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

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Indian Ocean Tsunamis in Legend

By Ruth S. Ludwin
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Earthquakes are more ancient than human beings; human culture and thought evolved in a world occasionally punctuated by landscape-altering geologic events. Political regimes and civilizations have fallen due to earthquake and/or tsunami catastrophes (Zeilinga de Boer & Sanders, 2005), which have often been interpreted as evidence of divine wrath (Safire, 2005). The human experience of earthquakes is engrained in culture; sometimes in obvious ways and sometimes so deeply it is difficult to recognize.

The 2004 tsunami was an event unprecedented in the written history of the Indian Ocean. However, members of ancient tribes that have lived India's Andaman and Nicobar Islands for 30,000 to 50,000 years (BBC News, 2005) appear to have survived the tsunami, saved by oral traditions handed down from generation to generation.

BBC reported folklore from the Andaman Islands of "huge shaking of ground followed by high wall of water" (BBC News, 2005), and Mokken "Sea Gypsies" from the Thai-Burmese border were reported to have survived because of folklore telling of monster waves created by the spirit of the sea (CBS News, 2005). Other isolated groups in the Andaman Islands, descended from migrants who arrived from South East Asia only a few centuries ago, fared far worse.

Flood stories from Sumatra, and from two Islands immediately to the west, Nias and Engano, were documented in the early 1900s by two anthropologists: James Frazer (1854-1941), author of "The Golden Bough", and Roland B. Dixon (1875-1934), a Harvard professor and student of Franz Boas. The paragraphs below are paraphrased for readability.

Ancient stories from Sumatra say that the earth rests on the horns of a monster described as a serpent with the horns of a cow (Frazer, 1918). At the beginning of time, the surface of the earth was primeval ocean where this great serpent, named Naga Padoha, swam or lay. The daughter of the highest deity (who dwelt in the heavens and had birds as servants) came down from the upper realm and spread a handful of earth to form the world. The serpent, however, disliked the weight upon his head, and turning over, caused this newly made world to be engulfed by the sea (Dixon, 1916). To aid his daughter, the deity let a mountain fall from heaven. From this mountain sprang all the rest of the habitable earth, and the people of the earth were born from his daughter (Frazer, 1918).

From that time forward, there has been a constant struggle between the serpent and the deity of the upper realm; the monster always trying to rid himself of his burden, and the deity always endeavoring to prevent him from so doing. This is the cause of the frequent earthquakes that shake the world in general and the island of Sumatra in particular. At last, when the monster proved obstreperous, the deity sent his son to tie the serpent. But even fettered, the monster continued to shake his head, so that earthquakes have not ceased to happen. And he will go on shaking himself till he snaps his fetters. Then the earth will again sink into the sea (Frazer, 1918).

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(continued from page 1)

From Nias, an island to the west of Sumatra, a story tells of an argument between the mountains as to which was the highest. This vexed their great ancestor Balugu Luomewona, and in his vexation he said, "Ye mountains, I will cover you all!" So he took a golden comb and threw it into the sea, and it became a huge crab, which stopped up the sluices whereby the waters of the sea usually run away. The consequences of the stoppage were disastrous. The ocean rose higher and higher till only the tops of two or three mountains in Nias still stood above the heaving billows. All the people who with their cattle had escaped to these mountains were saved, and all the rest were drowned (Frazer, 1918).

The natives of Engano, another island to the west of Sumatra and close to the epicenter of the 2004 earthquake, also tell the story of a great flood. The tide rose so high, they say, that it overflowed the island and every living being was drowned, except one woman. She owed her preservation to the fortunate circumstance that, as she drifted along on the tide, her hair caught in a thorny tree and she clung there. When the flood abated, she came down from the tree, and saw with sorrow that she was left all alone in the world. Feeling the pangs of hunger, she wandered inland to search for food but, finding nothing to eat, she returned disconsolately to the beach, where she hoped to catch a fish. She saw a fish, but when she tried to catch it, the creature glided into one of the corpses that were floating on the water or weltering on the shore. Not to be balked, the woman picked up a stone and struck the corpse a smart blow therewith. The fish leaped from its hiding-place and made off inland. The woman followed, but had hardly taken a few steps when, to her great surprise, she met a living man. When she asked him where he had come from, he answered that somebody had knocked on his dead body, and therefore he had returned to life. Together they resolved to try whether they could not restore all the other dead to life in like manner by knocking on their corpses with stones. No sooner said than done. The drowned men and women revived under the knocks, and thus the island was re-peopled after the great flood (Frazer, 1918).

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Expanded from Ludwin, Ruth S. and others, 2005, Dating the 1700 Cascadia earthquake—Great coastal earthquakes in native stories: Seismological Research Letters, v. 76, no. 2, p. 140-148, Seismological Society of America. Reprinted with permission. ♦

See also story on page 14: Fire of Rice Sheaves

Japan Meteorological Agency's new role

"From March of this year [2005], the JMA will take on the role of Tsunami Information Center for the northeastern Pacific region stretching from the Kamchatka peninsula to Papua New Guinea."

From: Asia Pacific Perspectives, v. 2, no. 12, p. 17.

"Tsunami Watch Information (TWI) is provided to the countries of the Indian Ocean region from JMA in collaboration with PTWC of U.S. on an interim basis prior to the establishment of the tsunami earth warning system in the region. TWI should be regarded as a reference material for the disaster prevention authorities of the recipient countries to issue tsunami warnings on their own initiative and responsibility."

From: tsunamiwarning-ioc-en@lists.unesco.org (April 28, 2005)

A disaster myth that just won't die—Mass burials and the dignity of disaster victim

By Donna Eberwine

It was South Asia's worst natural disaster in memory—the earthquake and tidal wave that claimed more than 250,000 lives in a dozen countries last December. But as the death toll climbed in the days following the disaster, media reports warned that a second calamity was in the making: dangerous disease outbreaks caused by the legions of rotting bodies.

"International organizations urged that the thousands of bloated corpses littering beaches, streets and makeshift morgues be disposed of quickly to stem the threat of disease," one news agency reported. Other media reports were equally alarming. One quoted a microbiologist saying that "There is a very high risk of epidemics breaking out in all these places. Decaying bodies are bacteria factories. The bodies must be quickly disposed of." Another noted, "Worried that rotting corpses could take more lives by spreading disease, health officials ordered them collected in city trucks and dumped in mass graves."

The notion that dead bodies pose an urgent health threat in the aftermath of a disaster is one of several enduring myths about disasters and relief efforts that live on. Survivors, however, are much more likely to be a source of disease outbreaks. Most victims of natural disasters die of trauma, drowning or burns rather than from infection, and victims are no more likely to carry infectious agents than survivors. Someone who died without cholera is not likely to produce it after they are dead.

An environmental epidemiologist at the London School of Hygiene and Tropical Medicine reviewed the scientific evidence on the issue in a recent article in the Pan American Journal of Public Health. "The microorganisms involved in decomposition are not the kind that cause disease." "And most viruses and bacteria that do cause disease cannot survive very long in a dead body." An exception is the human immunodeficiency virus, HIV, which has been shown to live up to 16 days in a corpse, but only under refrigeration. He points out that bloodborne viruses, such as HIV and hepatitis B and C, as well as tuberculosis and gastrointestinal infections, do pose a slight risk for relief workers charged with handling bodies. But the risk of contagion can be minimized with basic precautions and proper hygiene.

One valid concern is that fecal matter from decomposing bodies may contaminate water. Getting clean water to people should be a high priority, regardless of the source of contamination.

Despite the scientific evidence, the belief that dead bodies spread disease remains a chronic problem in disaster relief efforts. Alarming reports in the media about the risk of massive disease outbreaks can prompt authorities to rush to bury bodies in mass graves. This adds to the survivors' anguish and to the chaos. It becomes one more blow to the affected population.

Seeking closure

There is a larger problem: mass burials and cremations can make identification of remains all but impossible and they prevent survivors from burying loved ones according to local customs and beliefs. Survivors have a strong psychological need to identify lost loved ones and to grieve for them in customary ways. Every survivor's hope is, of course, that they will find someone alive. But when that hope fades, there is a nearly universal human need to learn the fate of a missing loved one and to somehow say good-bye. This need must be recognized along with all the other needs that people have in the aftermath of a disaster. This is why following the recent tsunami disaster, countries with specialized forensic identification teams and technology offered their services to the affected countries in support of the disaster recovery effort.

Failure to find and identify a victim can have material consequences as well, leaving survivors in a kind of legal limbo with respect to property ownership, inheritance, or family benefits. In many cases, these problems add to the economic hardship caused by the disaster itself. Although authorities may feel public pressure to dispose of bodies quickly, families, neighbors and immediate community members are likely to resist efforts to bury victims en masse. Following Hurricane Jeanne in Haiti last September, residents of Gonaives reportedly stoned a truck trying to dump corpses into a mass grave.

Much of the news coverage of the tsunami catastrophe propagated the myth of dead bodies and epidemics, particularly in the first days following the disaster. But the coverage also reflected the enormous importance survivors place on identifying lost loved ones. Media reports were filled with stories and images of

survivors searching desperately in hospitals and morgues, perusing bulletin boards with victims' photos, and posting pleas on the Internet for help in finding lost loved ones. They also showed many instances in which relief workers tried to facilitate this process.

In disaster and emergency situations that produce mass casualties, dealing with large numbers of corpses is a critical challenge for disaster relief. The approach to this task should recognize the rights of survivors and be based on scientific evidence, which is widely available, rather than on unfounded fears.

Read more about infectious disease risks from dead bodies following natural disasters in an article by Oliver Morgan published in the Pan American Journal of Public Health (http://publications.paho.org/english/dead_bodies.pdf). An editorial in the same issue of the Journal on topic is online at http://publications.paho.org/english/editorial_dead_bodies.pdf. Finally, the new PAHO/WHO publication Management of Dead Bodies in Disaster Situation is available in full text on the web: www.paho.org/English/dd/ped/ManejoCadaveres.htm.

From: Disasters—Preparedness and Mitigation in the Americas, issue 98, January 2005. Full-text: http://www.paho.org/english/dd/ped/newsletter.htm (in html or pdf formats). Reprinted from Perspectives in Health, the magazine of the Pan American Health Organization, vol. 10, no. 1 (2005) published in English and Spanish (http://www.paho.org/English/DD/PIN/Number21_article01.htm).
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http://www.fema.gov/fima/bp.shtm

The Federal Emergency Management Agency's *Mitigation Best Practice Portfolio* is now live. This portfolio is a collection of ideas, activities, projects, and funding sources that can help reduce or prevent the impacts of disasters. This Web page also invites users to submit their own mitigation best practices for review and possible inclusion in the portfolio.

Tsunami disaster mapping portal

GeoWorld magazine's Resource of the Month (April 2005) can be accessed at http://www2.mapsherpa.com/tsunami/. The page is entitled Tsunami Disaster Mapping for Indian Ocean Coastal Regions.

"The Tsunami Disaster Mapping Portal (DMapP) web site was created to help aid workers coordinate their work during the on-going humanitarian crisis in the Indian Ocean Basin.

The interactive, Internet-based infrastructure provides free access to current and historical spatial data for planners and workers for short-term emergency needs as well as post-disaster supplies distribution, rehabilitation planning and infrastructure restoration.

The site was created in less than a week with help from Ottawa-based DM Solutions Group Inc. and the University of Ottawa, using open-source technologies.

'This initiative provides an opportunity to connect, in a very effective way, the vast amount of data accumulating around the world with the people who need it most,' said Dave McIlhagga, president, DM Solutions Group.

The portal serves as a channel for those with observations from the affected regions to share data with other organizations. The list of data providers and integrators involved in the international effort is multiplying. The Laboratory for Applied Geomatics and GIS Science (LAGGISS) at the University of Ottawa was instrumental in helping the humanitarian effort get off the ground, including helping to obtain and integrate space shuttle and satellite observations.

'This effort has allowed many geomatics students at our university to contribute their expertise to help the devastated regions,' said Mike Sawada, director of LAGGISS.

Universities in Thailand and Japan have already contributed high-quality pre- and post-tsunami data for inclusion in the data portal. It's hoped that other organizations, including the many government and aid agencies in the disaster area, will contribute data so effective maps and applications can be shared with the worldwide aid community."

From: GeoWorld, v. 18, no. 4, p.12. ♦

NEWS

USGS conducts congressional hearing on earthquakes and tsunamis

On May 13, 2005, the USGS held a congressional briefing, featuring Dr. Brian Atwater. According to the press release, Dr. Atwater spoke about the U.S. vulnerability to tsunamis. Japanese records and vegetation in the Pacific Northwest (tree rings) confirm that there was a large earthquake in 1700 that caused a tsunami in the Seattle area. Evidence shows that other historic earthquakes have occurred in this region and that the area is vulnerable to another one in our lifetime, or our children's lifetime, according to Dr. Atwater.

Also speaking was Stephanie Fritts from the Pacific County Emergency Management Agency (Washington); she talked about how emergency planners depend upon science to keep citizens safe. As an example, she told how Dr. Atwater's inundation maps are used as the basis of evacuation route maps the emergency planners in the state of Washington use for tsunami preparedness.

Stacy Bartoletti of Degenkolb Engineers spoke about how science is used to design safer structures and how vulnerable many cities are because many of the key infrastructure such as houses, hospitals, and schools are not built to withstand an earthquake and/or a tsunami.

From: Clarice Nassif Ransom, Public Affairs Specialist, Office of Communications, USGS

New Emergency Alerting and Messaging Initiative

A group of National organizations representing a multitude of emergency response organizations has announced the launch of the National Emergency Alerting and Response Systems (NEARS) Initiative. NEARS, a nonprofit, cooperative effort, was launched to develop an effective approach to interagency messaging to better protect the public as well as first responders themselves.

The NEARS partners plan to deploy interoperable emergency data messaging using national emergency message and data standards, commercial information technologies, and a shared, electronic directory of agencies called the Emergency Provider Access Directory (EPAD) that gives agencies the ability to register for emergency messages based on their geography, incident interest, and agency type.

Current NEARS partners include representatives from fire, law enforcement, 9-1-1, emergency medical services, emergency medicine, public health, emergency management, private infrastructure, and the media.

Upon completion, NEARS partners expect that:

Every emergency agency that participates by registering in EPAD will be able to send an emergency data message to any other emergency agency in the directory;

Agencies will benefit by improving their preparedness planning and emergency event coordination efforts;

Agencies will be able to send and receive external information into their current technology tools, so they do not lose that investment; and

NEARS will provide one approach for all-hazards emergency messaging.

More information about the NEARS initiative can be found at http://comcare.org/nears/ or by calling (202) 429-0574. The Emergency Information Infrastructure Project Virtual Forum hosted an online discussion about NEARS on April 6. Read the transcript at http://www.emforum.org/.

From: Natural Hazards Observer, v. 29, no. 5, p. 10 (http://www.colorado.edu/hazards/o/may05/)

Dissolution of the Partnership for Public Warning

Nine months after scaling back operations pending funding for the implementation of its National Strategy for Integrated Public Warning Policy and Capability, the Board of Trustees of the Partnership for Public Warning (PPW) has announced the dissolution of the organization. The PPW was created as a nonprofit consortium in December 2001 by representatives from federal, state, and local government; emergency management; private industry; academia; and others who recognized the need to identify the major challenges to improving the nation's public warning capability and reach consensus on effective solutions and strategies.

The PPW's accomplishments include the following:

Establishing the only national collaborative, public-private partnership where government, industry, and the public could work together on public warning issues;

Focusing national attention on the need to improve America's public warning capability;

Developing and promoting the first standard message format for public warning—the Common Alerting Protocol;

Conducting an assessment of the Emergency Alert System and providing recommendations for improvement;

Evaluating the Homeland Security Advisory System and providing recommendations for developing a more effective way to communicate terrorist threat information to the public; and

Producing a consensus-based national strategy and implementation plan for creating a more effective national capability to warn and inform citizens during times of emergency.

While acknowledging that there is still a vital need for public-private partnerships in the area of public warnings, the board expects that other organizations will step forward and build upon the foundation laid by the PPW.

The board thanks all the organizations and individuals who worked with the partnership to improve America's public warning capability. The PPW's Web site will remain available until May 31, 2005: http://ppw.us/ppw/.

From: Natural Hazards Observer, v. 29, no. 5, p. 7. (http://www.colorado.edu/hazards/o/may05/may05b.html#eas)

Digital EAS Pilot Tests Successful

The Federal Emergency Management Agency, the federal government's program manager for the national Emergency Alert System; the U.S. Department of Homeland Security's (DHS) Information Analysis and Infrastructure Protection Directorate; and the Association of Public Television Stations have joined other federal departments and agencies and several private communication companies and broadcasters for a series of tests using digital technology to improve America's alert and warning system.

The tests are part of a pilot project designed to demonstrate how DHS can improve public alert and warning during times of national crisis through local public television's digital television broadcasts. Launched in October 2004 as part of DHS' Integrated Public Alert and Warning (IPAWS) initiative, the Digital Emergency Alert System National Capital Region Pilot has successfully demonstrated how DHS and the National Oceanic and Atmospheric Administration can disseminate alert and warning messages through public–private partnerships. Utilizing the digital capabilities of the nation's public television stations and the voluntary participation of cell phone service providers, public and commercial radio and television broadcasters, satellite radio, cable and internet providers, and equipment manufacturers, the tests represent the beginning of an IPAWS program designed to provide critical life-saving information to the nation in a timely and effective manner.

Read the press release at http://www.apts.org/news/EAS-PILOT.cfm.

From: Natural Hazards Observer, v. 29, no. 5, p. 4-5. (http://www.colorado.edu/hazards/o/may05/may05b.html#eas)

Notice on Cost Share Adjustments for Disasters

Pursuant to a final rule issued in 1999 (see the *Observer*, July 1999, p. 5), the Federal Emergency Management Agency (FEMA) annually adjusts the statewide per capita threshold used to recommend an increase of the federal cost share from 75 percent to not more than 90 percent of the eligible cost of permanent work under section 406 and emergency work under section 403 and section 407 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act). The adjustment to the threshold is based on the Consumer Price Index for All Urban Consumers published annually by the U.S. Department of Labor. For disasters declared on January 1, 2005, through December 31, 2005, the qualifying threshold is $110 of state population. This means that if a disaster is so extraordinary that actual federal obligations under the Stafford Act, excluding FEMA administrative costs, meet or exceed $110 per capita, FEMA may recommend a 90 percent federal/10 percent state cost-share arrangement, as opposed to the normal 75 percent/25 percent requirement.

The complete text of the notice is in the February 1, 2005, *Federal Register* (Vol. 70, No. 20, p. 5201), which can be found in any federal repository library or online at http://www.access.gpo.gov/. For more information, contact Magda Ruiz, Recovery Division, FEMA, 500 C Street SW, Washington, DC 20472; (202) 646-4066.

From: Natural Hazards Observer, v. 29, no. 4, p. 9; http: //www. colorado.edu/hazards/o/mar05/ mar05c.html#is800.

U.S. National Response Plan Online Training

The Federal Emergency Management Agency has released a new independent study course to introduce emergency management practitioners to the National Response Plan (NRP).

The course, The National Response Plan, an Introduction, IS-800, is designed primarily for U.S. Department of Homeland Security and other federal department/agency staff responsible for implementing the NRP. State, local, and private sector emergency management professionals can also benefit from this course. Students who successfully complete this course will be able to describe the purpose of the NRP, locate information within the NRP, describe the roles and responsibilities of entities as specified in the NRP, identify the organizational structure used for NRP coordination, describe the field-level organizations and teams activated under the NRP, and identify the incident management activities addressed by the NRP. Access this course on the Web at http://training.fema.gov/emiweb/is/is800.asp.

From: Natural Hazards Observer, v. 29, no. 4, p. 8; http: //www. colorado.edu/hazards/o/ mar05/ mar05c.html#is800.

New Alliance Aims to Enhance Public Safety

The National Oceanic and Atmospheric Administration (NOAA) is working with the National Law Enforcement Telecommunications System (NLETS) to establish a new communication link with NOAA's National Weather Service (NWS) to increase public safety through improved dissemination of weather forecasts and warnings. This relationship features a two-way link between NLETS, an interstate law enforcement network, and the NOAA Weather Wire Service, a satellite collection and dissemination system that provides timely delivery of NWS weather information products. An initial evaluation is underway. National implementation is slated for mid-2005. Visit the partners on the Web at http://www.noaa.gov/ and http://www.nlets.org/.

From: Natural Hazards Observer, v. 29, no. 4, p. 10; http: //www. colorado.edu/hazards/o/ mar05/ mar05c.html#is800.

Citizen Corps Partners with American Legion and American Legion Auxiliary

The U.S. Department of Homeland Security Citizen Corps has joined forces with the American Legion and the American Legion Auxiliary to help raise public awareness about the importance of emergency preparedness and volunteer service. Through these partnerships, American Legion Posts and American Legion Auxiliary Units across the nation will assist in developing local Citizen Corps Councils to involve citizens in preparedness efforts. This affiliation will also focus on engaging America's youth in hometown security, elevating Flag Day as a day of citizenship and emergency preparedness, and providing support to Veteran's Affairs Hospitals in emergency preparedness efforts. For more information about Citizen Corps, visit http://www.citizencorps.gov/. To learn more about the American Legion, visit http://www.legion.org/. And, for more information about the American Legion Auxiliary, visit nowcoast.team@noaa.gov.

From: Natural Hazards Observer, v. 29, no. 4, p. 10; http: //www. colorado.edu/hazards/o/ mar05/ mar05c.html#is800.

Training to Help Animals Survive Disasters

Noah's Wish is a national disaster response team solely dedicated to rescuing and sheltering animals in disasters that offers volunteer in-field training. This training is for experienced volunteers, new volunteers, and individuals who want to be more aware of how disasters affect animals.

This comprehensive three-day in-field exercise combines instructional teaching, team building, and hands-on experience. Participants will stay on-site during the training to give them a realistic experience of the physical challenges of responding to a disaster.

Once a participant completes the volunteer in-field training, they will become part of the Noah's Wish National Disaster Response Team and be placed on an active call-out list to be alerted and possibly mobilized to future disaster sites.

For more information about the training, including dates and locations, or Noah's Wish and the services they provide, visit http://www.noahswish.org/ or contact Sheri Thompson at (405) 621-9616 or sherithompson@cox.net.

From: Natural Hazards Observer, v. 29, no. 5, p. 13. http://www.colorado.edu/hazards/o/may05/may05e.html.

2005 Coastal Tsunami Summit

For presentations made at the February 2005 Summit, Long Beach, Washington, visit website http://www.emd.wa.gov/5-prep/PnP/prgms/eq-tsunami/2005CoastalTsunamiSummit.htm

PUBLICATIONS

Natural Hazards Observer, v. 29, no. 5, 2005
The new issue is online:
http://www.colorado.edu/hazards/o/may05/

EQ – Earthquake Quarterly

The 2005 Winter issue is available online (http://www.wsspc.org/Publications/news/EQ2005Winter.pdf)

With WSSPC member agency reports from the five Pacific coastal states concerning earthquake, tsunami and hazard mitigation. The "2005 Washington Coastal Tsunami Summit White Paper Summary" and "Oregon Tsunami Workshop—Community Needs Drive Program Recommendations" articles are also included. The cover is a map showing the locations of the 16 TsunamiReady sites, as of March 9, 2005.

Tsunami Newsletter—International Tsunami Information Centre

Volume 36, no. 4 has been published and will be online at http://www.prh.noaa.gov/itic/library/about_tsu/newsletters.html (On the left side of the page, find Library and click on Newsletters). This issue publishes all the national reports submitted for the XIXth Session of the ICG/ITSU conference held in New Zealand in 2003. The purpose of the conference was a review progress made since the 2001 meeting and the making of recommendations for priorities for the 2004-2005 period. Each report includes the ITSU National Contact in 2003, a summary, information on the Member States' local and distant tsunami procedures, its sea level and seismic networks, and a description of activities.

Cascadia Subduction Zone Earthquakes—A magnitude 9.0 earthquake scenario

The Cascadia Region Earthquake Workgroup has released a thorough new "general assessment" of the effects of a 9.0 earthquake along the Cascadia subduction zone. Its intended audience is government agencies, businesses, and families. The illustrations are vivid and clear, providing a dramatic supplement to the text. The second half of the book explores what could happen to people and places along Hwy 101, the I-5 corridor, and in the eastern parts of the states.

[Editor's opinion: This publication should be on every emergency manager's desk; it provides a clear understanding of the need for preparedness. It provides examples of what could happen. It mentions all the things that need to be considered when making a preparedness and mitigation plan.]

A pdf file of the booklet is available online: http://www.crew.org/papers/CREWCascadiaFinal.pdf

Emergency Preparedness Guide: Protecting Your Family and Your Home

The result of a collaborative effort between the Homeownership Alliance, a coalition of more than fifteen organizations committed to ensuring support for the American housing system, and the U.S. Department of Homeland Security (DHS), *Emergency Preparedness Guide: Protecting Your Family and Your Home* is a new resource designed to help homeowners prepare for potential terrorist attacks and other emergencies. Produced by the Homeownership Alliance based on components of DHS' Ready campaign, the guide outlines the simple steps homeowners can take to prepare for an emergency. It includes information on emergency supplies, effective emergency plans for families, various threats homeowners may face, and resources available to homeowners through DHS, the Homeownership Alliance, and local government and community officials. In addition to being available for download on the alliance's Web site, http://www.homeownershipalliance.com/documents/emergency_final_000.pdf, the nine-page guide will also be distributed through the National Association of Realtors and Habitat for Humanity International.

From: Natural Hazards Observer, v. 29, no. 4, p. 8-9.; http://www.colorado.edu/hazards/o/mar05/mar05c.html#guide

Jane's Citizen's Safety Guide

Sonayia Shepherd, John B. Copenhaver, Robert Marston Fanney, Rennie Campbell, Adrian Dwyer, and Jessica Duda. ISBN 0-7106-2661-4. 2004. 213 pp. $27.00. Available from Jane's Information Group, 110 North Royal Street, Suite 200, Alexandria, VA 22314; (703) 683-3700, (800) 824-0768; e-mail: info.us@janes.com; http://www.janes.com/.

Intended for citizen emergency response volunteers and emergency volunteer trainers as well as those involved in emergency management, fire and rescue, emergency medical services, law enforcement, public health, and local, state, and federal government, this all-hazards guide features emergency procedures

and checklists for before, during, and after incidents such as natural disasters, mechanical accidents, and human-caused emergencies, including terrorism. It also focuses on critical needs, such as communicating with children, dealing with loss, handling the media, and providing volunteer assistance.

From: Natural Hazards Observer, v. 29, no. 4, p. 24; http://www.colorado.edu/hazards/o/mar05/mar05h.html

Disaster Readiness and Response

2004. 140 pp. $40.00. Available from the International City/County Management Association (ICMA), PO Box 931897, Atlanta, GA 31193; (770) 442-8631, x377, (800) 745-8780; http://bookstore.icma.org/.

This publication is a compilation of articles from ICMA publications about how local government practitioners can work together to prepare and respond to emergencies, natural and human-induced disasters, and security threats. Topics include performing risk assessments, implementing homeland security measures, communicating with citizens during times of crises, leveraging resources, and coordinating with other agencies and jurisdictions.

From: Natural Hazards Observer, v. 29, no. 4, p. 24; http://www.colorado.edu/hazards/o/mar05/mar05h.html

The Economics of Natural Hazards

Howard Kunreuther and Adam Rose, editors. ISBN 1-84064-815-5. 2004. 1,040 pp. $380.00. Available from Edward Elgar Publishing, 136 West Street, Suite 202, Northampton, MA 01060; (413) 584-5551; e-mail: kwight@e-elgar.com; http://www.e-elgar.com/.

Through previously published papers, this two-volume set investigates the impact of natural disasters on national and regional economies. Volume I considers the effects of the perception of risk and of direct losses and explores the costs of reducing the impact of disasters by, for example, forecasting, self-protection, and the building of physical structures. Volume II deals with mitigating the costs of disaster through insurance, including financial coverage for catastrophic loss, and investigates the development of private–public partnerships for managing disasters and the problems of reconstruction and recovery. A final section addresses the particular problems of disasters in developing countries.

From: Natural Hazards Observer, v. 29, no. 4, p. 24; http://www.colorado.edu/hazards/o/mar05/mar05h.html

Disaster Dictionary: The Definitive Guide to Related Terms, Acronyms, and Concepts for Emergency Planning and Operations

Daniel J. Biby. ISBN 0-9727134-4-1. 2004. 250 pp. $42.95. Available from K&M Publishers, (918) 499-3959, (800) 831-4210; e-mail: sales@kmpub.com; http://www.kmpub.com/.

The purpose of this reference book is to establish a terminology foundation for all types of natural and human-induced emergencies, enabling public safety professionals to speak the same language, regardless of their agency affiliations and backgrounds. Appendices highlight weapons of mass destruction, the Incident Command System, and Web-based resources.

From: Natural Hazards Observer, v. 29, no. 4, p. 25; http://www.colorado.edu/hazards/o/mar05/mar05h.html.

Are You Ready?

The Federal Emergency Management Agency (FEMA) has announced the release of the updated, in-depth guide to citizen preparedness, *Are You Ready?* The guide provides a step-by-step approach to disaster preparedness by walking the reader through how to get informed about local emergency plans and identify hazards that affect their area and instructing them on how to develop and maintain an emergency communications plan and build a disaster supplies kit. Other guide topics include evacuation, emergency public shelters, animals in disaster, and information specific to people with disabilities.

To broaden the usage of the *Are You Ready?* materials, a facilitator guide is available for those interested in delivering the disaster preparedness content in a classroom or small group setting. The facilitator guide includes training modules for adults and older and younger children and contains a CD-ROM toolkit that includes customizable slides and hazard specific fact sheets. *Are You Ready?* is also a study guide for the independent study course Are You Ready? An In-Depth Guide to Citizen Preparedness, IS-22. College credit for successful completion of the course is available through Frederick Community College in Frederick, Maryland.

The updated guide is available from the FEMA Web site in both English and Spanish. Download a copy at http://www.fema.gov/areyouready/. English-only copies are also available by mail from FEMA's Publications Warehouse at (800) 480-2520. Access the course at http://training.fema.gov/EMIWeb/IS/is22.asp.

From: Natural Hazards Observer, v. 29, no. 4, p. 8; http://www.colorado.edu/hazards/o/mar05/mar05c.html#is800

Oceanus

Oceanus, the online magazine of research from Woods Hole Oceanographic Institution, March 31, 2005, published five articles under the heading In the Tsunami's Wake:

In the Tsunami's Wake, New Knowledge About Earthquakes

Building a Tsunami Warning Network

Throwing DART Buoys into the Ocean

What Could a Tsunami Network Look Like in the Future?

MIT/WHOI Graduate Leads the World's Tsunami Awareness Program (starring Laura Kong!)

Tsunamis in the Caribbean? It's Possible. They can be accessed at http://oceanusmag.whoi.edu/v44n1/dawicki.html

Washington tsunami evacuation maps

These brochures for selected Washington coastal communities can be downloaded from http://www.emd.wa.gov/5-prep/PnP/prgms/eq-tsunami/tsunami-idx.htm.

Communities are Aberdeen-Hoquiam, Clallam Bay, Copalis Beach, Cosmopolis, La Push, Neah Bay, and Ocean Shores.

From: Washington Military Department Emergency Management Division

Washington tsunami evacuation maps

Additional evacuation map brochures for the Washington coast are available from website http://www.dnr.wa.gov/geology/hazards/tsunami/evac/. These brochures cover the communities of Bay Center, Long Beach, North Cove, Ocean Park, Raymond, and Westport.

From: Washington Department of Natural Resources, Division of Geology and Earth Resources

WEBSITES

http://www.pdc.org/PDCNewsWebArticles/2004SouthAsiaTsunami/index.html

Pacific Disaster Center, Information on the Great Sumatra earthquake and Indian Ocean tsunami
Submitted by Wayne Johnston

http://www.google.com.au/search?hl=en&q=tsunami+video&btnG=Google+Search&meta=http://www.waxy.org/archive/2004/12/28/amateur_.shtml

Sumatra tsunami videos (amateur) online.
Submitted by Wayne Johnston

www.pmel.noaa.gov/tsunami/sumatra20041226.html

The National Oceanic and Atmospheric Administration's Pacific Marine Environmental Laboratory has put together this list of Web links related to the tsunami in the Indian Ocean on December 26, 2004.

http://www.nsf.gov/news/special_reports/tsunami/

Within days of the massive tsunami in the Indian Ocean in late 2004, teams of researchers rushed to survey the disaster, hoping to learn how such loss of life, property, and ecosystems can be prevented in the future. This special report from the National Science Foundation describes some of the findings.

http://www.asce.org/page/?id=53

Technical assessment teams comprised of members of the American Society of Civil Engineers and the Institution of Civil Engineers traveled to South Asia to study the catastrophic damage resulting from the recent earthquake and tsunami. Read their field reports here.

http://www.fas.org/sgp/crs/RL32739.pdf

Tsunamis: Monitoring, Detection, and Early Warning Systems, a report from the Congressional Research Service, was released in the wake of the Indian Ocean tsunami.

http://ioc.unesco.org/indotsunami/paris_march05.htm

The 1st International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean Within a Global Framework concluded on March 8, 2005, with the adoption of a communiqué outlining the proposed arrangements for the establishment of a

Tsunami Warning and Mitigation System for the Indian Ocean region (IOTWS) and terms of reference for the Intergovernmental Coordination Group for the IOTWS. Access the communiqué, the terms of reference, and the meeting presentations here.

http://www.swissre.com/ (Research and Publications)

This new Focus report from Swiss Re, *Tsunami in South Asia: Building Financial Protection***,** examines how the insurance industry should respond to tsunamis and other natural catastrophes occurring in developing countries.

http://walrus.wr.usgs.gov/tsunami/srilanka05/

The December 26, 2004 Indian Ocean Tsunami: Initial Findings on Tsunami Sand Deposits, Damage, and Inundation in Sri Lanka is a cooperative study by the U.S. Geological Survey, Earthquake Engineering Research Institute, National Science Foundation, Geological Survey and Mines Bureau of Sri Lanka, and GeoEnvironmental Consultants of New Zealand.

http://www.pbs.org/wgbh/nova/tsunami/

PBS debuted Nova's "Wave That Shook the World" on March 29. This episode-dedicated Web site features a transcript, links and books, a teacher's guide, and more information about tsunamis past and present.

http://walrus.wr.usgs.gov/news/field.html

USGS. *Notes from the field—USGS Scientists in Sumatra Studying Recent Tsunamis, March 30-April 26.* This website documents a field study of the effects of the March 28, 2005, and December 26, 2005, tsunamis in Sumatra. Links take you to Daily USGS field reports, Tsunami research at USGS, or Tsunami event—28 March 2005, NOAA.

http://www.adpc.net/infores/dsituation/webtsunami/documents/LLinpics.pdf

This report from the Asian Disaster Preparedness Center, *Lessons Learned from the Tsunami Event, December 26, 2004, Case of Sri Lanka***,** uses photographs as well as text to illustrate lessons learned.

http://www.nvoad.org/ManagingSpontaneousVol.pdf

The National Voluntary Organizations Active in Disaster Volunteer Management Committee's *Managing Spontaneous Volunteers in Times of Disaster: The Synergy of Structure and Good Intentions* provides a basis for developing a national strategy for working with unaffiliated volunteers and is based on an analysis of effective practices and models.

http://www.ssri.hawaii.edu/research/GDWwebsite/pages/proceeding.html

The proceedings from last summer's Gender Equality and Disaster Risk Reduction Workshop in Honolulu, Hawaii, are now available online, including presentations, posters, background resource materials, participant profiles, regional commentaries, and the call to action.

http://ioc.unesco.org/indotsunami/

The IndoTsunami web site has been established, dedicated to the follow-up activities to the Indian Ocean tsunami that devastated several countries in the Indian Ocean region and killed over 250,000 people. The web site will report on the many activities that are being organized at the national, regional and international level to establish tsunami warning and mitigation systems in the Indian Ocean and other ocean basins.

CONFERENCES / SYMPOSIA

June 27-29, 2005

22nd International Tsunami Symposium. Host: Institute of Geodynamics, National Observatory of Athens. Chania, Greece**.** The program of this symposium will include all aspects of tsunami science and technology, such as physics, statistics, engineering, hazards and risk assessment, numerical simulations, geological studies, instrumental warning systems, disaster prevention and mitigation, and public awareness and education. Three special sessions are also scheduled: "Tsunamis in the Mediterranean and European Seas," "Tsunami Technology and Society," and "The Indian Ocean Big Earthquake and Tsunami of 26 December 2004." Papers and abstracts are due May 10, 2005. For more information, visit http://www.gein.noa.gr/English/tsunamis.htm.

From: Natural Hazards Observer, v. 29, no. 4, p. 16; http://www.colorado.edu/hazards/o/mar05/mar05e.html

September 18-21, 2005

Fall World 2005. Organizer: *Disaster Recovery Journal***.** San Diego, California**.** This

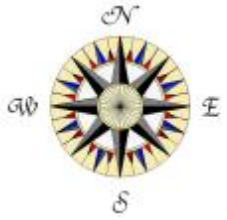
conference will focus on all aspects of disaster recovery, contingency planning, and business continuity. Attendees will gain knowledge and information through sessions, workshops, exercises, and networking opportunities. An exhibit hall will showcase the latest industry trends, products, and services. Among other things, attendees can participate in a real-time disaster simulation (limited to 200 participants). For more information, visit http://www.drj.com/conferences/sd2005/ or call (314) 894-0276.

From: Natural Hazards Observer, v. 29, no. 5, p. 12 (http://www.colorado.edu/hazards/o/may05/may05e.html)

November 1-4, 2005

250th Anniversary of the 1755 Lisbon Earthquake**.** Lisbon, Portugal. The 250th anniversary of the 1755 earthquake and tsunami is an opportunity to bring together scientists, engineers, historians, urban planners, architects, economists, and policy makers to foster an integrated view of the global perception of natural disasters and how society must deal with them. For more information, contact Mundiconvenius, Rua do Embaixador, 13-2, 1300-215 Lisboa, Portugal; +351 21 364 94 98; e-mail: info@mundiconvenius.pt; http://www.mundiconvenius.pt/2005/lisbon1755/

From: Natural Hazards Observer, v. 29, no. 5, p. 12 (http://www.colorado.edu/hazards/o/may05/may05e.html) ♦



National Tsunami Warning System - Australia

Joint Media Release, 10 May 2005
Australia: The Minister for Foreign Affairs, Alexander Downer and The Attorney-General, Philip Ruddock
http://www.reliefweb.int/rw/RWB.NSF/db900SID/RMOI-6CB4UV?OpenDocument

Following the tragic events of the Indian Ocean tsunami in December last year, the Australian Government has announced a major initiative to establish an Australian National Tsunami Warning System.

This initiative will provide a comprehensive tsunami warning system for Australia, support international efforts to establish an Indian Ocean tsunami warning system and will contribute to the facilitation of tsunami warnings for the South West Pacific.

The Government will provide $68.9 million over four years to establish a national tsunami warning centre, to be managed jointly by the Bureau of Meteorology and Geoscience Australia. It will be one of the first Indian Ocean regional warning systems, and will join the planned network of national systems which collectively will form the Indian Ocean Tsunami Warning System.

Australia is surrounded by 8,000 kilometres of active tectonic plate boundary capable of generating tsunamis with the potential to reach our coastline within two to four hours. One third of earthquakes worldwide occur along these boundaries.

This initiative will provide an around-the-clock tsunami monitoring and analysis capacity for Australia, integrated into our well-established emergency management arrangements. The existing sea-level gauge and seismic network will be upgraded and expanded to ensure accurate and timely tsunami warnings.

The Government also will establish national tsunami education and training programmes to be implemented by Emergency Management Australia. A National Tsunami Emergency Management Plan will also be developed and exercised through EMA. Technical assistance programmes will help build the capacity of scientists and technicians in the South West Pacific and Indian Oceans.

The initiative also includes a contribution to UNESCO's Intergovernmental Oceanographic Commission, the coordinating body for the establishment of an Indian Ocean Tsunami Warning System.

This measure ensures Australia will continue to play a leading diplomatic, scientific and technical role in international efforts to establish a durable and effective Indian Ocean tsunami warning system.

It also demonstrates our strong commitment to assist our Pacific Island neighbours to address the tsunami threat. ♦

Thanks to Wayne Johnston for relaying this press release to *TsuInfo Alert.*

The Fire of Rice Sheaves

Refuge experience of residents in Hiro, Wakayama against the Ansei-Nankai Earthquake Tsunami occurred on 24 December 1854 (By T. Nakai referring to "Living God" by R. Hearn, appeared in a state textbook of primary school approved by the Ministry of Education, Science and Culture of Japan in 1937, and translated by Dr. O. Muta, Murdoch University, Australia)

"It is not normal," Gohei muttered to himself as he came out of his house. The earthquake was not particularly violent. But the long and slow tremor and the rumbling of the earth were not of the kind old Gohei had ever experienced. It was ominous.

Worriedly he looked down from his garden at the village below. Villagers were so absorbed in the preparation of a harvest festival that they seemed not to notice the earthquake.

Turning his eyes now to the sea, Gohei was transfixed at the sight. Waves were moving back to the sea against the wind. At the next moment the expanse of the sand and black base of rocks came into view.

"My God! It must be the tsunami", Gohei thought. If he didn't do something, the lives of four hundred villagers would be swallowed along with the village. He could not lose even a minute.

"That's it!' he cried and ran into the house. Gohei immediately ran out of the house with a big pine torch. There were piles of rice sheaves lying there ready for collection. "It is a shame I have to burn them, but with this I can save the lives of the villagers." Gohei suddenly lighted one of the rice sheaves. A flame rose instantly fanned by the wind. He ran frantically among the sheaves to light them.

Having lit all the sheaves in his rice field, Gohei threw away the torch. As if dazed he stood there and looked at the sea. The sun was already down and it was getting dark. The fire of the rice sheaves rose high in the sky. Someone saw the fire and began to ring the bell of the mountain temple.

"Fire! It is the squire's house!" Young men of the village shouted and ran hurriedly to the hill. Old people, women and children followed the young men. To Gohei, who has looking down from the hill, their pace seemed as slow as ants. He felt impatient. Finally about twenty young men ran up to him. They were going to extinguish the fire. "Leave them! There will be a disaster. Have the villagers come here." Gohei shouted in a loud voice. The villagers gathered one by one. He counted the old and young men and women as they came. The people looked at the burning sheaves and Gohei in turn.

At that time he shouted with all his might. "Look over there! It is coming." They looked through the dim light of disk to where Gohei pointed. At the edge of the sea in the distance they saw a thin dark line. As they watched, it became wider and thicker, rapidly surging forward.

"It is the tsunami!" Someone cried. No sooner than they saw the water in front of them as high as a cliff, crashing against the land, they felt the weight as if a mountain was crushing them. They heard a noise as if a hundred thunders roared all at once. The people involuntarily jumped back. They could not see for a while anything but clouds of spray which had advanced to the hill like clouds.

They saw the white fearful sea passing violently over their village. The water moved to and fro over the village two or three times. On the hill there was no voice for a while. The villagers were gazing down in blank dismay at the place where their village had been. It was now gone without a trace, excavated by the waves.

The fire of the rice sheaves began to rise again fanned by the wind. It illuminated the darkened surroundings. The villagers recovered their senses for the first time and realized they had been saved by this fire. In silence they knelt down before Gohei.

From: Tsuchiya, Yoshito; Shuto Nobuo, editors, Tsunami: Progress in Prediction, Disaster Prevention and Warning: Kluwer Academic Publishers, p. xvii-xviii. ♦

[NOTE: *TsuInfo* has a VHS copy of the animated film, THE WAVE, which is a re-telling of this story. See Video Reservations, page 22.]

Material added to the National Tsunami Hazard Mitigation Program Library
May - June 2005

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

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Indian Ocean – Andaman Island Earthquakes, 2004-2005

"The fault slipped by as much as 50 feet (15 meters) in places, averaging about 33 feet (10 meters) of displacement along the segment off the northwestern tip of Sumatra where the quake was centered.

The earthquake rupture ran a distance equivalent to the area from Jacksonville, Fla., to Boston, Mass.," said Charles Ammon, a geoscientist at Penn State University and lead author of one of the reports (May issue of *Science*). "This earthquake lasted just under 10 minutes, while most large earthquakes take only a few seconds."

From the epicenter, the rupture expanded along the fault at a speed of about 1.5 miles 92.5 kilometers) per second toward the north-northwest."

From: http://www.infozine.com/news/stories/op/storiesView/sid/7293/ Analysis of the Sumatra-Andaman Earthquake Reveals Longest Fault Rupture Ever ♦

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corrected 2-15-2005

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

VIDEO RESERVATIONS

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

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

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

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

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

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

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

Disaster Mitigation Campaign (15 min.). Ameri-can 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 infor-mation about the Jan. 1700 Cascadia earthquake and tsunami; Walter C. Dudley talks about Hawaiian tsunamis and warning systems.

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

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

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

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

Ocean Fury--Tsunamis in Alaska (25 min.) 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). (*continued on next page*)

Video Reservations (*continued*)

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

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

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

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

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

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

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

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

Updated June 2, 2005 ♦

More Indian Ocean tsunami videos/photos
www.asiantsunamivideos.com/

Tsunami Glossary, part one

Hereafter, in each issue of *TsuInfo Alert*, we will print selections from the *Tsunami Glossary* (ITIC and UNESCO, 2003), as space allows.

A

Air-coupled tsunami…..synonym for atmospheric tsunami.

Arrival time…..time of the first maximum of the tsunami waves.

Atmospheric tsunami…..tsunami-like waves generated by a rapidly moving atmospheric pressure front moving over a shallow sea at about the same speed as the waves, allowing them to couple.

Naval survey

The [British] Royal Navy's hydrographic survey ship HMS Scott is mapping the ocean floor, along the tectonic boundary in the Indian Ocean where a magnitude 9 earthquake on 26 December [2004] triggered triggered huge tsunami waves.

The data from Scott's high-resolution multi-beam sonar equipment will be used by scientists to help them understand better the region's geology.

Researchers involved in the project believe the images may help in the design of the tsunami early warning system to be built in the region.

Images of the ocean floor have been released and can be seen at http://www.royalnavy.mod.uk/static/pages/8296 and http://news.bbc.co.uk/2/hi/science/nature/247409.stm ♦

Infrequently Asked Questions

Compiled by Lee Walkling

Besides submarine landslides, volcanic eruptions, earthquakes and meteor impacts, what can cause tsunamis?

Indirectly, gas hydrates can cause tsunamis, because they can trigger submarine landslides and slumping.

From: Yalciner, Ahmet C.; Pelinovsky, Efim N.; Okal, Emile; Synolakis, Costas E., editors, 2003, Submarine landslides and tsunamis--Proceedings of the NATO Advanced Research Workshop on Underwater ground failures on tsunami generation, modeling, risk and mitigation, Istanbul, Turkey, May 23-26, 2001: Kluwer Academic Publishers, p. 167

Ok, you know tsunamis can travel up to 600 mph. How many kilometers per hour is that? How many knots?

Tsunamis can travel up to 600 mph (965 km per hour) or (521 knots).

From: http://wwp.mega-tsunami.com/

Which killer tsunami is missing from this chart?

Deadliest Tsunamis in History

Fatalities	Year	Magnitude	Principal areas
283,106	2004	9.0	Indian Ocean
100,000	1410 B.C.		Crete-Santorini, Ancient Greece
60,000	1755	8.5	Portugal, Morocco
40,000	1782	7.0	South China Sea
36,500	1883		Krakatau, Indonesia
30,000	1707	8.4	Tokaido-Nankaido, Japan
26,360	1896	7.6	Sanriku, Japan
25,674	1868	8.5	Northern Chile
15,030	1792	6.4	Kyushu Island, Japan
13,486	1771	7.4	Ryukyu Trench, Japan

http://www.infoplease.com/ipa/A0930219.html

The December 28, 1908 earthquake/tsunami (7.2 magnitude) in the Messina Straits, Italy, which killed 70,000-100,000. (Thanks to Wayne Johnston for bringing this tsunami to our attention!)

What's a tsunameter?

"Without direct tsunami detection from tsunameters (DART buoys and bottom pressure recorders) in the deep ocean, it was impossible to even qualitatively forecast the tsunami propagation." http://www.usc.edu/dept/tsunamis/2005/index.html ♦