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)

Contents **Volume 9, Number 6 December 2007**

Tsunami early warning system takes shape in the Caribbean
U.S. experts and 40 years of experience in Pacific contribute to effort

By Cheryl Pellerin, USINFO Staff Writer
Posted online 20 August 2007
Reprinted with permission

This is the second in a series of articles about U.S. contributions to a global early warning system for tsunamis and other hazards.

Washington -- An early warning system for tsunamis is taking shape in the Caribbean region, building on the island nations' long experience in dealing with hurricanes, storm surge, volcanic eruptions and mudslides.

As Hurricane Dean, the first of the Atlantic season, raged through the Caribbean August 20, leaving nine people dead in its wake among the region's 7,000 islands, islets, reefs and cays, experts from a handful of countries are putting their own experience and technology to work to strengthen the region against a future tsunami.

The collaboration began in 2005, after the UNESCO Intergovernmental Oceanographic Commission (IOC) created a framework for developing regional tsunami early warning systems in the Indian Ocean, the Caribbean and the Mediterranean.

A month later, the U.S. Agency for International Development Office of Foreign Development Assistance (OFDA) and its Caribbean intergovernmental counterpart, the Caribbean Disaster Emergency Response Agency (CDERA), brought key parties together in Barbados to discuss building a tsunami warning system.

At the meeting were experts from the Seismic Research Unit at the University of the West Indies-St. Augustine, Trinidad and Tobago; the University of Puerto Rico-Mayaguez; the Montserrat (a British territory) Volcano Observatory, Meteo-France at Guadeloupe and Martinique; and others.

The group concluded, said OFDA Regional Adviser Julie Leonard during an August 14 USINFO interview, "that whatever is created in the Caribbean should not be a stand-alone [system] but should be able to incorporate other coastal hazards."

STRENGTHENING A SYSTEM

Because the Caribbean and the United States are close neighbors that share residents, tourists and interests in shipping, trade, oil and gas, insurance and land investment, one of the best things the United States can do to help the Caribbean monitor tsunamis is bolster its own early warning system. (See related article.)

In 2006, the U.S. National Oceanic and Atmospheric Administration (NOAA) installed five new deep-ocean assessment and reporting of tsunami (DART) buoy stations, called tsunameters, off the U.S. East and Gulf coasts and the Caribbean.

(*continued on page 3*)

TsuInfo Alert

is 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).

It is assembled by
Lee Walkling, Librarian,
and is published bi-monthly by the
Washington Department of Natural Resources, Division of Geology and Earth Resources.

This publication is free upon request and is available in print (by surface mail),
electronically by e-mail, and at http://www.dnr.wa.gov/geology/tsuinfo/index.html.
Participants in the TsuInfo program can request copies of reports listed in this issue from:
Washington Geology Library
Washington Department of Natural Resources
Division of Geology and Earth Resources
1111 Washington Street SE, MS 47007
Olympia, WA 98504-7007
360/902-1473
fax: 360/902-1785
e-mail: lee.walkling@dnr.wa.gov

ISSN 1938-5064

(*continued from page 1*)

"These buoys are a first line of defense in providing citizens of the Atlantic, Caribbean and Gulf regions with a comprehensive tsunami warning system," NOAA Administrator Conrad Lautenbacher said at the time.

Until the Caribbean has a working system, NOAA, along with the Japan Meteorological Agency, is providing 24-hour interim watch services from its Pacific Tsunami Warning Center (PTWC) in Hawaii.

Today, the NOAA network includes 28 DART stations and will grow to 39 by spring 2008 -- 32 in the Pacific, seven in the Atlantic Basin.

NOAA also has increased the number of real-time sea-level stations in Puerto Rico and the U.S. Virgin Islands, developed inundation (flooding) models for two at-risk communities in Puerto Rico, expanded coastal bathymetric (the study of underwater depth) mapping and modeling, provided decision and analysis tools to regional institutions and, with USGS, is installing seismic stations in neighboring countries.

U.S. CONTRIBUTION

In the Caribbean, with local and international partners and funding approved by Congress in 2005, OFDA, NOAA, the U.S. Geological Survey (USGS) and other agencies have been lending expertise and technology to the Caribbean effort.

According to NOAA Tsunami Program Manager David Green, five seismic stations--in Grenada, Panama, Honduras, Barbados and the Dominican Republic--are installed and streaming data to the USGS National Earthquake Information Center in Colorado and NOAA's tsunami warning centers in Hawaii and Alaska.

Stations will be installed in Guantanamo Bay, Cuba, and Barbuda, part of the nation of Antigua and Barbuda, in September, and in Jamaica and Grand Turk, legislative seat of Turks and Caicos Islands, in November.

Before 2005, Green said, "we had some seismic information but it was too sparse. The best we could do until recently was maybe to give people a heads up if there was an earthquake. We didn't know enough to give a [tsunami] warning."

The USGS also "trained two people in each country on the maintenance and operation of our stations," said Jean Weaver, USGS regional specialist for the Americas, "and in conjunction with UNESCO/IOC, OFDA and the University of the West Indies Seismic Research Unit, held a regional workshop on tsunamis at the end of June."

Seismologist Walter Mooney, lead coordinator for the USGS Indian Ocean tsunami warning system program, organized the training course.

"We had 43 participants from 20 countries," he said during an August 16 *USINFO* interview, "and gave six days of training in how the Pacific Tsunami Warning Center and the Japanese Meteorological Agency disseminate warnings."

NEXT STEPS

NOAA also is working with international partners and organizations to help update and strengthen Caribbean ocean observations, data and information delivery, dissemination and notification systems and the region's communications and information technology infrastructure.

Other countries involved in the region's tsunami and coastal hazards mitigation effort include Spain, Norway, Venezuela, France, Russia and the United Kingdom.

In one of the next steps, Leonard said, OFDA and CDERA will begin to develop protocols to disseminate tsunami warnings at the national level.

"At this point," she said, "the work that remains to be done is getting the warning from the [national warning center] out to the community. We have to look at the flow of information, establish the protocols and procedures," and determine the best way to alert the population.

More information about the tsunami warning system for the Caribbean and adjacent regions is available on the IOC Web site.

Additional information about the Pacific Tsunami Warning Center is available on the NOAA Web site.

(USINFO is produced by the Bureau of International Information Programs, U.S. Department of State. Web site: http://usinfo.state.gov)

From:
http://usinfo.state.gov/xarchives/display.html?p=washfile-english&y=2007&m=August&x=20070817155419lcnirellep0.5727503 ♦

Starting in this issue, web links will remain underlined and in blue. (Only the underlining will be noticed in the print copies). These links will be active in the e-mailed and online versions of *TsuInfo Alert.* Online copies: http://www.dnr.wa.gov/geology/tsuinfo/.

★ ★ ★

NTHMP Partners -- Update.

According to website nthmp.tsunami.gov/partners.html, The National Tsunami Hazard Mitigation Program partners now include USGS, DHS/FEMA, NSF, NOAA and state, territorial and commonwealth partners: Alaska, Hawaii, Oregon, Washington, California, Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia, Maryland, Delaware, New Jersey, New York, Rhode Island, Connecticut, Massachusetts, New Hampshire, Maine, Puerto Rico, Guam, American Samoa, U.S. Virgin Islands, Northern Mariana Islands, and Marshall Islands ♦

Draft Minutes of the
NTHMP PACIFIC REGIONAL MEETING
NOAA Pacific Marine Environmental Laboratory
Seattle, Washington
15 March 2007

Kickoff/Admin

Pick up documents on table including NOAA standards and criteria for evaluation of tsunami numerical models OAR PMEL-135.

NTHMP Voting Structure

5 Pacific States (1 vote each)
PR – 1 vote
USVI – 1 vote
Eastern states – 1 vote (based on NWS eastern region AOR)
Gulf states – 1 vote (based on NWS southern region AOR)
Pacific territories commonwealths -1 vote (based on NWS PR AOR –Guam; American Samoa; CNMI)
FEMA-USGS-NOAA-NSF -2 votes each.

Federal total – 8 ; State total – 10 = 18 total NTHMP votes
Tie vote goes to chair
Written proxy from a non-attending member must verify voting preference

Reports from Modeling and Mitigation sub-committees.

Modeling (Hanson), 14 March

Copies of draft minutes available for pick up on table. Send corrections, edits to Hanson.

Discussed creation of Checklist on how to proceed with mapping.

Transition from TIME center to NGDC operations discussed.

Mitigation and Outreach Subcommittee Meeting, 14 March. (Chris J-T)

Minutes distributed.

There was Tsunami Ready Program Discussion; State Priorities; 5 year Review of NTHMP.

Vertical evacuation shelter guidance project closing on Phase II – near final draft under review in CA. Then draft sent to all NTHMP to finalize by October. Phase III is User guidance for local officials in evacuation planning efforts. Phase III funds still encumbered.

FEMA will likely be more engaged in the future with tsunamis due to PL 109-424.
Looking for a FEMA Headquarters champion. FEMA reorganizing under DHS.

Overview of Public Law PL 109-424: Tsunami Warning and Education Act (Rhoades)

PL authorizes NOAA to utilize up to $25M of its 2008 Appropriation to carry out the Act.

NOAA's FY08 President's Budget (PB) is $23.1 M for the Strengthening Program (2005 infrastructure, DART, tide stations, SIFT modeling, expansion to east coast)
$2.9 M for the Local Forecasts and Warnings program (enhance Tsunami Warning Centers).
$26M Total

Eddie Bernard provided a detailed, line by line review of the PL, including showing a 20 minute debate on the floor of the US House with the Chair of the Science committee (Boelhert R-NY).

Funding will be determined by NOAA's appropriation bill amounts and language.

Overall budget structure reference PL

PL has four components
65% A. Tsunami Forecast # Warning Program – NWS
NLT 27% B. NTHMP
NLT 8% C. Tsunami Research Program – OAR
D. Global Tsunami Warning and Mitigation Network (ITIC)

		A	B	C
FY08	25M	16.25	6.75	2.00
FY09	26 M	16.90	7.02	2.06
Fy10	27M	17.55	7.29	2.16
Fy11	28M.	18.20	7.56	2.24
Fy12	29M	18.85	7.83	2.32

Tsunami Ready under A. Guidance provided under B.

There is a current FY08 President's Budget for PL. In FY05 about $55M spent by Federal Agencies for Tsunami Risk Reduction. NOAA 48%; USGS 31%. Does not include state contribution estimated about $10M.

PL Program Component on use of NTHMP
5.(c) inundation models.
(Gonzalez) Real test of model is the robustness of model. How does the model operate in real time without tweaking.
(Rhoades) Organize approaches according to public law

SDR Implementation (Rhoades)

Tying into PL 109-424
Working Groups, Strategic Focus (macro level)
Recommendation is to redistribute draft for review.
NTHMP Web Site
New site in development
Solicit NTHMP input into the development

GAO recommendation for NOAA to develop a Strategic Plan for its Tsunami Efforts.

Currently in Draft Form
Tied to PL 109-424
Mission: NOAA's tsunami forecasts and to promote community resilience

Next steps
Finalize Draft (Internal Review)
Submit review to NTHMP
Final Strategic Plan by July 2007

NOAA/NTHMP Contract Renewal (5 year contract with 1 year renewals)

Submitting one umbrella contract for all NTHMP Non-Federal Partners to NOAA for Approval. Should be out to states within a month.

On track to be awarded before the current contract expires this June.

Next meeting in October. Proposals due Sept. 1, 2007 that add up to $275,000 for Pacific States. $6.2 million available for 28 states. Add-ons can sweep up extra monies.

NOAA can give no cost extensions. States must invoice.

At October meeting, as in the past, have a core. Do not yet have an appropriation bill , only authorization bill. If continuing resolutions, must have projects on the table to fund in October.

Monthly financial reports will transition to quarterly reports.

Tsunami Ready Program (separate from contract)

WA: Can you take burden off regions and state, and insert into one NOAA contract and transfer to states to expedite. Currently regions coordinates with states. Rhoades will discuss with NOAA Regional Directors and internal fiscal discussions.

(Lorens) First year of Tsunami Ready, lack of guidelines and rules in expending funds. Intent was to target communities trying to become Tsunami Ready.

About $700,000 in Tsunami Ready program. Normally spent on signage, etc. WA has had to use core funds because did not know Tsunami Ready funds available. States must be advised how to budget properly. LaDouce: Pay your self back. AK: Installing sirens with seed funds from Tsunami Ready, communities "buy in" and responsible for O & M.

Discussion

Core state items plus individual line items from states.

States partner with WCM's on budgeting for coastal communities.

Difficult but can try to write in Tsunami Ready into NTHMP contract

Although Hawaii is declared Tsunami Ready, some communities do not have signage.

Must find most efficient mechanism to distribute funds for communities.

LaDouce provided $35 million to US House and Senate subcommittees. Senate used $35 million, but house did not. Must highlight shortfall needs.

Multi-state pilot projects are above $275,000. Funds are reimbursable. Up front funds. NOAA transfer funds to respective regions to states. Multi-state funds have no vehicle to give funding directly to states, must be a mod to the contract.

States may want to put position papers on voting mechanism based on hazard assessment (i.e. Apportionment of funds). Must also face realities that some eastern states may want more funds. Other mechanism is Congressional appropriation process.

Risk assessment (population exposure to hazard, etc.) has not been done, but can propel eastern states high.

Where do we go from here now that NTHMP activities are budgeted for 26% of the new Tsunami Program under the new law?

FY08 Budget Formulation

(Priest) Need layered budget of top priorities. Ball park figures divided by number of votes. Budget targets. Develop "Strawman" budget; develop generalized targets.

(Priest) Proposal: $6.75 M NTHMP Budget. Divide by 10 state votes, after taking out federal agency budgets.

(Vicky) Look at state requirements for the next 5 years. State requirements can exceed $6.75M

(Seattle MIC) Priority "wish list" can be constrained knowing budget in advance.

(Crawford) Need to know budget constraints in formulating priorities in dealing with some economically poor coastal communities.

(LaDouce) I have "fenced funds" Target $530,000 per vote. $275,000 + increments.

(Priest) That is reasonable.

Tsuinfo $55M
Multi-State $ 300,000 Multi-lingual project.

(Bernard) Should focus on major requirements rather than now "cutting up the pie" and discuss specific minutia projects. It is a different game than in 1997.

(Rhoades) What major requirements need to be accomplished, which can be contained within a 5 year plan. Take advantage of PL as a great opportunity.

(Priest) Have thought through requirements and already have SDR guidance document and budget figures.

Define the Pacific Region tsunami threatened community mapping priority process. How are states supposed to work with NGDC?

ISSUE: State coordination issues with NGDC for providing NTHMP / State priority list.

NGDC replaced TIME center due to evolving NOAA needs after 2004 Sumatra. NGDC produces products. NGDC can train states.

NGDC has NOAA priority (TWC's forecast relevant to modeling/mapping input) list on their NGDC web site.

ACTION: NGDC wants state input on priorities, placed in an ARC IMS format.

Mapping and Modeling sub-committee can function as a mechanism for coordination by providing state priority lists.

Bernard reviewed 15 November Kuril Islands EQ/Tsunami relevant to forecasts, modeling/mapping.

Detection: Tsunameters (DARTs) and tide gauges. 26 deployed.

Pre-computed Data base (MOST)

Inundation forecast model (SDM – MOST)

Experimental, real time forecast for 15 Nov.

PMEL scientist responded by supplying experimental forecasts for 12 harbors in 5 Pac states to both TWC's.

Energy refocused itself towards Cape Mendocino, CA. Crescent City was going to be a problem.

WC/ATWC had this information.

PMEL provided nested models of specific tide gauge locations.

In general, amplitude model was good @ Hilo for PTWC. Overestimated the third wave.

Forecast vs. Observation were generally close for 15 Nov. forecasts. Nawiliwili, Kauai tide gauge was influenced by presence of cruise ship.

NOAA sets standards for inundation models per PL.

Japan also uses pre-computed models to issue public warnings/advisories coastal evacuations displayed on maps on NHK television.

LaDouce: Customers looking for consistency in forecasting.

IDEA: Consider placing tsunami models in NWS forecast offices at the local level. PC with UNIX operation. Running one model on a workstation is OK.

Consider boundary conditions for later interpretation.

TWC can currently generate energy propagation map. In January 2007, TWC ingesting DART data. By Dec 2007, full capability to run high resolution models.

NTHMP Charter

(Hanson) NTHMP Mapping and Modeling (M & M) sub-committee currently has no charter since Gonzales retired. Hanson was asked to Chair in November 2005.

(LaDouce) Represents M & M for Pacific Region. (Rhoades) Sees Pac M & M as NTHMP sub-committee by involving PR and eastern/gulf states.

(Bernard) Mitigation sub-committee needs should drive M & M charter.

(Yanagi) ITIC will provide international tsunami framework for sub-committee charters/ terms of reference.

(LaDouce) Create NTHMP sub-committees and designate chairs as "message carriers" for NTHMP. Currently have three NTHMP sub-committees on Warning, Mapping, Mitigation.

ACTION: Jeff to take NTHMP charter draft creation for action. Will solicit input from three sub-committee chairs.

ITIC will provide example IOC charters.

(Rhoades) Maybe we just need one charter for NTHMP.

(Vicky/Eddie) Take language of PL into NTHMP charter. Spell out members on each sub-committee. Meetings are open to everyone.

Humboldt Concerns

(Troy Humboldt WCM) Would like to see needs addressed. Are you representing needs of constituents? There are methods to arrive at consensus that this NTHMP could use. For example, a critical field issue was Oregon's issue on siren protocol solution. Only spent a few minutes on this field issue instead of coming to a resolution.

(Lorens) Agree with Troy to provide unbiased facilitator.

(Johnston) Disagree with use of facilitator. I am a tsunami survivor, also in the trenches. Factors that hold back progress (i.e. tourism). Believe that a distant tsunami, no one should lose their lives. NTHMP has done tremendous work.

(Vicky) Past NTHMP has been successful, but "landscape" is changing. More states now involved. PL passed. WCM's in the field are still waiting for solutions to longstanding field problems.

(Crawford) Sirens not an issue in Washington. Use voice to avoid FEMA regulations. Use EAS as primary comms; NOAA weather radio is higher priority.

(Johnston) Siren protocols worked form bottom up from counties.

(Simmons) This is an example of lack of communication between state and WCM's. But state already know the needs of its community. Budget has already been a limiting factor. States are sovereign; Feds can't tell states what to do.

(Priest) Darienzo authored NTHMP multi-state study recommended steady tone for siren warning.

NTHMP Chair

(Wilson) John Jones not engaged as much as Eddie / Jeff. Green not here. Rhoades has to pick up slack. States felt they don't have a chair that they can contact (Jones and Green). Since 2005, NTHMP been going through growing pains and in a drifting course. Have a NTHMP State co-chair. Jones represents NOAA, not the states, and not well engaged. Jones not the appropriate person for day to day operations.

(Vicky) Acknowledge NOAA leadership problems. Jones doesn't have time to answer the phone to assist states. Will take this back. Structural problems exist that must be fixed. Opinion is not to focus only on Jones, perhaps a state co-chair (coordinator).

ACTION: Will check if Jones will continue as NTHMP Chair and for how long.

(LaDouce) Do you want to contact me?

(Wilson) Logistic problems based in Hawaii.

(NGDC) Disappointed at the structure of meetings over the past day. M & M issues now have to be resolved by email.

(Hanson/Walsh/Crawford/Priest/Wilson) First Pac regional meeting. This was not structured as well as past NTHMP meetings. First Pac meeting of 5 states in 2 years. State – Federal protocols. Starting to tumble now due to new landscape. Jones doesn't have the tsunami passion of chair compared to Eddie Bernard. Need to have Pac state co-chair. LaDouce has the background and can get technical guidance from Bernard. Could have travel funds set aside for state co-chair. Would like to see co-chair represent states interest. Perhaps a rotating state co-chair. John Jones not meeting state's needs and engagement. Rhoades and Green have limited ability to make authority decisions. Need to empower a regional coordinator.

(Vicky) Idea: Not a formal state co-chair; designate an interim spokesperson for the states.

(Hanson) Need formal state co-chair.

(LaDouce): I am willing to serve as Pacific Regional Chair. Can also have a state co-chair.

RECOMMENDATION: Proceed to propose to establish a National state co-chair to NTHMP. Wilson will coordinate.

AGREED: LaDouce will serve as interim Pac Regional coordinator. No objections from Pac Region.

AGREED: Wilson will serve as interim state co-chair for Pac Regional.

AGREED: Structure each NTHMP sub-committee with Federal and State co-chair.

NOMINATIONS: Titov and Barry as co-chair for Mapping sub-committee (Priest / Hanson)

RECOMMENDATION: Establish and advertise position for NTHMP chair (NWS).

(Rhoades): Regional coordinators are a good idea, that can contact new states.

(LaDouce) Historically, Hagemeyer & Bernard agreed to be co-chairs. Once NWS took over NTHMP, NWS (LaDouce) took over as chair.

ACTION ITEMS

1) How to handle tribes as sovereign nations within the program. (Rhoades)
2) NTHMP Chair - John Jones issue (Jeff and Vicky)
3) Formulation of NTHMP Draft Charter (LaDouce, Rhoades). Input from IOC (Yanagi). Participants: Scott, Jeanne, Jay. Include PL language and sub-committees with co-chairs. 1st draft due June 1st.
4) NGDC wants state input on priorities, placed in an ARC IMS format.

NOAA Summary of Tsunami Recommendations (Product Suite):

(Vicky) Would like feedback on Report

WA had concerns on Recommendation #20. WC/ATWC messages. Don't want NWS field offices calling a warn-ing without state input. It is a state decision vs. a NWS decision. Wants pre-decisional input. Chat room must include FEMA and state Me's. State calls evacuation and issue their own messages.

(Priest) If it is going to kill someone, issue a warning. Models are not precise.

(LaDouce) TWC's issue a warning if wave height > 1 meter. Messages must highlight current danger.

(Vicky) NWS conference calls will be better coordinated through its field offices.

Next meeting in late October on Oahu at a hotel to be announced.

From:
http://nthmp.tsunami.gov/Minutes/march07/miinutes_march07_nthmp_pacific_regional_meeting.doc ♦

For links to NTHMP Annual Meeting minutes, October 30-November 1, 2007, see page 10.

ICG/PTWS Tsunami Warning Centre Coordination Meeting

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS) held its PTWS Tsunami Warning Centre Coordination Meeting 17-19 January 2007 in Honolulu, Hawaii. The meeting was convened by the Directors of the PTWS and the International Tsunami Information Centre in order to improve coordination and information sharing amongst the tsunami warning centres and to improve the quality, accuracy, and timeliness of international tsunami advisory information to Pacific customers.

The meeting was attended by 23 participants representing Australia, Canada, France, Indonesia, Japan, New Zealand, Russian Federation, USA, GLOSS and the University of Hawaii Sea Level Center, IRIS Global Seismic Network, Pacific Tsunami Warning Center, West Coast/Alaska Tsunami Warning Center, the IOC Tsunami Coordination Unit, and the ITIC. Participants shared information on their current and future operations and upgrades, and their lessons learned from Pacific tsunami events in 2006 and 2007. The Group agreed to take action to enable better and more timely parametric information sharing amonst tsunami warning focal points and designated national emergency operations agencies, clarified terms and definitions and identified shortcomings and solutions for improving international TWC messages, including consideration of the media and warning guidance for the public, and discussed the present state and future plans of operational tsunami wave forecasting and how to best use

DART system data to support tsunami warnings and their cancellations. Recommendations and conerns were taken as input to the PTWS Task Team on Messages which will report its finding and recommendation to ICG/PTWS-XXII. The Group agreed on the important value of annual TWC Coordination Meetings. For more details of the meeting, visit the ITIC website at http://ioc3.unesco.org/ptws/working_groups_other_tsunami_meetings.php.

Meeting's outcome

All agree: Important types of data and science interpretations are sharable privately among the TWC. It was generally agreed that every TWC should look at the same data and do their own national assessment to issue national warnings.

TWC information sharing

1)ITIC will seek more information about current implementations of RSS feeds, web crawlers, secure ftp sites, and other possible mechanisms, e.g., e-mail, fax, secure ftp sites which users can access every 10 seconds or so (using a web crawler; Rsync server is a more sophisticated version, Jabber).

2) The Group called for a solution that would provide TWC information sharing, and asked if private communication lines for information sharing, or heads-up messages could be provided. As identified earlier, the ITIC would collect information and provide summaries.

TWC Information sharing – Earthquake observatory message

1) Warning Operations agree: PTWC and WC/ATWC will provide existing observatory messages to designated audiences that need lead time.

2) PTWC action: PTWC to put Mw (or other magnitude type) specifications in its Observatory Message.

TWC information sharing—PTWC message time stamp

PTWC action: PTWC to correct time stamp to immediately before message sent.

TWC operations—JMA message

JMA action: JMA to amend their messages since JMA still includes wave prediction information (amplitudes and arrival times) in their messages, even after a cancellation. JMA cancellation means expected wave amplitude is expected to be less than 1m. This may be confusing to customers.

RANET SMS Alert

ITIC action: ITIC to inform TWC and TNC of availability of SMS messaging service.

Operations—"Destructive" threshold

International Tsunami Operations action: Australia requested guidance from experts on determining minimum threshold for warnings that use the word "destructive."

TWC operations—South China Sea

Agree PTWC and JMA: For South China Sea, JMA will follow PTWC lead.

Action: JMA, PTWC, and ITIC to further discuss and coordinate for the SCS. A discussion should be held at ICG/PTWS-XXII, and a recommendation endorsed, if appropriate.

Sea level data sharing—GTS

All action: Currently, NWPTAC and CPPT and other TWC are not receiving DART, but these should be made available on GTS system, not just through NDBC web site. For this, GTS product header needs to be rebroadcast; TWC should know the headers of these broadcasts.

Sea level network standards

WG2 Chair action: The Group agreed that the tsunami community should be taking the lead to identify sites and transmission requirements. GLOSS should be used for technical expertise, and for requesting upgrades within its programme. The Meeting agreed in particular, that the TWC, with PTWS WG2 chair, should take the lead to establish the technical specifications of the PTWS sea level network. In particular, criteria should be established for station location, identification of station upgrade priorities, data sampling, and transmission frequency. These system and station criteria should be based on the importance of stations for determining tsunami warnings.

Sea level upgrades

WG2 Chair action: The Group further agreed that each country, with technical assistance from their TWC, PTWS WG 2, international tsunami warning centres, and other experts, should develop their own priorities and seek national commitments to host sea level stations and provide these data internationally for use in tsunami monitoring.

Sea level—GOES users group

UHSLC action: GOES User Group meeting notes along with written copy of Kay Metcalf's communication to be provided to Secretariat.

Sea level data sharing and monitoring tools

IOC, ITIC action: This is needed for all TWC. Tidetool and Sea Level Station metadata tools should be made available to everyone. A request to WMO to assist in getting the GTS-transmitted sea level data to be rebroadcast back to countries should be made.

Forecasting—JMA

JMA action: Japan is preparing a paper in English that describes the upgrades to the Japanese forecasting system.

Forecasting—DART data use and interpretation

AGREE: the WC/ATWC and PTWC recommended that DART data be used with caution, and be used with modeling in order to determine a coastal forecast. This is because decisions based solely on the DART signal in the deep-ocean are not yet diagnostic; an exception would be the case where the DART signal is very large so that a destructive wave is expected. However, since the goal is to provide useful information on tsunami impact along coasts (not in the deep ocean), a model must still be computed.

Message content

ALL AGREE:

1) Use wave amplitude and define the term amplitude.

2) Threshold for cancellation: 0.5m for international bulletins; for national bulletins, country develops own thresholds.

3) Units: use metric, or metric and imperial (must specify the units in each case).

4) Time zone of the predicted or observed arrival time must also be identified.

5) Shallow means less than 100 km.

WMO standards

Australia action: Australia to research minimum WMO bulletin standards and report to Task Team.

TWC graphical products

ALL AGREE: Encourage the development of graphical products to supplement the existing text messages, and make widely available, such as through web sites.

TWC public information

ALL AGREE:

1) TWC should emphasize that all information and background information and preparedness guidance is provided through bulletins and additionally through its web pages. Phone inquiry by the media and public to the TWC or national authority will not have more information than already made publicly available.

2) TWC and Emergency Managers should engage media to educate them on what is to be expected in a tsunami event. Considerations should be given to find ways in which the media are partners in the dissemination of alert and public safety information. Examples are between JMA and NHK in Japan, and with the Emergency Alert System in the USA.

Use of 'Warning' Bulletins

ALL AGREE: Remove 'warning' from message to indicate international messages are advisory to national authority in same manner as to be implemented in the IOTWS.

Bulletin guidance

International TWC action: Provide guidance on suitable actions in international bulletins or Users Guides.

Message Task Team

ALL AGREE:

1) After much discussion, it was agreed that further discussion is needed on reporting, measurement, downgrades, bulletin types, etc. This should be done within the PTWS Message Task Team that involved TWCs.

2) Message Task Team report and recommendations should be distributed at least one month prior to PTWS-XXII in order to provide time for review and national position determination. Goal is decision-making at PTWS-XXII.

Ports and ships

ALL AGREE: The Group recommended that for each harbor, the Port Authority was responsible and that worst case tsunami scenarios should be modeled in order to arrive at the most specific guidance for SOLAS vessels and other port facilities and infrastructure should a tsunami warning be issued.

TWFPs (Tsunami warning focal points) and TNCs (Tsunami national contacts)

IOC actions:

1) Need policy for sharing of operational contacts, i.e., focal points.

2) Need clear process for TWFP and TNC and updates, which should be same globally.

ITIC action: ITIC will combine three lists for TWFP and transmit to TWCs. ITIC will refresh TNC lists on web site as these are updated.

ALL AGREE: ITIC will construct a secure web site as soon as possible, and possibly before PTWS-XII.

Users Guide

ALL AGREE: Rename Communications Plan to "PTWS Users Guide." This should be proposed and approved by the ICG/PTWS.

Post tsunami evaluations

ALL AGREE: Compilations of lessons learned and other post-tsunami TWC analyses are important and essential for continually improving the system.

ITIC and USA action: To work together to assemble post-event TWC compilations. PTWC to put together five questions for post-event evaluations. Immediately after a significant tsunami, the PTWC or ITIC would send out the questionnaire to TWFP. The ITIC would compile the results and make them widely known.

Medium term strategy

ALL (TWCs, PTWS WGs) action: The PTWS Vice-Chair asked the group to consider the development of priority projects that the PTWS and its member states can

seek funding for. He called for the PTWS to move beyond recommendations to identify strategies to achieve results.

Regular meetings

ALL AGREE: The Group agreed on the importance of convening regular TWC coordination meetings. The Group recommended that TWC coordination meetings be held annually.

From: Tsunami Newsletter, v. 39, no. 1, p. 12-15 (January-March 2007). ♦

NTHMP Annual Meeting minutes
October 30-November 1, 2007

Meeting Agenda and Opening Address

State of Alaska Report

State of California Report

State of Hawaii Report

State of Maryland Report

State of Oregon Report

Oregon Post-Disaster Recovery Planning Forum Report

State of Washington Report

State of Washington Report II

U.S. Virgin Islands Report

Commonwealth of the Northern Marianas Islands (CNMI) Report

Puerto Rico Report

USGS CREST Report

Mapping and Modeling Sub-Committee Charter

Mitigation and Outreach Sub-Committee Brief

Education Project Proposal

Contracts versus Grants

From: http://nthmp.tsunami.gov/Minutes/oct-nov07/index.html
Downloaded November 16, 2007 ♦

Principles to guide emergency management professionals
By Emergency Management Roundtable
From: *Disaster Resource Guide*, Education issue, v. 12, no. 1, 2007, p. 12.
Reprinted with permission

In March of 2007, Dr. Wayne Blanchard, of FEMA's Emergency Management Higher Education Project, convened a working group of emergency management practitioners and academics to consider principles of emergency management. This project was prompted by the realization that while numerous books, articles and papers referred to "principles of emergency management", nowhere in the vast array of literature on the subject was there an agreed upon definition of what these principles were. The group agreed on eight principles that will be used to guide the development of a doctrine of emergency management.

Definition

Emergency management is the managerial function charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters.

Vision

Emergency management seeks to promote safer, less vulnerable communities with the capacity to cope with hazards and disasters.

Mission

Emergency management protects communities by coordinating and integrating all activities necessary to build, sustain, and improve the capability to mitigate against, prepare for, respond to, and recover from threatened or actual natural disasters, acts of terrorism, or other man-made disasters.

Principles

1. Comprehensive—emergency managers consider and take into account all hazards, all phases, all stakeholders and all impacts relevant to disasters.
2. Progressive—emergency managers anticipate future disasters and take preventive and prepatory measures to build disaster-resistant and disaster-resilient communities.
3. Risk-driven—emergency managers use sound risk management priciples (hazard identification, risk analysis, and impact analysis) in assigning priorities and resources.
4. Integrated—emergency managers ensure unity of effort among all levels of government and all elements of a community.
5. Collaborative—emergency managers create and sustain broad and sincere relationships among individuals and organizations to encourage trust, advocate a team

atmosphere, build consensus, and facilitate communication.

6. Coordinated—emergency managers synchronize the activities of all relevant stakeholders to achieve a common purpose.

7. Flexible—emergency managers use creative and innovative approaches in solving disaster challenges.

8. Professional—emergency managers value a science and knowledge-based approach based on education, training, experience, ethical practice, public stewardship and continuous improvement.

For an expanded description of these principles visit the Emergency Management Institute's website http://training.fema.gov/EMIWeb/edu/emprinciples.asp.

The Emergency Management Roundtable: Dr. B. Wayne Blanchard, CEM, Lucien G. Canton, CEM, CBCP, CPP, Carol L. Cwiak, JD, Kay C. Goss, CEM, Dr. David A. McEntire, Lee Newsome, CEM, Michael D. Selves, CEM, CPM, Eric A. Sorchik, Kim Stenson, James E. Turner III, Dr. William L. Waugh, Jr., Dewayne West, CEM, CCFI. ♦

[Kaua'i] County recognized as StormReady and Tsunami-Ready community
News release: November 8, 2007
County of Kaua'i, Kaua'i Civil Defense
Mark Marshall, Administrator

Lihu'e—In a ceremony held recently at the county's Emergency Operating Center, Raymond Tanabe with the National Weather Service presented Mayor Bryan Baptiste with a certificate recognizing Kaua'i County as a StormReady and TsunamiReady community.

"This designation reflects Kaua'i County officials' continued commitment to disaster preparedness and safety on behalf of the citizens of Kaua'i," said Tanabe, adding that the county must meet specific guidelines in order to receive the StormReady and TsunamiReady designation and reapply every three years.

"The safety of our residents is of utmost importance," said the mayor. "Our Civil Defense Agency has taken a proactive approach in helping to prepare our community for severe weather threats, and I'm glad they're being recognized for their efforts."

One of the most important benefits to having this designation is the Insurance Services Organization (ISO) provides points in the Community Ratings System (CRS) to StormReady communities, which may be applied toward lower National Flood Insurance Program (NFIP) rates.

"When a minimum of 500 points are accumulated by the county, residents living in special flood hazard areas can apply for reduced NFIP premiums," said Tanabe.

Other benefits include: increased level of awareness and readiness in the community; ongoing education in disaster and emergency plans; and increased opportunities for the county to obtain grants that support disaster preparedness.

"By participating in these programs, it provides us with a gauge of how ready we are, what our strong points are, and what we need to improve on," said Mark Marshall, administrator of the Kaua'i Civil Defense Agency.

The StormReady and TsunamiReady programs were developed by the National Weather Service in 1999 and 2000, respectively. The primary aim of the programs is to save lives and protect property by improving communication and safety skills in communities across America.

Editor's note: While searching for this news release I came across the County of Kaua'i's tsunami inundation maps (8" x 11" format and 42" x 60" format) at http://www.kauai.gov/Government/Departments/CivilDefenseAgency/tabid/90/Default.aspx ♦

NEWS

TsunamiReady and StormReady

Congratulations to Guam and the Commonwealth of the Northern Marianas Islands for joining the list of locales that are now TsunamiReady and StormReady.

See page 18 for a complete list of TsunamiReady sites.

State and local officials feel shut out of the disaster planning process

On September 10, 2007, the Department of Homeland Security (DHS) released the draft National Response Framework, successor to the National Response Plan, for a 30-day public comment period. The Framework, which focuses on response and short-term recovery, articulates the doctrine, principles, and architecture by which the United States prepares for and responds to all-hazard disasters across all levels of government and all sectors of communities. The latest document was revised to improve upon the previous plan, which was criticized for taking a unilateral approach to disaster response, and to include state and local officials in the planning process. However, the draft that circulated in August showed no signs of collaboration, and state and local emergency officials were angered by its apparent "secret" rewrite and release. Local and state officials had worked with DHS and the Federal Emergency Management Agency (FEMA) to create a new version reflecting these collaborative efforts, though the drafts they originally drew up were not included in the new document because expectations had not been met by the May deadline. Federal officials familiar with the process said that the version drafted by state and local officials was not an improvement, but rather an

equally long-winded document that called to satisfy the needs of too many constituencies. The original National Response Plan was criticized as being unworkable and convoluted, with conflicting command roles that led to a poor response to Hurricane Katrina in 2005. Federal officials say this newly released draft is a step in the right direction and creates an outline for state and local officials to work from as they review the plan before its formal release. The documents are available at the newly-created NRF Research Center at www.fema.gov/nrf/.

From: Natural Hazards Observer, v. 32, no 2, p. 10. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

NOAA Weather Radio Audio Available on the Internet

The National Oceanic and Atmospheric Administration (NOAA) has announced that audio from many NOAA Weather Radio (NWR) channels is now available online, either as streaming audio or as MP3s and podcasts.

Though National Weather Service (NWS) offices are not hosting live streaming audio, many third parties do so, and the NWS maintains a list of streams at www.weather.gov/nwr/streamaudio.htm.

In addition, a few dozen NWS offices are uploading audio files of weather radio messages to their Web sites, either as MP3 files or as podcasts. The audio files available vary by site, but typically contain routine messages such as forecasts, hourly weather roundups, and climate summaries. For the list of sites with downloadable audio, go to www.weather.gov/nwr/streamaudio-d.htm.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder

AHAB radios

On October 1, 2007, George Crawford, Washington EMD, announced: AHAB radios in Grays Harbor County (14) were activated by the State EOC at noon today—This was the first test of State EOC activation—100 percent activation rate.

WEBSITES

http://www.unisdr.org/cadri

The new Web site of the Capacity for Disaster Reduction Initiative (CADRI) is an online database of disaster risk reduction academic courses worldwide. Currently the database contains more than 70 entries and will continue to expand. CADRI is a joint initiative of the United Nations Development Program, the Office for the Coordination of Humanitarian Affairs, and the International Strategy for Disaster Reduction.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder

http://www.nyu.edu/ccpr/pubs/Report_StaffordActReform_MitchellMoss_10.03.07.pdf

The Stafford Act: Priorities for Reform:Cities, Communications and Catastrophe-- Improving Robustness and Resiliency

This New York University Center for Catastrophe Preparedness and Response study finds that the Stafford Act, the nation's major disaster response law, is out of date. The study notes that the 1988 act offers the same level of assistance for a blizzard in a rural community as it does for a major earthquake or hurricane in a major urban area, and the authors recommend that the act be amended to establish a response level for catastrophic events.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder

http://www.all-hands.net

After being shut down due to repeated hacker attacks, the All-Hands Community Portal is back online, on a more secure platform. The portal is an excellent resource for emergency management, homeland security, and business continuity professionals to use in sharing information, tools, and other resources.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder

http://www.geohaz.org/contents/projects/tsunamiguide.html

A working draft of this GeoHazards International guidebook, *Preparing Your Community for Tsunamis: A Guidebook for Local Advocates*, is now available online. Addressing community-level tsunami preparedness, the guidebook is a work in progress, and GeoHazards International plans to make available in mid-November a new version with photographs, maps, and graphics.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder

http://www.emforum.org/vforum/lc071031.htm

The Emergency Information Infrastructure Partnership (EIIP) hosted a virtual forum on October 31, 2007, titled "The New Certification Program for Business Preparedness: Key Issues for Stakeholders." Matt Statler, the associate director of the International Center for Enterprise Preparedness at New York University presented information on the implications of legislation that requires the U.S. Department of Homeland Security (DHS) to provide for the development of a voluntary certification pro-

gram for private sector all-hazards emergency preparedness. The transcript is now available.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder

http://www.em-dat.net/documents/Confpress%202006.pdf

Annual Disaster Statistical Review 2006. Every year, the Centre for Research on the Epidemiology of Disasters (CRED) reports on the effects of disasters on human populations. This first *Annual Disaster Statistical Review* is an analysis of the disaster figures in 2006 compared to 2005 and 2000-04.

From: Natural Hazards Observer, v. 32, no 2, p. 19. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

http://www.colorado.edu/hazards/workshop/archives/2007/

Each summer, hazards researchers and professionals from federal, state, and local government, non-profit organizations, and private industry convene in Boulder, Colorado, for the Natural Hazards Center's Annual Hazards Research and Applications Workshop. Participants debate, explore, and share information on a wide range of issues. This year's workshop included discussion of the the legacy of Gilbert F. White, social vulnerability, the National Flood Insurance Plan evaluation, pets in disasters, and much more.

Keynote and plenary presentations, brief session summaries, abstracts of research and projects presented, and photographs taken at the event are now available online.

From: Natural Hazards Observer, v. 32, no 2, p. 22. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

Presidential Candidates' Positions on Emergency Management

Joe Biden:
http://www.seas.gwu.edu/%7Eemse232/november2007_16.html

Hilary Clinton:
http://www.seas.gwu.edu/%7Eemse232/november2007_19.html

Chris Dodd:
http://www.seas.gwu.edu/%7Eemse232/november2007_15.html

John Edwards:
http://www.seas.gwu.edu/%7Eemse232/november2007_23.html

Rudy Giuliani:
http://www.seas.gwu.edu/%7Eemse232/november2007_18.html

Mike Huckabee:
http://www.seas.gwu.edu/%7Eemse232/november2007_25.html

Duncan Hunter:
http://www.seas.gwu.edu/%7Eemse232/november2007_17.html

John McCain:
http://www.seas.gwu.edu/%7Eemse232/november2007_21.html

Barack Obama:
http://www.seas.gwu.edu/%7Eemse232/november2007_22.html

Bill Richardson:
http://www.seas.gwu.edu/%7Eemse232/november2007_20.html

Mitt Romney:
http://www.seas.gwu.edu/%7Eemse232/november2007_24.html

Fred Thompson:
http://www.seas.gwu.edu/%7Eemse232/november2007_14.html

PUBLICATIONS

Disaster Research

Every other Thursday, the Natural Hazards Center distributes the *Disaster Research* (DR) e-newsletter, which features timely announcements about new policies and programs, funding opportunities, calls for papers and presentations, upcoming conferences, Internet resources, job openings, and other information useful to researchers, practitioners, policy makers, and students in the field of hazards and disasters. The DR complements the *[Natural Hazards] Observer*, and while there is some information overlap between the two publications, the DR often contains time-sensitive information that the *Observer* cannot distribute. The Center welcomes and encourages the submission of news, announcements, and questions or information requests for DR readers (who represent a readily available network of experts). All contributions and queries for the DR should be indicated as such and e-mailed to hazctr@colorado.edu. To receive the DR in your inbox or view it online, visit www.colorado.edu/hazards/dr/.

From: Natural Hazards Observer, v. 32, no 2, p. 14. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

Editor's note: *TsuInfo Alert* has relied on these publications for years and you should, too!

Research Digest

Natural Hazards Center is proud to announce a new electronic publication entitled *Research Digest*—a quarterly online compilation of recent research related to hazards and disasters. The aim of *Research Digest* is to

advance and communicate knowledge on hazard mitigation and disaster preparedness, response, and recovery within an all-hazards, interdisciplinary framework. It provides the complete references and abstracts (when available) for current research in the field.

Additional issues will follow in December and March. The issues are compiled and edited by Center staff and include more than 35 peer-reviewed publications. Check out the first issue online at http://www.colorado.edu/hazards/rd.

From: Natural Hazards Observer, v. 32, no 2, p. 22. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

Communicating with the public using ATIS during disasters: A guide for practitioners

U.S. Department of Transportation, Research and Innovative Technology Administration, Federal Highway Administration. 2007, 36 p. FREE online: http://www.ops.fhwa.dot.gov/publications/atis/atis_guidance.pdf.

Advanced Traveler Information Systems (ATIS) can play an important role in communicating essential information to the public during disasters. Variable message signs, 511 telephone systems, highway advisory radio, and Web sites are some of the dissemination devices of systems that collect, process, and disseminate information about travel conditions to the public for day-to-day transportation operations, and these same systems need to be effectively used during disaster situations. This document provides advice on use of ATIS during disasters and is intended not only for state and local transportation agencies, but also for their partners in public safety and emergency management agencies. It offers practical guidance to managers of transportation management centers and emergency operations centers and to public information officers who may be called on to staff joint information centers during disasters.

From: Natural Hazards Observer, v. 32, no 2, p. 15. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

Emergency evacuation planning guide for people with disabilities

National Fire Protection Association (NFPA), 2007. 60 p. FREE online: http://www.nfpa.org/assets/files/PDF/Forms/EvacuationGuide.pdf

This guide was developed in response to the emphasis placed on the need to properly address the emergency procedure needs of the disabled community. It outlines the four elements of evacuation information that occupants need: notification, way finding, use of the way, and assistance. Also included is a Personal Emergency Evacuation Planning Checklist that building services managers and people with disabilities can use to design a personalized evacuation plan.

From: Natural Hazards Observer, v. 32, no 2, p. 15. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

Nobody left behind: Disaster preparedness for persons with mobility impairments

Glen W. White, Michael H. Fox, Catherine Rooney, and Jennifer Rowland; University of Kansas Research and Training Center on Independent Living. 2007. 14 p. FREE online. Centers for Disease Control and Prevention (CDC); Association for Prevention Teaching and Research. http://www.nobodyleftbehind2.org/findings/index.shtml.

The Nobody Left Behind research project began in 2002 in response to the lack of empirical data on emergency preparedness and response for persons with mobility impairments. The research team investigated 30 randomly selected U.S. counties, cities, parishes, and boroughs where a natural or human-caused disaster occurred between 1998 and 2003 to determine the state of preparedness at local levels for people with mobility impairments. The report includes research findings, emerging "best practices," and recommendations.

From: Natural Hazards Observer, v. 32, no 2, p. 15. Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder.

Ready.gov Instructional Videos

http://www.ready.gov/america/about/instructional.html

These Department of Homeland Security (DHS) demonstration videos, part of the Ready Campaign, highlight the specific steps older Americans, individuals with disabilities and special needs, and pet owners should take to prepare for emergencies. DHS worked with the AARP, the National Organization on Disability, and The Humane Society of the United States to develop these new emergency preparedness resources.

From: Disaster Research 488, October 18, 2007; Natural Hazards Center, University of Colorado

Preparing Your Community for Tsunamis: A Guidebook for Local Advocates

http://www.geohaz.org/contents/projects/tsunamiguide.html

A working draft of this GeoHazards International guidebook is now available online. Addressing community-level tsunami preparedness, the guidebook is a work in progress, and GeoHazards International plans to make available in mid-November a new version with photographs, maps, and graphics.

From: Disaster Research 489, Nov. 1, 2007; Natural Hazards Center, Institute of Behavioral Science, University of Colorado, Boulder ♦

Materials added to the NTHMP Library
November-December 2007

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.

Abe, Kuniaki, 2007, Phases representing source lengths of tsunami in tide gauge records. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 453-463.

Altinok, Y.; Alpar, B.; Ozer, N.; Gazioglu, C., 2005, 1881 and 1949 earthquakes at the Chios-Cesme Strait (Aegean Sea) and their relation to tsunamis: Natural Hazards and Earth System Sciences, v. 5, no. 6, p. 717-725.

Annaka, Tadashi; Satake, Kenji; Sakakiyama, Tsutomu; Yanagisawa, Ken; Shuto, Nobuo, 2007, Logic-tree approach for probabilistic tsunami hazard analysis and its applications to the Japanese coasts. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 577-592.

Bourgeois, Joanne; Weiss, Robert; MacInnes, Breanyn; Martin, Elizabeth; Titov, Vasily; Houston, Heidi, 2007, Inverting tsunami deposits to their source via tsunami modeling--Sedimentary geology, earthquake seismology, and geophysical fluid dynamics [abstract]: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 121

Cherniawsky, Josef Y.; Titov, Vasily V.; Wang, Kelin; Li, Jing-Yang, 2007, Numerical simulations of tsunami waves and currents for southern Vancouver Island from a Cascadia megathrust earthquake. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 465-492.

Chiesa, Chris; Bosse, Zodd; Cowher, Pam; Kunitzer, Steve; Askov, David, 2007, Hawaii resource information system for coastal hazards [abstract]. IN National Oceanic and Atmospheric Administration, Coastal GeoTools '07--The geospatial technology conference for coastal professionals: National Oceanic and Atmospheric Administration, p. 15-16.

Choi, B. H.; Suh, K. D.; Yoon, S. B., editors, 2005, Asian and Pacific coasts 2005--Proceedings of the Third International Conference on Asian and Pacific Coasts, September 4-9, 2005: Hanrimwon Publishing Co., 1 CD-ROM.

Choi, B. H.; Hong, S. J.; Hwang, D.; Hidayat, R.; Kaistrenko, V.; Korolev, Yu.; Kurkin, A.; Pelinovsky, E.; Polukhin, N.; Prasetya, G.; Razzhigaeva, N.; Subandono, D.; Yalciner, A.; Yoon, S. B.; Zaitsev, A., 2005, Catastrophic tsunami in the Indian Ocean (December 26, 2004)—Data of two field surveys and numerical simulation. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 159-187.

Choi, Byung Ho; Siripong, Absornsuda; Sundar, V.; Wijetunge, Janaka J.; Diposaptono, Subandono, 2005, Post runup survey of the December 26, 2004 earthquake tsunami of the Indian Ocean. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p.1-20.

Diposaptono, Subandono; Pujiono, Puji; Imamura, Fumihiko, 2005, Tsunami disaster mitigation in Indonesia--Towards better integrated coastal zone management. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 147-157.

Eakins, Barry; Taylor, Lisa A.; Carignan, Kelly S.; Warnken, Robin R.; Sazonova, Tatiana, 2007, Development of high-resolution coastal DEMs—Seamlessly integrating bathymetric and topographic data to support coastal inundation modeling [abstract]. IN National Oceanic and Atmospheric Administration, Coastal GeoTools '07--The geospatial technology conference for coastal professionals: National Oceanic and Atmospheric Administration, p. 66.

Emergency Management Accreditation Program, 2006, Assessing your disaster public awareness program--A guide to strengthening public education: Emergency Management Accreditation Program, 33 p.

Farreras, Salvador; Ortiz, Modesto; Gonzalez, Juan I., 2007, Steps towards the implementation of a tsunami detection, warning, mitigation and preparedness program for southwestern coastal areas of Mexico. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 605-616.

Freundt, Armin; Strauch, Wilfried; Kutterolf, Steffen; Schmincke, Hans-Ulrich, 2007, Volcanogenic tsunamis in lakes--Examples from Nicaragua and general implications. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 527-545.

Fujima, Koji; Tomita, Takashi; Honda, Kazuhiko; Shigihara, Yoshinori; Nobuoka, Hisamichi; Hanzawa, Minoru; Fujii, Hiroyuki; Ohtani, Hideo; Orishimo, Sadao; Tatsumi, Masahiro; Koshimura, Syunichi, 2005, Survey results of Indian Ocean tsunamis in the Maldives. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 37-48.

Gianfreda, F.; Mastronuzzi, G.; Sanso, P., 2001, Impact of historical tsunamis on a sandy coastal barrier--An example from the northern Gargano coast, southern Italy: Natural Hazards and Earth System Sciences, v. 1, p. 213-219.

Govindaraju, M., 2005, Tsunami and its impact on coastal ecosystem of South Asia through remote sensing--India and Sri Lanka. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004—Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 189-198.

Greene, H. G.; Murai, L. Y.; Watts, P.; Maher, N. A.; Fisher, M. A.; Paull, C. E.; Eichhubl, P., 2006, Submarine landslides in the Santa Barbara Channel at potential tsunami sources: Natural Hazards and Earth System Sciences, v. 6, p. 63-88.

Hebert, H.; Schindele, F.; Heinrich, P., 2001, Tsunami risk assessment in the Marquesas Islands (French Polynesia) through numerical modeling of generic far-field events: Natural Hazards and Earth System Sciences, v. 1, p. 233-242.

Ho, Hsien-Jung; Hsui, Haw-Ping Peter, 2005, Mega-tsunami in northeastern Taiwan at least 12, 000 years ago. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 199-208.

Hwang, Dennis J., 2005, Mitigating the risk from coastal hazards--Preliminary strategies and concepts for recovery from the December 26, 2004 tsunami. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 75-82.

Imamura, Fumihiko; Arikawa, Taro; Tomita, Takashi; Yasuda, Tomohiro; Kawata, Yoshiaki, 2005, Field investigation on the 2004 Indian Ocean tsunami in the southwestern coast of Sri Lanka. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 93-105.

Inoue, Shusaku; Wijeyewickrema, Anil C.; Matsumoto, Hiroyuki; Miura, Hiroyuki; Gunaratna, Priyantha; Madurapperuma, Manoj; Sekiguchi, Toru, 2007, Field survey of tsunami effects in Sri Lanka due to the Sumatra-Andaman earthquake of December 26, 2004. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 395-411.

International Strategy for Disaster Reduction, 2007, 2006-2007 Global campaign on disaster risk reduction and school safety--Lessons save lives and The power of knowledge: International Strategy for Disaster Reduction, 1 DVD, 10 min.

Japan Meteorological Agency, 2004, Save your lives from tsunami!: Japan Meteorological Agency, 1 CD-ROM, 17 min.

Jinadasa, S. U. P.; Arulanathan, K., 2005, Study of tsunami generated run-up and horizontal inundations with coastal bathymetric changes around Sri Lanka. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 113-118.

Jinadasa, S. U. P.; Wijerathne, E. M. S., 2005, Assessment of geomorphological influences to protect the tsunami hazardous at south eastern belt of Sri Lanka. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 107-111.

Joku, Gorden N.; Davis, Jocelyn M.; Davies, Hugh L., 2007, Eyewitness accounts of the impact of the 1998 Aitape tsunami, and of other tsunamis in living memory, in the region of Jayapura, Indonesia, to Vanimo, Papua New Guinea. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 433-452.

Kelletat, Dieter; Scheffers, Sander R.; Scheffers, Anja, 2007, Field signatures of the SE-Asian mega-tsunami along the west coast of Thailand compared to Holocene paleo-tsunami from the Atlantic region. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, Birkhauser-Verlag, p. 413-431.

Kilfeather, Aoibheann A.; Blackford, Jeffrey J.; Van der Meer, Jaap J. M., 2007, Micromorphological analysis of coastal sediments from Willapa Bay, Washington, USA--A technique for analysing inferred tsunami deposits. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors,

Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 509-525.

Komatsubara, Junko; Fujiwara, Osamu, 2007, Overview of Holocene tsunami deposits along the Nankai, Suruga, and Sagami troughs, southwest Japan. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 493-507.

Kowalik, Zygmunt; Knight, William; Logan, Tom; Whitmore, Paul, 2007, The tsunami of 26 December, 2004--Numerical modeling and energy considerations. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 379-393.

Lakshumanan, C.; Choi, Byung Ho; Madan Kumar, M.; 2005, Tele tsunami, December 26, 2004--Causes and consequences in Tamil Nadu coast, south India. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 119-146.

Matsuyama, Masafumi; Ikeno, Masaaki; Sakakiyama, Tsutomu; Takeda, Tomoyoshi, 2007, A study of tsunami wave fission in an undistorted experiment. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 617-631.

Matsumoto, T.; Kimura, M.; Nakamura, M.; Ono, T., 2001, Large-scale slope failure and active erosion occurring in the southwest Ryukyu fore-arc area: Natural Hazards and Earth System Sciences, v. 1, p. 203-211.

Merati, Nazila; Chamberlin, Chris; Ford, David; Moore, Christopher, 2007, Using ArcEngine to build decision support tools for tsunami emergency management, modeling and planning [abstract]. IN National Oceanic and Atmospheric Administration, Coastal GeoTools '07--The geospatial technology conference for coastal professionals: National Oceanic and Atmospheric Administration, p. 21.

Okal, Emile A., 2007, Seismic records of the 2004 Sumatra and other tsunamis—A quantitative study. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 325-353.

Okal, Emile A.; Talandier, Jacques; Reymond, Dominique, 2007, Quantification of hydrophone records of the 2004 Sumatra tsunami. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 309-323.

Okal, Emile A.; Titov, Vasily V., 2007, M(sub)tsu--Recovering seismic moments from tsunameter records. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 355-378.

Orfanogiannaki, K; Papadopoulos, G. A., 2007, Conditional probability approach of the assessment of tsunami potential--Application in three tsunamigenic regions of the Pacific Ocean. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 593-603.

Pelinovsky, E.; Kharif, C.; Riabov, I.; Francius, M., 2001, Study of tsunami propagation in the Ligurian Sea: Natural Hazards and Earth System Sciences, v. 1, p. 195-201.

Pelinovsky, E.; Talipova, T.; Kurkin, A.; Kharif, C., 2001, Nonlinear mechanism of tsunami wave generation by atmospheric disturbances: Natural Hazards and Earth System Sciences, v. 1, p. 243-250.

Piantanesi, A.; Tinti, S.; Pagnoni, G., 2001, Tsunami waveform inversion by numerical finite-elements Green's functions: Natural Hazards and Earth System Sciences, v. 1, p. 187-194.

Pilarczyk, Jessica E.; Reinhardt, Eduard G., 2007, Characterization of modern benthic foraminiferal assemblages for paleo-tsunami detection in Sur Lagoon, Oman [abstract]: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 70.

Pinegina, T. K.; Bourgeois, J., 2001, Historical and paleo-tsunami deposits on Kamchatka, Russia--Long-term chronologies and long-distance correlations: Natural Hazards and Earth System Sciences, v. 1, p. 177-185.

Power, William; Downes, Gaye; Stirling, Mark, 2007, Estimation of tsunami hazard in New Zealand due to South American earthquakes. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 547-564.

Rabinovich, Alexander B.; Thomson, Richard E., 2007, The 26 December 2004 Sumatra tsunami—Analysis of tide gauge data from the world ocean, Part 1. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 261-308.

Sato, Shinji; Koibuchi, Yukio; Honda, Takahide, 2005, Tsunami disaster mechanisms in Sri Lanka due to the Sumatra earthquake. IN Choi, Byung Ho; Imamura,

Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 57-64.

Shibayama, Tomoya; Okayasu, Akio; Sasaki, Jun; Wijayaratna, Nimal; Suzuki, Takayuki; Jayaratne, Ravindra; Masimin; Ariff, Zouhrawaty; Matsumaru, Ryo, 2005, Disaster survey of Indian Ocean tsunami and its application to disaster prevention works. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 33-35.

Shigihara, Yoshinori; Fujima, Koji, 2005, Numerical modeling of Indian Ocean tsunami in the Maldives. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 49-56.

Singarasubramanian, S. R.; Mukesh, M. V.; Manoharan, K.; Seralathan, P., 2005, A preliminary report on coastal sediment characteristics after tsunami event along the central Tamil Nadu, east coast of India. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 209-221.

Siripong, Absornsuda; Choi, Byung Ho; Vichiencharoen, Chukiart; Yumuang, Sombat; Sawangphol, Narumitr, 2005, The changing coastline on the Andaman seacoasts of Thailand from Indian Ocean tsunami. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 21-31.

Tanioka, Y.; Seno, T., 2001, Detailed analysis of tsunami waveforms generated by the 1946 Aleutian tsunami earthquake: Natural Hazards and Earth System Sciences, v. 1, p. 171-175.

Tinti, S.; Manucci, A.; Pagnoni, G.; Armigliato; Zaniboni, F., 2005, The 30 December 2002 landslide-induced tsunamis in Stromboli--Sequence of the events reconstructed from the eyewitness accounts: Natural Hazards and Earth System Sciences, v. 5, no. 6, p. 763-775.

Wijeratne, E. M. S.; Pattiaratchi, C., 2005, Characteristics of 26 Dec. 2004 and 28 March 2005 tsunami waves oscillations along the coast of Sri Lanka. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 83-92.

Wijetunge, Janaka J., 2005, Indian Ocean tsunami of 26 December 2004--Spatial distribution of tsunami height and extent of inundation along the coastline of Sri Lanka. IN Choi, Byung Ho; Imamura, Fumihiko, editors, Sumatra tsunami on 26th December 2004--Proceedings of the Special Asia Tsunami Session at APAC 2005: Hanrimwon Publishing Co., p. 65-74.

Yanagisawa, Ken; Imamura, Fumihiko; Sakakiyama, Tsutomu; Annaka, Tadashi; Takeda, Tomoyoshi; Shuto, Nobuo, 2007, Tsunami assessment for risk management at nuclear power facilities in Japan. IN Satake, Kenji; Okal, Emile A.; Borrero, Jose C., editors, Tsunami and its hazards in the Indian and Pacific Oceans: Birkhauser-Verlag, p. 565-576.

Zahibo, N.; Pelinovsky, E. N., 2001, Evaluation of tsunami risk in the Lesser Antilles: Natural Hazards and Earth System Sciences, v. 1, p. 221-231.

Zanetti, Aurelia; Enz, Rudolf; Trub, Jurg, editors, 1998, Natural catastrophes and major losses in 1997—Exceptionally few high losses: Swiss Reinsurance Company, no. 3, 38 p. ♦

TsunamiReady sites

As of November 13, 2007 there were 47 Tsunami Ready sites in 10 states, Puerto Rico, Northern Mariana Islands and Guam, with one TsunamiReady Supporter

Alaska: Homer, Kodiak, Seward, Sitka

California: Crescent City, Dana Point, Huntington Beach, Newport Beach, Orange County, San Clemente, University of California at Santa Barbara

Florida: Indian Harbor Beach, Naval Station Mayport

Georgia: Liberty County

Guam

Hawaii: Hawaii County, Honolulu, Honolulu County, Kauai County, Maui County

North Carolina: Brunswick County, Camp Lejeune Military Reservation, Onslow County

Northern Mariana Islands: Saipan

Oregon: Cannon Beach, Douglas County, Lincoln City, Coos County, Manzanita, Nehalem, Rockaway Beach, Tillamook, Wheeler

Puerto Rico: Mayaguez

South Carolina: Charleston County, Horry County, Myrtle Beach, North Myrtle Beach, Surfside Beach

Virginia: Norfolk

Washington: Aberdeen, Clallam County, Grays Harbor County, Long Beach, Ocean Shores, Pacific County, Quinault Indian Nation

From: http://www.tsunamiready.noaa.gov/ts-communities.htm ♦

STATE EMERGENCY MANAGEMENT OFFICES
updated 3-31-2006

Alaska Dept of Military & Veteran Affairs
Division of Homeland Security & Emergency Mgmt.
PO Box 5750
Fort Richardson, AK 99505-5750
(907) 428-7000; toll-free 800-478-2337
Fax (907) 428-7009
http://www.ak-prepared.com/

California Office of Emergency Services
3650 Schriever Ave.
Mather, CA 95655
(916) 845-8510; Fax (916) 845-8910
http://www.oes.ca.gov/

Hawaii State Civil Defense, Dept. of Defense
3949 Diamond Head Road
Honolulu, HI 96816-4495
(808) 733-4300; Fax (808) 733-4287
http://www.scd.state.hi.us

Oregon Division of Emergency Management
PO Box 14370
Salem, OR 97309-50620
(503) 378-2911; Fax (503) 373-7833
http://www.oregon.gov/OOHS/OEM/

Washington State Military Dept.
Emergency Management Division
Camp Murray, WA 98430-5122
(253) 512-7067; Fax (253) 512-7207
http://emd.wa.gov

Provincial Emergency Program
455 Boleskin Road
Victoria, BC V8Z 1E7 Canada
(250) 952-4913; Fax (250) 952-4888
http://www.pep.bc.ca/

ALSO:
American Samoa Territorial Emergency Management Coordination (TEMCO)
American Samoa Government
P.O. Box 1086
Pago Pago, American Samoa 96799
(011)(684) 699-6415
(011)(684) 699-6414 FAX

Office of Civil Defense, Government of Guam
P.O. Box 2877
Hagatna, Guam 96932
(011)(671) 475-9600
(011)(671) 477-3727 FAX
http://ns.gov.gu/

Guam Homeland Security/Office of Civil Defense
221B Chalan Palasyo
Agana Heights, Guam 96910
Tel:(671)475-9600
Fax:(671)477-3727
www.guamhs.org

CNMI Emergency Management Office
Office of the Governor
Commonwealth of the Northern Mariana Islands
P.O. Box 10007
Saipan, Mariana Islands 96950
(670) 322-9529
(670) 322-7743 FAX
www.cnmiemo.gov.mp

National Disaster Management Office
Office of the Chief Secretary
P.O. Box 15
Majuro, Republic of the Marshall Islands 96960-0015
(011)(692) 625-5181
(011)(692) 625-6896 FAX

National Disaster Control Officer
Federated States of Micronesia
P.O. Box PS-53
Kolonia, Pohnpei - Micronesia 96941
(011)(691) 320-8815
(001)(691) 320-2785 FAX

Palau NEMO Coordinator
Office of the President
P.O. Box 100
Koror, Republic of Palau 96940
(011)(680) 488-2422
(011)(680) 488-3312

Puerto Rico Emergency Management Agency
P.O. Box 966597
San Juan, Puerto Rico 00906-6597
(787) 724-0124
(787) 725-4244 FAX

Virgin Islands Territorial Emergency Management - VITEMA
2-C Contant, A-Q Building
Virgin Islands 00820
(340) 774-2244
(340) 774-1491

Added November 30, 2007 ♦

Scientists calling for more funding for ocean studies

An international group of scientists, The Partnership for Observation of the Global Oceans, is requesting $5 billion to study threats to the oceans, create a better network of satellites, monitor tsunamis, develop drifting robotic probes and put electronic tags on fish in the next decade.

From: http://www.tv3.co.nz/tabid/213/Default.aspx?&articleID=40043.

Infrequently Asked Questions

Compiled by Lee Walkling

Approximately how long is the circum-Pacific seismic belt?

24,854 miles (40,000 kilometers) according to http://news.nationalgeographic.com/news/2007/08/070816-peru-quake.html

Why does the water retreat before a tsunami strikes, in some cases?

When the first part of a tsunami to reach land is a trough rather than a crest of the wave, the water along the shoreline may recede dramatically, exposing areas that are normally always submerged. This can serve as an advance warning of the approaching crest of the tsunami, although the warning arrives only a very short time before the crest, which typically arrives seconds to minutes later.

From: wikipedia

There is yet another way that tsunami waves can be generated, besides submarine landslides, underwater earthquakes, volcanic explosions, and meteor impacts. What is it?

"Tsunami waves may be generated by….rapid anomalous changes in the atmospheric pressure over the sea (Murty, 1977; Pelinovsky, 1996). For a tsunami to arise, it is necessary that the water surface deviate from its equilibrium on a sufficiently large area." This kind of tsunami is referred to as a meteorological tsunami.

From: Pelinovsky, E.; Talipova, T.; Kurkin, A.; Kharif, C., 2001, Nonlinear mechanism of tsunam wave generation by atmospheric disturbances: Natural Hazards and Earth System Sciences, v. 1, p. 243. ♦

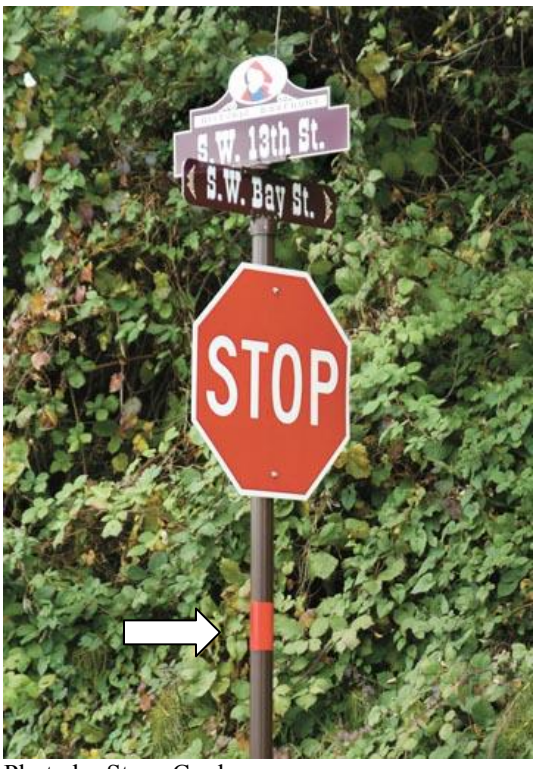


Photo by Steve Card
Reprinted with permission from the Newport News-Times
http://www.newportnewstimes.com/articles/2007/10/12/news/news21.txt

Newport Fire Department creates tsunami reminders

Fire Chief Rick Crook found an easy, effective and inexpensive way to show residents and visitors which areas of the city are in tsunami evacuation zones and which aren't.

Street sign and stop sign posts were banded with red reflective tape to indicate that the location is below 50 ft. in elevation, placing the area within NOAA's projected tsunami evacuation zone. Sign posts with blue tape identify areas above 50 ft. in elevation, making them higher and safer.

Fire Chief Crook, members of the Newport Volunteer Fire Department, and the Community Emergency Response Team went door-to-door to all the residents and businesses within the evacuation zone to educate them about tsunami hazards, the sign-banding, and the evacuation maps for the area. In this time of information overload, the Chief feels that person-to-person contacts are the best way to exchange vital information and make an impact.

Currently the banding has been done in South Beach, Bayfront, and Nye Beach. There are plans to continue marking all intersections in Newport.

Tsunami emergency brochures and evacuation maps are available from the Newport Fire Department, the Newport Chamber of Commerce, and the Community Emergency Response Team. Further information is available at http://www.lincolncoemergencyservices.us
♦

VIDEO-CD-DVD RESERVATIONS

To reserve tsunami videos, CDs or DVDs, 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@dnr.wa.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.

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. ♦

Personal experience with 2004 Indonesia Tsunami
By Ying Li

Review:

The 2004 Indian Ocean earthquake which occurred in the morning of December 26, 2004 triggered a series of devastating tsunamis along the coasts of Indian Ocean, killing large number of people and inundating coastal communities across South and Southeast Asia, including parts of Indonesia, Sri Lanka, India and Thailand. This was one of the ten worst earthquakes in recorded history with almost 230 thousands people dead and missing.

Detailed experience:

In December 2004, I was working for China Shipping Container Lines Corporation in its headquarters in Shanghai. Although I didn't witness the devastating scene in Southeast Asia, I had been working with the maritime emergency response team of our company and watched the whole process of mitigation and response activities, including our 14 ships' routing changes and urgent in-harbor operations.

Right after the tsunami at noon in December 26, the agents in Southeast Asia sent us reports, showing the safety status of all in-port cargos and ship operations in Southeast Asia's hub ports such as Singapore Port, Port Kelang in Malaysia and other ports of feeder network in Indonesia, Philippines, Thailand and Sri Lanka. Most of these ports were closed for a little while because of abnormal big waves except for Singapore Port and Port Kelang, which did not directly face the Tsunami in Indian Ocean and were still in normal operation. 4 containers ships were in port task at these two ports. Among the other ships of our company in that area, 1 ironstone cargo vessel, 5 oil tanks and 3 chemicals tanks were all in safe conditions, either in harbor or in deep sea area where big ships would not be affected by severe tsunamis. However, One China Shipping Group cargo vessel named Peach Mountain encountered the tough situation and broke its three mooring ropes, and was later anchored in an anchorage point. My colleague Mr. Zhou in Shanghai, who was in charge of Peach Mountain's emergency response activity, said that Peach Mountain had a hard time during the tsunami and fortunately survived eventually.

At 9am in December 26 2004, Peach Mountain was going to start its loading operation at Chennai Port in southeast Indian when a sudden tidal wave came into the harbor. Waves covered the dock and made the water level rise by 2 to 3 meters. Chennai Port suffered a power disruption and all the berthing and discharging operations were suspended. One container on the crane was swept away; a few container ships and oil tanks had their mooring ropes broken and were floating free in the basin. Several vessels were pushed against the berthing wall by heavy currents and crashed into each other after being tossed about like toys in the giant tides. It all happened in less than an hour. According to an eyewitness from Peach Mountain, a small ship swirled several times, before hitting a large ship and was dragged out of the harbor. Three ships were involved in the collision. Gem of Tuticorin, loading sugar, sustained heavy damage; it is estimated that about 1,500 tons of raw sugar was in the hatch. The other vessels were ABG Kesava and Canadian Express. ABG-Kesava caused damage to Gem of Tuticorin, hit two hoppers on the wharf, and also hit the wharf cranes demolishing the equipments. Finally, Peach Mountain got in contact with China Shipping headquarters and started urgent self-rescue. The captain decided to move out of the basin with the concern that other oil tanks might block the ship entry channel and collide to cause explosion there.

It was fortunate that a collision did not occur. The tide went back in the late afternoon December 26 and operations in Chennai Port returned to normal two days later. A report from our agency at Chennai Port showed that the loss caused by the tsunami was about Rs 10 crore on the damage to the infrastructure, including the wharf, equipments and cranes; another Rs 10 crore would be needed on dredging to remove the silt formation.

Relief supplies after tsunami

In March 7 2005 a container ship CSCL XIAMEN, which belongs to China Shipping Container Lines Corporation, started a shipment from Tianjin with relief goods and materials provided by Chinese government and arrived at Port Kelang Malaysia in March 17 and at Palauan of Indonesia on the next day.

From:
http://www.seas.gwu.edu/%7Eemse232/november2007_8.html
Crisis and Emergency Management Newsletter
Institute for Crisis, Disaster, and Risk Management; The George Washington University
October/November 2007, v. 13, no 1-2.
Reprinted with permission

Tonga is working on tsunami preparedness

Recently Tonga's Minister of Lands, Survey, and Natural Resources, Hon. Tuita, signed an agreement with Nobuaki Matsui of the Japan International Cooperation Agency (JICA), whereby Japan will help Tonga with new equipment and training for earthquake analysis and observation, as well as with the early warning system. This agreement continues and upgrades a mutual program begun in 2003.

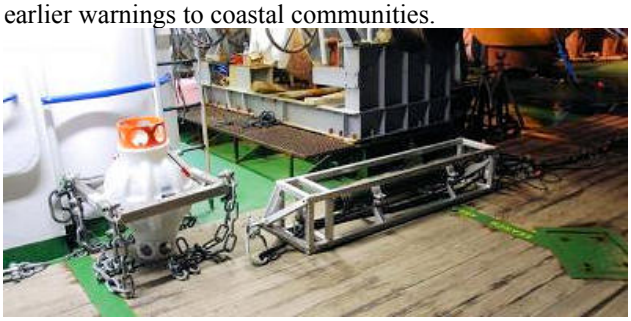
Mr. Kelepi Mafi of the Tonga Geology Department

From: http://www.tonga-now.to/Article.aspx?ID=4558 ♦

★★★

New deep sea Tsunami-detecting system speeds detection, response
Submitted by Layer 8 on Wed, 11/21/2007 - 10:12am.
From:
http://www.networkworld.com/community/node/22154

Researchers have developed a sea floor pressure recording system that measures ocean depths and promises to detect tsunamis faster while providing ever-earlier warnings to coastal communities.



The system, known as the pressure-based acoustically coupled tsunami detector (PACT) for real-time detection of sea level rises in the deep ocean, was successfully tested near the Canary Islands earlier this month [Nov.], signaling a milestone in the development of the Indian Ocean Tsunami Early Warning System, researchers said in a news release.

Scientists of the Alfred Wegener Institute, in collaboration with companies Optimare and Develogic, and with the Zentrum für Marine Umweltwissenschaften (MARUM) and the University of Rhode Island, are developing parts of the project. PACT consists of a reliable, compact and highly energy efficient system that records and analyzes seafloor pressure every 15 seconds. It then transmits the information to the surface modem if a tsunami event is detected. Similar to a fax machine, an acoustic modem uses a sequence of sounds - the so-called telegram - to transmit information to a second modem which is connected to a buoy near the surface, sending the data via satellite to the warning center, the group said in a release.

PACT is unique in that it processes a multitude of information as the basis for a comprehensive and accurate evaluation of every particular situation. Within just few minutes, measurements of the vibrations and horizontal seafloor movements off the coast of Indonesia provide a clear picture of the location and intensity of a seaquake, which, at the warning centre, facilitate the appropriate selection of a previously calculated tsunami propagation model. However, not every seafloor quake causes a tsunami. There is only one way to be clear about this and avoid nerve-wrecking and costly false alarms: we must measure sea level directly, researchers said.

During the Canary Island test, the system worked at depths over 10,000 feet deep. Over periods of several days, pressure data were transmitted repeatedly to the surface modem and none of the data telegrams were lost, a crucial requirement for the reliable functioning of the warning system, the group said. The PACT system will undergo further testing at this point mostly aimed at seeing how it responds during the winter storm season.

Many scientific agencies world-wide are contributing to tsunami early warning systems. The National Oceanic and Atmospheric Administration for example last year launched the Deep-ocean Assessment and Reporting of Tsunami buoy station in the Indian Ocean to assist in detecting tsunamis.

The DART system provides real-time tsunami detection as waves travel across open waters. According to a NOAA press release, the stations consist of a bottom pressure sensor that is anchored to the seafloor and a companion moored surface buoy. An acoustic link transmits data from the bottom pressure sensor to the surface buoy, and then satellite links relay the data to ground stations.

According to NOAA, since 1850 alone tsunamis have been responsible for the loss of more than 420,000 lives and billions of dollars of damage to coastal structures and habitats. Most of these casualties were caused by local tsunamis that occur about once per year somewhere in the world. For example, the Dec. 26, 2004, tsunami near Thailand killed about 130,000 people close to the earthquake and about 58,000 people on distant shores. Predicting when and where the next tsunami will strike is impossible but the idea is these sensor networks will help avert calamity and give localities early warning to evacuate as many people as possible. ♦

Pop Quiz

1) The power of the 2004 Sumatra earthquake was equal to how many Hiroshima-type atomic bombs?

The earthquake that generated the great Indian Ocean tsunami of 2004 is estimated to have released the energy of 23,000 Hiroshima-type atomic bombs, according to the U.S. Geological Survey (USGS).

From:
http://news.nationalgeographic.com/news/2004/12/1227_041226_tsunami.html

2) Where can you find an animated explanation for the 2004 earthquake and tsunami?

Courtesy of the BBC UK website, there is an animated presentation at
http://news.bbc.co.uk/1/hi/in_depth/4136289.stm ♦

Index to *TsuInfo Alert*, volume 9, 2007