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[2004] SUMATRA EARTHQUAKE THREE TIMES LARGER THAN ORIGINALLY THOUGHT

By Seth Stein and Emile Okal, Northwestern University
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Northwestern University seismologists have determined that the Dec. 26 [2004] Sumatra earthquake that set off a deadly tsunami throughout the Indian Ocean was three times larger than originally thought, making it the second largest earthquake ever instrumentally recorded and explaining why the tsunami was so destructive.

By analyzing seismograms from the earthquake, Seth Stein and Emile Okal, both professors of geological sciences in Northwestern's Weinberg College of Arts and Sciences, calculated that the earthquake's magnitude measured 9.3, not 9.0, and thus was three times larger. These results have implications for why Sri Lanka suffered such a great impact and also indicate that the chances of similar large tsunamis occurring in the same area are reduced.

"The rupture zone was much larger than previously thought", said Stein. "The initial calculations that it was a 9.0 earthquake did not take into account what we call slow slip, where the fault, delineated by aftershocks, shifted more slowly. The additional energy released by slow slip along the 1,200-kilometer long fault played a key role in generating the devastating tsunami".

"The large tsunami amplitudes that occurred in Sri Lanka and India", said tsunami expert Okal, "result from rupture on the northern, north-trending segment of the fault -- the area of slow slip -- because tsunami amplitudes are largest perpendicular to the fault".

Because the entire rupture zone slipped (both fast and slow slip fault areas), strain accumulated from subduction of the Indian plate beneath the Burma microplate has been released, leaving no immediate danger of a comparable ocean-wide tsunami being generated on this segment of the plate boundary. However, the danger of a local tsunami due to a powerful aftershock or a large tsunami resulting from a great earthquake on segments to the south remains.

The analysis technique used by Stein and Okal to extract these data from the Earth's longest period vibrations (normal modes) relied on results developed by them and colleague Robert Geller (now at the University of Tokyo) in their graduate studies almost 30 years ago. However, because such gigantic earthquakes are rare, these methods had been essentially unused until records of the Sumatra earthquake on modern seismometers became available.

The largest earthquake ever recorded, which measured 9.5, was in Chile on May 22, 1960.

Additional information on this research can be found at <http://www.earth.northwestern.edu/people/seth/research/sumatra2.html>.

(Source contacts: Seth Stein at 847-491-5265 or seth@earth.northwestern.edu or Emile Okal at 847-491-3238 or emile@earth.northwestern.edu)♦

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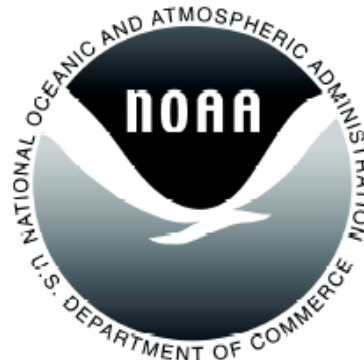
This publication is free upon request and is available in print (by surface mail),
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Participants in the TsuInfo program can request copies of reports listed in this issue from:

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WASHINGTON STATE DEPARTMENT OF
Natural Resources
Doug Sutherland - Commissioner of Public Lands



Accounting for the Tsunami Missing

By Jim Moran

The tsunami of 2005 has created unparalleled challenges in locating missing people and identifying disaster victims. The enormous span of countries hit by the tsunami coupled with the thousands of foreigners who were in the region at the time continues to hamper efforts to account for the missing. Philip Beh, a forensic pathology professor at Hong Kong University, characterizes the efforts of teams in Thailand alone to be the, "largest victim identification event in recent history."

Recent efforts by officials in tsunami-affected countries have evolved quickly. There are several government-based web sites that offer a host of information and services relating to missing persons including but not limited to: hotlines, articles/information on progress, registration of missing persons databases (including information on where to send identification information/last known whereabouts), and a variety of links to helpful non-profit disaster relief organizations and information posting sites. Affected countries have also established several 24/7 operations centers that have easily obtainable phone numbers and e-mail addresses.

European countries have also sent officials and volunteers to help with the effort. Sweden—particularly interested in the identification efforts because of the amount of its citizens affected—has established "temporary embassies" and "contact points" throughout the region in several joint efforts between its Ministry of Foreign Affairs and the Swedish Rescue Service Agency. Sweden—like other European Countries—as also provided a host of helpful services via the internet and hotlines.

Early concerns in western countries over reports that foreigners were being buried in unidentified mass graves caused some European countries such as Germany to call for immediate investigations. In the past weeks, however, reports from many tsunami affected countries on increased organization and effectiveness may have helped stem such concerns.

Although the early use of mass graves is well documented, recent reports on innovative approaches and technologies have gained notice in the press. In Thailand, government spokesmen said that unidentified foreigners were now being stored in refrigerated containers. The Thai government has also stated that Thai disaster victims were now being stored in temporary graves with electronic chips that contain personal information for future identification. On its website (www.mfa.go.th/tsunami/index_en.php) the Thai

Ministry of Foreign Affairs has announced procedures for a DNA identification program.

The Sri Lanka Information Management Centre has also earned praise for innovative searchable databases made available on its web page (www.contanctsrilanka.org/namelist.htm).

This page incorporates extensive travel data gathered from private industry, and references a report that uses triangulation technology to document last cell phone transmissions of visiting tourists in hopes of focusing search efforts. ♦

Institute for Crisis, Disaster, and Risk Management

Crisis and Emergency Management Newsletter Vol. 8, no. 1, February 2005

<http://www.seas.gwu.edu/%7Eemse232/february2005tsunamidisasterupdates1.html>

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The Pacific Disaster Center - Website Overview

By Rebecca Updike

The Pacific Disaster Center (PDC) mission statement is to "provide applied information research and analysis support for the development of more effective policies, institutions, programs and information products for the disaster management and humanitarian assistance communities of the Asia Pacific region and beyond." In other words, PDC strives to promote proactive hazard mitigation, planning and increased efficiency of operational organizations through analyses and various information resources. The five primary or "strategic" focuses at PDC are: Decision and Policy Support, Institution Capacity Development, Risk and Vulnerability, Humanitarian Assistance Support, and Security and Sustainability. These programs are used to promote partnerships between United States research and technology, and disaster experts in the Asian Pacific. Details for each specialized section can be found within the PDC website.

The PDC website provides thorough information and explanation of the different types of natural hazards (drought, hurricane, high wind and surf, volcanoes, tsunami and wildfires). It provides visual weather imagery from around the globe and information on what PDC's capabilities, services and products are. Highlights include the *Asia Pacific Natural Hazards and Vulnerabilities Atlas*; an interactive; geospatial mapping device that can be accessed to aid planners in identifying natural hazards and their potential impacts. Another service is the *Dynamic Map Viewers*; a map that gives out the natural

hazard location within the Pacific and allows the user to seek specific information that will aid in planning for the impact and severity of the hazard. Finally, the *Asia Pacific Natural Hazards Information Network*; provides planners and emergency managers with natural hazard information about the Asia Pacific region. Its background information, maps and technical essays allow planners to search for, evaluate and access high-quality geospatial data. The website allows the user to test drive each product and experience what it can do before they register for the product.

Though the PDC appears to be geared towards the emergency managers and Asian Pacific officials, this public website homepage reaches out to the general public and acts as a “communications medium” for the Asian Pacific Community. Citizens can access local weather, a public message board that is updated numerous times a day with environmental information and advisories, news updates on events like the Sumatra Earthquake and Tsunami, and various information links such as Hawaiian emergency numbers, warnings and bulletins, Homeland Security, etc. There are also links to investigate news happenings around the world. Simply pick an area of the world and then hyperlinks from various news sources appear.

The PDC offers support to members of the disaster community and valuable public education opportunities through their website. They give contact information and encourage people to contact them with questions or interests in becoming registered users of their products and services. ♦

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<http://www.seas.gwu.edu/%7Eemse232/march2005disastercenters1.html>
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British Columbia Tsunami Warning System By Anhdai Tran

Recently, Public Safety and Emergency Preparedness Canada published “*An Assessment of the B.C. Tsunami Warning System and Related Risk Reduction Practices: Tsunamis and Coastal Communities in British Columbia.*” The study examines the British Columbia Tsunami Warning System (B.C. TWS) and provides recommendations for improvement as well as

implementation of other tsunami risk reduction strategies.

According to the report, the Canadian general public and federal and provincial governments under-prioritized the tsunami threat during the mid-20th century. In fact, in 1963, Canada withdrew from participating in the Pacific Tsunami Warning System (PTWS) because no major tsunamis had been recorded along its west coasts. Unfortunately, one year later in 1964, the Alaska Earthquake caused tsunamis, which hit the western coastal regions of British Columbia without any official warning and caused millions of dollars of damage. This prompted the Canadian federal government and the Province of British Columbia to rejoin the PTWS with other members of the international community.

B.C. TWS is essentially a regional component of the PTWS and consists of three major functional elements: detection, emergency management and public response. The report states that “together these critical links establish a three-stage detection and dissemination network to alert local populations along the B.C. coast to the threat of a potential or imminent tsunami.” First, the detection subsystem identifies, monitors, tracks, and predicts tsunami hazards. Next, the emergency management subsystem determines the extent and magnitude of the tsunami threats to British Columbia. Finally, the public response subsystem informs local populations of a potential or imminent threat to the area and initiates and coordinates protective-action response measures.

The study recognizes several factors that influence the functional elements of the B.C. TWS, including emerging economic development initiatives in the areas of British Columbia most vulnerable to tsunamis, the shift in emergency management towards a more comprehensive model, and the inherent international scope of tsunami warning and Canada’s reciprocal obligation to the international community. It then identifies strategies, based on international best practices, to enhance the current warning system in order to address the needs of present and future stakeholders. The focus of the recommendations is on local warning and alerting and on public awareness and education

Some of the major recommendations from the study include:

--For the detection subsystem, Canada needs to actively participate in the PTWS, utilize new communications technology to improve detec-

tion activities, and develop a warning and alerting system for local tsunamis.

--For the emergency management subsystem, Canada's inundation mapping activities need to be expanded to include all vulnerable areas and populations and institutionalized as part of existing federal and provincial mitigation strategies.

--For the public response subsystem, Canada needs to increase local warning capabilities by improving the communication infrastructure, holding regular reporting meetings for the B.C. TWS, establishing a Universally Digitally Coded Warning system, and developing targets and incentives. Also, at the provincial level, officials need to work together with relevant ministries, local authorities, and local communities to develop trailhead information campaigns, form tsunami working groups, develop a means for continued assessment of needs and successes, and implement special awareness and educational programs about tsunami risk and appropriate response, including training and an information clearinghouse. Federal and provincial governments need to also support the transfer of scientific knowledge to local communities and information exchanges in formal (conferences) and informal settings.

The study concludes by identifying three areas requiring further research. They are: communication infrastructure, the result of which could inform community planning and Canada's Public Alerting initiative; coastal preparedness, the result of which could inform future mitigation and preparedness planning and activities in the coastal regions; and duty to warn, the result of which could help federal and provincial governments define the roles and responsibilities to the general public in regards to tsunami hazards.

For the complete study, visit:

http://www.ocipep.gc.ca/research/resactivites/CI/2003-D001_e.asp ♦

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<http://www.seas.gwu.edu/%7Emse232/march2005internationalupdates3.html>

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Interagency team studies geospatial preparedness

By Patricia Daukantas, GCN Staff, 4-28-03

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http://www.gcn.com/vol1_no1/daily-updates/21900-1.html

An interagency team is developing a comprehensive national strategy for delivering geospatial data to emergency responders.

The Federal Emergency Management Agency formed the team in February [2003] because geospatial technology is critical to response and recovery efforts in natural and manmade disasters, said Susan Kalweit, who heads the Interagency Geospatial Preparedness Team.

"Regardless of what causes the incident, the kinds of response and recovery are basically the same," Kalweit said. Geospatial technology addresses the universally important questions of where the disaster happened and how responders can get to it.

The team will assess the needs and existing capabilities of federal, state and local agencies, Kalweit said. Its capabilities assessment will leverage work being done for the Geospatial One-Stop Portal program, one of the 25 e-government initiatives, and the National Imaging and Mapping Agency's 133 Cities project, she said.

The assessments will take eight or nine months, but those may not be contiguous months, Kalweit said. Hurricane, wildfire and flooding seasons have started or will begin soon, and workshops the interagency team plans to hold in each of the 10 FEMA regions may have to wait until the threats of natural disasters have abated.

The team is reaching out to state and local governments through the National States Geographic Information Council.

Kalweit, who was deputy chief of NIMA's North America and Homeland Security Division, is working at FEMA on detail until February. ♦

Editor's Note: Additional information:

1) March 2003 interview with IGPT chief Susan Kalweit at http://www.directionsmag.com/article.asp?article_id=324

2) FEMA's press release on IGPT formation: http://www.fema.gov/nwz03/nwz03_054.shtm

3) The Overview Briefing is online: <http://www.mel.nist.gov/div826/msid/sima/simconf/proc/ftp/kalweit.pdf>

NEWS

Tsunami warning bill goes to full U.S. Senate.

On Thursday, March 10, 2005, a bill to expand and upgrade the U.S. tsunami hazard warning system, in addition to cleaning up debris along the nations shorelines, was sent to the full Senate after receiving Senate Commerce, Science and Transportation Committee approval. The bill was co-sponsored by Senators Dan Inouye (D-Hawaii) and Ted Stevens (R-Alaska).

Backed by Oregon and Washington senators, the bill would fund a 6-year, \$35 million-per-year plan to improve the Pacific Ocean warning system and to build the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico warning systems.

Under the bill, the National Oceanic and Atmospheric Administration would also help other nations create an international tsunami warning system. No date has been set yet for the full Senate to consider the bill. The House is working on its version of the legislation.

[There is a more detailed report at <http://the.honoluluadvertiser.com/article/2005/Mar/12/ln/ln05p.html>]

Tsunami! Evacuation maps (Washington)

Washington State Department of Natural Resources, Division of Geology and Earth Resources, in cooperation with local emergency management officials and the Washington Military Department, Emergency Management Division, have completed a series of tsunami evacuation maps for Pacific and Grays Harbor Counties. The maps cover Aberdeen-Hoquiam, Copalis Beach-Pacific Beach-Ocean City, Cosmopolis-South Aberdeen, Ocean Shores, and Westport-Grayland-Ocosta. All the maps are available online at web sites given below. [See also page 20]

Coastal population boom puts Americans at risk

Continuity e-Guide, March 9, 2005...A Wednesday Update by Disaster Resource Guide <http://disaster-resource.com/newsletter/subpages/v74/newsclip5v74.htm>

A new study has found that more than half of all Americans reside close to one of the nation's coastlines, prompting emergency planning officials to rethink their evacuation plans in the event of disaster.

The Associated Press' Randolph E. Schmid is reporting that the population growth in coastal areas is causing new concerns for emergency

preparedness and disaster response. "Whether it is tsunamis on the West Coast, hurricanes on the Atlantic and Gulf coasts, or winter storms on the Great Lakes," he says, "rising populations complicate evacuations and make emergency response more complex."

The study by the National Oceanic and Atmospheric Administration, released last week, found that 153 million people live in coastal counties, an increase of 33 million since 1980. Schmid says an additional 12 million are expected in the next decade.

One possible answer, Schmid says, is "vertical evacuations that could send people fleeing upward in high-rise buildings rather than away from a stormy coast." In addition, road construction, improved emergency communication and better understanding of population and transportation patterns are all crucial, officials told Schmid.

Tony MacDonald, executive director of the Coastal States Organization, told Schmid the expected population growth will increase conflicts and put a greater burden on coastal management programs.

To read the full article, go to http://www.boston.com/news/nation/articles/2005/03/02/increased_risk_accompanies_growth_of_coastal_areas/

World conference on disaster reduction

When the World Conference on Natural Disaster Reduction opened in Kobe, Japan, almost 10 years to the day on which a devastating 1995 earthquake killed more than 6,000 in that city, the painful memory of the south Asian tsunami that occurred just three weeks earlier was still fresh on everyone's mind. The Conference brought together 4,000 participants from 150 countries to review concrete results and develop a strong plan of action for reducing disaster losses over the next ten years.

"We have to make sure that key urban functions in every community are able to withstand the shocks of natural disasters when they strike. When hospitals are destroyed, it is impossible to care for the wounded; when schools are damaged, our future generation is at risk," said Salvano Briceno, Director of the U.N. Secretariat of the International Strategy for Disaster Reduction, at the World Conference. Protecting and strengthening vital social services was among the main issues being discussed at the Conference, where participants called on governments to protect and strengthen critical public facilities and physical infrastructure.

The 168 delegations at the Conference adopted a framework for action calling on states to put disaster risk at the center of political agendas and national policies. The “Hyogo Framework for Action: 2005-2015” will strengthen the capacity of disaster-prone countries to address risk and invest heavily in disaster preparedness. “This new plan will help reduce the gap between what we know and what we do; the critical ingredient is political commitment,” said Jan Egeland, U.N. Under-Secretary-General for Humanitarian Affairs. The Conference also adopted a declaration recommending, among other things, that a “culture of disaster prevention and resilience must be fostered at all levels” and called on countries to recognize the relationship between disaster reduction, sustainable development and poverty reduction.

Visit the Conference web site at www.unisdr.org/wcdr to review official documents, presentations and plans. Read more on page 6 about the health sector initiative to make hospitals safe from disasters.

From: Disasters—Preparedness and Mitigation in the Americas, issue 98, January 2005, p. 2-3.

2004 Western States Seismic Policy Council policy recommendations

WSSPC continues to fulfill its mission of developing, recommending and supporting seismic policies and programs throughout the western region. At the last WSSPC annual business meeting, held September 30, 2004 in St. Louis, Missouri, the membership unanimously approved seven policy recommendations. To view the background, history and implementation of each recommendation, visit <http://www.wsspc.org/PublicPolicy/PolicyRecs/index.htm>.

Tsunami-related recommendations:
Recommendations 04-1 and 04-2: Rapid tsunami identification and evacuation notification.

Policy recommendation 04-1: Promote the development of complete tsunami evacuation and re-entry notification systems, supplemented with an education campaign, that insure all populated coastal areas in the WSSPC coastal states, territories and provinces are guided by at least one type of system, appropriate to local conditions.

Policy recommendation 04-2: Evaluate and promote new technological systems that rapidly identify the tsunami potential from a local earthquake and that rapidly send out warnings to the coastal areas affected by the earthquake. These

systems would reinforce evacuation decisions indicated by the ground shaking.
From: EQ, Fall 2004, p. 18.

PUBLICATIONS

International Journal of Mass Emergencies & Disasters.

The staff at the Center for Disaster Research & Education (CDRE) has decided to give an update on the progress of the development of the IJMED website access. While the Center includes a director, an associate director and eleven faculty associates, like any good center, the CDRE relies on its research assistants for the work of creating the IJMED site, scanning issues of the journal into pdf format and uploading recent pdf versions coming from the journal editor and publisher. [They] owe a debt of gratitude to Scott Romine, CDRE Director of Computer Operations (and the best IT person around), for his hours of devotion.

...Approximately a third of the issues are scanned in at this point. [They] hope to have the remaining issues for which [they] have publisher proofs, completed during the spring semester. There are quite a few back issues for which [they] do not have such proofs, which will slow down the process. [They] will have to photocopy those issues, before scanning them.

[They] anticipate that by the time you receive the May issue of *UnScheduled Events*, you should be able to access www.IJMED.org and read any journal issue or article you choose. Even if all of the issues are not available at that time, enough will be to guarantee that [they] will believe on the internet by then.

[The] team is creating menu options that will enable you to select by journal issue as well as by individual article via table of contents for each issue. As [they] build the site, you will be able to run a word search to identify and select articles dealing with topics of interest. [They] are excited and looking forward to soon providing this service to both the RC39 community as well as the world beyond. [They] also plan a fire wall to limit access for non-RC39 members to prior to the most recent three years of publication.

If you have any suggestions, comments, or concerns, before launch, please feel free to forward them to hfisher@millersville.edu.

From: *UnScheduled Events*, v. 23, no. 1, p. 18.

The Daily World

The Daily World of Aberdeen, Washington, recently ran a series of thorough and thought-provoking articles on tsunamis, tsunami research in Washington, and paleotsunamis, written by staff reporter Kaitlin Manry. The three articles are available online:

“It could happen here again” (February 7, 2005):
http://www.thedailyworld.com/articles/2005/02/07/local_news/01news.prt

“The unthinkable not so unthinkable here” (February 8, 2005)
http://www.thedailyworld.com/articles/2005/02/08/local_news/01news.prt

“How to be prepared?” (February 9, 2005)
http://www.thedailyworld.com/articles/2005/02/09/local_news/01news.prt

CLASSES/WORKSHOPS/ EVENTS

April will be disaster preparedness month in Washington, highlighted by a statewide “Drop, Cover and Hold” earthquake drill on April 21 between 9:45 and 10 a.m.

Preparedness month packets will be available from local emergency managers in mid-March. Packet materials will include a Disaster Preparedness Handbook, 9-1-1 information, and a new tsunami lessons poster. These campaign materials will be available to download from the Emergency Management Division (EMD) website at www.emd.wa.gov.

Additional information can be obtained from EMD’s Barbara Thurman, disaster preparedness month coordinator at 253-512-7047.

From: Emergency Responder, January-February 2005, p. 5.

WEBSITES

<http://www.gismaps.fema.gov>

FEMA Mapping and Analysis Center website was cited as Internet Resource of the Month in the November 2004 issue of *GeoWorld* magazine (p. 12).

“The Federal Emergency Management Agency (FEMA) Mapping and Analysis Center (MAC) provides national-level GIS support and coordination. The MAC web site is limited to presidential-declared disasters and tropical storms/hurricanes such as Hurricane Jeanne, Hurricane Ivan, Hurricane Frances and

Hurricane Charley that have projected landfall on the United States or a U.S. territory.

In the early, crucial stages of a disaster or emergency (and throughout the disaster process), managers use GIS products because they provide important information quickly and in easy-to-understand formats. FEMA managers and staff use GIS to visualize actual damages by analyzing collected aerial reconnaissance and ground-truth data.

Using GIS, MAC customers can see the spatial extent of damage, learn who was affected by the disaster and which resources were affected. Management and staff then can use the data to distribute resources and coordinate with other federal and state agencies and organizations.

MAC’s primary mission is the dissemination of geographic information during disaster operations and the enhancement of information services. Its current concept of operations is expanding to include providing a full range of GIS services to all FEMA program offices. In addition, the MAC has become the cornerstone for developing and implementing an integrated, enterprise (E-GIS) for the agency.

The MAC maintains an array of datasets to provide customers with needed information. The MAC also can produce maps from important model output; damage assessment data; and maps and/or tables from FEMA Human Services, National Emergency Training Center, National Processing Service Center and Disaster Finance Center statistics in federally declared counties.

Prior to making landfall, MAC staff can generate maps that depict the track of a hurricane or tropical storm. The E-GIS Team uses a hurricane wind model to develop estimates for projected damages in affected states or areas. Typical model output maps include estimated wind damage to homes in areas along the storm’s track.

In addition to providing GIS maps, tables and analyses during disasters and emergencies, the E-GIS Team supports planning exercises, the Federal Insurance and Mitigation Administration, the Office of National Preparedness, the Office of Homeland Security, the Administration and Resource Planning Directorate, and FEMA’s ad-hoc GIS requirements.

Some of MAC’s most frequently requested maps include storm-track and damage-prediction maps, remote-sensing maps, maps of federally declared counties in an affected state, basic census demographics, street locations,

help-line calls, disaster unemployment claims, and Small Business Administration applicants.”

From: GeoWorld, November 2004, p. 12.
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<http://www.co.grays-harbor.wa.us/info/DEM/images/MapImages/Aberdeen-Hoquiam.pdf>

Tsunami! Evacuation map for Aberdeen and Hoquiam, Washington.

<http://www.co.grays-harbor.wa.gov/info?DEM/images/MapImages/CopalisBeach2.pdf>

Tsunami! Evacuation map for Copalis Beach, Pacific Beach, and Ocean City, Washington.

<http://www.co.grays-harbor.wa.gov/info?DEM/images/MapImages/Cosmopolis.pdf>

Tsunami! Evacuation map for Cosmopolis and South Aberdeen, Washington.

<http://www.co.grays-harbor.wa.gov/info?DEM/images/MapImages/OceanShores.pdf>

Tsunami! Evacuation map for Ocean Shores, Washington.

<http://www.co.grays-harbor.wa.gov/info?DEM/images/MapImages/Westport.pdf>

Tsunami! Evacuation map for Westport, Grayland, and Ocosta, Washington.

http://www.co.grays-harbor.wa.gov/info?DEM/images?MapImages/gm49_plate.pdf

Tsunami hazard map of the southern Washington coast.

<http://walrus.wr.usgs.gov/tsunami/basics.html>

Life of a tsunami, by Eric L. Geist, USGS, is an easy-to-understand, 2-page explanation of tsunamis, how they are created, their characteristics, and their impact. The overview includes links to tsunami preparedness.

<http://www.ostp.gov/html/Tsunamiplanrelease.pdf>

U.S. announces plan for an improved tsunami detection and warning system. From the U.S. Office of Science and Technology Policy, January 14, 2005.

<http://www.ostp.gov/>

Link to 1-14 FACT SHEET: U.S. Plan for Improved TSUNAMI Detection.

<http://www.whitehouse.gov/ask/20050114.html>

Admiral Conrad Lautenbacher's "Ask the White House" tsunami questions and answers, January 15, 2005.

CONFERENCES/SYMPOSIA/MEETINGS

June 7-9, 2005

National Tsunami Hazard Mitigation Program steering group meeting. Honolulu, Hawaii.

July 10-13, 2005

15th World Conference on Disaster Management; Defining the New Normal. Toronto, Ontario, Canada.

The future of Disaster Management is in our hands! As never before the world is turning to disaster management professionals to help them think through the unthinkable. In July of 2005, our worldwide community will gather in Toronto in order that together we may network on some of the most important topics facing our profession. <http://www.wcdm.org/main.html>
from: *Unscheduled Events*, v. 23, no. 1, p. 13.

May 23-25, 2006

3rd Tsunami Symposium, East-West Center, University of Hawaii, Honolulu, sponsored by the Tsunami Society. Contact: The Tsunami Society, PO Box 1130, Honolulu, Hawaii 96807 USA; <http://www.sthjourn.org/2006.pdf>.

LESSON PLANS/ACTIVITIES FOR KIDS

Understanding tsunamis (grade level 6-8)

<http://school.discovery.com/lessonplans/programs/tsunami/>

Includes sections on objectives, materials, procedures, evaluation, vocabulary, and academic standards.

Dynamic Earth (grade level 3-5)

<http://school.discovery.com/lessonplans/programs/dynamicearth/>

Includes sections on objectives, materials, procedures, evaluation, vocabulary, and academic standards. ♦

Dan Driscoll, Oysterville Underground, has a website with his "Tsunami" music:

www.avadriscoll.com

See Tom Paulson's Seattle P-I article on tsunamis and Dan's music:

http://seattlepi.nwsource.com/local/211473_tsunami10.html

Material added to the National Tsunami Hazard Mitigation Program Library
March – April 2005

Note: These, and all our tsunami materials, are included in the online (searchable) catalog at <http://www.dnr.wa.gov/geology/washbib.htm>.
Type 'tsunamis' in the Subject field to get a full listing of all the tsunami reports and maps in the collection.

- Altinok, Y.; Alpar, B.; Yaltirak, C., 2003, Tsunami of Sarkoy-Murefte 1912 earthquake—Western Marmara, Turkey. IN Submarine landslides and tsunamis—Proceedings of the NATO Advanced Research Workshop on Underwater ground failures on tsunami generation, modeling, risk and mitigation, Istanbul, Turkey, May 23-26, 2001: Kluwer Academic Publishers, p. 33-42.
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2004 NATIONAL EARTHQUAKE CONFERENCE AWARDS (WSSPC)

<http://www.earthquakeconference.org/awards.html>

The 2004 National Earthquake Conference Awards of Excellence are given to persons, organizations, or agencies, that have contributed significantly to addressing earthquake risk reduction within the U.S. through their achievements, leadership, and dedication. Special emphasis is placed on those who have demonstrated these qualities as part of a collaborative effort in addressing the hazard.

2004 Award Winners:

The following award recipients were honored during the Awards Luncheon at the Adam's Mark Hotel in St. Louis, Missouri on Wednesday September 29, 2004, where they received a specially designed plaque.

Award Category: Mitigation

Program Name:

Development and Implementation of Seismic Design Policy

Contact: David Skoubye, Senior Engineer
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Award Category: Mitigation

Program Name: **ISO-Base Seismic Isolation Platform**

Contact: Don Hubbard, President

25133 Avenue Tibbitts, Building F

Valencia CA 91355

Phone: (661) 257-2527; Fax: (661) 257-2547

Email: don@worksafetech.com

Award Category: Mitigation

Program Name: **ABAG Home Quake Safety Toolkit & Outreach Education Program**

Contact: Jeanne Perkins, Program Manager

Association of Bay Area Governments

PO Box 2050

Oakland CA 94604

Phone: (510) 464-7934; Fax: (510) 464-7970

Email: jeanep@abag.ca.gov

Award Category: Response

Program Name: **All Hazard Broadcasting (AHAB) Radio**

Contact: George Crawford, Earthquake Program Manager

Emergency Management Division

Washington State Military Department

Building 20, MS:TAT-20

Camp Murray, WA 98430-5122

Phone: (253) 512-7061; Fax: (253) 512-7205

Email: g.crawford@emd.wa.gov

Award Category: Plans/Materials

Program Name: **Manual of Code Compliance Guidelines on Earthquake Resistance of Architectural, Mechanical & Electrical Components & Systems**

Contact: Dan Duggan, Co-author

Loos & Co. Inc.

12049 Mereview Dr.

St. Louis MO 63146

Phone: (800) 321-5667; Fax: (941) 643-4558

Email: fsd@earthquakebrace.com

Award Category: Plans/Materials

Program Name: **Spring Earthquake and Tsunami Awareness Campaign, What's Shaking, Oregon 2003**

Contact: Andre LeDuc, Program Director

Oregon Natural Hazards Workgroup

1209 Community Service Center

University of Oregon

Eugene OR 97403-1209

Phone: (541) 346-5833; Fax: (541) 346-2040

Email: crux@darkwing.uoregon.edu

Award Category: Research

Program Name:

Basin and Range Province Seismic Hazards Summit II

Contact: Craig dePolo, Organizer

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Award Category: Multi-Jurisdictional Planning
Program Name: **Vermont Geological Survey**
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Award Category: Outreach
Program Name: **Community Disaster Education**
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For more details, go to the Fall 2004 issue of EQ (Earthquake Quarterly) published by the Western States Seismic Policy Council:
<http://www.wsspc.org/Publications/newsletter.html>. Pages 6-11 explains the winning programs.

Western States Seismic Policy Council Awards in Excellence Program

WSSPC is now accepting nominations for its 2005 Awards in Excellence program.

Submissions must be received in the WSSPC office by Friday, April 22, 2005. To download an award nomination application, click on the appropriate link below.

2005 Awards Application (.doc)
http://www.wsspc.org/Awards/2005/WSSPC_awardapp05.doc
2005 Awards Application (.pdf)
Overview http://www.wsspc.org/Awards/2005/WSSPC_awardapp05.pdf ♦

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From: <http://www.pmel.noaa.gov/tsunami-hazard/tsuhaz.htm>
March 21, 2005

VIDEO RESERVATIONS

To reserve tsunami videos, contact *TsuInfo Alert* Video Reservations, Lee Walkling, Division of Geology and Earth Resources Library, 1111 Washington St. SE, MS 47007, Olympia, WA 98504-7007; or e-mail lee.walkling@wadnr.gov

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.

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.) **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 story-teller 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.

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

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.



Infrequently Asked Questions

Compiled by Lee Walkling

What is a meteotsunami?

Atmospherically generated large amplitude seiche oscillations are called meteotsunamis. “Extremely large seiche oscillations are regularly observed in some specific areas around the world even in the absence of any seismic forcing. These seiches have been successfully associated with strong atmospheric pressure perturbations inducing seal level oscillations at the open ocean, before entering the inlet, which are in turn resonantly amplified by the geometric characteristics of the inlet. The coastal behaviour of such waves, although of different origin, is similar to tsunami waves behaviour and is sometimes referred to as meteotsunamis.”

From: Yalciner, Ahmet C.; Pelinovsky, Efim N.; Okal, Emile; Synolakis, Costas E., editors, 2003, Submarine landslides and tsunamis—Proceedings of the NATO Advanced Research Workshop on Underwater ground failures on tsunami generation, modeling, risk and mitigation, Istanbul, Turkey, May 23-26, 2001: Kluwer Academic Publishers, p. 243.

How many communities are now TsunamiReady?

As of March 8, 2005, there were 877 StormReady Sites in 47 states:

461 Counties, 402 Communities, 9 Universities, 1 Indian Nation, 2 Industrial Sites, 2 Military Site

16 TsunamiReady Sites in 5 states and 4 StormReady Supporters

From: <http://www.stormready.noaa.gov/communities.htm>

Washington: 31 StormReady Designations: 21 Communities, 7 Counties

3 StormReady/Tsunami Ready Communities and 1 StormReady Supporter

From: <http://www.stormready.noaa.gov/com-maps/wa-com.htm>

The TsunamiReady communities are

Homer	AK
Kodiak	AK
Seward	AK
Sitka	AK
Kauai County	HI
Maui County	HI
Crescent City	CA
University of California at Santa Barbara	CA
Cannon Beach	OR
Lincoln City	OR
Manzanita	OR
Nehalem	OR
Wheeler	OR
Long Beach	WA
Ocean Shores	WA
Quinault Indian Nation	WA

STOP THE PRESSES

(Last minute news items)

West Coast and Alaska Tsunami Warning Center/NOAA/NWS bulletin, March 28, 2005

TSUNAMI INFORMATION BULLETIN NUMBER 3

ISSUED 03/28/2005 AT 2235 UTC

THIS TSUNAMI INFORMATION BULLETIN IS FOR ALASKA – BRITISH COLUMBIA - WASHINGTON - OREGON AND CALIFORNIA ONLY...

NO - REPEAT NO - WATCH OR WARNING IS IN EFFECT.

EARTHQUAKE DATA PRELIMINARY MAGNITUDE - 8.5

LOCATION - 2.3N 97.1E - NORTHERN SUMATRA, INDONESIA

TIME - 0711 AST 03/28/2005 0811 PST 03/28/2005 1611 UTC 03/28/2005

THE TSUNAMI HAS BEEN OBSERVED AT THE FOLLOWING SITES

GAN 0.7N 73.2E 5CM / 0.16FT

MALE 4.2N 73.5E 9CM / 0.3FT

HANIMAADHOO 6.8N 73.2E 20CM / 0.66 FT

COCOS IS (NO LAT / LON) 23CM / 0.75FT

EVALUATION: BASED ON LOCATION AND MAGNITUDE THE EARTHQUAKE WAS NOT SUFFICIENT TO GENERATE A TSUNAMI DAMAGING TO CALIFORNIA - OREGON - WASHINGTON - BRITISH COLUMBIA OR ALASKA. SOME AREAS MAY EXPERIENCE SMALL SEA LEVEL CHANGES.

Pacific Tsunami Warning Center/NOAA/NWS bulletin, March 28, 2005 (excerpt)

TSUNAMI BULLETIN NUMBER 001

ISSUED AT 1629Z 28 MAR 2005

THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.

THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING OR WATCH IN EFFECT.

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS

ORIGIN TIME - 1610Z 28 MAR 2005

COORDINATES - 2.3 NORTH 97.1 EAST

LOCATION - NORTHERN SUMATRA INDONESIA

MAGNITUDE - 8.5

UN to Coordinate Indian Ocean Early Warning System

In response to the recent tsunami disaster in the Indian Ocean, international delegates at a special session at the United Nations' (UN) World Conference on Disaster Reduction pledged their support to create a regional tsunami early warning system in the Indian Ocean, emphasizing the importance of international and regional cooperation. The new warning system will draw from the experience of the Pacific Ocean tsunami early warning systems, making use of the existing coordination mechanism of the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific, and Cultural Organization.

The UN will be responsible for coordinating the implementation of the new system, which could be operational in a year's time. Countries from around the world have already committed national resources and technical assistance to establish the system, which is estimated to cost \$30 million. Find out more about these efforts, their progress, and activities that support them, at the IOC's "IndoTsunami" Web site at <http://ioc.unesco.org/indotsunami/>.

From: Natural Hazards Observer, v. 29, no. 4, p. 12; <http://www.colorado.edu/hazards/o/mar05/mar05d.html#warning>

Public tsunami warning listserv

http://ioc.unesco.org/itsu/categories.php?category_no=63

The UNESCO Intergovernmental Oceanographic Commission's tsunami warning system in the Pacific has set up a public tsunami warning listserv. Subscribe here to receive Pacific tsunami warnings via e-mail.

More Washington tsunami brochures/maps [see also page 6]

New tsunami brochures for Clallam Bay, La Push, Neah Bay, Port Angeles, Port Townsend and Sequim, Washington, are available online in pdf format: <http://www.emd.wa.gov/3-map/mit/eq-tsunami/tsunami-idx.htm>.