



# TsuInfo Alert

prepared by the Washington State Department of Natural Resources on behalf of the

## National Tsunami Hazard Mitigation Program

a state/federal partnership funded through the National Oceanic and Atmospheric Administration (NOAA)

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**NOAA announces first *Tsunami Awareness Week*, March 21-27**  
 NOAA and coastal states to test tsunami warning communication system  
[http://www.noaaneews.noaa.gov/stories2010/20100319\\_tsunami.html](http://www.noaaneews.noaa.gov/stories2010/20100319_tsunami.html)

The National Oceanic and Atmospheric Administration and the National Tsunami Hazard Mitigation Program have designated March 21-27 as *Tsunami Awareness Week*. This designation comes in the wake of last month's tsunami in Chile and less than six months after a tsunami hit American Samoa, both events resulting in loss of life and property.

As part of tsunami awareness week, NOAA's National Weather Service will host open houses at its tsunami warning centers in Alaska and Hawaii, and many coastal states will host community tsunami awareness activities. California will launch a statewide tsunami awareness campaign including a new classroom lesson plan, two municipalities in Puerto Rico will complete requirements to become National Weather Service-designated **TsunamiReady™** communities and Hawaii's Lt. Governor, Duke Aiona, will host a tsunami awareness event at a school within a tsunami inundation zone on Oahu.

"NOAA continues to improve our ability to detect, forecast and warn for tsunamis," said Jane Lubchenco, Ph.D., under secretary of commerce for oceans and atmosphere and NOAA administrator. "But warnings are only part of the equation. To survive a tsunami, coastal residents and visitors need to know how to recognize a tsunami threat and how to get to safety quickly."

Lubchenco noted that the U.S. coast is vulnerable to near-and onshore earthquakes, similar to recent tragedies in American Samoa and Chile. Those earthquakes generated fast-moving tsunamis that struck within 20 minutes with little or no warning. "A powerful earthquake can be nature's warning of a tsunami. That's when you need to grab your family and head to higher ground."

In conjunction with *Tsunami Awareness Week*, on March 24 the National Weather Service and several state emergency management organizations will conduct exercises to test and practice tsunami response plans along the U.S. Gulf of Mexico, Atlantic and Pacific coasts, including Puerto Rico, the U.S. Virgin Islands, Alaska and Hawaii. These exercises, called LANTEX10 and PACIFEX10, provide an opportunity for coastal emergency management organizations to test and update emergency response plans for tsunamis – a critical component to maintaining readiness for a tsunami emergency. Coastal emergency management organizations will participate in the tests at varying levels, ranging from table top exercises to full-scale drills and beach-front evacuations.

"It's important that families in coastal areas take steps to prepare for a potential tsunami or other emergency," said FEMA Administrator Craig Fugate. "These steps include developing a family communications plan, putting an emergency kit together, and following the instructions of state and local officials in the event of an emergency. I encourage everyone to become informed of the risks where they live in order to better protect their homes and families."

*(continued on page 3)*

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(continued from page 1)

In the State of Alaska and the northern California counties of Del Norte, Humboldt, and Mendocino, an Emergency Alert System communications test will be conducted in conjunction with the exercise. Residents in these areas may hear community sirens, see an Emergency Alert System tsunami alert scroll across their television screens and hear a test message being broadcast over NOAA Weather Radio All Hazards. The tests also provide coastal residents and businesses an opportunity to review and practice tsunami response plans.

The National Weather Service operates a tsunami warning system for the United States, U.S. territories and western Canada through two tsunami warning centers, in Palmer, Alaska, and Ewa Beach, Hawaii. The centers, staffed 24/7, issue tsunami warning, advisory, watch and information messages as early as five to fifteen minutes after an earthquake. Upon receipt of tsunami messages, state and local emergency management agencies determine the appropriate response including whether or not to evacuate people from the warned area.

Following the deadly 2004 Indian Ocean tsunami, Congress provided NOAA with more than \$90 million to expand the nation's tsunami detection and warning capabilities, and an additional \$135 million for research, integrated observing systems, hazard mitigation and for a global tsunami warning and education network. As a result of this investment, the nation and the world are better prepared for the next tsunami.

To date 74 coastal communities in the U.S. have earned the National Weather Service TsunamiReady™ designation, up from only 11 in 2004. Thanks to this program, emergency managers in these communities are now better prepared to warn their citizens about tsunamis. NOAA also has completed a network of 39 buoy stations, up from only six experimental buoys in 2004.

#### Warning Signs of a Tsunami:

A strong earthquake, or one that persists for 20 seconds or longer.

The ocean withdraws, exposing the sea floor.

A loud, roaring sound (like an airplane or a train) coming from the ocean .

Tsunami warnings broadcast over television and radio, by beach lifeguards, community sirens, text message alerts, National Weather Service tsunami warning center Web sites and on NOAA Weather Radio All Hazards.

#### What You Should Do if You See These Signs:

Remain calm.

Move inland to higher ground.

Continue to monitor media sources for information.

Stay away from the beach until officials issue an "all clear" — Remember that a tsunami may be a series of waves over a period of several hours. ♦

#### My Word: North Coast tsunami test

Lori Dengler/for the Times-Standard

Posted: 03/23/2010 01:27:21 AM PDT

[http://www.times-standard.com/othervoices/ci\\_14737907](http://www.times-standard.com/othervoices/ci_14737907)

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This Wednesday, Del Norte, Humboldt, and Mendocino counties will participate in the annual test of the tsunami warning communication system. Tests of the Emergency Alert System happen all the time, so what's different about this test and why should you care?

Earthquakes and tsunamis have, unfortunately, been in the news lately. Starting with our North Coast earthquake on Jan. 9, followed by the devastating Haiti earthquake three days later, and then the really big one -- a magnitude 8.8 in Chile -- on Feb. 27, the spotlight has been on earthquakes and tsunamis.

Three important lessons have emerged from these earthquakes:

- 1). Build structures strong enough to resist earthquake shaking.
- 2). Make sure everyone recognizes that strong ground shaking is nature's tsunami warning.
- 3). Develop a robust warning system that can detect earthquakes with the potential to cause tsunamis far away from the source area and disseminate the information to everyone at risk quickly and accurately.

For Humboldt and Mendocino counties, Wednesday's test is focused on No. 3 (more about Del Norte below). Tsunami warnings are disseminated through the Emergency Alert System (EAS). It's a complex system -- each event has a different code and the codes used for tests and actual warnings are different. The system is tested monthly with "test" messages, but communities are rightfully wary about using the "live" warning codes because of concern that people may be confused and will respond as if a real tsunami is on the way. For this reason, some states have made it clear they will never do live code testing. California and the North Coast counties believe the only way to make sure the warning messages will work when you really need them is to test them. Last fall's earthquake and tsunami in American Samoa made it clear why this is important when, 15 minutes after the earthquake, officials mistakenly sent out the test message and not the actual warning.

Each of the past North Coast live code tests have revealed problems in the system. In the first year, special efforts were needed to reach the deaf and hard-of-hearing community, and last year there was a problem with the primary EAS station in Crescent City. This is the purpose of testing -- find the problems and correct them. Technology and people continually change so testing must be an ongoing process.

So what will happen on Wednesday? If you are in Mendocino County, between 10:15 a.m. and 10:45 a.m.,

you might hear/see your radio/TV program interrupted or receive an alert on your NOAA weather radio if you have one. In some areas of Humboldt County, you might also hear an announcement from an airplane (subject to weather conditions), receive a reverse 911 message on your phone, or hear a siren being tested. Please don't evacuate, just note what you observed and go to the NWS web site <http://www.wrh.noaa.gov/eka/> or call (707) 443-6484 to report your feedback.

Take this as an opportunity to discuss earthquake and tsunami safety with your family, friends, and co-workers. Check out the Living on Shaky Ground web site at [humboldt.edu/shakyground](http://humboldt.edu/shakyground) or request a copy of the magazine from HSU's Earthquake Education Center 826-6019.

The Wednesday test is about disseminating tsunami warnings. In the last six months, two tsunami advisories were issued for the California coast. On Sept. 29, 2009, a magnitude 8.1 earthquake occurred in American Samoa. On Feb. 27, 2009, a magnitude 8.8 earthquake occurred in Chile. For both of these earthquakes, the West Coast Alaska Tsunami Warning Center determined that a tsunami had been generated that posed a possible hazard to beaches, docks and harbors. No flooding on land was expected. The advisory is conveyed to coastal jurisdictions who may choose to limit access to vulnerable areas. Tsunami advisories are not disseminated through the EAS system. The Wednesday tsunami communication test is to examine how well the system works for a tsunami that poses a risk of flooding on land -- a much larger tsunami for California than what happened on either Sept. 29 or Feb. 27.

Del Norte County officials and the Yurok Tribe in Klamath, are adding evacuation drills to Wednesday's test. In Smith River, Crescent City, and Klamath, sirens will be used as a proxy for feeling a strong earthquake. When people hear sirens, they should pretend that the ground is shaking and evacuate. Volunteers will be stationed to help guide people safely to high ground. This will be the largest full scale tsunami evacuation drill ever attempted in the U.S. When an event like the Chilean earthquake occurs, people close to the source must rely on recognize that shaking is the warning and move to higher ground or inland as soon as it is safe to do so, without any official guidance. Evacuation drills, like practicing Drop, Cover and Hold On drills, give us the muscle memory to do the right thing when the real event occurs. Humboldt and Mendocino counties are not conducting any evacuation drills on Wednesday but will plan similar drills in the future.

Lori Dengler is professor and chair of the HSU Geology Department and is leading an earthquake/tsunami reconnaissance team to Chile March 25 to April 4 to better understand how a future Cascadia earthquake and tsunami will impact the North Coast.♦

### **The 1835 Chilean earthquake/tsunami**

20 February of 1835, "The Ruin"

Preparado por Jorge Quezada Flory

[http://www.udec.cl/gema/Ter\\_hist/20\\_2\\_1835.html](http://www.udec.cl/gema/Ter_hist/20_2_1835.html)

(Spanish)

translated by the Internet; edited by Lee Walkling

Originally published in *TsuInfo Alert*, v. 4, no. 4, p. 21-22.

Of the Chilean earthquakes, this one appears to be more widely documented and studied thanks to the contribution of English naturalist Charles Darwin who was in Valdivia and experienced the tremors there. [His account of the earthquake and tsunami are also in *TsuInfo Alert*, v. 4, no. 4, p. 16-22:

[http://www.dnr.wa.gov/Publications/ger\\_tsuinfo\\_2002\\_v4\\_no4.pdf](http://www.dnr.wa.gov/Publications/ger_tsuinfo_2002_v4_no4.pdf) ]

The descriptions of the phenomenon in diverse locales indicate that there were at least two main shocks in a space of two minutes. The first tremor was felt in Concepcion at 11:40 a.m., but was not strong enough to produce panic.

The main earthquake (second tremor) destroyed most of the buildings in a few seconds. On Quiriquina Island, the local administrator told Darwin that his first memory of the earthquake was being thrown to the ground along with the horse he had been riding. While riding he had not felt the first, weaker tremor, and that the epicenter of the second tremor was closer to Quiriquina Island.

Next, it is described by Captain Fitz-Roy, captain of the *Beagle* on which Darwin was a passenger, who was in the vicinity of Concepcion during the earthquake. "Concepcion, 20 of February. Ten in the morning, great flocks of marine birds were observed on the roofs of houses, flying from the coast to the interior. Old-timers and experts on the climate of Concepcion were astonished by the unusual behavior of the birds (mostly gulls) and did not see any signs of approaching storms, which is very rare in this area. About eleven in the morning, the south breeze refreshed as usual, the sky was clear and almost without clouds. At 11:40 a movement was felt that began weakly and without any preceding underground noise; the intensity increased quickly. During the first minutes, many people remained inside, but the movements became so violent that soon the terrified people rushed outside. No one could remain on their feet and the buildings seemed to swing like waves; suddenly a tremendous shock demolished and destroyed everything. In less than 6 seconds the city became a pile of ruins. The noise of the houses that collapsed; the horrible screaming of the Earth when it opened and closed, repeated in numerous sites; the heart-rending shouts of the people. The suffocating heat; the dust clouds that blinded and choked the unfortunate inhabitants; the desperation and confusion,

the extreme horror and the alarm cannot be described nor imagined.”

The main convulsion lasted about two minutes, during which time it was impossible to remain standing without leaning on trees or other firm objects. Some were thrown to the ground but the movement was so violent that others had to stretch their arms to each side to avoid being thrown to the ground. The birds fled in all directions. The horses were very scared, they shook nervously, with raised legs and low heads. The vigorous shaking continued at short intervals and the Earth did not rest in the following three days. By March 4 there had been more than 400 aftershocks. The coastline raised between one and two meters, nevertheless this deformation disappeared with time.

Five died and 30 disappeared in Concepcion, but there were also victims in Talcahuano, Chillan, Constitucion, Cauquenes, Talca, and other towns. All the cities to the south of Rancagua suffered damage. There was no damage in the buildings of Santiago, but periodic inundations of water in numerous irrigation ditches were observed. In the alluvial lands surrounding Concepcion the central valley, earth craters and cracks appeared. A series of great cracks (some a foot wide) appeared in alluvial lands at the skirt of the hills in Concepcion, parallel to mountainous spurs. The city of Chillan was totally destroyed. It was decided to more safely reconstruct the town in a place about 3 kilometers from the previous site. All the inhabitants did not move to the new place, causing the city to be divided into Chillan Viejo and Chillan Nuevo.

A magnitude of 8 is estimated for this earthquake whose epicenter would have been less than 30 kilometers from the city of Concepcion. It also generated a tsunami of such proportions more destruction was caused. In the history of Chile, the earthquake of February 20, 1835 is known as “The Ruin.”♦

### **The first NPS area to be officially TsunamiReady? Redwood National and State Parks**

Posted August 9th, 2009 by Jim Burnett  
<http://www.nationalparkstraveler.com/2009/08/redwood-national-and-state-park-first-nps-area-be-officially-tsunami-ready>

The staff at Redwood National and State Parks has gone the extra mile to prepare for a hazard most visitors don't think about very often: a tsunami. The park is the first NPS area to earn TsunamiReady designation by the National Weather Service. Here's a quick tsunami primer.

Tsunamis make good fodder for Hollywood eco-thrillers and TV shows such as *The Weather Channel's* "It Could Happen Tomorrow", featuring potential natural

disasters—but is this really an issue? The U. S. Geological Survey (USGS) points out that

- Tsunamis are triggered by earthquakes, volcanic eruptions, submarine landslides, and by onshore landslides in which large volumes of debris fall into the water. All of these triggers can occur in the United States.
- Devastating tsunamis have struck North America before and are sure to strike again. Especially vulnerable are the five Pacific States—Hawaii, Alaska, Washington, Oregon, and California—and the U.S. Caribbean islands.
- The 1964 Alaska tsunami led to 110 deaths, some as far away as Crescent City, California; in 1918, an earthquake and tsunami killed 118 people in Puerto Rico. Several such events have struck this region in historic times.
- If a tsunami-causing disturbance occurs close to the coastline, a resulting tsunami can reach coastal communities within minutes.
- Although many people think of a tsunami as a single, breaking wave, it typically consists of multiple waves that rush ashore like a fast-rising tide with powerful currents. Tsunamis can travel much farther inland than normal waves.

According to the USGS, in the wake of the Indian Ocean disaster, the United States is redoubling its efforts to assess the Nation's tsunami hazards, provide tsunami education, and improve its system for tsunami warning. The good news is that some public officials are working to prevent a catastrophe similar to the December 2004 tragedy, when a tsunami killed more than 200,000 people in 11 countries around the Indian Ocean.

Employees at Redwood National and State Parks accomplished this recognition by completing a tsunami contingency plan, developing an employee tsunami response plan, and preparing an ocean safety brochure including tsunami information for park visitors. Employees have also participated in tsunami exercises with the Office of Emergency Services in Humboldt and Del Norte counties, and have taken an integrated emergency management course on dealing with tsunamis with local emergency responders from Humboldt County at the Emergency Management Institute in Emmitsburg, Maryland.

Troy Nicolini, the National Weather Service tsunami coordinator for Northern California, presented a TsunamiReady plaque to NPS Superintendent Steve Chaney and California State Park Supervising Ranger Brett Silver. Nicolini commented the park accomplished many things that were well beyond the requirements for being designated TsunamiReady.

“Redwood National and State Parks employees have reached out to local communities to assist them in also achieving their TsunamiReady designations,” she said. “This has definitely been a community effort.”

Are tsunamis a low probability? Perhaps, but the staff at Redwood deserves kudos for their proactive

efforts to make the park safer for anyone who visits the area. This is one situation when it's way too late to figure out what to do once you hear the words, "surf's up." ♦

**Long-term tsunami data archive supports tsunami forecast, warning, research, and mitigation,**

by Paula K. Dunbar, Kelly J. Stroker, Vanita R. Brocko, Desse D. Varner, Susan J. McLean, Lisa A. Taylor, Barry W. Eakins, Kelly S. Carignan, and Robin R. Warnken, in *Pure and Applied Geophysics*, v. 165, no. 11-12, p. 2275-2291.

[Abstract]--In response to the 2004 Indian Ocean tsunami, the United States began a careful review and strengthening of its programs aimed at reducing the consequences of tsunamis. Several reports and calls to action were drafted, including the Tsunami Warning and Education Act (Public Law 109-424) signed into law by the President in December 2006. NOAA's National Geophysical Data Center (NGDC) and co-located World Data Center for Geophysics and Marine Geology (WDC-GMG) maintain a national and international tsunami data archive that fulfills part of the P.L. 109-424. The NGDC/WDC-GMG long-term tsunami data archive has expanded from the original global historical event databases and damage photo collection, to include tsunami deposits, coastal water-level data, DART™ buoy data, and high-resolution coastal DEMs. These data are used to validate models, provide guidance to warning centers, develop tsunami hazard assessments, and educate the public about the risks from tsunamis. In this paper we discuss current steps and future actions to be taken by NGDC/WDC-GMG to support tsunami hazard mitigation research, to ultimately help save lives and improve the resiliency of coastal communities. (NTHMP Library has a copy of the article). ♦

Tsunami Warning and Education Act (Public Law 109-424): [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109\\_cong\\_public\\_laws&docid=f:publ424.109.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_public_laws&docid=f:publ424.109.pdf)

National Geophysical Data Center:  
<http://www.ngdc.noaa.gov/>

World Data Center for Geophysics and Marine Geology:  
<http://www.ngdc.noaa.gov/mgg/>

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**UH Mānoa houses newest FEMA National Disaster Preparedness Training Center**

Center will focus on training needs specific to island communities  
University of Hawai'i at Mānoa

Posted: Feb. 5, 2010;  
<http://www.hawaii.edu/news/article.php?aId=3387>



Karl Kim, NDPTC Executive Director

A ceremony celebrating the establishment of the newest Federal Emergency Management Agency (FEMA) National Disaster Preparedness Training Center (NDPTC) will be held on Tuesday, February 9, 2010, from 11 a.m. to noon at the East-West Center's Keoni Auditorium. The Center, headquartered at the University of Hawai'i at Mānoa, is the newest of seven federally funded members of the National Domestic Preparedness Consortium (NDPC).

In conjunction with the UH NDPTC ceremony, the Center will host the quarterly meeting of the NDPC on February 8-11, 2010. About 100 emergency responders, educators and community leaders from Hawai'i and the Pacific Islands will attend various training seminars, workshops and events to acquire high-quality disaster training, which focuses on Hawai'i, the Pacific Islands and other coastal communities.

UH's NDPTC will add to the nation's all-hazards capabilities by focusing on programming and training for the following: natural hazards, coastal communities, special needs and resources of island communities and territories.

Training sessions will include a demonstration of the NDPTC's tsunami awareness course and training by Louisiana State University's National Center for Bio-Medical Research and Training (NCBRT) to address campus emergencies associated with spontaneous events requiring the immediate attention of college and campus officials, emergency responders, elected officials and other community stakeholders. The Rural Domestic Preparedness Consortium (RDPC) will conduct training on event security planning for state and local law enforcement agencies. Attendees will also visit Kilauea Volcano, the Pacific Tsunami Museum and the tsunami evacuation zone.

Under the leadership of U.S. Senate Appropriations Chair Daniel K. Inouye and Senate Homeland Security Committee senior member Daniel K. Akaka, the University of Hawai'i was recently awarded more than \$4.8 million for FY 2009 by the Department of Homeland



Security. The appropriated funds will be used to conduct research to develop and deliver disaster training for responders, decision-makers, policy-analysts and urban planners to ensure they are prepared to respond in an event of a catastrophe.

“The Center’s strategic placement at the University of Hawai‘i will position it as a significant resource for emergency responders in Hawai‘i, the Pacific and the country,” said Sen. Inouye. “This training capability adds to FEMA’s mission and responsibility. With proper training, the center serves, in large degree, as an agent of FEMA to enhance its ability to safeguard communities.”

“I can think of no better place for this Center than to be affiliated with the University,” said University of Hawai‘i President M.R.C. Greenwood. “With its access to a wide range of University resources, this Center can surely contribute to develop our nation’s capacity to prepare for, respond to, and recover from natural disasters.”

The Natural Disaster Preparedness Training Center will be led by University of Hawai‘i at Mānoa Professor Karl Kim, who will serve as Executive Director of the Center. Kim is a UHM faculty member in the Department of Urban and Regional Planning who is routinely called upon by international, national, state and local agencies to provide technical assistance related to climate change, disaster resilience and urban planning.

“Sen. Inouye’s leadership brought the Center to life at a critical time, given the number of recent worldwide disasters,” said Kim. “The NDPTC will be a vital resource for the university, the state and the world, particularly the Pacific Island region. Over the next few years, we plan to expand our all-hazards capabilities for natural disasters, which will complement the strengths of our partner centers.”

“Being well-prepared for emergencies is critically important for the well-being of the people of Hawai‘i and the Pacific Islands,” said UH Mānoa Chancellor Virginia Hinshaw. “The NDPTC will bring together expertise from many groups across the campus, the UH system and Hawai‘i. Such education and preparation efforts will make us all feel and be more secure, so UH Mānoa is truly pleased to be a partner in this important endeavor.”

The NDPTC works closely with its affiliate partners including the Pacific Risk Management ‘Ohana; National Oceanic and Atmospheric Administration Pacific Services Center; International Tsunami Information Center; the Pacific Disaster Center; Pacific Marine Environmental Laboratory; Center for Tsunami Research, Center for Excellence: In Disaster Management & Humanitarian Assistance; Partnership for Disaster Resilience at the University of Oregon; and the Asia-Pacific Center for Security Studies.

The other six members of the National Domestic Preparedness Consortium include the National Nuclear Security Administration, Counter Terrorism Operations

Support; New Mexico Institute of Mining and Technology, Energetic Materials and Research Testing Center; National Center for Biomedical Research and Training, Academy of Counter-Terrorist Education (Louisiana State University); National Emergency Response and Rescue Training Center (Texas A&M University); Center for Domestic Preparedness; and the National Center for Emergency Response to Surface Transportation.

For more information on the NDPC, visit <http://www.ndpc.us>. For more information about the NDPTC at the University of Hawai‘i, visit <http://ndptc.hawaii.edu/index.php>.♦

#### **‘No messenger is more credible...’**

*Natural Hazards Observer*, March 2010, v. 34, no. 4, p. 5.

Tsunami warnings have improved dramatically over the past 20 years, thanks in large part to the advancement of technology. But recent experiences with the tsunami that hit Samoa on September 29, 2009 demonstrate that a lot of old-fashioned communication and emergency management response is still needed to save lives.

“People want to know what to do,” says Walter Dudley, chair of the Pacific Tsunami Museum’s Scientific Advisory Council. “No messenger is more credible than a tsunami survivor.”

Dudley interviewed survivors of the September 29, 2009 Samoan tsunami shortly after the disaster occurred. One of his interviewees, Peter Gurr of Malota, told him, “Homeland security training actually saved my life. The training educated me about tsunami.”

Gurr said children at the school had received tsunami training the Friday before the tsunami. When the teachers felt the quake, they led the children out the back of the school and up the hill. “It saved the school,” Gurr said in a video interview with Dudley. “Thank God those teachers knew what they were doing.”

The low tech approach of training and running uphill is aided by the newly completed tsunami warning system with 39 detection buoys placed in the Atlantic, Pacific, and Indian Oceans. “Over the past 25 years, NOAA [the U.S. National Oceanic and Atmospheric Administration] has developed a real-time forecasting capability with an accuracy of 80 percent,” says Eddie Bernard of NOAA’s Pacific Marine Environmental Laboratory.

Paul Whitmore, director of NOAA’s West Coast and Alaska Tsunami Warning Center, says that once the tragic 2004 Indian Ocean tsunami occurred, “Things became apparent ... Everywhere on the coast ought to be covered by a tsunami warning system.” Within about two weeks after the 2004 tsunami, a rudimentary warning system was set up on the U.S. East Coast where none had existed before.

Other changes in the early warning system include an increase in NOAA staffing levels to provide round-the-clock coverage, the installation of 39 buoys for tsunami warning—up from seven before 2004—development of a forecast system, upgrading of the Hawaii seismic network, funding for the TsunamiReady program, and installation of a Caribbean seismic network.

In 2004, the tsunami warning system detected about 35 percent of all the seismic events in the Pacific, but by 2008, that had increased to 95 percent. Response times decreased from seven minutes to three minutes between 2004 and 2008.

Curiously, the strength of an earthquake does not help to predict whether a tsunami will be triggered. Small quakes can trigger large tsunamis, and large quakes may trigger small ones, or perhaps none at all.

The tsunami research was presented at several sessions at the American Geophysical Union fall meeting in San Francisco on December 15 and 16, 2009. ♦

### **Best practices for risk communication**

From: *Coastal Services*, v. 13, no. 2, March/April 2010, p. 1

Publication of the NOAA Coastal Services Center  
Reprinted with permission. See 1992 revised version...available online.

How do you get people to evacuate before a hurricane strikes? How do you get people to lower their carbon emissions? How do you get people to understand climate change?

The most common approach is to feed the public more information. A more informed citizenry is more likely to react in the “right” way, correct? Social scientists say collective decision-making is much more complicated than that; how people feel about a risk is just as important as how much they know.

Other important factors also influence the decision maker, such as the opinions shared by friends and family, issues of mobility and transportation, and the cost and benefit of different options. With these considerations, it is no wonder that human behavior is so difficult to predict.

#### **Risk communication**

Even though eliciting widespread change is difficult, it can be done. Social scientists compiled the following best management practices for community leaders to consider when trying to use risk-related information to change behavior.

Start small—consider beginning a campaign by initially targeting a very specific behavior displayed by a very specific audience. Small-scale, localized efforts may be more likely to succeed and can be helpful in

setting the stage for more comprehensive and far-reaching campaigns.

Use social norms to your advantage—people are profoundly influenced by the behavior of those around them. Begin the campaign by targeting an audience whose behavior may be relatively easy to change, and allow that group’s behavior to diffuse throughout the broader community.

Know your audience—do what’s necessary to understand audience perceptions, decision-making processes, and social and cultural norms. Work to uncover what prevents and promotes the behavior that is being cultivated. Knowing the audience will aid in designing an effective message and in identifying a trusted messenger to deliver that message.

Present easy-to-understand and repetitive information—craft the message to be as brief and as vivid as possible. Recognize that it will need to be delivered repeatedly, through a variety of media and communication channels, in order to change behavior.

Use a positive approach—provide the audience with a specific action to take, and design a message that taps into their existing skills, roles, or desires. Messages suggesting a familiar or easy-to-do action can be more effective at grabbing an audience’s attention and promoting action.

Evaluate your success—evaluate the campaign mid-course and make any needed improvements. Also evaluate the campaign when it is over to understand whether campaign goals were met. This information can be used to increase the effectiveness next time.

*For coastal resource management programs that need help with social science-related tasks, the NOAA Coastal Services Center’s Human Dimensions program offers technical assistance and many how-to guides. Contact [csc.info@noaa.gov](mailto:csc.info@noaa.gov) to learn more or visit [www.csc.noaa.gov/publications/](http://www.csc.noaa.gov/publications/). ♦*

### **4<sup>th</sup> International Tsunami Symposium, July 25-29, 2010**

The deadline for submission of papers for the 4th International Tsunami Symposium has been extended until April 10. The Symposium will be held in conjunction and co-sponsorship with the 2010 US-CANADA joint conference on Earthquake Engineering. Contact Dr. George Pararas-Carayannis with questions or problems concerning the submission of papers:

[drgeorgepc@yahoo.com](mailto:drgeorgepc@yahoo.com). To submit abstracts:  
[tsunamisociety@hawaiiintel.net](mailto:tsunamisociety@hawaiiintel.net).

Please let Dr. George Pararas-Carayannis know if you need a letter of invitation for a Visa to Canada. Also, please note that there are reduced registration fees for members of EERI or the Tsunami Society International (which is a co-sponsoring organization). Membership application forms can be obtained by writing [drgeorgepc@yahoo.com](mailto:drgeorgepc@yahoo.com). ♦



**Action Items from the 2010 Meeting of the NTHMP Warning Coordination Subcommittee**

January 26, 2010 – Pasadena, CA

Update – March 2, 2010

<b>Action</b>	<b>Date</b>	<b>Office</b>	<b>Status</b>
1: Issue SCN to re-define PTWC definition of advisory.	3/10	PTWC	Done
2: Notify WCS when NWS Samoa tsunami assessment is complete and where it is posted.	6/10	WCATWC - PTWC	
3: State EM NTHMP reps. and NWS regional Tsunami Program Managers distribute exercise handbooks to coastal county/local officials and coastal WCMs.	2/10	NTHMP State EM reps., NWS Reg. Tsunami Program Mgrs	Done – LANTEX provided to WCS State and NWS Reg. Program Mgs. members in Dec.; PACIFEX in Jan.
4: Coordinate LANTEX/PACIFEX with Atlantic Storm Prediction Center, BC PEP, and DOD.	2/10	WCATWC - ARH	Done 2/5/10
5: Coordinate with American Samoa regarding participation in exercise.	2/10	PTWC	Done
6: Issue NOAA Press Release 1-3 weeks in advance of LANTEX/PACIFEX exercises.	3/10	TPO – ARH - WCATWC	Process Started
7: Determine date for 2011 national exercises.	7/10	WCS co-chairs	
8: Develop exercise handbooks for 2011 LANTEX/PACIFEX exercises.	12/10	WCATWC – PTWC	
9: Notify WCS co-Chairs when decision made for date/time of next international Pacific exercise.	9/10	ITIC	
10: Issue SCN to remove marine zones from Pacific products and implement change.	3/10	TPO–WR–AR–WCATWC	Underway
11: Issue SCN to convert WCATWC breakpoints to NWS public zone boundaries and implement.	6/10	TPO–WR–AR–WCATWC	
12: Examine potential of refining PR/VI warning regions by using public zone boundaries.	6/10	WCATWC – PRSN	
13: Dependent on Action 11, Issue SCN to convert PR/VI breakpoints to NWS public zone boundaries and implement.	9/10	TPO – SRH – WCATWC	
14: Adjust WCATWC procedures so that all M <sub>s</sub> ≥7.9 offshore events trigger multiple Info Stmts. until it is verified no dangerous tsunami exists for AOR.	6/10	WCATWC	
15: Adjust WCATWC criteria so that WCATWC Pacific Info. Stmt. criteria mimic Atlantic Info. Stmt. criteria.	6/10	WCATWC	
16: Remove statements from Recommended Actions which are not Actions and place in appropriate place of message (reword “It is not known...”).	4/10	WCATWC	Done – 2/2010
17: Drop detailed PTWC actions from WCATWC products and list generic stmt. on PTWC AOR.	3/10	WCATWC	Done – 2/2010
18: Drop Juneau as WCATWC ETA site, add San Pedro, Replace Ketchikan with Craig	3/10	WCATWC	Done – 2/2010
19: Query WCS members for input on tsunami.gov prototype when ready in May, 2010.	6/10	WCATWC	
20. Recommend to CC that NTHMP develop response plan for major events like Samoa.	1/10	Co-Chairs	Done – CC appointed team to develop plan for NTHMP (see 22).
21: Ensure appropriate baseline warning reception/dissemination data is captured and collated in MES surveys.	12/10	Co-Chairs	
22. Create plan for NTHMP to respond to tsunami events.	12/10	Whitmore, Goltz, Goeke, Richards, Biasco, Turner, Wilson	

## REGIONAL REPORTS

### OREGON

#### **O.H. Hinsdale Wave Research Laboratory**

The O.H. Hinsdale Wave Research Laboratory (Oregon State University) strives to expose students of all ages to engineering and research with a newly-developed guided education and outreach program. The program is guided by knowledgeable WRL researchers, faculty, and graduate students. It includes an introduction to basic wave mechanics as well as demonstrations of the wave lab equipment and descriptions of past and current projects.

For more information, visit:

[http://wave.oregonstate.edu/Education/K12\\_Outreach/](http://wave.oregonstate.edu/Education/K12_Outreach/)

You can also view the wave flume and tsunami wave basin via webcams:

[http://wave.oregonstate.edu/About\\_Us/webcam/](http://wave.oregonstate.edu/About_Us/webcam/)

#### **New multi-year tsunami mapping and outreach program comes to the Oregon Coast**

*Several coastal communities selected to become TsunamiReady, TsunamiPrepared over the next year*

Portland, Oregon: The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with Oregon Emergency Management and the National Weather Service, are enhancing and expanding tsunami preparedness for Oregon coastal communities with a new program called *Tsunami Ready, TsunamiPrepared*.

Funded by a multi-year, multi-million dollar grant from the National Tsunami Hazard Mitigation Program overseen by the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), *TsunamiReady, TsunamiPrepared* will accelerate the remapping of the Oregon coast for tsunami inundation using state-of-the-art computer modeling and laser based terrain mapping (lidar). The outcome will be the creation of new, more accurate tsunami evacuation maps for the entire 362 mile length of the Oregon coast.

The enhanced tsunami mapping and outreach program, *TsunamiReady, TsunamiPrepared*, will also build on the hard work coastal communities have already accomplished, or assist in work they are ready to begin, by supporting a grass roots program of awareness and preparedness. *TsunamiReady, TsunamiPrepared* will also provide much needed resources to help these communities create or maintain a sustained effort of education and preparation in anticipation of the next, inevitable tsunami to strike the Oregon coast.

Communities chosen for the first year of accelerated funding of the *TsunamiReady, TsunamiPrepared* program include Rockaway Beach, Manzanita, Nehalem, and Wheeler on the north coast, Yachats, Waldport and Seal Rock on the central coast and Bandon on the south coast. Adjacent state parks to these communities will also

participate in the program, with details of individual community efforts being finalized.

Support for all coastal towns interested in accelerating their earthquake and tsunami programs is also available in many forms, from an online clearing house of resources and emergency prep ideas, to workshops, printed materials, and media resources.

From:

<http://www.oregongeology.org/sub/default.htm>

### WASHINGTON

#### **Tsunami preparedness in Washington; version 1.0**

Tsunamis are a constant threat to the coasts of our world. Although tsunamis are infrequent along the West coast of the United States, it is possible and necessary to prepare for potential tsunami hazards to minimize loss of life and property. Community awareness programs are important, as they strive to create an informed society by providing education and training.

This video about tsunami preparedness in Washington distinguishes between a local tsunami and a distant event and focuses on the specific needs of this region. It offers guidelines for correct tsunami response and community preparedness from local emergency managers, first-responders, and leading experts on tsunami hazards and warnings...the people who have been working on ways of making the tsunami affected regions safer for the people and communities on a long-term basis.

This video was produced by the US Geological Survey (USGS) in cooperation with Washington Emergency Management Division (EMD), with funding by the National Tsunami Hazard Mitigation Program. There are 7 segments: Tsunami preparedness in Washington; Understanding tsunami warnings; Understanding local and distant tsunamis; Preparing your evacuation route; Preparing your evacuation kit; Oral history; and Tsunami preparedness along the West Coast, USA.

<http://pubs.usgs.gov/gip/97/>

### CALIFORNIA

#### **Proclamation by the Governor of the State of California**

While California's coastline is something we love and take pride in, our location on the Pacific Ocean and our proximity to earthquake faults make us vulnerable to tsunamis. The 1964 Alaska earthquake caused a tsunami on Northern Californian shores that claimed the lives of twelve residents of Del Norte County. To honor their deaths, and to protect the lives of coastal residents and visitors, we have made tsunami awareness and preparedness a priority in our state.

The California Emergency Management Agency and the National Oceanic and Atmospheric Administration's

National Weather Service will be partnering with local governments on March 24, 2010, at 10:15 a.m., to test our ability to issue a tsunami warning using the Emergency Alert System. This prepared response system will be tested in conjunction with educational programs and awareness campaigns in our at-risk coastal communities.

Our state's first responders are taking action and have made important strides to protect our coasts and to reduce property losses, injury and death. Being aware of the dangers and being prepared for the consequences will help California avoid tragedies caused by tsunamis in the future.

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of California, do hereby proclaim March 23-29, 2010, as "Tsunami Awareness and Preparedness Week."

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 22nd day of March 2010.

ARNOLD SCHWARZENEGGER  
Governor of California

#### **Newport Beach to get warning sirens**

The California Coastal Commission approved the installation of tsunami warning sirens in three open parks in Newport Beach to alert residents and beachgoers of potentially devastating post-earthquake waves and surge, allowing time to evacuate the area.  
<http://www.thelog.com/news/logNewsArticle.aspx?x-10633> for the full report.

## HAWAII

#### **April is Tsunami Awareness Month in Hawaii**

Lt. Gov. James "Duke" Aiona, Jr. will officially announce Tsunami Awareness Month at an Oahu school to emphasize the importance of tsunami education.

Tsunami Awareness Month is held in April to commemorate the 159 lives lost to the April 1, 1946, devastating tsunami – the most destructive in Hawaii's history.

NOAA scientists and Civil Defense volunteers are systematically visiting every school across the state located in tsunami danger zones to help them understand the risks of tsunami and improve their evacuation plans.

During student assemblies, experts talk about tsunami safety, provide educational materials, and answer questions. They also meet with school safety committee members to review emergency plans.

During April and May, NOAA will sponsor display booths and keiki activities at several public events on Oahu and the Big Island to help families prepare for tsunamis. Scientists from the Pacific Tsunami Warning Center and the International Tsunami Information Center will be available to speak to the public.

Big Island events include:

\* Statewide Tsunami Communications Test, Wednesday, March 24, 7 a.m. – noon, in conjunction with similar exercises in the Atlantic, Gulf, West Coast states, and Pacific Island nations. Sponsors: NOAA and Hawaii State Civil Defense. (No public involvement.)

\* Pacific Tsunami Museum Open House – Free Admission, Saturday, April 10, 9 a.m. – 4 p.m.  
130 Kamehameha Ave., Hilo, 935-0926

\* 22nd Annual Hawaii Community College Earth Day Fair, Friday, April 23, 9 a.m. – 4 p.m. University of Hawaii Hilo Campus, 974-7537. NOAA and Civil Defense partners will sponsor keiki activities and provide tsunami preparedness information.

\* 8th Annual Tsunami Talk Story Festival: "Hilo Perseveres"--Sunday, May 23, 2010, 6 p.m.  
Pacific Tsunami Museum, Sangha Hall, 130 Kamehameha Ave., Hilo, 935-0926. In commemoration of the 50th anniversary of the May 22, 1960 tsunami; dinner and program will recognize family-owned businesses that have survived two tsunamis and a war and are still thriving today. Reservations:  
[www.tsunami.org/storyfestfirst\\_responders.html](http://www.tsunami.org/storyfestfirst_responders.html)

From: <http://www.hawaii247.org/2010/03/19/april-is-tsunami-awareness-month-in-hawaii/>

#### **Annual Tsunami Story Festival**

The 8<sup>th</sup> Annual Tsunami Story Festival will be held on Sunday, May 23, 2010 at Sangha Hall in Hilo.

The theme of the festival is "Unstoppable! The Hilo Spirit" and will feature the stories of family-owned Hilo businesses that have survived two tsunamis and World War II and are still prospering today and are the social and economic backbone of the island.

Submitted by Donna Saiki, Director of the Pacific Tsunami Museum

## ALASKA

#### **Tsunami Awareness Week proclamation**

WHEREAS, as one of the world's most seismically active regions, Alaska's coastline contains many communities that are vulnerable to tsunamis. Ten of the 15 largest earthquakes in the United States have occurred in Alaska; and

WHEREAS, Alaskans remember the magnitude 9.2 Good Friday earthquake that struck Prince William Sound, 75 miles east of Anchorage, on March 27, 1964. The tsunami generated by the quake in South Central Alaska killed 106 people, and caused \$84 million in damages. Other tsunamis resulted along the coasts of British Columbia and the western contiguous United States claimed an additional 17 lives, and another \$10.7 million worth of damage; and

WHEREAS, in response to the Good Friday quake, the National Oceanic and Atmospheric Administration established the West Coast and Alaska Tsunami Warning

Center in 1967. Today, the center operates around the clock, issuing tsunami advisories and warnings for the east and west coasts of the United States and Canada, as well as for the Gulf of Mexico, Puerto Rico, and the Virgin Islands; and

WHEREAS, through a collaborative program involving State, federal, and local officials, several coastal communities are now labeled as "Tsunami Ready." This program promotes tsunami hazard preparedness and community awareness, and efforts are underway to increase the number of coastal communities who have achieved this level of preparedness.

NOW, THEREFORE, I, Sean Parnell, Governor of the State of Alaska, do hereby proclaim March 21-27, 2010 as: Tsunami Awareness Week

## AUSTRALIA

### **Australia participates in regional tsunami exercise – 14 October 2009**

Attorney-General, Robert McClelland, welcomed Australia's participation in an international exercise to test response arrangements for tsunami activity in the Indian Ocean.

"The importance of such an exercise is highlighted by the tragic devastation and loss of life experienced in both Sumatra and Samoa in recent weeks," said Mr. McClelland.

The exercise, Indian Ocean Wave, was led today (Oct. 14, 2009) by Indonesia and tested the ability to communicate urgent information including the size, intensity and likely land inundation of a simulated tsunami.

The exercise involved emergency services from Western Australia as well as Commonwealth agencies including Emergency Management Australia (EMA), Geoscience Australia, and the Bureau of Meteorology who are involved in the Australian Tsunami Warning System (ATWS).

The ATWS is provided through the Joint Australian Tsunami Warning Centre which operates 24-hours a day, seven days a week to detect and verify tsunami threats to Australia as a result of earthquakes. The ATWS provides a comprehensive warning system capable of delivering timely and effective tsunami warnings to affected populations. It also supports international efforts to establish an Indian Ocean tsunami warning system, and contributes to the facilitation of tsunami warnings for the South-West Pacific.

Indian Ocean Wave [coincided] with the United Nations International Disaster Reduction Day and follows a similar exercise conducted in June that successfully tested tsunami warning and communication arrangements for countries in the Pacific Ocean.

Eighteen nations participated in the Indian Ocean Wave exercise, including Indonesia, Bangladesh, India, Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Singapore, Sri Lanka, Tanzania, Timor Leste, and Australia.

From: Australian Journal of Emergency Management, v. 25, no. 1, p. 70.

## ITIC

Laura Kong sent a reminder about the Awareness Materials that are available FREE online, often in multiple languages. The website is [http://ioc3.unesco.org/itic/categories.php?category\\_no=75](http://ioc3.unesco.org/itic/categories.php?category_no=75)

Information includes TsunamiTeacher, educational materials, posters, safety flyers, stickers, brochures, publications, children's cartoon book, a tsunami glossary, textbooks and more, like the Tsunami Safety for Boaters (Tongan):

FALE'i MA'AE KAU FOLAUTAH 'OKA FAKATOKANGA  
PEAU KULA

1. 'Oua te ke foki ki taulanga 'oka ke ma'u ha fakatokanga peau kula lolotonga 'oku ke 'i ha feitu'u loloto
2. Fanongo ki he letio pea ke fakapapau'i 'oku faingamalie 'a e taulanga pea ke toki foki ki 'uta
3. 'E faingamalie ange ho vaka kapau 'e 'i he tahi loloto (lahi ange 'i he mita 'e 400) lolotonga ha peau kula. 'Oua na'a ke feinga ke fakahaofi ho vaka 'oka panaki mai 'a e peau kula ka ke feinga he vave taha ki lotofonua
4. Talangofua ki he ngaahi tu'utu'uni 'a e ma'u mafai lahi ki he ngaahi taulanga 'oka 'iai ha fakatokanga peau kula ♦

## NTHMP PARTICIPANTS

*TsuInfo Alert* will continue publishing State/Regional reports. We rely on each State, Region, or Country to send information about their programs and activities to *TsuInfo Alert*. Please send material to [lee.walking@dnr.wa.gov](mailto:lee.walking@dnr.wa.gov) or to the address given on page 2.

If the material is date-sensitive, the deadlines for individual issues are

- Jan 20 for the February issue;
- March 20 for the April issue;
- May 20 for the June issue;
- July 20 for the August issue;
- September 20 for the October issue, and
- November 20 for the December issue.

*TsuInfo Alert* continues to look for good articles on emergency management or tsunami science or historical tsunamis. If you come across an article you think other EMs or tsunami researchers would value, please forward the reprint suggestion to [lee.walking@dnr.wa.gov](mailto:lee.walking@dnr.wa.gov) or to the address given on page 2.



## Cell phones and radios help save lives after Haiti earthquake

24 Jan 2010 11:28:00 GMT

Written by: Tim Large

<http://www.alertnet.org/db/blogs/1564/2010/00/24-120746-1.htm>

Tim Large, editor of the Thomson Reuters Foundation's Emergency Information Service and of AlertNet, sent in this report from Port-au-Prince:

PORT-AU-PRINCE, Jan 24, 2010 (AlertNet) – In a tiny general store in the northern suburb of Croix-des-Bouquets, Jacques Pierre jams the choke of his Honda generator and cranks it into life. Half a dozen Haitians wait in line to pay 40 gourdes (75 cents) to recharge their cell phones for a quarter of an hour.

Twelve days after the earthquake, Port-au-Prince has no power grid and no landlines. At night, the only illumination comes from the fires of burning trash and a smattering of lights on the hills of Laboule and Boutilier where the wealthy have generators. But Haitians have cell phones, including the tens of thousands who sleep in the capital's streets, fearful of aftershocks.

Despite the devastation to infrastructure from Haiti's Jan. 12 earthquake, cell phones are emerging as a lifeline for many survivors. Just two days after the quake, a team from Thomson Reuters Foundation's AlertNet humanitarian news service touched down in a twin-prop plane at Port-au-Prince's international airport to set up the first-ever Emergency Information Service (EIS), offering Haitians free, practical SMS messages to help them minimize the disaster's impact. Despite countless logistical setbacks, EIS got off the ground in about 48 hours, and since its launch thousands have used the service to report missing persons, shelter problems and food issues.

### How the EIS helps save lives

Just a few days after the earthquake, EIS was able to direct injured Haitians via text message to one of the few hospitals able to treat patients. The service also helped search-and-rescue teams to find people trapped in the rubble.

In one case, a man trapped for five days in a collapsed building in downtown Port-au-Prince sent a text message, which the EIS team, working through the night with experts around the world, translated into GPS coordinates. A search-and-rescue team was dispatched and saved his life.

Working with InSTEDD, an innovative humanitarian technology NGO, we created an information system allowing Haitians subscribed to the Digicel and Comcel networks to register with a simple short-code – 4636 – to receive our free Creole-language alerts. In addition to receiving critical news and information, Haitians can send, at no cost, text messages into the system. This

ensures a stream of on-the-ground information of use to aid groups.

We publicised the shortcode chiefly through local radio stations, including Signal FM, Melody FM, MINUSTAH Radio FM and Caraibes FM. The latter broadcasts from the sidewalk outside its quake-damaged building, sucking power off a car engine. As of the time of writing, EIS had received nearly 10,000 text messages from Haitians, all translated into English and geo-tagged by hundreds of global volunteers organised by "crowdsourcing" NGO Ushahidi. The information is also available through RSS feeds.

Now that the search-and-rescue phase is over, we are working with the United Nations, the Red Cross, the government and others to help spread messages such as how to reduce disease risks, trace missing relatives and protect children.

Entrepreneurs like Jacques Pierre, 25, help people to keep their devices charged.

"Last week I had gasoline (for the generator) but the phones weren't all working," he said. "This week there's more gasoline out there and the phones are back, so the price is going down."

Just down the road from Pierre's phone-charging operation, an outlet of Digicel, Haiti's biggest mobile carrier, offers a free recharging service for about 40 people at a time.

"I'm waiting for the money, I'm waiting for the money," one man shouts into his handset, on the line to relatives overseas. "We're hungry."

### SMS robust

Haiti's cell phone networks have been quick to recover, even as other infrastructure remains crippled. Robin Padberg, head of Comcel-owned mobile carrier Voila, told me most services were restored within a day of the earthquake. Digicel came fully back online a few days later.

SMS networks proved most robust, which explains why Philippe Richardson, the coordinator of Port-au-Prince's emergency service, made SMS his chief point of contact with the capital's residents. There was simply no other way.

"The City Hall collapsed, the mayor's house collapsed, the houses of our employees collapsed," he told Radio Metropole in an interview, announcing a 3702 2418 text hotline for residents. "Now we are homeless. We sleep looking at the stars, like you."

A straw poll of a group of 15 young men in Lepine on the outskirts of Port-au-Prince showed that 14 of them owned cell phones – and nearly all said they relied on them for news and information rather than radio.

"It's less expensive because I don't have to buy batteries," said one.



Working with local radio

But while the number of EIS subscribers grows by the day, radio is still the most efficient way to reach a mass audience. That's why we turn to local broadcasters to help spread key information, often acting as a bridge between the international aid effort and local media. In this respect, our efforts mesh nicely with other initiatives launched in the wake of Haiti's quake.

Internews, a media development organisation, has been broadcasting a daily Creole-language programme called "Nouvelles-Utiles" (News You Can Use) on 12 radio stations since Jan. 21. The BBC World Service has just begun producing a daily 20-minute show out of Miami called "Connexion Haitienne". All this is part of efforts to improve communications with disaster survivors led by Communications with Disaster Affected Communities (CDAC), an inter-agency working group comprising Thomson Reuters Foundation, Internews, BBC World Service Trust, the Red Cross, Save the Children, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and others.

"The issue we face is getting the message out to the affected community that aid is coming, that something is being done," said OCHA spokesman Nicholas Reader.

Meanwhile, the U.S. military is distributing 50,000 solar- and crank-powered radios in the capital.

It would be hard to overstate the logistical difficulties of the EIS operation, especially in the first days. Half our gear was lost in the white-knuckle plane ride from Santo Domingo, including all our water, most of our food and a lot of communications equipment. The grassy patch to the west of the runway where we pitched camp was infested with tarantulas. And communications varied from sporadic to impossible, even with satellite phones. Credit goes to mobile phone operators Comcel and Digicel for making the service free. GATR Technologies also pitched in by lending us a 2.4-metre inflatable satellite antenna for a couple of days. ♦

## NEWS

### LANTEX 10

[NOAA](#) and the [National Tsunami Hazards Mitigation Program](#) are providing the framework for a tsunami response exercise on March 24, 2010. The exercise simulates the West Coast Alaska Tsunami Warning Center response for a major earthquake and tsunami in the Atlantic Ocean. The Atlantic exercise, entitled **LANTEX 10**, simulates a magnitude 7.5 earthquake off the New England coast with an induced continental slope slump that generates a major tsunami.

For the LANTEX 2010 Handbook in English [click here](#).

For the LANTEX 2010 Handbook in En Español [click here](#), courtesy of [Puerto Rico Seismic Network](#)

All emergency management agencies in Puerto Rico and the U.S. Virgin Islands are invited to use this opportunity to exercise response plans.

Also on March 24, 2010, the National Weather Service in coordination with the Puerto Rico State Emergency Communications Committee (SECC), the [Puerto Rico Emergency Management Agency](#), and the [Puerto Rico Seismic Network](#) will be conducting a live tsunami warning code [Emergency Alert System](#) test which will be heard on radio and seen on TV throughout Puerto Rico between 1005 am AST and 1035 am AST. From: <http://www.srh.weather.gov/sju/?n=lantex2010>

### **Tsunami brought on a wave of Tweets—The wave set off by the Chilean earthquake was a perfect Internet phenomenon**

The news from Chile on Saturday morning, appearing on the Associated Press app on my iPhone as I read it half-asleep, was tragic but distant: An earthquake measuring 8.8 on the Richter scale had rocked central Chile and the capital city of Santiago, and dozens were already confirmed dead.

But it was already clear that the disaster was spreading across more than one-quarter of the world in the form of a tsunami. Though the quake had done more damage in Chile, the wave was traveling to nearly every shore on the Pacific Ocean. It was the kind of moment that the Internet, especially Twitter, was made for. An event that would affect millions of people was developing in real time. Only the Internet had the range and scale to carry a collective conversation about it. For full story by Stephen Lawson (March 3, 2010, 04:40 PM — IDG News Service): <http://www.itworld.com/internet/98773/tsunami-brought-wave-tweets?page=0%2C0>

### **Peru funds tsunami-warning system on Pacific Coast** Fri Mar 12, 3:19 pm ET

[http://news.yahoo.com/s/ap/20100312/ap\\_on\\_re\\_la\\_am\\_c/a/lt\\_peru\\_tsunami](http://news.yahoo.com/s/ap/20100312/ap_on_re_la_am_c/a/lt_peru_tsunami)

LIMA, Peru – Peru is creating a tsunami-warning system to help protect 1.6 million residents who live along the South American country's Pacific coast. President Alan Garcia has ordered funding by decree to create an alarm network so Peruvians can seek high ground in the event of a tsunami.

### **Tsunami severs Shelter Island dock**

According to a March 2, 2010 report by Robert Krier (San Diego Union-Tribune) a series of "tidal surges" caused by the Chile earthquake caused about \$50,000 damage to the dock at the Bali Hai Restaurant on Shelter Island, San Diego Bay.

From:

<http://www.signonsandiego.com/news/2010/mar/02/tsunami-severs-shelter-island-dock/>

### **Library comes to life while *Research Digest* rests**

After decades of housing our [Natural Hazards Center, University of Colorado] unique collection of hazards and disasters resources the old fashioned way, the [Natural Hazards Center Library](#) is turning a page. In order to provide users with greater access to content, our non-lending library has begun the lengthy process of upgrading its technology and offerings. We're sorry to announce it will temporarily affect our ability to publish *Research Digest*, our quarterly compilation of the latest disaster research abstracts. Previous issues will still be available on the [Natural Hazards Center Web site](#). *Research Digest* plans to return with a new look and even more online accessibility in early 2011.

From: Disaster Research 540, Feb. 11, 2010, p. 6

### **Job announcements**

Each issue of *Disaster Research* lists current job openings in emergency management and hazards-related fields. To subscribe to the e-mailed newsletter, contact [hazctr@colorado.edu](mailto:hazctr@colorado.edu).

### **GAO wonders if FEMA's preparedness message is getting through**

It's unclear if the Federal Emergency Management Agency has the American public dancing to the beat of its preparedness drum, according a [recent report](#) from the U.S. Government Accountability Office. A lack of strategy and accurate performance data, however, could be keeping the agency from rocking out readiness, though, the report found.

A GAO investigation into challenges faced by FEMA community preparedness programs, including Citizen Corps and the Ready Campaign, found that the program's impacts were difficult to evaluate because there wasn't a good system for analyzing performance data, the data were collected by sources other than FEMA, and there was no strategy for correlating the programs with overarching national preparedness goals.

"While FEMA identifies community preparedness as an important part of its national preparedness strategy, FEMA lacks accurate performance information...that would enable it to determine whether these programs are operating in the communities in which they have been established," the report stated.

"Challenges in measuring the performance of these programs stem in part from FEMA lacking an overall strategy for achieving community preparedness or defining how these efforts align with the larger National Preparedness System.

Among the GAO's recommendations for helping the agency get its groove on were creating a strategy for the programs, setting milestones for strategy implementation, and identifying ways to keep Citizen Corps participation active. The agency agreed with the GAO assessment.

From: Disaster Research 542, Mar. 11, 2010

### **Helping the helpers help themselves**

Surprising as it might seem, many community organizations that provide everyday assistance to others aren't prepared to fall on hard times themselves. When faced with disaster, how can community aid organizations make sure they will still be providing services instead of scrambling to pick up the pieces of their broken operations?

Natural Hazards Center Researcher [Brandi Gilbert](#) will discuss organizational preparedness for disaster in a webinar aimed at community-based organizations and nonprofits. Gilbert, who participated in a study examining the preparedness of 93 San Francisco Bay Area organizations, will highlight the need for readiness, how to leverage communication and social media resources, and ways to assure continuity of operations.

The May 31 webinar, sponsored by the Corporation for National and Community Service and [Hands On Network](#), is free. For more information and to register, visit [In the Wake of Disaster—How Will You Respond?](#)

From: Disaster Research 542, Mar. 11, 2010

### **Keep up with the latest at the Natural Hazards Center**

The Natural Hazards Center is pleased to unveil a completely new system to keep you abreast of our latest news and publications. With one stop at our new information update page, you can make sure we have your most current information, adjust your subscription preferences, and even sign up for our new *Natural Hazards Observer* e-mail notifications. So if we haven't heard from you in a while, stop by. It's the best way to make sure you don't miss out!

From: Disaster Research 542, Mar. 11, 2010

### **Australia to review tsunami alert**

"Tsunami warnings in Australia are to be reviewed after thousands of beachgoers shrugged off alerts following Chile's huge earthquake."

Full story from BBC News:

<http://news.bbc.co.uk/go/pr/fr--/hi/asia-pacific/8553466.stm> March 6, 2010

### **Natural phenomenon exhibit at Chicago's Museum of Science and Industry—Science Storms**

Science begins with wonder inspired by nature: Why does a tornado spin? Why does a wave break? Why does a flame burn? Why does lightning strike?

Our questions about the world begin almost as soon as we're aware of it. Science can answer the questions, yet science is also the process of asking.

The essence of science emerges from this deep human desire to observe the world around us and make sense of nature's awe-inspiring phenomena. Science Storms is a journey that takes us from wonder to inquiry, curiosity to observation, investigation to understanding.

Science Storms reveals the science behind seven natural phenomena—lightning, fire, tornados, avalanches, tsunamis, sunlight and atoms in motion. Investigate the basic scientific principles behind nature's power as you try more than 50 amazing experiments that take two floors and 26,000 square feet to contain ... barely. It's a perfect storm of physics, chemistry and curiosity.

The Tsunami section includes a tsunami wave tank, ripple tanks and string waves.

Join us on an adventure to discover science inspired by the spectacle of nature!

Exhibit Essentials--Ages: This exhibit is suitable for all ages; Location: Main Level, Allstate Court; Tickets: Included with General Admission

From: <http://www.msichicago.org/whats-here/exhibits/science-storms/>

See also:

<http://abclocal.go.com/wls/story?section=resources&id=7343634> Local news story about the exhibit.

## PUBLICATIONS

### ***Natural Hazards Observer now online***

The latest edition of the *Natural Hazards Observer* is now available online. Featured articles from the March 2010 *Observer* include:

— A Thousand Barking Dogs

—Twitter Quakes

—Training Veterinarians in All-Hazards Response

—U.S. Officials Encourage Haiti-Led Reconstruction Efforts

Visit the Natural Hazards Center Web site to read the March and past *Observers* or sign up to [receive e-mail notifications](#) letting you know when the latest *Observer* is available.

<http://www.colorado.edu/hazards/publications/signup.html>

From: Disaster Research 542, Mar. 11, 2010

### **Report released on tsunami evacuation building workshop**

The Oregon Department of Geology and Mineral Industries (DOGAMI) has released Open-File Report O-10-02, Tsunami Evacuation Building Workshop, September 28-29, 2009, Cannon Beach, Seaside, and Portland, Oregon.

On September 28th and 29th, 2009, the Cascadia Region Earthquake Workgroup held the first ever regional workshop that addressed tsunami vertical evacuation as a new means to protect people and improve community recovery. This two-day work-shop included participants from the Pacific Northwest, California, Hawaii and British Columbia.

Oregon Senate President Peter Courtney welcomed the workshop participants and said, "The Oregon coast

has done much to prepare for a tsunami, but there are parts of the coast that lack high ground for safe evacuation. In these and other highly populated areas tsunami evacuation buildings are a critical alternative."

A policy session at the workshop included panelists from the Governor's office, congressional representatives, the Federal Emergency Management Agency and the National Weather Service, and participants agreed that vertical evacuation options should be adopted. A design team for the proposed Cannon Beach City Hall Tsunami Evacuation Building unveiled a conceptual design, with the possible goal of constructing the proposed Tsunami Evacuation Building by March 2014, the 50th anniversary of the 1964 magnitude 9.2 Alaskan earthquake that claimed 5 lives in Oregon from the distant tsunami.

Jay Raskin, design team member, architect and former mayor of Cannon Beach said, "We need to expand the escape options to get people to safety in the event of a tsunamis, and tsunami evacuation buildings are one important option."

Identification of the need for a regional strategic tsunami evacuation building siting study along the Cascadia margin was also discussed. Sponsors included the Cascadia Region Earthquake Workgroup, the City of Cannon Beach, the Oregon Department of Land Conservation and Development, the American Society of Civil Engineers, Oregon Emergency Management, the Oregon Department of Geology and Mineral Industries, and the Western States Seismic Policy Council.

Open-File Report O-10-02, Tsunami Evacuation Building Workshop, September 28-29, 2009, Cannon Beach, Seaside, and Portland, Oregon can be purchased on CD-ROM for \$15 from the Nature of the Northwest Information Center (NNW), 800 NE Oregon Street, Suite 965, Portland, Oregon, 97232. You may also call NNW at (971) 673-2331 or order online at <http://www.naturenw.org>. There is a \$4 shipping and handling charge for all mailed items.

## WEBSITES

<http://www.pr-inside.com/comparison-between-chile-and-haiti-earthquakes-r1774695.htm>

Comparison Between Chile And Haiti Earthquakes.

<http://www.pal-item.com/article/20100323/NEWS13/3230310>

Richmond [Indiana] woman experiences tsunami evacuation in Hawaii, after Chilean earthquake.

<http://training.fema.gov>

The Emergency Management Institute webpage contains links to the EMI courses and schedules, FEMA independent study, preparedness grant funds, and

emergency response activities for the total community, plus much more.

<http://earthquake.usgs.gov/earthquakes/pager/>

PAGER (Prompt Assessment of Global Earthquakes for Response) “Did You Feel It?” is an online form people can fill out to provide their own experience of a quake to the U.S. Geological Survey, which then creates a map to show people where the worst shaking took place.

<http://r4resilience.wordpress.com/2010/02/03/resilience-recovery-requires-reflection/>  
R4Resilience Blog

In between political meanderings, R4Resilience consultant Mark Chubb offers some thoughtful views of applied resilience. With an emphasis on multiple perspectives and the bigger picture, recent posts on Haitian recovery efforts are especially interesting.

From: Disaster Research 540, Feb. 11, 2010, p. 9

<http://www.gao.gov/products/GAO-10-17?source=twitter>

GAO Report on Disaster Assistance  
Disaster assistance for permanent housing following the 2005 Gulf Coast hurricanes was more likely to benefit homeowners than renters, according to this recently released report by the U.S. Government Accountability Office. The GAO looked at who got the money, how far it went toward meeting housing needs, and how difficult the application process was to navigate. The office concluded that Congress would need to give states’ guidance on how to more evenly distribute the funds if it wants to better target renters’ needs.

From: Disaster Research 541, Feb. 25, 2010

<http://www.stopdisastersgame.org/en/playgame.html>  
Stop Disasters!

If you’ve caught yourself shaking your head at the latest building failures, evacuation follies, or general ill-preparedness for disasters, here’s a chance to do it your way. Stop Disasters!, an addictive game created by the UN International Strategy for Disaster Reduction, lets you pick from various disaster scenarios such as earthquake, tsunami, and wildfire. With a limited budget to build safely, get prepared, and communicate, it’s up to you to keep your city safe when disaster strikes.

From: Disaster Research 542, Mar. 11, 2010

<http://maptogether.org/taxonomy/term/25>  
MapTogether

Whether you’re looking for a slick way to illustrate an evacuation route or trying to visualize vulnerable populations in a pandemic, mapping technology can be invaluable—but small nonprofits rarely have a cartographer on the payroll. That’s where MapTogether comes in with free training, software, and other resources. Check out their site for examples of how their tools can be applied

to public safety, disaster preparedness, and relief efforts.  
From: Disaster Research 542, Mar. 11, 2010

<http://www.prh.noaa.gov/ptwc/messages/pacific>

For a list of current and archived Tsunami Bulletins for the Pacific Region, visit this website.

<http://www.diversitypreparedness.org>

This website of the National Resource Center in the U.S. serves as a central clearinghouse of resources and an information exchange portal to facilitate communication, networking and collaboration to improve preparedness, build resilience and eliminate disparities for culturally diverse communities across all phases of an emergency. It is intended for a broad audience including individuals, communities, government, emergency planners, emergency managers, first responders, health care providers, public health professionals, researchers, businesses and policymakers interested in preparedness for diverse populations.

The site currently includes

- A catalog of annotated and cross-referenced resources, programs, and projects by a range of topics, languages, and communities.
- Links to full-text sources, including peer-reviewed journal articles, training and education content, resource guides, measurement and evaluation tools, translated materials and other publications.
- Links to federal, state and local government, as well as private sector, academic and community-based programs and websites devoted to preparing culturally diverse populations for emergencies.
- A database of translated materials cataloged by multiple languages and cultural communities.
- Powerful search options, including a keyword search, advanced search and browse function.
- An option to submit resources as well as information on new and emerging programs related to preparedness of culturally diverse communities.
- A monthly e-newsletter featuring the latest publications, resources and events as well as promising practices, success stories, lesson learned, innovations, and policies.

From: Australian Journal of Emergency Management, v. 25, no. 1, p. 84.



## CONFERENCES/EXERCISES

### March 24, 2010

LANTEX 10, the Atlantic tsunami warning exercise, took place, along with PACIFEX 10, the Pacific tsunami warning exercise.

### May 2-7, 2010

European Geosciences Union General Assembly; European Geosciences Union, Vienna, Austria, Cost and Registration: \$602 before March 31, open until filled.

This event examines current issues and research from earth, planetary, and space sciences. Hazard-related sessions include hydrometeorology, the societal impacts of natural hazards, and the influences of climate change on wildfire.

From: Disaster Research 540, Feb. 11, 2010, p. 11

### May 3-7, 2010

Fifth Global Conference on Oceans, Coasts, and Islands United Nations Education, Scientific, and Cultural Organization, Paris, France. [www.globaloceans.org](http://www.globaloceans.org)

This conference addresses the ability of coastal and island communities to respond to climate change through the use of adaptation, mitigation, financing, and technology. Innovative private-sector solutions and improving governance will be discussed.

From: Natural Hazards Observer, March 2010, v. 34, no. 4, p. 27

### May 11-13, 2010

18th Annual Voluntary Organizations Active in Disaster Conference

Lake Buena Vista, Florida. Cost and Registration: \$380 before March 15.

This year's conference, titled "United in Waves of Hope and Help," will offer expert presentations to improve VOAD members' skills, services, and organizational practices. Session topics include long-term recovery training, technology and holistic community readiness, and community emergency planning for special needs populations.

From: Disaster Research 542, Mar. 11, 2010

### May 16-19, 2010

Eighth UCLA Conference on Public Health and Disasters University of California, Los Angeles, Center for Public Health and Disasters, Torrance, California. Cost and Registration: \$395 before April 16, Open until filled.

This conference will promote dialog between local health departments and others to improve emergency public health preparedness, mitigation, response, and recovery. Topics address emergency public health issues, mass shelters, hospital and community clinics as partners in disaster response, and the escalation of response from emergency to disaster.

From: Disaster Research 542, Mar. 11, 2010

### May 26, 2010

2010 Coastal Resilience Symposium

Rice University, Houston, Texas. Cost and Registration: \$25 before May 15.

This symposium seeks a more resilient Houston region by discussing what to expect if a Hurricane Ike-sized storm makes landfall southwest of Houston, especially with new growth in low-lying areas. Sessions will discuss risks and vulnerabilities, structural and non-structural mitigation options, and coastal and public policy issues.

From: Disaster Research 542, Mar. 11, 2010

### May 30-June 3, 2010

International Disaster and Risk Conference

Global Risk Forum, Davos, Switzerland;

[www.davos2010.org](http://www.davos2010.org)

Risk management will be examined at the conference from many perspectives with an eye to creating safer, more resilient, and sustainable societies. Topics include risk reduction and disaster management, environment, resources, climate change, and more. A series of conference-related trainings, workshops, and special sessions determined by participants will be offered.

From: Natural Hazards Observer, March 2010, v. 34, no. 4, p. 27

### June 6-9, 2010

World Conference on Disaster Management

Held at Metro Toronto Convention Centre and presented by Canadian Centre for Emergency Preparedness, this conference is about "Building solutions for a global community—Emergency management and business continuity working together," with over 75 hours of dedicated education focused on business continuity, emergency management, and emergency health.

More information at: <http://www.wcdm.org/>

July 25-29, 2010

4<sup>th</sup> International Tsunami Symposium, Toronto, Canada.

## CONTRACTS/GRANTS

### Peer-mentored disaster preparedness for adults with developmental disabilities.

National Institute of Nursing Research/National Institutes of Health. Two years. \$345,723. Principal Investigator David Eisenman, UCLA, [DEisenman@mednet.ucla.edu](mailto:DEisenman@mednet.ucla.edu).

This project will test the feasibility of delivering a disaster preparedness program to adults with a developmental disability (ADD), such as mental retardation, epilepsy, cerebral palsy or autism, who are living independently in the community. This project fills a gap in



disaster preparedness and applies peer-mentored health promotion to the disaster field.

In phase one, we will work with key informants and a community advisory board to identify facilitators and barriers to disaster preparedness among ADD living independently in the community. In phase two, a health educator and peer mentors will deliver the disaster preparedness program to the ADD audience.

From: Natural Hazards Observer, March 2010, v. 34, no. 4, p. 23

### **International travel grant for survey of structural damage from the September 2009 Samoan Islands tsunami.**

National Science Foundation grant #1005740. Six months. \$24,995. Principal investigator Solomon Yim, Oregon State University, [solomon.yim@oregonstate.edu](mailto:solomon.yim@oregonstate.edu).

The September 29, 2009, earthquake-induced tsunami caused extensive damage to coastal structures on the American Samoan and the Western Samoan islands. Field data from these islands may provide invaluable evidence for calibration of the experimental and numerical models and design guidelines being developed under the current NSF-supported NEES research (NEESR) project entitled "NEESR-SG:Development of Performance Based Tsunami Engineering, (PBTE)."

A seven-member team will survey the structural damage and aerial and submarine scour effects of the affected Samoan islands. Similar to a survey conducted by members of the field team after Hurricane Katrina, this survey will collect and preserve data to: (1) compare against numerical simulations; (2) update the database for risk models; (3) develop retrofit and design recommendations; and (4) improve the understanding of the dynamics of fluid, structure, and sediment interactions, which is critical to the general design and retrofit of dams, levees, and a wide range of coastal structures.

From: Natural Hazards Observer, March 2010, v. 34, no. 4, p. 24

### **Tsunami reconnaissance of the 29 September 2009 American Samoa and Samoa Islands earthquake.**

National Science Foundation grant #1000694. One year. \$60,570. Principal investigator Hermann Fritz, Georgia Institute of Technology, [hermann.fritz@gtsav.gatech.edu](mailto:hermann.fritz@gtsav.gatech.edu).

Grantees will study the immediate and transient effects of the September 29, 2009 earthquake and tsunami in American Samoa. A team of 10 experts from eight institutions traveled to the islands to measure and examine impacts of the earthquake and tsunami on built infrastructure, erosion and deposition of sediments, extent and duration of flooding and inundation, and the

effectiveness of local warnings and previous outreach and education about the tsunamis and their danger. The work will benefit our understanding of tsunami impacts to engineered structures, to humans, and the natural environment.

From: Natural Hazards Observer, March 2010, v. 34, no. 4, p. 24 ♦

## **Material added to the NTHMP Library**

March - April 2010

Note: These, and all our tsunami materials, are included in the online (searchable) catalog at <http://www.dnr.wa.gov/ResearchScience/Topics/Geology/PublicationsLibrary/Pages/washbib.aspx>. Click on SEARCH DATABASE, then type 'tsunamis' in the Subject field to get a full listing of all the tsunami reports and maps in the collection.

Bernard, Eddie N.; Robinson, Allan R., 2009, The sea--Ideas and observations on progress in the study of the seas; volume 15, Tsunamis: Harvard University Press, 450 p.

Cascadia Region Earthquake Workgroup, 2007, Using the CREW scenario--Three tabletop exercises: Cascadia Region Earthquake Workgroup, 16 p. [earthquake and tsunami scenario].

Dotsenko, S. F.; Eremeev, V. N., 2008, Analysis of the necessity and possibility of tsunami early warning on the Black-Sea coast: Physical Oceanography, v. 18, no. 5, p. 288-296.

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Ely, Lisa L.; Cisternas, Marco; Orem, Caitlin A.; Lagos, Marcelo; Wesson, Robert L.; 2009, Pursuing Darwin's geological observations of the 1835 earthquake and tsunami in Concepcion, Chile [abstract]: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 244.

Gaillard, Jean-Christophe; Clave, Elsa; Vibert, Oceane; Azhari; Dedi; Denain, Jean-Charles; Efendi, Yusuf; Grancher, Delphine; Liamzon, Catherine C.; Sari, Desy Rosnita; Setiawan, Ryo, 2008, Ethnic groups' response to the 26 December 2004 earthquake and tsunami in Aceh, Indonesia: Natural Hazards, v. 47, no. 1, p. 17-38.

- Gesell, Justine; Loeffler, Kurt, filmmakers, editors, 2010, *Tsunami preparedness in Washington*; version 1.0: U.S. Geological Survey; Washington Emergency Management, 1 DVD, 30 min. [7 segments].
- Goff, James R., 2009, Identifying a tsunami geomorphology and the implications for improving coastal hazards mitigation [abstract]: *Geological Society of America Abstracts with Programs*, v. 41, no. 7, p. 583.
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- Kim, Karl; Pant, Pradip; Yamashita, Eric, 2009, Modeling tsunami evacuation or shelter-in-place alternatives for Waikiki, Hawaii [abstract]: *Geological Society of America Abstracts with Programs*, v. 41, no. 7, p. 374.
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#### **News release : New tsunami education web site developed by oceanographers**

A life-saving tool for coastal residents, vacationers, and emergency planners

November 19, 2009

Woods Hole Oceanographic Institute

<http://www.whoi.edu/page.do?pid=39136&tid=282&cid=63086&ct=162>

Scientists and Web developers at the Woods Hole Oceanographic Institution (WHOI) have created a new educational Web site with crucial tips on how to prepare for and survive a tsunami. Tagged as “an interactive guide that could save your life,” the site also features the latest tsunami-related science research and compelling tsunami survivor videos and interviews.

“Tsunamis can neither be prevented nor precisely predicted yet,” says site initiator Dr. Jian Lin, a WHOI geologist actively involved in tsunami research and a member of a U.S. national committee on tsunami warning and preparedness. “But people educated about tsunami warning signs can save their own lives and the lives of others.”

Tsunami is the Japanese word for “harbor wave,” and is the term used when giant undersea earthquakes, landslides or volcanic eruptions generate a sudden motion of ocean water that results in a series of large waves. In the open ocean, these waves can travel as fast as 500 miles per hour — the same speed as a jet plane. They slow and grow in height as the waves near the coast; a tsunami can quickly engulf vulnerable coastal regions resulting in widespread destruction and death.

The 2004 Indian Ocean tsunami, in which 240,000 lives were lost, serves as a reminder of how devastating these events can be. While tsunamis are not particularly rare — 25 noticeable ones have occurred in the last century in the Pacific Ocean, Indian Ocean, Caribbean, and Mediterranean — they are rare enough to escape the collective consciousness, so that people do not recognize them or know what to do when they occur.

“Despite the tremendous loss of life that tsunamis cause,” says Lin, “until now, the public worldwide, including school kids, had a hard time finding user-friendly and interactive Web sites to educate them on what tsunamis are, the warning signs of an approaching tsunami, and what to do if they see a warning sign.”

In September 2009 more than 180 people were killed by the Samoa tsunami. The Pacific Tsunami Warning Center in Hawaii issued a warning 15 minutes after a powerful undersea earthquake, but most people of the Samoan Islands did not receive the warning before the waves hit.

“Some lives could definitely have been saved if everyone living on or visiting the Samoan Islands knew to run to the high ground when they first felt ground shaking or saw the ocean behaving strangely,” says Lin.

The new Web site,

<http://www.whoi.edu/home/interactive/tsunami/>, is intended to be a resource for both residents and visitors to coastal zones of the U.S. and the rest of the world, as well as an educational tool for students from the middle-school level and up.

Using interactive graphics and animations, the site covers how to prepare for a tsunami, how to respond should you see one approach, and what to do in the aftermath. It includes stories from survivors of the 2004 Indian Ocean tsunami, amateur video, and even includes a sound file of the undersea earthquake that caused the 2004 tsunami. (continued on p. 24)

NOAA operates a tsunami warning system for the U.S. Atlantic and Gulf of Mexico coasts, eastern Canada, Puerto Rico, and the Virgin Islands through the West Coast/Alaska Tsunami Warning Center in Palmer, Alaska.

NOAA’s Pacific Tsunami Warning Center in Ewa Beach, Hawaii provides a similar service internationally in the Caribbean Sea.

The Puerto Rico Seismic Network of the University of Puerto Rico at Mayaguez also provides earthquake and tsunami information and warning service to Puerto Rico and the Virgin Islands in coordination with the WC/ATWC. ....Exercise LANTEX 10 Handbook

## VIDEO-CD-DVD RESERVATIONS

To reserve tsunami videos, CDs or DVDs, contact Lee Walkling, Division of Geology and Earth Resources Library, 1111 Washington St. SE, MS 47007, Olympia, WA 98504-7007; or e-mail [lee.walkling@dnr.wa.gov](mailto:lee.walkling@dnr.wa.gov). **These programs are available to all NTHMP participants, with a 3-week loan period.**

Adventures of Disaster Dudes (14 min.). Preparedness for preteens. American Red Cross.

The Alaska Earthquake, 1964 (20 min.) Includes data on the tsunamis generated by that event.

Business Survival Kit for Earthquakes & Other Disasters; What every business should know before disaster strikes (27 min.). Global Net Productions for the Cascadia Regional Earthquake Workgroup, 2003. With CD disaster planning toolkit & other data.

Cannon Beach Fire District Community Warning System (COWS) (21 min.) Explains why Cannon Beach chose their particular warning system.

Cascadia: The Hidden Fire—An Earthquake Survival Guide (10 min.). Global Net Productions, 2001. A promo for a documentary about the Cascadia subduction zone and the preparedness its existence demands of Alaska, Oregon and Washington states. Includes mention of tsunamis.

Disasters are Preventable (22 min.) Ways to reduce losses from various kinds of disasters through preparedness and prevention.

Disaster Mitigation Campaign (15 min.). American Red Cross; 2000 TV spots. Hurricanes, high winds, floods, earthquakes.

Earthquake...Drop, Cover & Hold (5 min.). Washington Emergency Management Division. 1998.

Forum: Earthquakes & Tsunamis (2 hrs.). CVTV-23, Vancouver, WA (January 24, 2000). 2 lectures: Brian Atwater describes the detective work and sources of information about the Jan. 1700 Cascadia earthquake and tsunami; Walter C. Dudley talks about Hawaiian tsunamis and warning systems.

International Tsunami Information Centre, 2004, Tsunami warning evacuation news clips and video footage, UNESCO/IOC International Tsunami Information Centre, 1 DVD, 12 min.

Killer Wave: Power of the Tsunami (60 min.). National Geographic video.

Mitigation: Making Families and Communities Safer (13 min.) American Red Cross.

Not Business as Usual: Emergency Planning for Small Businesses, sponsored by CREW (Cascadia Regional Earthquake Workgroup) (10 min.), 2001. Discusses disaster preparedness and business continuity. Although it was made for Utah, the multi-hazard issues remain valid for everyone. Websites are included at the end of the video for further information and for the source of a manual for emergency preparedness for businesses.

Numerical Model Aonae Tsunami—7-12-93 (animation by Dr. Vasily Titov) and Tsunami Early Warning by Glenn Farley, KING 5 News (The Glenn Farley portion cannot be rebroadcast.)

Ocean Fury—Tsunamis in Alaska (25 min.) VHS and DVD. Produced by Moving Images for NOAA Sea Grant College Program, 2004.

The Prediction Problem (58 min.) Episode 3 of the PBS series "Fire on the Rim." Explores earthquakes and tsunamis around the Pacific Rim

Protecting Our Kids from Disasters (15 min.) Gives good instructions to help parents and volunteers make effective but low-cost, non-structural changes to child care facilities, in preparation for natural disasters. Accompanying booklet. Does NOT address problems specifically caused by tsunamis.

The Quake Hunters (45 min.) A good mystery story, explaining how a 300-year old Cascadia earthquake was finally dated by finding records in Japan about a rogue tsunami in January 1700

Raging Planet; Tidal Wave (50 min.) Produced for the Discovery Channel in 1997, this video shows a Japanese city that builds walls against tsunamis, talks with scientists about tsunami prediction, and has incredible survival stories.

Raging Sea: KGMB-TV Tsunami Special. (23.5 min.) Aired 4-17-99, tsunami preparedness in Hawaii.

The Restless Planet (60 min.) An episode of "Savage Earth" series. About earthquakes, with examples from Japan, Mexico, and the 1989 Loma Prieta earthquake.

Run to High Ground (14 min.). Produced by Global Net Productions for Washington Emergency Management Division and Provincial Emergency Program of British Columbia, 2004. Features storyteller Viola Riebe, Hoh Tribe. For K-6 grade levels. Have video and DVD versions.

Tsunami and Earthquake Video (60 min.). "Tsunami: How Occur, How Protect," "Learning from Earthquakes," "Computer modeling of alternative source scenarios."

Tsunami: Killer Wave, Born of Fire (10 min.). NOAA/PMEL. Features tsunami destruction and fires on Okushiri Island, Japan; good graphics, explanations, and safety information. Narrated by Dr. Eddie Bernard, (with Japanese subtitles).

Tsunami: Surviving the Killer Waves (13 min.). 2 versions, one with breaks inserted for discussion time.

Tsunami Chasers (52 min.). Costas Synolakis leads a research team to Papua New Guinea to study submarine landslide-induced tsunamis. Beyond Productions for the Discovery Channel.

Tsunami Evacuation PSA (30 sec.). DIS Interactive Technologies for WA Emergency Management Division. 2000.

TsunamiReady Education CD, 2005, American Geological Institute Earth Science Week kit.

Understanding Volcanic Hazards (25 min.). Includes information about volcano-induced tsunamis and landslides.

UNESCO/IOC International Tsunami Information Centre, 2005, U.S. National Tsunami Hazard Mitigation Program public information products—B-roll footage, tsunami science, warnings, and preparedness: UNESCO/IOC International Tsunami Information Centre, 1 DVD, 57 min.

The Wave: a Japanese Folktale (9 min.) Animated film to start discussions of tsunami preparedness for children.

Waves of Destruction (60 min.) An episode of the "Savage Earth" series. Tsunamis around the Pacific Rim.

Who Wants to be Disaster Smart? (9 min.). Washington Military Department/Emergency Management Division. 2000. A game show format, along the lines of *Who Wants to be a Millionaire?*, for teens. Questions cover a range of different hazards.

The Wild Sea: Enjoy It...Safely (7 min.) Produced by the Ocean Shores Wash. Interpretive Center, this video deals with beach safety, including tsunamis. ♦



NEW! Tsunamis: Know What to Do! (8 min. DVD)

## **Officials assess tsunami response--County looks for ways to improve, because 'we won't miss them all'**

By LEE IMADA, News Editor, The Maui News  
<http://www.mauinews.com/page/content.detail/id/529308.html?nav=10>

POSTED: March 7, 2010  
Reprinted with permission

The next time a tsunami is headed toward Maui, emergency responders hope to provide "staging areas" for evacuees, find better ways to communicate with the public and even provide pet carriers to homeless people reluctant to leave their animals in danger.

Those are just some of the ideas being discussed by Maui County officials and others involved in the Feb. 27 tsunami response as they review their performance, identifying areas for improvement and looking for ways to use the event to keep tsunami readiness on the minds of the public.

"It was a great drill, because we won't miss them all," said Capt. Mark Merritt, Kahului Corps officer for the Salvation Army, which transported about 80 homeless people to safe areas the morning of the tsunami.

An 8.8-magnitude earthquake off the coast of Chile triggered tsunami warnings across the Pacific basin. Large, destructive and deadly waves swamped Chile's coastal areas, but in the rest of Pacific basin the surge was small and caused little or no damage. Kahului Harbor recorded a surge of just more than 3 feet, the largest in the state. But while the size of the coming tsunami was still uncertain, officials ordered the evacuation of low-lying and coastal areas, and for a few hours much of Maui County stood still. Front Street and Kaahumanu Avenue were deserted of cars, shoppers and activity. Residents moved to higher ground, and visitors moved to higher floors in hotels.

"We don't appreciate the power of this until we really go through it, and we haven't really gone through it," warned Marc Nishimoto, public health emergency preparedness planner with the Maui District Health Office. Nishimoto, who was in the county's Emergency Operation Center during the tsunami response, is afraid the public impact of the potential disaster will dissipate with time. The "Surge of 2010" will result in "lessons observed, not lessons learned," he said, "because they (the public) don't make any changes in what they are doing."

His office has embarked on a public information campaign and is soliciting stories and comments from the public to better understand what happened and how people reacted to the tsunami evacuation. The goal is to "figure out what went wrong; what could have been better; what was done right," said Nishimoto, who shared in an e-mail that one early respondent to the study said he included beer in his emergency kit.

Ideas for making things better include creating specific evacuation areas and improving communication, said

Maui County spokeswoman Mahina Martin, noting that government, nonprofit and private groups involved in the tsunami response were debriefed Friday.

Residents and visitors were advised to head to higher ground but no one was told specifically where to go, said several officials involved in the tsunami response. Some of the places evacuees ended up lacked restrooms, food and water, they noted.

This was especially an issue for visitors, noted Carol Reimann, executive director of the Maui Hotel & Lodging Association. Visitors in hotels along Kahului Harbor could not evacuate vertically - as they could in most Wailea and Kaanapali resorts - and were told to head for "higher ground."

"To visitors, higher ground means nothing," Reimann said, adding that "we need to know what to tell them and where to go."

Many of those visitors ended up in the Baldwin High School parking lot, she said. The King Kamehameha Golf Club had about 500 people on its property above Waikapu, said Nishimoto. That disrupted operations, but "they did not deny anyone haven," he said. He also said he received reports of people relieving themselves in the bushes on the side of the road due to the lack of available restroom facilities.

The issue of designated evacuation areas is being addressed, said Martin. Formal evacuation shelters are set up and operated by the American Red Cross during disasters, but in the case of tsunami, the organization does not open its shelters unless the wave strikes and causes damage that prevents people from being able to return to their homes.

The county is looking to "provide for that gap" with staging areas, said Martin. Staging areas would not have all the medical, food, water and resources of a full Red Cross shelter but would offer a safe place to wait out a tsunami, she said. The sites would provide bathroom facilities, safe areas to park and an information board to keep people abreast of disaster information.

Improving communication has been another major issue raised. The multi-island Maui County offers challenges not faced by other counties, Martin noted. Information has to get to more urban areas such as Kahului and Lahaina, as well as to rural Hana and remote Halawa Valley on Molokai.

With radios no longer a fixture in homes, the county has to evaluate how to best get information out.

"Our life is so different," said Martin recalling her younger days. "I know in the morning my mom would turn on the radio. . . . (Today) we are such an electronic society."

The Maui County Web site [www.mauicounty.gov](http://www.mauicounty.gov) got 155,000 visits during the evacuation, she said. The problem with using the Internet, as well as televisions and cell phones, is that those new technologies require power - which may not be available in a disaster. The beauty of portable radios is that most can be run off batteries.



Ironically or prophetically, just two days before the tsunami event, Martin's office announced a Maui Resident Disaster Preparedness Survey on the county Web site, which may be accessed at [www.surveymonkey.com/s.aspx?sm=s9hHZtO6OSxTaWqmY01xoQ\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=s9hHZtO6OSxTaWqmY01xoQ_3d_3d). The results of the survey are intended to help the county improve disaster planning and preparedness strategy. Martin said residents may fill out the form online or send e-mails to the mayor through the county Web site at [www.mauicounty.gov/emailpage.aspx](http://www.mauicounty.gov/emailpage.aspx).

"We are in the middle of our review process," she said last week. The mayor's office on Friday was still adding up the cost of the county's response to the tsunami, with the total expected to be released early this week, she said.

As for the functioning of civil defense sirens, Maui Civil Defense Administrator Gen Iinuma said the county received no reports of malfunctioning sirens after sounding the tsunami warning shortly after 6 a.m. Feb. 27.

But in a monthly test of civil defense sirens two days later, six of the 75 sirens tested did not sound, Iinuma said. County officials were unable to contact residents living near an additional seven sirens to determine whether they sounded during the test, he added.

The county does not automatically know when sirens do not sound; officials rely on reports from the public after they are fired, he said.

When those alarms sounded Feb. 27, a diverse group of Mauians was alerted to head to the EOC. That mix was considered one of the strengths of the county response, and many praised the cooperation between government agencies, nonprofit groups such as the American Red Cross and the Salvation Army, and visitor groups such as the Maui Hotel & Lodging Association and the Maui Chamber of Commerce.

"They were very inclusive, and we are very appreciative of that," said Reimann, who was called to the EOC at about 3 a.m. "We all work good together. It was awesome."

Reimann was sending e-mail blasts to her group's members, which include 40 hotel, timeshare and condo properties and 80 allied businesses, such as activity companies and banks. One hotel official, who was on another island, said he was grateful for the e-mails because he was getting more information from Reimann than from sources on his island.

Island hotels implemented their evacuation plans, and things seemed to go smoothly, Reimann said. At the Hyatt Regency Maui Resort & Spa for example, about 200 people were moved from rooms on the lower floors to higher floors to wait out the tsunami, said General Manager Michael Jokovich.

Resort officials used a public-address system to notify guests, who were "very cooperative," about the tsunami warning, he said. Most guests elected to stay at the hotel rather than drive to higher ground or to the airport. The resort was able to serve a breakfast buffet, before having to shut down to prepare for the anticipated surge. Services were restored after the all-clear was given.

The tsunami cost the resort lunch service and its luau that evening but the overall financial loss was "not major," said Jokovich.

For Maui residents without homes, the Salvation Army was busy that morning, gathering up about 80 people in Central, South and West Maui with its 15 vans, said Merritt. The people were taken to the Kihei and Lahaina Community Centers and the Baldwin High parking lot. He estimated that about 10 people declined transportation, deciding instead to seek higher ground on their own with their pets. Those people were worried that their animals would be turned away from evacuation sites.

In preparation for the next tsunami, the Salvation Army will be looking to obtain pet carriers that would allow homeless evacuees to take their animals with them to shelters, he said.

"It was great to see how the community got together to get prepared," said Merritt. "Everyone was helping. . . . Everyone came together. It was great to see. It gives us encouragement for when it does hit."

\* Staff Writer Ilima Loomis contributed to this report. Lee Imada can be reached at [leeimada@mauinews.com](mailto:leeimada@mauinews.com). ♦

### **New tsunami education website**

(continued from page 21)

The site also explores the research and technology currently being used to study and watch for tsunamis and includes video interviews with scientists describing their work.

"This site is an invaluable source for educating the public and providing outreach to at-risk coastal communities," says Dwayne Meadows of the National Oceanic and Atmospheric Administration (NOAA). Meadows, who shares his own tale of survival from the 2004 Indian Ocean tsunami on the site, serves as NOAA's first environmental hazards representative on the new U.S. government Civilian Response Corps.

"We've taken the lessons learned from the 2004 Indian Ocean tsunami and applied that to the study of other earthquakes and tsunamis," adds Lin. "Scientists are making progress. But public education is still the most important means to saving lives."

This project received funding from the WHOI Coastal Ocean Institute.

*The Woods Hole Oceanographic Institution is a private, independent organization in Falmouth, Mass., dedicated to marine research, engineering, and higher education. Established in 1930 on a recommendation from the National Academy of Sciences, its primary mission is to understand the oceans and their interaction with the Earth as a whole, and to communicate a basic understanding of the oceans' role in the changing global environment. ♦*

## INFREQUENTLY ASKED QUESTIONS

### **How many Chilean volcanoes erupted on the day of the big 1835 Chilean earthquake/tsunami?**

Three. Minchinmavida, Robinson Crusoe, and Yanteles, Cerro all erupted on February 20, 1835—the day of the earthquake/tsunami.

From: *TsuInfo Alert*, v. 4, no. 4, p. 30

### **Did the Chilean earthquake have any effect on time?**

[Seismologists](#) estimate that the earthquake was so powerful that it may have shortened the length of the day by 1.26 microseconds and moved the Earth's figure axis by 8 cm or 2.7 milliarcseconds.<sup>[14][15]</sup> It also moved the entire city of Concepción 3.04 metres (10 ft) to the west. The capital [Santiago](#), moved almost 24 centimetres (10 in) west, and even [Buenos Aires](#), about 1,350 kilometres (840 mi) from Concepción,<sup>[16]</sup> shifted 3.9 centimetres (1.5 in).<sup>[17][18]</sup>

From: [http://en.wikipedia.org/wiki/2010\\_Chile\\_earthquake](http://en.wikipedia.org/wiki/2010_Chile_earthquake)

### **Name a lake in the U.S. that had a seiche caused by the Chilean earthquake.**

The earthquake also caused [seiches](#) to occur in [Lake Pontchartrain](#) to the north of [New Orleans](#), United States, located nearly 7,500 kilometres (4,700 mi) from the epicenter of the quake.<sup>[21]</sup>

The [epicenter](#) of the earthquake was offshore from the Maule Region, approximately 11 km (6.8 miles) southwest of [Curanipe](#) and 100 km (71 mi) north-northeast of Chile's second largest city, [Concepción](#).<sup>[19][20]</sup>

From: [http://en.wikipedia.org/wiki/2010\\_Chile\\_earthquake](http://en.wikipedia.org/wiki/2010_Chile_earthquake)

### **What was the date of the 1835 Chilean earthquake; what was the date of the 2010 Chilean earthquake?**

Feb. 20, 1835 and Feb. 27, 2010.

### **How far did the 8.8 Chilean earthquake move the city of Concepcion?**

The entire city of Concepcion moved at least 10 feet to the west. These preliminary measurements, produced from data gathered by researchers from four universities and several agencies, including geophysicists on the ground in Chile, paint a much clearer picture of the power behind this temblor, believed to be the fifth-most-powerful since instruments have been available to measure seismic shifts.

Buenos Aires, the capital of Argentina and across the continent from the quake's epicenter, moved about 1 inch to the west. And Chile's capital, Santiago, moved about 11 inches to the west-southwest. The cities of Valparaiso and Mendoza, Argentina, northeast of Concepcion, also moved significantly.

From: <http://researchnews.osu.edu/archive/chilemoves.htm>

### **Although 85 % of the world's oceanic tsunamis occur in the Pacific basin, there have been tsunamis in the Caribbean Sea. Have the Virgin Islands experienced a tsunami?**

Yes, in 1867 the Virgin Islands had a tsunami (up to 8m high) which killed 30 people. There was another, lesser tsunami in 1918.

For more information about tsunamis in the Caribbean, visit USC Tsunami Research Group's webpage <http://www.usc.edu/dept/tsunamis/caribbean/webpages/index.html>

From: Exercise LANTEX 10 Participant Handbook♦

## Chile earthquake/tsunami, Feb. 27, 2010



### Sections (Chile earthquake, 2010)

[SAR](#), [Topography](#), [Visible](#), [GPS](#), [Surface Deformation](#), [Earthquakes](#), [Links](#)

New on Tuesday Mar 23: [High Rate GPS time series](#)

New on Friday Mar 19: [Envisat interferogram](#) [more ALOS data](#) [GPS coseismic model](#) [NEST-DORIS PALSAR interferograms](#) [GMTSAR PALSAR interferograms](#)

New on Tuesday Mar 16: [rupture properties](#)

New on Friday Mar 12: [Updated aftershocks](#) [M 6.9 aftershock link](#) [AIST damage map](#)  
[tsunami link](#) [IPGP Tsunami study](#)

New on Thursday Mar 11: [ALOS data](#)

New on Wednesday Mar 10: [Tsunami report](#)

New on Tuesday Mar 09: [GPS coseismic displacement](#)

New on Monday Mar 08: [New Envisat data](#) [UCSD Palsar interferogram](#)

New on Saturday Mar 06: [damage map](#)

New on Friday Mar 05: [GSI PALSAR interferogram](#) [GFZ rupture movie](#)

New on Thursday Mar 04: [ALOS PALSAR requests](#) [Stress Transfer](#)

New on Wednesday Mar 03: [IPGP seismic context](#) [Envisat archive data](#) [Surface displacement](#)

New on Monday Mar 01: [USGS source map](#)

New on Sunday Feb 28: [shake map](#) [coherence map](#) [aftershocks](#)

Chile earthquake, 27 February 2010 06:35 UTC, Latitude 35.846°S, Longitude 72.719°W, 8.0, Depth 35 km (USGS).

From: <http://supersites.unavco.org/chile.php>

### Photos of damage

David B. Swanson is currently in Chile investigating the M8.8 subduction zone earthquake performance of buildings and infrastructure with the Structural Engineers Association of Washington (SEAW) Chile Earthquake Reconnaissance Team. He provided a 60 slide PDF file that shows some of the earthquake performance of buildings in the cities of Santiago and Concepcion and some tsunami damage. Visit: <http://www.reidmiddleton.com/PDFs/NEWS-ChileEQSummarySlides.pdf>

### Why the Haiti earthquake wasn't as strong, but far more devastating

Frank Bajak, 2-27-2010, The Huffington Post

From: [http://www.huffingtonpost.com/2010/02/28/chile-haiti-earthquake-2010-comparison\\_n\\_480153.html](http://www.huffingtonpost.com/2010/02/28/chile-haiti-earthquake-2010-comparison_n_480153.html)

“PORT-AU-PRINCE, Haiti — The earthquake in Chile was far stronger than the one that struck Haiti last month – yet the death toll in this Caribbean nation is magnitudes higher.

The reasons are simple. Chile is wealthier and infinitely better prepared, with strict building codes, robust emergency response and a long history of handling seismic catastrophes. No living Haitian had experienced a quake at home when the Jan. 12 disaster crumbled their poorly constructed buildings.

And Chile was relatively lucky this time. Saturday's [Feb. 27, 2010] quake was centered offshore an estimated 21 miles (34 kilometers) underground in a relatively unpopulated area while Haiti's tectonic mayhem struck closer to the surface – about 8 miles (13 kilometers) – and right on the edge of Port-au-Prince, factors that increased its destructiveness.” For full story, go to the website given above.

### Shake maps for Haiti and Chile

USGS shake map for Haiti <http://tinyurl.com/y8h9une>

USGS shake map for Chile <http://tinyurl.com/yd7srhg>

### Deaths

Haiti, estimated at 170,000-270,000

Chile, estimated at 708 ♦

## National Preparedness Directorate

Timothy W. Manning, Deputy Administrator

### Overview

NPD Overview Brief ([PDF](#) 238KB, [TXT](#) 9KB)  
NPD 2008 Annual Report ([PDF](#) 1.39MB, [TXT](#) 75KB)  
NPD 2008 Accomplishments ([PDF](#) 845KB, [TXT](#) 32KB)  
NPD 2009 Operating Plan ([PDF](#) 169KB, [TXT](#) 25KB)

The 2006 Post-Katrina Emergency Management Reform Act (PKEMRA) mandated the creation of the National Preparedness Directorate (NPD), unifying DHS' preparedness, mitigation, response, and recovery missions. Established on April 1, 2007, NPD oversees the coordination and development of the capabilities and tools necessary to prepare for terrorist incidents and natural disasters. The NPD provides strategy, policy, and planning guidance to build prevention, protection, response, and recovery capabilities among all levels of government throughout the Nation. The Divisions of the NPD are:

#### [Preparedness Policy, Planning, and Analysis](#)

Strengthens national preparedness by leading special initiatives, directing preparedness policy planning efforts, and analyzing policy and program results within the scope of the National Preparedness Directorate's mission

#### [Technological Hazards Division](#)

Coordinates the National effort to enhance the emergency preparedness and response capabilities of communities surrounding commercial nuclear power plants and chemical weapons stockpile sites.

#### [National Integration Center](#)

Develops, manages, and coordinates all homeland security training, education (external), exercise and lessons learned programs, as required, to ensure the Nation is prepared to prevent, protect against, respond to, recover from, and mitigate against all hazards, natural or manmade.

#### [Community Preparedness Division](#)

Seeks to engage, educate and train Americans of all abilities on all-hazards preparedness. Working through the Citizen Corps program, the division brings community and government leaders together to involve community members in all-hazards emergency preparedness, planning, mitigation, response, and recovery.

#### [Preparedness Coordination Division](#)

Develops and executes a field-based, all-hazards preparedness program to enhance the capacity of Federal, State, and local agencies, and the private sector, to prevent, protect against, respond to, and recover from threats, acts of terrorism, major events and other emergencies through regionally-based Federal Preparedness Coordinators, enhanced regional staff, and national-level programs for technical assistance, preparedness planning, capabilities assessments and requirements, and preparedness reporting.

### Organization and Administration

NPD organization and administration is based on six functional areas:

- Training, Exercises Lessons Learned: Develop and coordinate training, exercises and lessons learned

programs credentialing, and response policy programs designed to teach, practice, test, and improve critical preparedness capabilities

- Preparedness Policy, Planning, and Analysis: Strengthen national preparedness by leading special initiatives, directing preparedness policy planning efforts, and analyzing policy and program results
- Chemical and Radiological Preparedness: Develop procedures and protocols to manage emergencies involving contamination from chemical and radiological agents
- Community Preparedness: Build preparedness at the community level by coordinating and encouraging citizen participation in preparedness activities
- Technical Assistance: Provide expert assistance on complex homeland security projects to jurisdictions nationwide
- Preparedness Coordination: Coordinate and provide assistance for regional and State preparedness efforts

### Directorate Highlights

The National Response Framework (NRF or Framework) establishes a comprehensive, national, all-hazards approach to domestic incident response. It intends to capture specific authorities and best practices for managing incidents ranging from the serious but purely local, to large-scale terrorist attacks or catastrophic natural disasters.

The National Preparedness Guidelines (NPG) outlines the top priorities intended to synchronize pre-disaster planning, prevention and mitigation activities throughout the nation, and to guide federal, state and local spending on equipment, training, planning and exercises. The Guidelines provide an overarching vision, tools, and priorities to shape national preparedness.

The National Incident Management System (NIMS) provides a systematic, proactive approach for guiding government departments and agencies, the private sector, and nongovernmental organizations to work seamlessly to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents, in order to reduce the loss of life, property, and harm to the environment.

The Target Capabilities List (TCL) is a national-level, generic model of operationally ready capabilities defining all-hazards preparedness. These are capabilities that may be needed in the event of terrorist attacks, natural disasters, health emergencies, and other major events. No single jurisdiction or agency is expected to perform every task identified and no two jurisdictions require the same level of capabilities.

#### Download Plug-in

Some of the links on this page require a plug-in to view them. Links to the plug-ins are available below.

 [Adobe Acrobat \(PDF\)](#)

Last Modified: Thursday, 04-Jun-2009 11:07:16 EDT

From: <http://www.fema.gov/about/divisions/npd.shtm>◆

## **NEMA and partners identify recommendations for an effective national mitigation effort**

“Building stronger partnerships, increased resilience, and disaster resistance for a safer nation.”

The National Emergency Management Association (NEMA), in conjunction with the Federal Emergency Management Agency and the assistance of numerous other organizations, today released a white paper titled “Recommendations for an Effective National Mitigation Effort,” outlining the importance of mitigation efforts aimed at building disaster resiliency across the nation.

The release of the white paper comes at a time where the threat of flooding, tornados, hurricanes, and other disasters weigh heavily on economically challenged states and localities across the country. While mitigation initiatives can come with hefty short term price tags, the long-term effects of successful mitigation plans and projects can prove to be crucial investments for the safety and resiliency of any community. Natural and man-made disasters can happen anywhere and at any time, making the effort to increase attention to all-hazards mitigation efforts essential to national preparedness.

“Mitigation is the least visible, but perhaps the most important concept that can be used to protect communities from disasters. Mitigation cannot completely eliminate the risk of disasters, but the process of identifying hazards should lead to effective, community-supported measures that can save lives, lower the overall cost of a disaster, and makes communities more resilient,” said James Mullen, Director of the Washington State Emergency Management Division and the NEMA Mitigation Committee chair.

“That so many professional associations worked to develop this paper is a testament to their conviction that all-hazards mitigation is essential to effective national preparedness.”

The paper originated from a meeting held in January that brought together partner organizations from many different sectors concerned with the issues surrounding mitigation benefits and challenges. The project was funded through a cooperative agreement established between NEMA and FEMA in the hope of facilitating mitigation dialogue and establishing relationships between those in the mitigation community.

“NEMA appreciates the efforts of FEMA and the other partner organizations involved in this white paper for their continued commitment to mitigation and their willingness to lend their time and expertise to this endeavor. We hope that as the message of the white paper is discussed and analyzed, attention is also focused on the enormous amount of work ahead as we continue to strengthen the mitigation component of emergency management,” said NEMA President Nancy Dragani. Dragani also serves as the Executive Director of Ohio’s State Emergency Management Agency.

The [Mitigation White Paper](#) is now available for download.

The Associations supporting the white paper effort are listed below.

- American Public Works Association
- American Society of Civil Engineers
- Association of Bermuda Insurers and Reinsurers
- Association of State Flood Plain Managers
- Central United States Earthquake Consortium
- Federal Emergency Management Agency
- Institute for Building Technology and Safety
- Institute for Business and Home Safety
- International Association of Emergency Managers
- International City/County Management Association
- International Code Council
- National Association of Counties
- National Emergency Management Association
- Reinsurance Association of America
- Western States Seismic Policy Council
- US Chamber of Commerce

From: <http://www.nemaweb.org/?3190> ♦

## **For your information**

### **Federal disaster declarations**

If you want to determine which areas have been declared federal disasters visit

<http://www.fema.gov/news/disasters.fema>

- Declared Disasters by Year or State
  - Major Disaster Declarations
  - Emergency Declarations
  - Fire Management Assistance Declarations
  - Declaration Policies and Guidance
  - Declaration Process Fact Sheet for Media
- You can search State, Region or Disaster type.

### **Disaster supplies kit locations**

#### Home

- Your disaster supplies kit should contain essential food, water, and supplies for at least three days.
- Keep this kit in a designated place and have it ready in case you have to leave your home quickly. Make sure all family members know where the kit is kept.
- Additionally, you may want to consider having supplies for sheltering for up to two weeks.

#### Work

- This kit should be in one container, and ready to "grab and go" in case you are evacuated from your workplace.
- Make sure you have food and water in the kit. Also, be sure to have comfortable walking shoes at your workplace in case an evacuation requires walking long distances.

#### Car

- In case you are stranded, keep a kit of emergency supplies in your car.
- This kit should contain food, water, first aid supplies, flares, jumper cables, and seasonal supplies.♦