PTWC Interim Advisory Services for the CARIBE-EWS

Charles McCreery
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NOAA Pacific Tsunami Warning Center
Nearby Seismic Stations Monitored by PTWC

Stations added since ICG/CARIBE-EWS-V
Nearby Sea Level Stations Monitored by PTWC

Stations added since ICG/CARIBE-EWS-V

Stations to be added by September 2011
PTWC Intersessional Activities

- Responded to >500 global earthquakes
- Issued Observatory Messages for 16 earthquakes in the Caribbean with < 6 min average response time (more seismic data)
- Issued Observatory Messages for 13 earthquakes in the Atlantic
- Issued Caribbean Tsunami Bulletins for just 1 of the earthquakes above: A Tsunami Information Statements for a magnitude 6.6 earthquake in the South Sandwich Islands
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 Regular Intersessional Tests**
  - July 13, 2010
  - September 11, 2010

- **CaribeWave11 Exercise**
## Communication Test Results Summary

<table>
<thead>
<tr>
<th></th>
<th>Designated</th>
<th>Responded 07/13/10</th>
<th>Responded 09/11/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries or Places</td>
<td>39</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>GTS</td>
<td>&lt;39</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AFTN</td>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
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<td>68</td>
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<td>1</td>
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<tr>
<td>Email</td>
<td>143</td>
<td>0</td>
<td>1</td>
</tr>
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Summary of PTWC-to-TWFP Comms

- Based on the CaribeWave11 Exercise, most TWFPs appear to be receiving Bulletins from PTWC in a timely way, but
- Communication tests are currently unable to verify or confirm most designated methods of communication and
- Some designated methods are probably obsolete and need to be removed
The Way Forward

- Issue Communication Tests on a set Day / Time of every month
  - TWFPs will know it should be coming on that day / time
  - TWFPs only respond back if they didn’t get the test by any method they expect.
  - Manageable – IOC, PTWC and U.S. Caribbean TWP should be able to follow-up on any reported problems.
The Way Forward

- An alternate internet-based communication method based on the CISN Global Earthquake Reporting Display / Interface
  - Low bandwidth
  - Alarm-able
  - Two-way comms between PTWC and TWFP
  - Private comms (outside media/public)
  - Supports graphical products
The Way Forward

- Website with current TWFP information
  - Password protected for each Member State
  - Validate current TWFP information
  - One Master List
PTWC Faxes

- PTWC uses a commercial faxing service to simultaneously fax its messages to all designated TWFP fax numbers.

- Fax costs can be large for major events:
  - US$15000 for 2009 Samoa Tsunami
  - US $25000 for 2010 Chile Tsunami
  - US $31000 for 2011 Japan Tsunami

- A small cost for the value of a warning message, but can this cost be reduced?
PTWC Faxes

- Can the number of fax numbers be reduced to 1 or 2 for each TWFP (some have 4 or 5)?
- Are faxes needed for every bulletin or only for the first one or key ones as a heads-up?
- If a heads-up, is the full message text needed in faxes?
- Recommend Working Group 3 on Communications investigate and provide guidance to PTWC on how to reduce faxes.
<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>
Limitations of Current Criteria

- They are based on limited historical data and are very conservative for safety
- Result in over-warning
- No information about levels of impact
Proposed Changes to Current Criteria

- Follow guidelines being established by IOC TOWS-WG (particularly its Task Team on Tsunami Watch Operations)
- Apply forecast models (RIFT, SIFT, AFTM) constrained by observations
- Provide expected levels of impact
  - No Threat
  - Marine Threat
  - Land Threat (inundation)
  - Major Land Threat (e.g., Japan 2011)
RIFT Model Mw=8.3 East of Barbados

Estimated Maximum Tsunami Amplitude in the Ocean
RIFT Model $M_w=8.3$ East of Barbados

Estimated Maximum Tsunami Amplitude at the Coast
RIFT Model Mw=8.3 North of Virgin Is.

Estimated Maximum Tsunami Amplitude in the Ocean
RIFT Model Mw=8.3 North of Virgin Is.

Estimated Maximum Tsunami Amplitude at the Coast
RIFT Model $M_w=8.3$ North of Panama

Estimated Maximum Tsunami Amplitude in the Ocean
RIFT Model Mw=8.3 North of Panama

Estimated Maximum Tsunami Amplitude at the Coast
RIFT Performance for Tohoku Tsunami

March 11, 2011, Sendai Tsunami: RIFT (GCMt9.1) Coastal Forecast

- Hawaii
- US/Canada Westcoast
- Alaska
- Japan
- New Zealand
- Chile
- Small Islands
- SW Pac

Napoopo, HI

Observed Zero to Peak Amplitude at tide gauges (m)

RIFT (GCMt9.1) (m)
But, Need More Sea Level Data
The Way Forward

Request the formation of an intersessional Task Team to guide and provide feedback to PTWC on the:

- development of new procedures, criteria and products based on model forecasts
- testing and staging their implementation
- taking into account the strengths and limitations of forecasting
- taking into account the needs of the Member States
- and taking into account the TOWS-WG recommendations
The Way Forward

Target introduction of new procedures and products by the next ICG in an experimental test mode, keeping current procedures in place. Target next CaribeWave exercise as a way to introduce and get feedback about new procedures and products. Implement after a reasonable testing and education period.
Re-Format of PTWC Text Products

- Described at ICG/CARIBE-EWS-V
- Still under development taking into account TOWS recommendations and changes due to use of forecast models.
Happy to have a quiet year in the Caribbean
Still need more sea level gauges
Implement monthly communication tests same day / time each month
Request help to reduce fax costs (guidance from WG3?)
Recommend moving towards new procedures and products based on forecast models (establish a Task Team?).
Thank You