



**CTIC**  
Caribbean Tsunami  
Information Centre



Regional Training Workshop on Pacific Tsunami Warning Center  
Enhanced Tsunami Products for ICG/CARIBE EWS  
Oct. 31 – Nov. 2, 2017  
Cartagena, Colombia

# PTWC New Enhanced Products

## Explanation of Each Product

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# Public Text message

## Information Statement

- No Threat
- No Action

*PTWC guidance  
information  
to Country  
TWFP/NTWC*

TSUNAMI INFORMATION STATEMENT NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
2058 UTC FRI NOV 13 2015

...TSUNAMI INFORMATION STATEMENT...

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

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

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

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

PRELIMINARY EARTHQUAKE PARAMETERS - FROM JMA

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\* MAGNITUDE           6.4  
\* ORIGIN TIME         2051 UTC NOV 13 2015  
\* COORDINATES         19.5 NORTH 64.5 WEST  
\* DEPTH               10 KM / 6 MILES  
\* LOCATION            VIRGIN ISLANDS

EVALUATION

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\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 6.4 OCCURRED IN THE VIRGIN ISLANDS AT 2051 UTC ON FRIDAY NOVEMBER 13 2015.  
  
\* BASED ON ALL AVAILABLE DATA... THERE IS NO TSUNAMI THREAT FROM THIS EARTHQUAKE.

RECOMMENDED ACTIONS

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\* NO ACTION IS REQUIRED.

# Public Text message – Threat Message

## 1<sup>st</sup> Message

- Threat
- Take Action
- EQ-based

*PTWC guidance  
information to  
Country TWFP/NTWC*

TSUNAMI MESSAGE NUMBER 1  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
0005 UTC WED DEC 2 2015

...TSUNAMI THREAT MESSAGE...

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

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### PRELIMINARY EARTHQUAKE PARAMETERS

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\* MAGNITUDE            8.2  
\* ORIGIN TIME         0000 UTC DEC 2 2015  
\* COORDINATES        10.0 NORTH 78.5 WEST  
\* DEPTH                20 KM / 12 MILES  
\* LOCATION            NORTH OF PANAMA

### EVALUATION

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\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NORTH OF PANAMA AT 0000 UTC ON WEDNESDAY DECEMBER 2 2015.  
  
\* BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.

TSUNAMI THREAT FORECAST

# Public Text message – Threat Message

## 1<sup>st</sup> Message

- Threat
- Take Action
- EQ-based

*PTWC guidance  
information to  
Country TWFP/NTWC*

### EVALUATION

-----

- \* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NORTH OF PANAMA AT 0000 UTC ON WEDNESDAY DECEMBER 2 2015.
- \* BASED ON THE PRELIMINARY EARTHQUAKE PARAMETERS... WIDESPREAD HAZARDOUS TSUNAMI WAVES ARE POSSIBLE.

### TSUNAMI THREAT FORECAST

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- \* HAZARDOUS TSUNAMI WAVES FROM THIS EARTHQUAKE ARE POSSIBLE WITHIN THE NEXT THREE HOURS ALONG SOME COASTS OF  
  
PANAMA... COLOMBIA... SAN ANDRES PROVID... COSTA RICA...  
HAITI... ARUBA... NICARAGUA... CAYMAN ISLANDS...  
JAMAICA... CUBA... BONAIRE... DOMINICAN REP... PUERTO  
RICO... CURACAO... BAHAMAS... US VIRGIN ISLANDS... TURKS N  
CAICOS... VENEZUELA... SABA... SAINT KITTS...  
MONTSERRAT... SINT EUSTATIUS... GUADELOUPE... DOMINICA...  
MEXICO... HONDURAS... SAINT LUCIA... SINT MAARTEN... SAINT  
VINCENT AND MARTINIQUE

### 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

# Public Text message – Threat Message

## 2<sup>nd</sup>-3<sup>rd</sup> + Messages

- Threat
- Take Actions
- Magnitude update ?
- Wave Forecasts
- Tsunami readings

*PTWC guidance information to  
Country TWFP/NTWC*

TSUNAMI MESSAGE NUMBER 2  
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI  
0030 UTC WED DEC 2 2015

...TSUNAMI THREAT MESSAGE...

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

PRELIMINARY EARTHQUAKE PARAMETERS

-----  
\* MAGNITUDE           8.4  
\* ORIGIN TIME        0000 UTC DEC 2 2015  
\* COORDINATES        10.0 NORTH 78.5 WEST  
\* DEPTH               20 KM / 12 MILES  
\* LOCATION            NORTH OF PANAMA

EVALUATION

-----  
\* AN EARTHQUAKE WITH A PRELIMINARY MAGNITUDE OF 8.4 OCCURRED NORTH OF PANAMA AT 0000 UTC ON WEDNESDAY DECEMBER 2 2015.  
  
\* TSUNAMI WAVES HAVE BEEN OBSERVED.  
  
\* BASED ON ALL AVAILABLE DATA... HAZARDOUS TSUNAMI WAVES ARE FORECAST FOR SOME COASTS.

TSUNAMI THREAT FORECAST

# Public Text message – Threat Message

## 2<sup>nd</sup>-3<sup>rd</sup> + Messages

- Threat
- Take Actions
- Magnitude update ?
- Wave Forecasts
- Tsunami readings

*PTWC guidance information to  
Country TWFP/NTWC*

### TSUNAMI THREAT FORECAST

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

CUBA... DOMINICAN REPUBLIC... HAITI... PANAMA... AND JAMAICA.

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

COLOMBIA... COSTA RICA... NICARAGUA... VENEZUELA... ARUBA... BAHAMAS... CURACAO... PUERTO RICO AND VIRGIN ISLANDS... AND SAN ANDRES AND PROVIDENCIA.

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

BELIZE... HONDURAS... MEXICO... ANGUILLA... ANTIGUA AND BARBUDA... BARBADOS... BONAIRE... CAYMAN ISLANDS... DOMINICA... GRENADA... GUADELOUPE... MARTINIQUE... MONTSERRAT... SABA AND SAINT EUSTATIUS... SAINT BARTHELEMY... SAINT KITTS AND NEVIS... SAINT LUCIA... SINT MAARTEN... SAINT MARTIN... SAINT VINCENT AND THE GRENADINES... AND TURKS AND CAICOS ISLANDS.

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

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



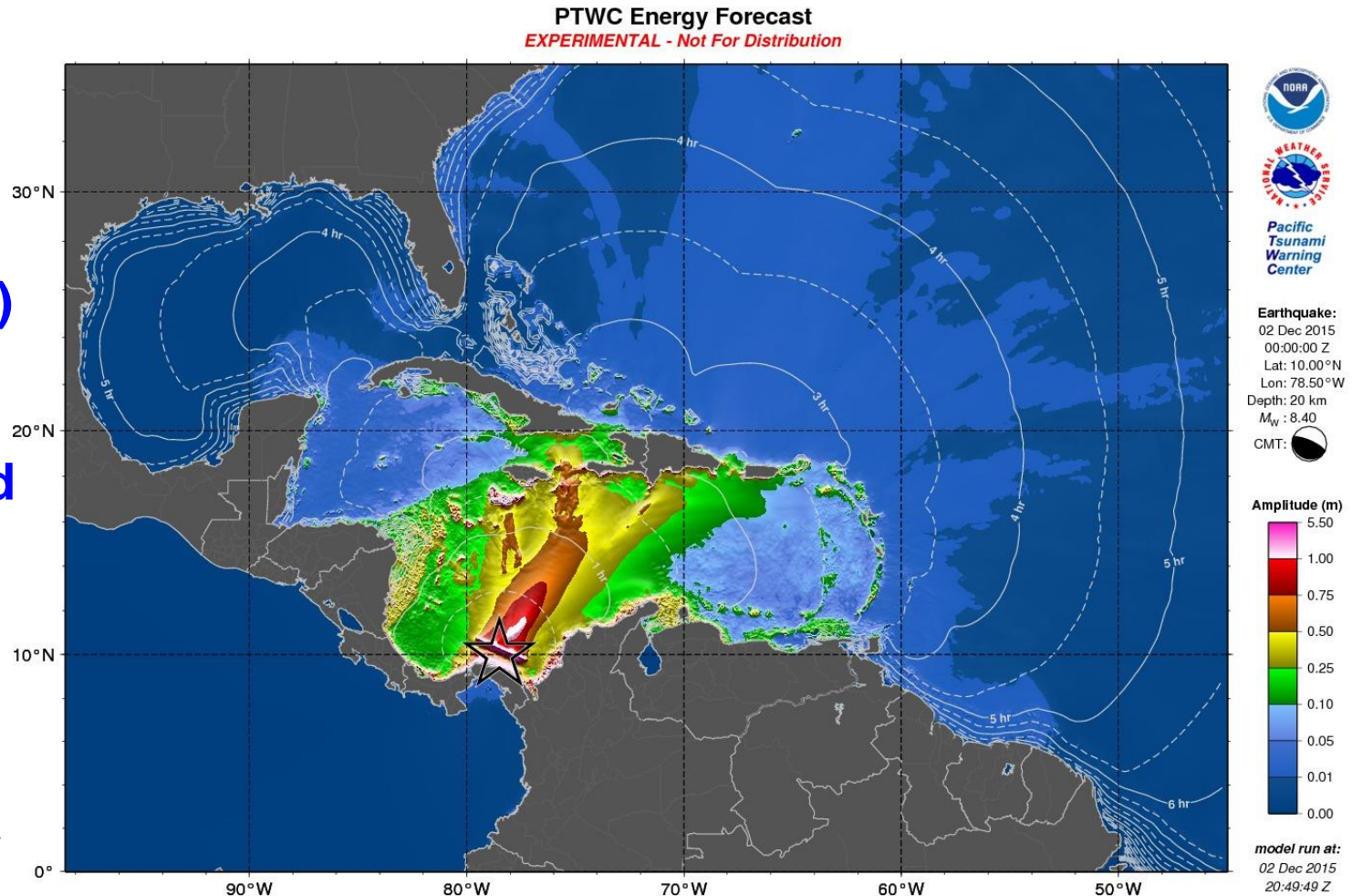
UNESCO – IOC – US NOAA ITIC  
US NOAA Pacific Tsunami Warning Center  
September 2015

# PTWC Enhanced Products: TWFP Products - Examples

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# Graphical Product: Deep-Ocean Forecast

- Tsunami Travel Time contours (assumes point source)
- Color range scaled so red / white show maxima
- Shaded textures show energy distribution

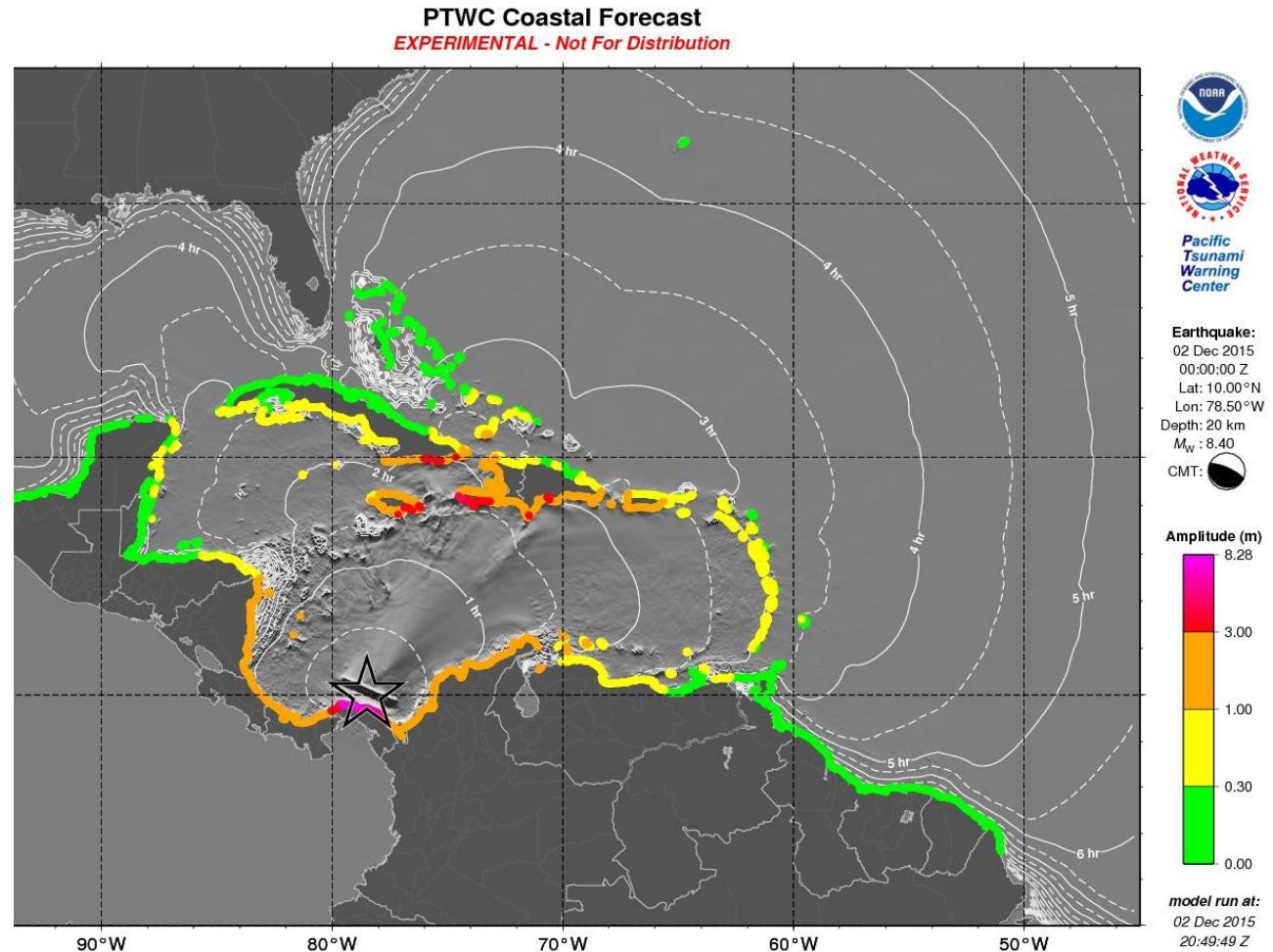


This map should not be used to estimate coastal amplitudes or impacts. Deep-ocean amplitudes are usually much smaller than coastal amplitudes



# Graphical Product: Coastal Forecast

- Green's Law used to propagate off-shore, deep-ocean to coast
- Tsunami Travel Time contours (assumes point source)
- Tsunami Wave Amplitudes at designated coastal forecast points (Green's Law)
- Shaded textures show energy distribution
- Caribbean-wide, sub-region plot

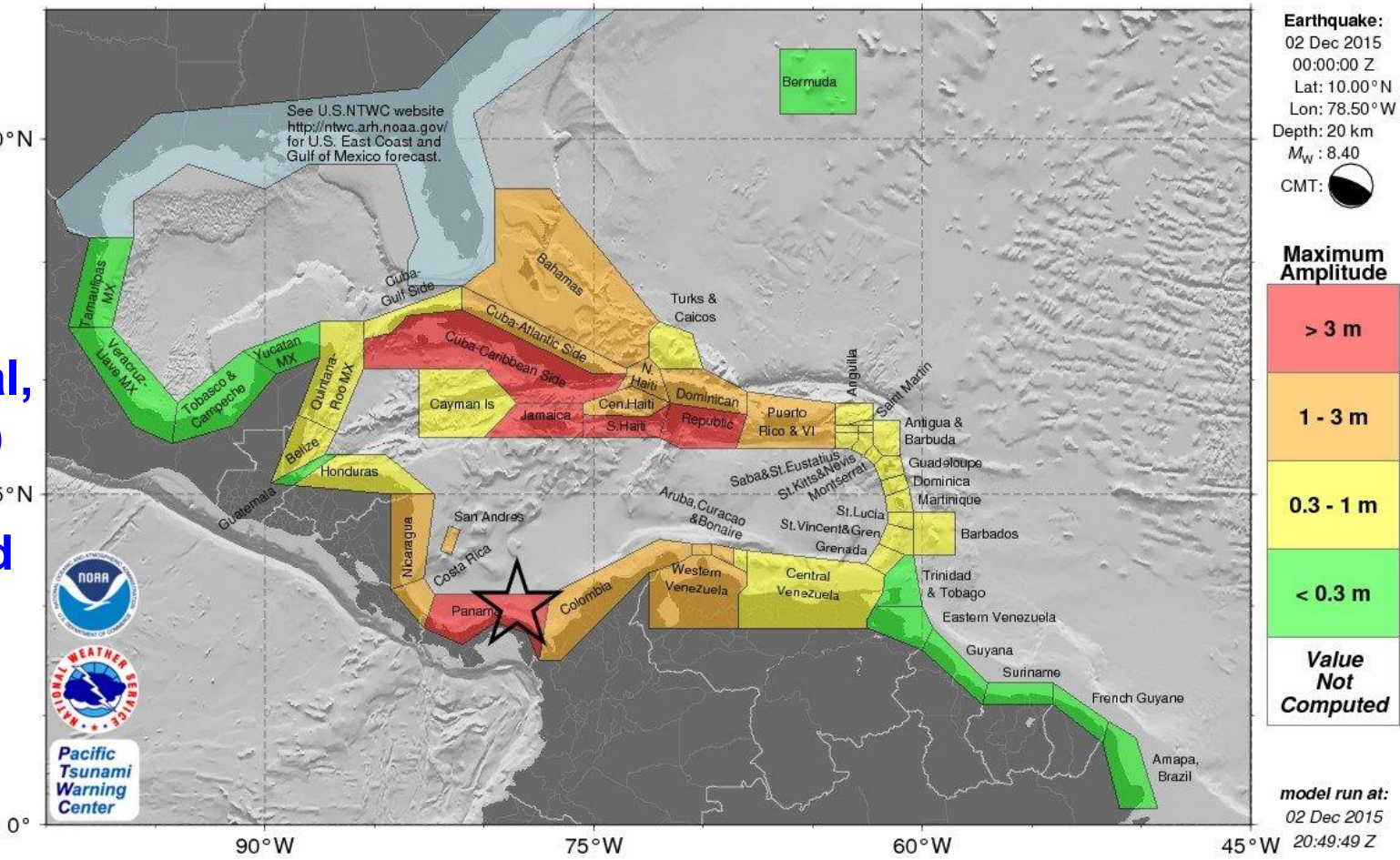


Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on atolls will likely be much smaller than the forecast indicates.

# Graphical Product: Coastal Forecast Polygon

- Threat level for designated forecast zones (based on geographical, geopolitical)
- Grey-shaded textures shows bathymetry

PTWC Forecast Polygons *EXPERIMENTAL - Not For Distribution*



Earthquake:  
02 Dec 2015  
00:00:00 Z  
Lat: 10.00°N  
Lon: 78.50°W  
Depth: 20 km  
 $M_w$ : 8.40  
CMT:

Maximum Amplitude

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

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.

# Text File: Forecast Polygon Table



- Coastal and Deep-Ocean Forecasts for polygons
- Includes statistics giving uncertainty / quality estimate.
- E.g., for each polygon (comprised of # forecast points), max / mean / median / standard deviation of coastal and offshore (deep-ocean) wave amplitude for that polygon
- Complements GoogleEarth .kmz tool - can show value variation from point-to-point.

PTWC TABLE OF FORECAST STATISTICS FOR REGIONAL POLYGONS - RUN ID 20151202204949  
(for internal use only - not for distribution)

Earthquake - Origin: 12/02/2015 00:00:00 UTC Coordinates: 10.0N 78.5W Depth: 020km Magnitude: 8.4

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

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

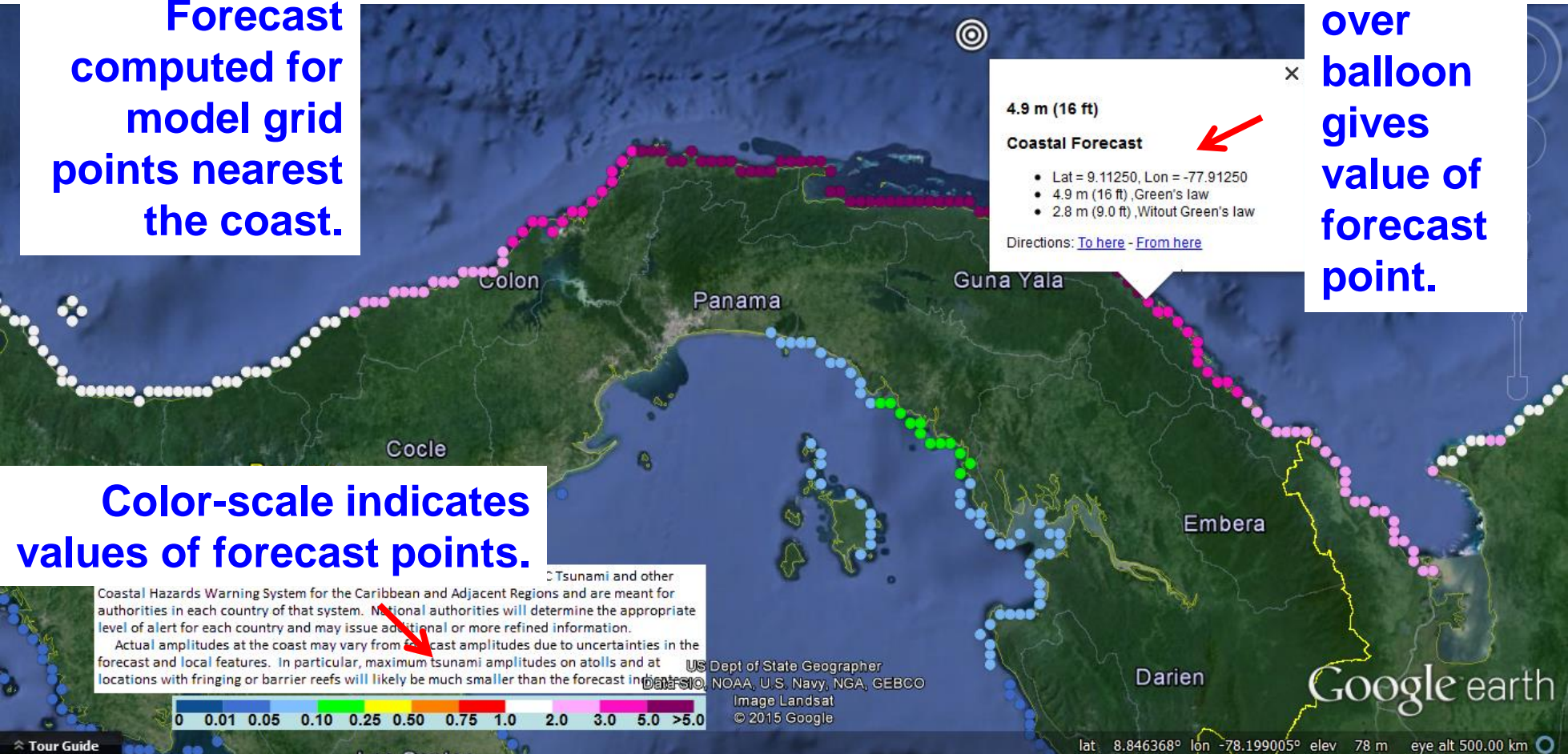
Region Name	Coastal Forecast (meters)				Offshore Forecast (meters)				Total Points
	Maximum	Mean	Median	STD	Maximum	Mean	Median	STD	
Caribbean Coast of Panama	8.3	3.50	2.50	2.30	5.1	1.90	1.50	1.20	179
Caribbean Coast of Haiti	4.9	2.90	2.90	0.70	2.0	0.92	0.85	0.33	89
Caribbean Coast of Cuba	3.5	0.85	0.53	0.84	1.9	0.26	0.17	0.24	472
Jamaica	3.4	1.80	1.50	0.73	2.8	0.79	0.71	0.43	146
Caribbean Coast of Dominican Republic	3.2	2.20	2.20	0.53	3.2	1.20	1.00	0.60	148
Caribbean Coast of Colombia	2.6	1.90	1.90	0.32	2.7	1.20	1.20	0.39	255
Puerto Rico and Virgin Islands	2.1	0.81	0.67	0.39	1.5	0.44	0.34	0.29	189
Gulf of Gonave Coast of Haiti	2.1	1.40	1.40	0.29	1.9	0.54	0.46	0.31	139
Bahamas	1.9	0.16	0.06	0.27	1.1	0.09	0.03	0.15	442
Caribbean Coast of Costa Rica	1.5	1.30	1.30	0.15	1.2	0.82	0.79	0.18	48



# kmz file in Google Earth

Forecast computed for model grid points nearest the coast.

Mouse-over balloon gives value of forecast point.



Color-scale indicates values of forecast points.

Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions and are meant for authorities in each country of that system. National authorities will determine the appropriate level of alert for each country and may issue additional or more refined information. Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on atolls and at locations with fringing or barrier reefs will likely be much smaller than the forecast in the Pacific.

- Zoom in to area of interest
- Trends more important than individual pts





UNESCO – IOC – NOAA – ITIC  
Pacific Tsunami Warning Center (PTWC)

Tsunami Warning and Emergency Response  
Using the PTWC Enhanced Products for National Tsunami Threat Decision-Making

November 2015

# Thank You

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