The 2010 Chilean Tsunami on the California Coastline

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ABSTRACT: At 2:06 AM PDT, a little over four hours after the Chilean Earthquake began, the West Coast Alaska Tsunami Warning Center (WCATWC) issued a Tsunami Advisory. The Advisory lasted about 4 hours and covered all of the coastline, and most of the mainland, of California, Oregon, and Washington. People were warned to expect a tsunami, and many counties declared states of emergency or issued tsunami advisories. The tsunami was caused by an earthquake off the Chilean coast that produced a tsunami which caused damage to harbors, beaches, and buildings.

Background: On February 27, 2010, at 10:41 PM MST, a significant 8.8 earthquake struck the Maule region of central Chile. The earthquake was generated by the Nazca Plate being subducted under the South American Plate, approximately 120 km north of the magnitude 9.5 1960 Chile earthquake. The earthquake was significant to older buildings and buildings with reinforced concrete foundations. A large tsunami generated locally, causing severe damage to coastal towns and port facilities.

Tsunami Effects in California

Information about the effects of the tsunami was available from eyewitness accounts,Ballaron, on-line articles and data, and field measurements by owners of the coasts. Table 1 shows WCATWC tsunami impact categories and travel times based on updated information.

Lessons Learned - Harbors

- Avoid outside sources for alert information or actions.
- Use local emergency responder plans.
- Have dedicated tsunami staff.
- Assess important infrastructure (e.g. CGS)
- Understand length of tsunami activity.
- Use appropriate tsunami hazard levels and inundation.
- Increase scientific/CGS support to state and regional EMs
- Supplement, and field validate, the tsunami forecast.
- Consider media and public awareness.
- Discuss the tsunami impact categories.
- Build confidence in the field.
- Support the NOS (and State) tsunami program.

What Needs Work

- Clarify what a “Tsunami Advisory” means.
- Improve geoscientist communications.
- Update local emergency responder plans.
- Consider state inundation maps.
- Increase education about alert status.
- Share reinforcement with local decision makers.
- Continue to educate alert status definitions.
- Speed up tsunami forecasts, especially in California.
- Increase scientific and technical support to state and regional DMs.
- Improve support for media communication.
- Encourage discussion on harbors and DMs in county workshops, with state and Federal Coordinating Councils.
- Provide guidance on harbors and DMs during events.

Supplemental Information from Federal and State Agencies

- Real-time tsunami simulation models.
- Information about the effects of the tsunami was available from eyewitness accounts, Ballaron, on-line articles and data, and field measurements.

Table 1: Data from various sources (this table is still being collected) and therefore should not be evaluated in a targeted way.

<table>
<thead>
<tr>
<th>Location</th>
<th>Peak Amplitude 0.5hr after first</th>
<th>Strong Currents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Barbara Harbor</td>
<td>0.9 m</td>
<td>5 m/s</td>
</tr>
<tr>
<td>San Diego</td>
<td>0.75 m</td>
<td>5 m/s</td>
</tr>
<tr>
<td>Mission Bay</td>
<td>0.64 m</td>
<td>5 m/s</td>
</tr>
<tr>
<td>La Jolla</td>
<td>0.5 m</td>
<td>5 m/s</td>
</tr>
</tbody>
</table>

Figure 1: Tsunami earthquake rupture

Figure 2: Map of California

Implementing New Strategies

- Strengthening regional and state inundation maps.
- Expanding training to local emergency managers (EMs).
- Increase coordination support to state and regional DMs.
- Support the NOS (and State) tsunami program.
- Provide guidance on harbors and DMs during events.

Acknowledgements and References

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Miller, R., 2010: NOAA/NRTMP for supporting tsunami hazard mitigation and response activities in California. Thank you to the county emergency responders, state park, and state personnel who provided information.


Goltz, M., 2010: NOAA/NRTMP for supporting tsunami hazard mitigation and response activities in California. Thank you to the county emergency responders, state park, and state personnel who provided information.