Towards an Integrated Tsunami Warning System for Port Vila and Luganville, Vanuatu

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Ministry of Climate Change, Meteorology, Geo-hazards, Energy, Environment and Disaster Management
Republic of Vanuatu
Tsunami Early Warning

- The Vanuatu Meteorology and Geo-hazards Department (VMGD) issued an Tsunami information, advisory or warning after significant earthquake (local, regional, trans-oceanic) [Based on a Tsunami Directive]
- CISN, USGS, IRIS, PTWC Messages, Tide tool, IOC Sea Level Facility, DARTS
- ORSNET; Seiscomp 3, earthquake detection time 2-4 minutes
Vanuatu Mainstreaming Disaster Risk Reduction (MDRR) Project 2013 – 2016

Project Sites: Port Vila & Greater Port Vila (South Efate) and Luganville & Greater Luganville (South Santo) i.e. pilot sites

Implemented by the Vanuatu Meteorology and Geo-hazards Department and National Disaster Management Office

➢ 3 Components:

➢ **Component 1: Risk Mapping to Support Urban Preparedness and Planning** (Becca, GNS & NIWA: Tsunami Risk/Hazard Maps for Port Vila and Luganville)

➢ **Component 2: Establish a tsunami warning system for Port Vila and Luganville**

➢ **Component 3: Strengthen the National Advisory Board on Climate Change and Disaster Risk Reduction**
Vanuatu Archipelago
- MDRR project sites
  - South Santo
  - South Efate
Component 2: Establish a tsunami warning system for Port Vila and Luganville

- Tsunami Evacuation Maps
- Tsunami Evacuation Signs
- Tsunami Information Boards
- Tsunami Walk
- Tsunami Sirens
- Tsunami Response Plan
- Tsunami Directive Review
- Tsunami Drill/Simulation
- Tsunami Siren Messaging
- Regulations/Bye Laws
Tsunami Evacuation Maps
- 67 Maps

South Santo Tsunami Evacuation Zones

South Efate Tsunami Evacuation Zones
Tsunami Information Boards

Vanuatu Meteorology & Geo-Hazards Department
Protecting Lives and Property

Tsunami Information Boards

Vanuatu Tsunami Warning and Response Plan

Tsunami Information Boards

Port Vila ~26 information boards; Greater Port Vila ~48 information boards; Luganville ~25; Greater Luganville ~27 hence combined total of 126 information boards
Examples of Information Boards

- Freshwota Park
- Katatara, Ifira Point
- Pango Surf Club
- Eratap School
- St. Michel, Luganville
Tsunami Evacuation Signs
~300 Signs

DANGER ZONE

TSUNAMI DENJA ZONE
ZONE DE DANGER TSUNAMI

Taem wan etkwek I stap bitim wan minit O wan we i had tumas bio stanap yu mas ronweil kwik taem I ko lo wan sef ples afta we hem I stop
In an earthquake longer than a minute OR hard to stand up, you must evacuate all zones

Pour un seisme superieur a une minute OU difficile a rester debout evacuez toute la zone

Black sands, South Efate

Unity Park, Liganville
Tsunami Evacuation Signs

SAFE ROUTE SIGNS

- Tsunami Evacuation Signs
  - VOIE D’ÉVACUATION
  - EVACUATION ROUTE
Tsunami Evacuation Signs

SAFE LOCATION

Pekoa airport, Luganville
Vanuatu Meteorology & Geo-Hazards Department
Protecting Lives and Property

Tsunami Evacuation Map

- Village/Community consultation process
- Provincial and Municipality Meetings
- Facilitator Training
- Presentation
- Break-out groups

Example of activity during meeting with provincial and municipality authorities; seen here are Luganville municipality councillors having a go on a draft Luganville evacuation map

Example of presentation used during Facilitator Trainings

Example of presentation used during Community Consultations
• Break-out groups
  • Drawn on proposed evacuation routes using arrows
  • Draw on sign locations for the sign groups
  • Location names that help people read the map
  • Write or correct English, French and Bislama version of evacuation maps, information boards and signs
  • Each group presented their work in front while others listen and asks questions after each presentation (Discussion)
  • After which all used draft materials were collected

Example (left) a break-out group discussing their ward evacuation map, (routes and locations added), and (right) a break-out group explaining a change in the word and language used on the Danger Zone sign during their presentation up front
Standard Operating Procedures

- Community-Based Tsunami Evacuation Maps and Signs (SOP 11)
- Creating Tsunami Evacuation Maps and Information Boards in QGIS (SOP 12)
- Guidance from GNS and GIS consultant
Tsunami Walk

- An educational outreach activity; walking through the main street of Port Vila and Luganville
Tsunami Walk

Participants after the “Tsunami Walk” at Unity Park, Lukanville
Tsunami Sirens

Port Vila – Greater Port Vila: 9 sirens
Tsunami Sirens

Luganville – Greater Luganville: 10 sirens
Testing and Commissioning of Tsunami Sirens in Port Vila – Greater Port Vila (South Efate)

Seafront Siren, Port Vila

Mele Siren, Southwest Efate
Testing and Commissioning of Tsunami Sirens in Port Vila – Greater Port Vila (South Efate)

Mele Siren Cabinet, Southwest Efate

Testing Erakor Siren, South Efate
Tsunami Response Plan

- Provincial/Municipality
- Area Council/Ward
- Community Disaster and Climate Change Committee
### Tsunami Directive Review

- VMGD to review

#### Current criteria for Tsunami Advisory

<table>
<thead>
<tr>
<th>Less than 7.0</th>
<th>No action is taken by the NTWC</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0</td>
<td>“Tsunami INFORMATION” is issued, if focal depth is deeper than 10 km.</td>
</tr>
<tr>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>7.4 more</td>
<td>“Tsunami INFORMATION” is issued, if focal depth is Deeper than 50 km.</td>
</tr>
</tbody>
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Earthquake data analysis for tsunami early warning!
## Tsunami Directive Review

<table>
<thead>
<tr>
<th>Mag</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6.4</td>
<td>Earthquake Information</td>
</tr>
<tr>
<td>6.5 - 6.8</td>
<td>Tsunami Information</td>
</tr>
<tr>
<td>6.9 and More</td>
<td>Tsunami Advisory</td>
</tr>
</tbody>
</table>

Incorporate the sirens when threat likely for Port Vila and Luganville
# Regional & Distant earthquake

<table>
<thead>
<tr>
<th>PTWC Expected Tsunami Height</th>
<th>Type of Message</th>
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<tbody>
<tr>
<td>More than 3 m</td>
<td>Tsunami Advisory</td>
</tr>
<tr>
<td>1 – 3 m</td>
<td>Tsunami Advisory</td>
</tr>
<tr>
<td>0.3 – 1 m</td>
<td>Tsunami Information (beach and harbor clear)</td>
</tr>
<tr>
<td>No threat</td>
<td>Earthquake Information</td>
</tr>
</tbody>
</table>

- Tide data analysis for tsunami early warning
- Incorporate siren if threat likely for Port Vila and Luganville
Tsunami Drill/Simulation

- Testing of Tsunami Response Plans
- Testing VMGD Tsunami Directive
- Testing NDMO Tsunami Emergency Plan
- Testing of Tsunami Sirens
- Testing of evacuation signs and information boards
Tsunami Siren Messaging

- Pre-recorded messages for announcement of “Testing” and “All Clear” situations
- Especially regular use (e.g. Half year or quarterly) of test announcements increases the awareness of the people and the trust in the tsunami siren system
 Regulations/Bye Laws

- Protection of tsunami evacuation signs, information board and sirens
- Smooth evacuation should one is required
Thank you