PTWC Interim Advisory Services for the CARIBE-EWS

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Director
NOAA Pacific Tsunami Warning Center

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NWS Chief of Meteorological Services
## Review of PTWC Message Criteria

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>CARIBBEAN EQ</th>
<th>ATLANTIC EQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Statement</td>
<td>Mw: 6.0 – 9.9 Deep or Inland</td>
<td>Mw: 6.5 – 9.9 Deep or Inland</td>
</tr>
<tr>
<td>Information Statement</td>
<td>Mw: 6.0 – 7.0 Shallow, Undersea</td>
<td>Mw: 6.5 – 7.8 Shallow, Undersea</td>
</tr>
<tr>
<td>Local Tsunami Watch</td>
<td>Mw: 7.1 – 7.5 Shallow, Undersea</td>
<td>N/A</td>
</tr>
<tr>
<td>Regional Tsunami Watch</td>
<td>Mw: 7.6 – 7.8 Shallow, Undersea</td>
<td>N/A</td>
</tr>
<tr>
<td>Caribbean-Wide Tsunami Watch</td>
<td>Mw: 7.9 – 9.9 Shallow, Undersea</td>
<td>Mw: 7.9 – 9.9 Shallow, Undersea</td>
</tr>
</tbody>
</table>
Nearby Seismic Stations Monitored by PTWC
Nearby Sea Level Stations Monitored by PTWC
PTWC Intersessional Activities

- Responded to >500 global earthquakes
- Issued Observatory Messages for 36 earthquakes in the Caribbean
- Issued Observatory Messages for 16 earthquakes in the Atlantic
- Issued Caribbean Tsunami Bulletins for 4 of the earthquakes above: 3 Tsunami Information Statements and 1 Local Tsunami Watch
PTWC Intersessional Products

Tsunami Information Statements
- 09/12/09 Mw=6.4 Coast of Venezuela
- 01/05/10 Mw=6.7 South Sandwich Islands
- 01/20/10 Mw=6.0 Haiti

Local Tsunami Watch
- 01/12/10 Mw=7.1 Haiti
  - Initial Bulletin
  - 1 Supplement
  - Cancellation
<table>
<thead>
<tr>
<th>TIME (UTC)</th>
<th>EVENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2153</td>
<td>Earthquake Occurs in Haiti</td>
</tr>
<tr>
<td>2155 (+2m)</td>
<td>PTWC Alarm (Big Seismic Signals)</td>
</tr>
<tr>
<td>2201 (+8m)</td>
<td>Observatory Message (7.3 Mwp)</td>
</tr>
<tr>
<td>2203 (+10m)</td>
<td>Local Tsunami Watch (7.3 Mw)</td>
</tr>
<tr>
<td>2240 (+47m)</td>
<td>Tsunami starts at Santo Domingo Gauge</td>
</tr>
<tr>
<td>2245 (+52m)</td>
<td>Tsunami starts at Caribbean DART Gauge</td>
</tr>
<tr>
<td>2254 (+61m)</td>
<td>Local Watch Supplement (7.1 Mw)</td>
</tr>
<tr>
<td>2345 (+112m)</td>
<td>Watch Cancellation</td>
</tr>
</tbody>
</table>
Haiti Event - Travel Time Contours
Haiti Tsunami at Caribbean DART

Pressure signal from seismic waves

Tide is going down normally

1-cm tsunami signal
Haiti Tsunami at Santo Domingo Gauge

12-cm tsunami signal
Cancellation Basis

- Mw 7.1 = Low Probability
  - of Major Tsunami
  - of Widespread Tsunami
- Small Sea Level Readings
  - Santo Domingo 12 cm (crest-to-trough)
  - Caribbean DART 1 cm (crest-to-trough)
PTWC Message Dissemination

- GTS (must subscribe to these products)
  - WECA43 PHEB (Information Statements)
  - WECA41 PHEB (Watch Messages)
- AFTN (need AFTN Address)
- EMWIN (need EMWIN System)
- FAX (need Fax Number)
- EMAIL (need email address)
- RANET (need phone number for SMS)
PTWC Communication Tests

- **Purpose**
  - Confirm all designated methods for message communication between PTWC and TWFPs
  - Confirm PTWC messages are quickly recognized when received by TWFPs

- **Two Intersessional Tests**
  - November 26, 2009
  - February 20, 2010

- Communication results from IOC Haiti Study
<table>
<thead>
<tr>
<th>PLACE</th>
<th>TYP</th>
<th>VER</th>
<th>CNF</th>
<th>ALL</th>
<th>VER</th>
<th>CNF</th>
<th>ALL</th>
<th>NUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anguilla - UK</td>
<td>GTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anguilla - UK</td>
<td>Email</td>
<td>F</td>
<td></td>
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<td>F</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Anguilla - UK</td>
<td>Email</td>
<td>C</td>
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<tr>
<td>Anguilla - UK</td>
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<td>Anguilla - UK</td>
<td>Email</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>Fax</td>
<td>Y</td>
<td></td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>Fax</td>
<td>Y</td>
<td>C</td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>AFTN</td>
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</tbody>
</table>

**Communication Test Results Sample**

- **11/26/2009 TEST**
- **2/20/2010 TEST**
- **HAITI**

The table above provides a sample of communication test results for different places and types of communication, including GTS, Email, Fax, and AFTN. The results are indicated by verification (VER) and confirmation (CNF) statuses, with green indicating successful completion and pink indicating failure. The number of failures (NUM) is also noted.
## Communication Test Results Summary

<table>
<thead>
<tr>
<th></th>
<th>11/26/09 Test</th>
<th>02/20/10 Test</th>
<th>Haiti Event</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F = Failed</strong></td>
<td>45 of 217 Methods (21%)</td>
<td>35 of 206 Methods (17%)</td>
<td></td>
</tr>
<tr>
<td><strong>R = Removed for</strong></td>
<td>None</td>
<td>11 of 217 Methods (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Repeated Failure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Y = Verified</strong></td>
<td>27 of 217 Methods (12%)</td>
<td>26 of 206 Methods (13%)</td>
<td></td>
</tr>
<tr>
<td><strong>Receipt</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electronically</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C = Confirmed</strong></td>
<td>29 of 217 Methods (13%)</td>
<td>11 of 206 Methods (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Receipt by</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>TWFP</strong></td>
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<td></td>
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</tr>
<tr>
<td><strong>Received by at least one Method</strong></td>
<td>24 of 38 Places (63%)</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Confirmed for at least one Method</strong></td>
<td>18 of 38 Places (47%)</td>
<td>10 of 38 Places (26%)</td>
<td>19 of 20 Places (95%)</td>
</tr>
</tbody>
</table>
Summary of Communications

- Based on the IOC Haiti Study, most Member States appear to be receiving Tsunami Bulletins from PTWC in a timely way, but communication tests are currently unable to verify or confirm most designated methods of communication.
- Some designated methods are probably obsolete and need to be removed.
The Way Forward

- More frequent Communication Tests
- Member States encouraged to respond in a timely and comprehensive way
- Member States re-confirm TWFP contact information
  - Update fax, phone, email, etc.
  - Some existing contacts obsolete and need to be removed
The Way Forward

- Develop alternate internet-based communication
  - CISN-like interface
  - Low bandwidth
  - Alarm-able
  - Two-way comms between PTWC and TWFP
  - Private comms (outside media/public)
  - Supports graphical products
The Way Forward

- Automate communication reports to TNCs
  - Fax and Email success or failure for tests or bulletins can be automated
  - Results for each TWFP compiled and emailed to each respective TNC

- Website with current TWFP information
  - Password protected for each Member State
  - Validate current TWFP information
  - One master list.
Re-Format of PTWC Text Products

- New Narrative Summary Statement
  - At beginning of text product
  - Contains key information immediately
  - Composed in English, French and Spanish

- Precautionary Statement
  - General safety info about tsunami hazard

- Supporting Information Tabulated Below
  - Earthquake parameters
  - Estimated arrival times
  - Tsunami measurements
TSUNAMI MESSAGE NUMBER 2
NWS PACIFIC TSUNAMI WARNING CENTER EWA BEACH HI
2254 UTC TUE JAN 12 2010

THIS MESSAGE APPLIES TO COUNTRIES WITHIN AND BORDERING THE
CARIBBEAN SEA...EXCEPT FOR PUERTO RICO AND THE VIRGIN ISLANDS.

... A LOCAL TSUNAMI WATCH IS IN EFFECT ...

A TSUNAMI WATCH IS IN EFFECT FOR

HAITI / CUBA / BAHAMAS / DOMINICAN REP

FOR OTHER AREAS OF THE CARIBBEAN COVERED BY THIS MESSAGE...IT IS
FOR INFORMATION ONLY AT THIS TIME.

THIS BULLETIN IS ISSUED AS ADVICE TO GOVERNMENT AGENCIES. ONLY
NATIONAL AND LOCAL GOVERNMENT AGENCIES HAVE THE AUTHORITY TO MAKE
DECISIONS REGARDING THE OFFICIAL STATE OF ALERT IN THEIR AREA AND
ANY ACTIONS TO BE TAKEN IN RESPONSE.

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS

ORIGIN TIME: 2153Z 12 JAN 2010
A TSUNAMI WATCH IS NOW IN EFFECT FOR HAITI...CUBA...THE BAHAMAS AND THE DOMINICAN REPUBLIC DUE TO A MAGNITUDE 7.1 EARTHQUAKE THAT OCCURRED IN THE HAITI REGION AT 2153 UTC. THIS WATCH MEANS THERE IS THE POSSIBILITY OF INUNDATION AND DAMAGE FROM TSUNAMI WAVES ALONG COASTS OF THOSE PLACES NAMED IN THE WATCH. A MORE WIDESPREAD TSUNAMI THREAT IS NOT EXPECTED...ALTHOUGH OTHER COASTAL AREAS IN THE CARIBBEAN REGION MAY EXPERIENCE SMALL SEA LEVEL CHANGES AND STRONG OR UNUSUAL CURRENTS.

[REPEAT PARAGRAPH ABOVE IN SPANISH]
Thank You