 03/17
CASTRIES	SAINT LUCIA	14.0N	61.0W	1710 03/17
FORT DE FRANCE	MARTINIQUE	14.6N	61.1W	1710 03/17
SANTA MARTA	COLOMBIA	11.2N	74.2W	1712 03/17
BRIDGETOWN	BARBADOS	13.1N	59.6W	1718 03/17
MAIQUETIA	VENEZUELA	10.6N	67.0W	1722 03/17
CARTAGENA	COLOMBIA	10.4N	75.6W	1723 03/17
KINGSTOWN	SAINT VINCENT	13.1N	61.2W	1724 03/17
WILLEMSTAD	CURACAO	12.1N	68.9W	1724 03/17
COZUMEL	MEXICO	20.5N	87.0W	1729 03/17
PUERTO CORTES	HONDURAS	15.9N	88.0W	1733 03/17
BARRANQUILLA	COLOMBIA	11.1N	74.9W	1734 03/17
ALIGANDI	PANAMA	9.2N	78.0W	1740 03/17
SAINT GEORGES	GRENADA	12.0N	61.8W	1742 03/17
CUMANA	VENEZUELA	10.5N	64.2W	1745 03/17
RIOHACHA	COLOMBIA	11.6N	72.9W	1747 03/17
PUERTO CARRETO	PANAMA	8.8N	77.6W	1748 03/17
LA HABANA	CUBA	23.2N	82.4W	1750 03/17
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1800 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1803 03/17
PUNTA CARIBANA	COLOMBIA	8.6N	76.9W	1804 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1809 03/17
COLON	PANAMA	9.4N	79.9W	1814 03/17
TRUJILLO	HONDURAS	15.9N	86.0W	1819 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1825 03/17

BELIZE CITY	BELIZE	17.5N	88.2W	1842 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1857 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1859 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1902 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1925 03/17
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	1926 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2024 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	2039 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	2105 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2223 03/17

POTENTIAL IMPACTS

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

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

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

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

TSUNAMI OBSERVATIONS

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1659	0.83M/ 2.7FT	28
DESHAIES GUADELOUPE	16.3N	61.8W	1657	0.62M/ 2.0FT	28
PORT SAN ANDRES DO	18.4N	69.6W	1651	1.14M/ 3.7FT	22
PARHAM AT	17.1N	61.8W	1647	0.42M/ 1.4FT	28
DESIRADE GUADELOUPE	16.3N	61.1W	1652	0.38M/ 1.3FT	22
ESPERANZA VIEQUES P	18.1N	65.5W	1639	0.73M/ 2.4FT	16
GEORGE TOWN CY	19.3N	81.4W	1639	0.47M/ 1.5FT	18
LIMETREE VI	17.7N	64.8W	1634	0.77M/ 2.5FT	20
ST CROIX VI	17.7N	64.7W	1629	0.80M/ 2.6FT	24
DART 42407	15.3N	68.2W	1630	0.07M/ 0.2FT	18
JACMEL HT	18.2N	72.5W	1629	0.78M/ 2.5FT	26
MAGUEYES ISLAND PR	18.0N	67.0W	1621	0.91M/ 3.0FT	26
PENUELAS PR	18.0N	66.8W	1623	0.94M/ 3.1FT	26
DART 41421	23.4N	63.9W	1619	0.19M/ 0.6FT	20
MONA ISLAND PR	18.1N	67.9W	1610	2.74M/ 9.0FT	22
PUNTA CANA DO	18.5N	68.4W	1604	3.47M/11.4FT	22
SAN JUAN PR	18.5N	66.1W	1601	2.03M/ 6.7FT	16
MAYAGUEZ PR	18.2N	67.2W	1603	3.55M/11.6FT	14
DART 41420	23.5N	67.3W	1553	0.24M/ 0.8FT	24
PUERTO PLATA DO	19.8N	70.7W	1522	15.27M/50.1FT	22
CAP HAITIEN HT	19.8N	72.2W	1514	17.74M/58.2FT	16

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

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

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

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

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

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PTWC Message #6

WECA41 PHEB 171800
TSUCAX

TSUNAMI MESSAGE NUMBER 6
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1800 UTC THU MAR 17 2016

...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 *****

UPDATES
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  * TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
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  * MAGNITUDE 8.7
  * ORIGIN TIME 1500 UTC MAR 17 2016
  * COORDINATES 20.2 NORTH 71.7 WEST
  * DEPTH 20 KM / 12 MILES
  * LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
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* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
----

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

  CUBA... DOMINICAN REPUBLIC... HAITI... BAHAMAS... AND TURKS AND CAICOS ISLANDS.

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

  MEXICO... PUERTO RICO AND VIRGIN IS... ANGUILLA... BERMUDA... JAMAICA... AND SAINT KITTS AND NEVIS.

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

  ARUBA... COLOMBIA... COSTA RICA... HONDURAS... GUATEMALA... NICARAGUA... PANAMA... ANTIGUA AND BARBUDA... BARBADOS... BELIZE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO... AND VENEZUELA.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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

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

ESTIMATED TIMES OF ARRIVAL

* ESTIMATED TIMES OF ARRIVAL -ETA- OF THE INITIAL TSUNAMI WAVE FOR PLACES WITHIN 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)
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1800 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1802 03/17
CUMANA	VENEZUELA	10.5N	64.2W	1806 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1809 03/17
BELIZE CITY	BELIZE	17.5N	88.2W	1810 03/17
COLON	PANAMA	9.4N	79.9W	1825 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1833 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1837 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1846 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1855 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1928 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	1958 03/17
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	2028 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2031 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2220 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	2225 03/17

POTENTIAL IMPACTS

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

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

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

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

TSUNAMI OBSERVATIONS

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

	GAUGE COORDINATES		TIME OF MEASURE	MAXIMUM TSUNAMI	WAVE PERIOD
GAUGE LOCATION	LAT	LON	(UTC)	HEIGHT	(MIN)
EL PORVENIR PM	9.6N	78.9W	1754	0.87M/ 2.9FT	18
PRICKLEY BAY GD	12.0N	61.8W	1749	0.47M/ 1.5FT	24
SAN ANDRES CO	12.6N	81.7W	1751	0.57M/ 1.9FT	26
CALLIAQUA VC	13.1N	61.2W	1735	0.50M/ 1.7FT	22
BRIDGEPORT BB	13.1N	59.6W	1729	0.31M/ 1.0FT	26
PORT ST CHARLES BB	13.3N	59.6W	1722	0.31M/ 1.0FT	16
SANTA MARTA CO	11.2N	74.2W	1721	0.89M/ 2.9FT	22
FORT DE FRANCE MQ	14.6N	61.1W	1719	0.62M/ 2.0FT	26
LE ROBERT MARTINIQU	14.7N	60.9W	1714	0.31M/ 1.0FT	22
ROSEAU DM	15.3N	61.4W	1710	0.46M/ 1.5FT	18

LE PRECHEUR MARTINI	14.8N	61.2W	1712	0.54M/ 1.8FT 28
BULLEN BAY CURACAO	12.2N	69.0W	1713	0.89M/ 2.9FT 24
POINT A PITRE GP	16.2N	61.5W	1701	0.60M/ 2.0FT 14
DART 41424	32.9N	72.5W	1704	0.19M/ 0.6FT 26
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1659	0.83M/ 2.7FT 28
DESHAIES GUADELOUPE	16.3N	61.8W	1657	0.62M/ 2.0FT 28
PORT SAN ANDRES DO	18.4N	69.6W	1651	1.14M/ 3.7FT 22
PARHAM AT	17.1N	61.8W	1647	0.42M/ 1.4FT 28
DESIRADE GUADELOUPE	16.3N	61.1W	1652	0.38M/ 1.3FT 22
ESPERANZA VIEQUES P	18.1N	65.5W	1639	0.73M/ 2.4FT 16
GEORGE TOWN CY	19.3N	81.4W	1639	0.47M/ 1.5FT 18
LIMETREE VI	17.7N	64.8W	1634	0.77M/ 2.5FT 20
ST CROIX VI	17.7N	64.7W	1629	0.80M/ 2.6FT 24
DART 42407	15.3N	68.2W	1630	0.07M/ 0.2FT 18
JACMEL HT	18.2N	72.5W	1629	0.78M/ 2.5FT 26
MAGUEYES ISLAND PR	18.0N	67.0W	1621	0.91M/ 3.0FT 26
PENUELAS PR	18.0N	66.8W	1623	0.94M/ 3.1FT 26
DART 41421	23.4N	63.9W	1619	0.19M/ 0.6FT 20
MONA ISLAND PR	18.1N	67.9W	1610	2.74M/ 9.0FT 22
PUNTA CANA DO	18.5N	68.4W	1604	3.47M/11.4FT 22
SAN JUAN PR	18.5N	66.1W	1601	2.03M/ 6.7FT 16
MAYAGUEZ PR	18.2N	67.2W	1603	3.55M/11.6FT 14
DART 41420	23.5N	67.3W	1553	0.24M/ 0.8FT 24
PUERTO PLATA DO	19.8N	70.7W	1522	15.27M/50.1FT 22
CAP HAITIEN HT	19.8N	72.2W	1514	17.74M/58.2FT 16

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

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

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

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

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

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PTWC Message #7

WECA41 PHEB 171900
TSUCAX

TSUNAMI MESSAGE NUMBER 7
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
1900 UTC THU MAR 17 2016

...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 *****

UPDATES
----

* TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.

PRELIMINARY EARTHQUAKE PARAMETERS
----

* MAGNITUDE 8.7
* ORIGIN TIME 1500 UTC MAR 17 2016
* COORDINATES 20.2 NORTH 71.7 WEST
* DEPTH 20 KM / 12 MILES
* LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
----

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17 2016.

* TSUNAMI WAVES HAVE BEEN OBSERVED.

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

TSUNAMI THREAT FORECAST
----

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

  CUBA... DOMINICAN REPUBLIC... HAITI... BAHAMAS... AND TURKS AND CAICOS ISLANDS.

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

  MEXICO... PUERTO RICO AND VIRGIN IS... ANGUILLA... BERMUDA... JAMAICA... AND SAINT KITTS AND NEVIS.

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

  ARUBA... COLOMBIA... COSTA RICA... HONDURAS... GUATEMALA... NICARAGUA... PANAMA... ANTIGUA AND BARBUDA... BARBADOS... BELIZE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... CURACAO... BONAIRE... SAINT LUCIA... SINT MAARTEN... SAINT BARTHELEMY... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... TRINIDAD AND TOBAGO... AND VENEZUELA.

* NON-HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR ALL OTHER AREAS COVERED BY THIS MESSAGE.

* 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 WILL LIKELY BE MUCH SMALLER THAN THE FORECAST INDICATES.

* FOR OTHER AREAS COVERED BY THIS PRODUCT A FORECAST HAS NOT YET BEEN COMPUTED. THE FORECAST WILL BE EXPANDED AS NECESSARY IN SUBSEQUENT PRODUCTS.

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)
PUERTO OBALDIA	PANAMA	8.7N	77.4W	1800 03/17
PUERTO LIMON	COSTA RICA	10.0N	83.0W	1802 03/17
CUMANA	VENEZUELA	10.5N	64.2W	1806 03/17
PIRATES BAY	TRINIDAD TOBAGO	11.3N	60.6W	1809 03/17
BELIZE CITY	BELIZE	17.5N	88.2W	1810 03/17
COLON	PANAMA	9.4N	79.9W	1825 03/17
SANTA CRZ D SUR	CUBA	20.7N	78.0W	1833 03/17
BOCAS DEL TORO	PANAMA	9.4N	82.2W	1837 03/17
PUNTA GORDA	NICARAGUA	11.4N	83.8W	1846 03/17
PUNTO FIJO	VENEZUELA	11.7N	70.2W	1855 03/17
PORT OF SPAIN	TRINIDAD TOBAGO	10.6N	61.5W	1928 03/17
NUEVA GERONA	CUBA	21.9N	82.8W	1958 03/17
PUERTO BARRIOS	GUATEMALA	15.7N	88.6W	2028 03/17
GOLFO VENEZUELA	VENEZUELA	11.4N	71.2W	2031 03/17
PUERTO CABEZAS	NICARAGUA	14.0N	83.4W	2220 03/17
PORLAMAR	VENEZUELA	10.9N	63.8W	2225 03/17

POTENTIAL IMPACTS
---

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

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

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

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

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

GAUGE LOCATION	GAUGE COORDINATES LAT	LON	TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
KEY WEST FL	24.6N	81.8W	1852	0.20M/ 0.6FT	18
TRIDENT PIER FL	28.4N	80.6W	1854	1.26M/ 4.1FT	20
DART 42429	27.4N	85.7W	1820	0.01M/ 0.0FT	26
LIMON CR	10.0N	83.0W	1818	0.71M/ 2.3FT	22
CHARLOTTEVILLE TT	11.3N	60.5W	1809	0.28M/ 0.9FT	24
DART 42409	26.7N	85.8W	1810	0.01M/ 0.0FT	28
PUERTO MORELOS MX	21.4N	86.8W	1806	0.38M/ 1.2FT	18
ISLA MUJERES	21.2N	86.7W	1759	0.68M/ 2.2FT	14
EL PORVENIR PM	9.6N	78.9W	1754	0.87M/ 2.9FT	18
PRICKLEY BAY GD	12.0N	61.8W	1749	0.47M/ 1.5FT	24
SAN ANDRES CO	12.6N	81.7W	1751	0.57M/ 1.9FT	26
CALLIAQUA VC	13.1N	61.2W	1735	0.50M/ 1.7FT	22
BRIDGEPORT BB	13.1N	59.6W	1729	0.31M/ 1.0FT	26
PORT ST CHARLES BB	13.3N	59.6W	1722	0.31M/ 1.0FT	16
SANTA MARTA CO	11.2N	74.2W	1721	0.89M/ 2.9FT	22
FORT DE FRANCE MQ	14.6N	61.1W	1719	0.62M/ 2.0FT	26
LE ROBERT MARTINIQU	14.7N	60.9W	1714	0.31M/ 1.0FT	22
ROSEAU DM	15.3N	61.4W	1710	0.46M/ 1.5FT	18
LE PRECHEUR MARTINI	14.8N	61.2W	1712	0.54M/ 1.8FT	28
BULLEN BAY CURACAO	12.2N	69.0W	1713	0.89M/ 2.9FT	24
POINT A PITRE GP	16.2N	61.5W	1701	0.60M/ 2.0FT	14
DART 41424	32.9N	72.5W	1704	0.19M/ 0.6FT	26
LAMESHURBAYSTJOHNVI	18.3N	64.7W	1659	0.83M/ 2.7FT	28
DESHAIES GUADELOUPE	16.3N	61.8W	1657	0.62M/ 2.0FT	28
PORT SAN ANDRES DO	18.4N	69.6W	1651	1.14M/ 3.7FT	22
PARHAM AT	17.1N	61.8W	1647	0.42M/ 1.4FT	28
DESIRADE GUADELOUPE	16.3N	61.1W	1652	0.38M/ 1.3FT	22
ESPERANZA VIEQUES P	18.1N	65.5W	1639	0.73M/ 2.4FT	16
GEORGE TOWN CY	19.3N	81.4W	1639	0.47M/ 1.5FT	18
LIMETREE VI	17.7N	64.8W	1634	0.77M/ 2.5FT	20
ST CROIX VI	17.7N	64.7W	1629	0.80M/ 2.6FT	24
DART 42407	15.3N	68.2W	1630	0.07M/ 0.2FT	18
JACMEL HT	18.2N	72.5W	1629	0.78M/ 2.5FT	26
MAGUEYES ISLAND PR	18.0N	67.0W	1621	0.91M/ 3.0FT	26
PENUELAS PR	18.0N	66.8W	1623	0.94M/ 3.1FT	26
DART 41421	23.4N	63.9W	1619	0.19M/ 0.6FT	20
MONA ISLAND PR	18.1N	67.9W	1610	2.74M/ 9.0FT	22
PUNTA CANA DO	18.5N	68.4W	1604	3.47M/11.4FT	22
SAN JUAN PR	18.5N	66.1W	1601	2.03M/ 6.7FT	16
MAYAGUEZ PR	18.2N	67.2W	1603	3.55M/11.6FT	14
DART 41420	23.5N	67.3W	1553	0.24M/ 0.8FT	24
PUERTO PLATA DO	19.8N	70.7W	1522	15.27M/50.1FT	22
CAP HAITIEN HT	19.8N	72.2W	1514	17.74M/58.2FT	16

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

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

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

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

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

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PTWC Message #8

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WECA41 PHEB 172000
TSUCAX

TSUNAMI MESSAGE NUMBER 8
NOT FOR DISTRIBUTION
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
2000 UTC THU MAR 17 2016

...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 *****


UPDATES
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  * THIS IS THE FINAL TSUNAMI THREAT MESSAGE FOR THIS EVENT.

  * TSUNAMI OBSERVATIONS ARE UPDATED IN THIS MESSAGE.


PRELIMINARY EARTHQUAKE PARAMETERS
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  * MAGNITUDE      8.7
  * ORIGIN TIME    1500 UTC MAR 17 2016
  * COORDINATES    20.2 NORTH  71.7 WEST
  * DEPTH          20 KM / 12 MILES
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* LOCATION DOMINICAN REPUBLIC REGION

EVALUATION
---

* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.7 OCCURRED IN THE DOMINICAN REPUBLIC REGION AT 1500 UTC ON THURSDAY MARCH 17 2016.

* BASED ON ALL AVAILABLE DATA... THE TSUNAMI THREAT FROM THIS EARTHQUAKE HAS NOW LARGELY PASSED.

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 MAY PERSIST IN COASTAL AREAS AFFECTED BY THE TSUNAMI FOR SEVERAL HOURS OR LONGER.

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

GAUGE LOCATION	GAUGE COORDINATES LAT	LON	TIME OF MEASURE (UTC)	MAXIMUM TSUNAMI HEIGHT	WAVE PERIOD (MIN)
PILOTS STATION LA	28.9N	89.4W	1921	0.08M/ 0.3FT	18
KEY WEST FL	24.6N	81.8W	1852	0.20M/ 0.6FT	18
TRIDENT PIER FL	28.4N	80.6W	1854	1.26M/ 4.1FT	20
DART 42429	27.4N	85.7W	1820	0.01M/ 0.0FT	26
LIMON CR	10.0N	83.0W	1818	0.71M/ 2.3FT	22
CHARLOTTEVILLE TT	11.3N	60.5W	1809	0.28M/ 0.9FT	24
DART 42409	26.7N	85.8W	1810	0.01M/ 0.0FT	28
PUERTO MORELOS MX	21.4N	86.8W	1806	0.38M/ 1.2FT	18
ISLA MUJERES	21.2N	86.7W	1759	0.68M/ 2.2FT	14
EL PORVENIR PM	9.6N	78.9W	1754	0.87M/ 2.9FT	18
PRICKLEY BAY GD	12.0N	61.8W	1749	0.47M/ 1.5FT	24
SAN ANDRES CO	12.6N	81.7W	1751	0.57M/ 1.9FT	26
CALLIAQUA VC	13.1N	61.2W	1735	0.50M/ 1.7FT	22
BRIDGEPORT BB	13.1N	59.6W	1729	0.31M/ 1.0FT	26
PORT ST CHARLES BB	13.3N	59.6W	1722	0.31M/ 1.0FT	16

SANTA MARTA CO	11.2N	74.2W	1721	0.89M/ 2.9FT	22
FORT DE FRANCE MQ	14.6N	61.1W	1719	0.62M/ 2.0FT	26
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LAMESHURBAYSTJOHNVI	18.3N	64.7W	1659	0.83M/ 2.7FT	28
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PARHAM AT	17.1N	61.8W	1647	0.42M/ 1.4FT	28
DESIRADE GUADELOUPE	16.3N	61.1W	1652	0.38M/ 1.3FT	22
ESPERANZA VIEQUES P	18.1N	65.5W	1639	0.73M/ 2.4FT	16
GEORGE TOWN CY	19.3N	81.4W	1639	0.47M/ 1.5FT	18
LIMETREE VI	17.7N	64.8W	1634	0.77M/ 2.5FT	20
ST CROIX VI	17.7N	64.7W	1629	0.80M/ 2.6FT	24
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JACMEL HT	18.2N	72.5W	1629	0.78M/ 2.5FT	26
MAGUEYES ISLAND PR	18.0N	67.0W	1621	0.91M/ 3.0FT	26
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DART 41421	23.4N	63.9W	1619	0.19M/ 0.6FT	20
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CAP HAITIEN HT	19.8N	72.2W	1514	17.74M/58.2FT	16

NEXT UPDATE AND ADDITIONAL INFORMATION
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Annex G. Sample Press Release for Local Media

TEMPLATE FOR NEWS RELEASE

USE AGENCY MASTHEAD

Contact: (insert name)
(insert phone number)
(insert email address)

FOR IMMEDIATE RELEASE
(insert date)

CARRIBEAN TSUNAMI EXERCISE TO BE CONDUCTED March 17, 2016

(*insert community/county/state name*) will join other localities in the Caribbean as a participant in a tsunami response exercise on March 17, 2016. The purpose of this exercise is to evaluate local tsunami response plans, increase tsunami preparedness, and improve coordination throughout the region.

(*insert a promotional comment from a local official, such as "The 2010 Haiti and 2010, 2014, 2015 Chilean earthquakes and tsunamis have reminded the world again of the urgent need to be more prepared for such events," said (insert name of appropriate official*). "This important exercise will test the current procedures of the Tsunami Warning System and help identify operational strengths and weaknesses in each community." (*Please modify for uniqueness.))*

The exercise, titled CARIBE WAVE 16, will simulate a widespread Tsunami Warning and Watch situation throughout the Caribbean which requires implementation of local tsunami response plans. The exercise will (*insert "include" or "not include")* public notification.

The exercise will simulate a major earthquake and tsunami generated just off the Caribbean coast of Venezuela scenario at 10:00 am (or Northern Hispaniola scenario 11:00 am) Atlantic Standard Time (*or appropriate local time*) on March 17, 2016. A handbook has been prepared which describes the scenario and contains tsunami messages from the Pacific Tsunami Warning Center (PTWC). The PTWC is the interim Regional Tsunami Service Provider for the other countries in the Caribbean Sea and Adjacent Regions.

Insert paragraph tailored for specific community. Could identify participating agencies and specific plans. Could describe current early warning program, past tsunami exercises (if any), ongoing mitigation and public education programs, etc. Could describe tsunami threat, history of tsunami hazards, if any.

If any real tsunami threat occurs during the time period of the exercise, the exercise will be terminated.

The exercise is sponsored by the UNESCO/IOC Intergovernmental Coordination Group for Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS), the Caribbean Emergency Management Agency (CDEMA), the Centro de Coordinación para la Prevención de los Desastres Naturales en América Central (CEPREDENAC), the U.S. National Oceanic and Atmospheric Administration (NOAA) and by the U.S. National Tsunami Hazard Mitigation Program (NTHMP – a partnership of 29 states and territories and three federal agencies). For more information on the U.S. tsunami warning system, see www.tsunami.gov. For more

information on the NTHMP, see nthmp.tsunami.gov. For more information on the ICG/CARIBE-EWS, see http://www.ioc-tsunami.org/content/view/36/1036/.

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On the Web:

ICG/CARIBE EWS	http://www.ioc-tsunami.org
Pacific Tsunami Warning Center	http://ptwc.weather.gov
NOAA Tsunami Program	http://www.tsunami.gov
NTHMP	http://nthmp.tsunami.gov
Caribbean Tsunami Warning Program	http://caribewave.info
Puerto Rico Seismic Network	http://prsn.uprm.edu
Insert state/local emergency response URLs	

IOC Technical Series

No.	Title	Languages
1	Manual on International Oceanographic Data Exchange. 1965	(out of stock)
2	Intergovernmental Oceanographic Commission (Five years of work). 1966	(out of stock)
3	Radio Communication Requirements of Oceanography. 1967	(out of stock)
4	Manual on International Oceanographic Data Exchange - Second revised edition. 1967	(out of stock)
5	Legal Problems Associated with Ocean Data Acquisition Systems (ODAS). 1969	(out of stock)
6	Perspectives in Oceanography, 1968	(out of stock)
7	Comprehensive Outline of the Scope of the Long-term and Expanded Programme of Oceanic Exploration and Research. 1970	(out of stock)
8	IGOSS (Integrated Global Ocean Station System) - General Plan Implementation Programme for Phase I. 1971	(out of stock)
9	Manual on International Oceanographic Data Exchange - Third Revised Edition. 1973	(out of stock)
10	Bruun Memorial Lectures, 1971	E, F, S, R
11	Bruun Memorial Lectures, 1973	(out of stock)
12	Oceanographic Products and Methods of Analysis and Prediction. 1977	E only
13	International Decade of Ocean Exploration (IDOE), 1971-1980. 1974	(out of stock)
14	A Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment and Baseline Study Guidelines. 1976	E, F, S, R
15	Bruun Memorial Lectures, 1975 - Co-operative Study of the Kuroshio and Adjacent Regions. 1976	(out of stock)
16	Integrated Ocean Global Station System (IGOSS) General Plan and Implementation Programme 1977-1982. 1977	E, F, S, R
17	Oceanographic Components of the Global Atmospheric Research Programme (GARP) . 1977	(out of stock)
18	Global Ocean Pollution: An Overview. 1977	(out of stock)
19	Bruun Memorial Lectures - The Importance and Application of Satellite and Remotely Sensed Data to Oceanography. 1977	(out of stock)
20	A Focus for Ocean Research: The Intergovernmental Oceanographic Commission - History, Functions, Achievements. 1979	(out of stock)
21	Bruun Memorial Lectures, 1979: Marine Environment and Ocean Resources. 1986	E, F, S, R
22	Scientific Report of the Interealibration Exercise of the IOC-WMO-UNEP Pilot Project on Monitoring Background Levels of Selected Pollutants in Open Ocean Waters. 1982	(out of stock)
23	Operational Sea-Level Stations. 1983	E, F, S, R
24	Time-Series of Ocean Measurements. Vol.1. 1983	E, F, S, R
25	A Framework for the Implementation of the Comprehensive Plan for the Global Investigation of Pollution in the Marine Environment. 1984	(out of stock)
26	The Determination of Polychlorinated Biphenyls in Open-ocean Waters. 1984	E only
27	Ocean Observing System Development Programme. 1984	E, F, S, R
28	Bruun Memorial Lectures, 1982: Ocean Science for the Year 2000. 1984	E, F, S, R
29	Catalogue of Tide Gauges in the Pacific. 1985	E only
30	Time-Series of Ocean Measurements. Vol. 2. 1984	E only
31	Time-Series of Ocean Measurements. Vol. 3. 1986	E only
32	Summary of Radiometric Ages from the Pacific. 1987	E only
33	Time-Series of Ocean Measurements. Vol. 4. 1988	E only
34	Bruun Memorial Lectures, 1987: Recent Advances in Selected Areas of Ocean Sciences in the Regions of the Caribbean, Indian Ocean and the Western Pacific. 1988	Composite E, F, S
35	Global Sea-Level Observing System (GLOSS) Implementation Plan. 1990	E only

(continued)

36	Bruun Memorial Lectures 1989: Impact of New Technology on Marine Scientific Research. 1991	Composite E, F, S
37	Tsunami Glossary - A Glossary of Terms and Acronyms Used in the Tsunami Literature. 1991	E only
38	The Oceans and Climate: A Guide to Present Needs. 1991	E only
39	Bruun Memorial Lectures, 1991: Modelling and Prediction in Marine Science. 1992	E only
40	Oceanic Interdecadal Climate Variability. 1992	E only
41	Marine Debris: Solid Waste Management Action for the Wider Caribbean. 1994	E only
42	Calculation of New Depth Equations for Expendable Bathymerographs Using a Temperature-Error-Free Method (Application to Sippican/TSK T-7, T-6 and T-4 XBTS. 1994	E only
43	IGOSS Plan and Implementation Programme 1996-2003. 1996	E, F, S, R
44	Design and Implementation of some Harmful Algal Monitoring Systems. 1996	E only
45	Use of Standards and Reference Materials in the Measurement of Chlorinated Hydrocarbon Residues. 1996	E only
46	Equatorial Segment of the Mid-Atlantic Ridge. 1996	E only
47	Peace in the Oceans: Ocean Governance and the Agenda for Peace; the Proceedings of *Pacem in Maribus* XXIII, Costa Rica, 1995. 1997	E only
48	Neotectonics and fluid flow through seafloor sediments in the Eastern Mediterranean and Black Seas - Parts I and II. 1997	E only
49	Global Temperature Salinity Profile Programme: Overview and Future. 1998	E only
50	Global Sea-Level Observing System (GLOSS) Implementation Plan-1997. 1997	E only
51	L'état actuel de 1'exploitation des pêcheries maritimes au Cameroun et leur gestion intégrée dans la sous-région du Golfe de Guinée *(cancelled)*	F only
52	Cold water carbonate mounds and sediment transport on the Northeast Atlantic Margin. 1998	E only
53	The Baltic Floating University: Training Through Research in the Baltic, Barents and White Seas - 1997. 1998	E only
54	Geological Processes on the Northeast Atlantic Margin (8th training-through-research cruise, June-August 1998). 1999	E only
55	Bruun Memorial Lectures, 1999: Ocean Predictability. 2000	E only
56	Multidisciplinary Study of Geological Processes on the North East Atlantic and Western Mediterranean Margins (9th training-through-research cruise, June-July 1999). 2000	E only
57	Ad hoc Benthic Indicator Group - Results of Initial Planning Meeting, Paris, France, 6-9 December 1999. 2000	E only
58	Bruun Memorial Lectures, 2001: Operational Oceanography – a perspective from the private sector. 2001	E only
59	Monitoring and Management Strategies for Harmful Algal Blooms in Coastal Waters. 2001	E only
60	Interdisciplinary Approaches to Geoscience on the North East Atlantic Margin and Mid-Atlantic Ridge (10th training-through-research cruise, July-August 2000). 2001	E only
61	Forecasting Ocean Science? Pros and Cons, Potsdam Lecture, 1999. 2002	E only
62	Geological Processes in the Mediterranean and Black Seas and North East Atlantic (11th training-through-research cruise, July- September 2001). 2002	E only
63	Improved Global Bathymetry – Final Report of SCOR Working Group 107. 2002	E only
64	R. Revelle Memorial Lecture, 2006: Global Sea Levels, Past, Present and Future. 2007	E only
65	Bruun Memorial Lectures, 2003: Gas Hydrates – a potential source of energy from the oceans. 2003	E only
66	Bruun Memorial Lectures, 2003: Energy from the Sea: the potential and realities of Ocean Thermal Energy Conversion (OTEC). 2003	E only

67	Interdisciplinary Geoscience Research on the North East Atlantic Margin, Mediterranean Sea and Mid-Atlantic Ridge (12th training-through-research cruise, June-August 2002). 2003	E only
68	Interdisciplinary Studies of North Atlantic and Labrador Sea Margin Architecture and Sedimentary Processes (13th training-through-research cruise, July-September 2003). 2004	E only
69	Biodiversity and Distribution of the Megafauna / Biodiversité et distribution de la mégafaune. 2006 Vol.1 The polymetallic nodule ecosystem of the Eastern Equatorial Pacific Ocean / Ecosystème de nodules polymétalliques de l'océan Pacifique Est équatorial Vol.2 Annotated photographic Atlas of the echinoderms of the Clarion-Clipperton fracture zone / Atlas photographique annoté des échinodermes de la zone de fractures de Clarion et de Clipperton Vol.3 Options for the management and conservation of the biodiversity — The nodule ecosystem in the Clarion Clipperton fracture zone: scientific, legal and institutional aspects	E F
70	Interdisciplinary geoscience studies of the Gulf of Cadiz and Western Mediterranean Basin (14th training-through-research cruise, July-September 2004). 2006	E only
71	Indian Ocean Tsunami Warning and Mitigation System, IOTWS. Implementation Plan, 7–9 April 2009 (2nd Revision). 2009	E only
72	Deep-water Cold Seeps, Sedimentary Environments and Ecosystems of the Black and Tyrrhenian Seas and the Gulf of Cadiz (15th training-through-research cruise, June–August 2005). 2007	E only
73	Implementation Plan for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), 2007–2011. 2007 *(electronic only)*	E only
74	Bruun Memorial Lectures, 2005: The Ecology and Oceanography of Harmful Algal Blooms – Multidisciplinary approaches to research and management. 2007	E only
75	National Ocean Policy. The Basic Texts from: Australia, Brazil, Canada, China, Colombia, Japan, Norway, Portugal, Russian Federation, United States of America. (Also Law of Sea Dossier 1). 2008	E only
76	Deep-water Depositional Systems and Cold Seeps of the Western Mediterranean, Gulf of Cadiz and Norwegian Continental margins (16th training-through-research cruise, May–July 2006). 2008	E only
77	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – 12 September 2007 Indian Ocean Tsunami Event. Post-Event Assessment of IOTWS Performance. 2008	E only
78	Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE EWS) – Implementation Plan 2013–2017 (Version 2.0). 2013	E only
79	Filling Gaps in Large Marine Ecosystem Nitrogen Loadings Forecast for 64 LMEs – GEF/LME global project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008	E only
80	Models of the World's Large Marine Ecosystems. GEF/LME Global Project Promoting Ecosystem-based Approaches to Fisheries Conservation and Large Marine Ecosystems. 2008	E only
81	Indian Ocean Tsunami Warning and Mitigation System (IOTWS) – Implementation Plan for Regional Tsunami Watch Providers (RTWP). 2008	E only
82	Exercise Pacific Wave 08 – A Pacific-wide Tsunami Warning and Communication Exercise, 28–30 October 2008. 2008	E only
83.	*Cancelled*	
84.	Global Open Oceans and Deep Seabed (GOODS) Bio-geographic Classification. 2009	E only
85.	Tsunami Glossary	E, F, S
86	Pacific Tsunami Warning System (PTWS) Implementation Plan	*Electronic publication*

(continued)

87.	Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) – Second Edition. 2011	E only
88.	Exercise Indian Ocean Wave 2009 (IOWave09) – An Indian Ocean-wide Tsunami Warning and Communication Exercise – 14 October 2009. 2009	E only
89.	Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. 2009	E only
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