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Disaster Myths... Third in a Series

Epidemics after Natural Disasters: A Highly Contagious Myth

By Claude de Ville de Goyet

Consultant on Risk Management and Former Director, Emergency Preparedness Program,
Pan American Health Organization

Most “average, common-sense people-on-the-street” would probably agree that massive epidemics pose a major risk after earthquakes, tidal waves, hurricanes, and other major disasters. And many would consider the presence of dead bodies to be the main cause. To the consternation of seasoned experts, many health responders in the humanitarian community share these mistaken beliefs and perpetuate these misconceptions. Indeed these are among the most persistent and contagious disaster myths that the World Health Organization (WHO) and Pan American Health Organization (PAHO) have tried to eradicate. Sadly, they have had only limited success.

Most myths are based on some degree of truth. Indeed, dead bodies were the reservoir and source of the “Black Death” in Europe in the mid-fourteenth century, and it is also true that longstanding conflicts in failed states that resulted in war-induced famine and the destruction of health services have led to epidemics. Moreover, without doubt, major natural hazards wreak havoc on the environment, often potentially increasing the transmission of water- and vector-borne diseases. However, the likelihood of massive postdisaster epidemics is generally grossly exaggerated. In particular, unburied bodies are incorrectly perceived as a public health threat.

The Risk of Epidemics is Overstated

Unfortunately, some unfounded predictions concerning the threat of epidemics after disasters have originated from “authoritative sources.” For example, after 2004’s Hurricane Jeanne in Haiti (in which 3000 died), a warning of a possible cholera epidemic was issued, although cholera had not been present in Haiti for decades. Other statements from supposed authorities have included: “Over 10,000 may die from shigellosis outbreaks following the Nicaragua earthquake,”¹ and “We could have as many dying from communicable diseases as from the tsunami.”² In fact, almost every disaster—whether in a developed or developing country—has resulted in similarly alarming statements from health “experts.” Of course, these statements immediately found their way into the mass media.

This may be explained by another survey finding that “those too young, too old, and too weak to hold on to the trees” were lost in the storm.³ The same mortality pattern was observed in the 2004 Indian Ocean tsunami, but no comparative health survey was carried out in spite of the abundance of resources mobilized for epidemiological study and control.

(continued on page 3)

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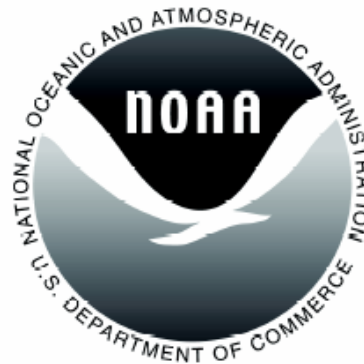
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WASHINGTON STATE DEPARTMENT OF
Natural Resources
Doug Sutherland - Commissioner of Public Lands



(continued from page 1)

Such findings should not be construed to show that there is no risk of increased disease transmission after a disaster. Overcrowding, poor sanitation, or contaminated water definitely can contribute to public health problems. What must be determined is the degree to which public health deterioration is attributable to the disaster. In poor countries where unsanitary conditions often are the norm, disaster-induced deterioration of public health may be minimal and quickly reversed or even improved by humanitarian assistance. Somewhat ironically, developed countries have much more to lose, given their initially higher health standards, but greater awareness and resources in those countries usually compensates, or even overcompensates, for any adverse changes in public health.

Dead Bodies are not a Public Health Hazard

Associating epidemics with the presence of human remains after an accident, conflict, or disaster is a deeply ingrained myth in Western culture. Cholera, typhoid fever, typhus, smallpox, and other diseases are caused by specific pathogens for which a decaying body is not a particularly favorable environment. If the causal agent was ever present—a rare occurrence in a normally healthy population—the micro-organisms quickly cease to proliferate and progressively die off in cadavers. In other words, a human carrier of any disease is less of a hazard dead than alive. Except for the risk of directly contaminating water, dead bodies pose no credible public health risk for the general population. It is even less rational to alarm an already traumatized population when bodies have been buried by landslides or earthquakes.

When Disaster Myths Get in the Way of Planning and Response

Using scaremonger tactics to promote public health is counterproductive. Such an approach damages the credibility of relief agencies and diverts resources away from real priorities. Adopting proper public health measures requires cooperation from the public and the support of funding agencies. Such cooperation is based on trust and credibility, and ultimately, exaggerated warnings can only undermine that trust. Such warnings can prompt authorities to overact and employ extraordinary measures to control the “risk.” For example, massive spraying to control disease vectors can become a substitute for proper solid waste disposal. Improvised, unneeded mass vaccination campaigns against diseases that are not locally present can become a political necessity, as occurred with cholera immunization in Aceh Province, Indonesia, after the 2004 tsunami. Besides being an unnecessary expenditure of time, money, and human resources, these immunization campaigns can be a significant inconvenience for a population already under considerable stress.

The more visible and expensive the response measures employed, the greater the false sense of security they induce. The resources mistakenly allocated for these measures could be better used to strengthen routine public health programs, improve water and sanitation, or support the recovery process. Indeed, as with consequence management in terrorism events, the most effective use of resources is to strengthen the capacity of the local health services before any emergency.

Treating dead bodies as a public health threat affects the population more directly. Mass burials or cremations unnecessarily heighten the drama of a disaster and have potentially serious mental, social, and legal consequences. In all cultures, the process of identifying the dead and conducting a ritual burial is an essential part of the grieving process (witness, for example, the effort and money spent by the United States to identify human remains decades after the Vietnam War). Proper handling of cadavers reflects the real need of affected families to respect and honor their lost relatives. Summarily disposing of bodies in mass graves violates the human rights of the survivors.

Further, the legal and financial complications related to a missing person also have considerable implications for the welfare and subsistence of family members. Since the 2004 tsunami, national authorities in Sri Lanka and Thailand have become much more aware of the importance of proper identification and handling of human remains. Unfortunately, the mass media and unknowledgeable responders help to keep alive the myth of the need for speedy burial.

Current Research

The overwhelming magnitude of the problem of human remains after the 2004 tsunami and the unusual sight of dead bodies in the streets of New Orleans has resulted in several studies and publications—from PAHO guidelines⁴ to editorials in disaster journals⁵ to systematic reviews of past disasters.

Lacking thorough research, little is actually known about the survival of human pathogens in the deceased. Even if active multiplication stops rapidly, how long the pathogens can survive is still matter of scientific guesswork. Sample-based surveys with control groups (unaffected populations) could be used to assess the risk of epidemics according each type of disaster. It is regrettable that WHO did not see the need for such studies after recent disasters (even though other follow-up studies were well funded). Such studies should be planned now in advance of the next major disaster.

Why so Little Progress, and Where Do We Go from Here?

In the last several years a number of publications and articles have been issued regarding this problem. Yet the

issue is not so much one of research but of adoption of the conclusions and recommendations of existing research, the timely subject of the first entry in this Disaster Myths series, which appeared in the September issue of the *[Natural Hazards] Observer*. Disagreement, when there is any, tends to be not scientific but emotional – accepting the realities rather than the myth goes against what we have believed for centuries.

There are, however, some troubling outcomes that can reinforce these myths. Doomsday predictions, when disseminated by the mass media, do pay off in the short term. It's a win-win situation. When an outbreak does not materialize, credit goes to the effectiveness of health agencies and the extreme measures taken. When the number of reported cases of a disease does increase (whether or not the increase is attributable to the disaster or to better surveillance), the need for more resources is confirmed.

Repudiating this disaster myth may ruin the reputation of an expert or decision maker brave enough to try to calm the public and dispel a longstanding misconception. Hence, many national or international experts privately disagreed with the alarmist predictions made in the wake of Hurricane Katrina, the 2004 tsunami, or the recent earthquakes in Asia, but publicly remained silent. At the same time, there does seem to be an encouraging increase in responsible reporting by the media in more recent disasters—for example after the recent Philippines mudslide and Indonesian earthquake.

How can we move ahead? The debate about these issues must be broadened in the scientific and disaster communities. More editorials, research, and publications are needed. But above all, the public must be increasingly involved and made aware through the mass media. The launching of a public education campaign associated with the proactive release of scientifically sound statements in the immediate aftermath of disasters may force the issue onto the front page of responsible publications and prevent the spread of alarmist statements. Educating the public is costly but indispensable.

Resources

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www.cbsnews.com/stories/2004/12/28/world/main663462.shtml
- (3) A. Sommer and W.H. Mosley. 1973. "The Cyclone: Medical Assessment and Determination of Relief and Rehabilitation Needs." p.125 in Lincoln C. Chen, editor, *Disaster in Bangladesh – Health Crises in a Developing Nation*. London: Oxford University Press.
- (4) Pan American Health Organization. 2004. *Management of Dead Bodies after Disasters: A Field*

Manual for First Responders. Washington, D.C.: PAHO and World Health Organization. 194 pp.
www.paho.org/english/dd/ped/ManejoCadaveres.htm
(5) See, for example, the forthcoming editorial in the *Journal of Prehospital and Disaster Medicine*, January-February 2007 issue.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 4-6
<http://www.colorado.edu/hazards/o/archives/2007/jan07/index.html> ♦

Tsunami videos

Teledrama addresses challenges by tsunami hit

In September 2006, "The East is Calling," a tele-drama, began in Sri Lanka, directed by renowned filmmaker Asoka Handagama and produced by Young Asia Television. It is funded by the US Agency for International Development (USAID).

"The East is Calling" delivers a fundamental message that respect for one another's feelings will lead to peaceful coexistence in a dramatic and entertaining way," said USAID mission director Rebecca Cohn at the inauguration. The show deals with post-tsunami situations and problems.

Indonesian tsunami relief documentary online

http://www.chrisvalentines.com/projects/indo_play.html

Becoming Family—A tsunami relief documentary

"Filmed on location in Sri Lanka, this documentary features the 2005 Grammy award-winning song "Sometimes You Can't Make It On Your Own" by U2."

<http://www.typecastingfilms.com/becomingfamily>

And the Sea Took Us—The effects and relief efforts

The 65 minute-movie chronicles the effects of the tsunami on the village of Marwella, and the relief efforts of all the generous foreign aid workers, based on footage taken by William Prosser. Narrated by Michelle Phillips, the film won the "Best Educational Documentary" award at the 2006 Docufest Atlanta Film Festival.

<http://www.williamprosser.com/andtheseatookus.html>

Tsunami—The Forgotten Danger

This video includes the history, hazards, and protective measures concerning tsunamis. The video was prepared by JAM Media (San Juan, P.R.) and it has been freely distributed to many schools, governmental and private agencies. To obtain copies of the documentary (VHS or DVD) contact the Puerto Rico Seismic Network
Teléfonos: 787-833-8433, 787-265-5452. It is available in English and Spanish.

New DVD version of this documentary, produced in Puerto Rico, is available to download at
<http://poseidon.uprm.edu/weblog.html> ♦

Dealing with Foreign Dead: An Evolution of Mass-Casualty Identification

By Joseph Scanlon

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<http://www.colorado.edu/hazards/o/archives/2006/may06/may06d.html>

Natural Hazards Observer, v. 30, no. 5, p. 10-11, May 2006

An estimated 250-300,000 people were killed by the 2004 Indian Ocean tsunami, but only 5-6,000 of the bodies have been formally identified, most of which were foreigners. The remaining bodies were buried in mass graves. This was especially true in Indonesia, where neither the resources nor the facilities were available to formally identify the overwhelming number of victims. Using the tsunami tragedy as a backdrop, this article briefly examines how countries deal with mass casualties among which there are significant numbers of foreigners.

Existing Guidelines and Beliefs

Guidelines for handling mass-death situations developed by the International Police Criminal Organization (Interpol) state that sites must be tightly controlled, bodies should not be moved until marked and photographed, and all bodies should be identified. These guidelines may be suitable following an air crash or a terrorist attack on a building, but they have little relevance to a widespread destructive incident like the tsunami.⁽¹⁾ After the tsunami, the bodies were taken to public buildings, such as temples and hospital emergency wards, where there were no records identifying the dead or where they came from.

Despite this general approach, there were massive efforts in Thailand and Sri Lanka to identify the many foreign dead, showing respect for the Western belief that the dead have a right to be identified: "The State has a duty to protect those fundamental human rights . . . such as the rights to physical and moral integrity of individuals, religious freedom, and respect for the customs of indigenous peoples. These rights can be violated if the authorities . . . refuse to recover the corpses; remove it improperly; if they are careless when identifying them; or if they disregard religious rituals and cultural beliefs when burying the remains."⁽²⁾

A History of Mass-Casualty Identification

In the past, countries that have suffered disaster-related mass fatalities have normally dealt with the dead themselves. They may have asked for help with next of kin and collection of predeath data, such as medical records, but they retained control. Examples include Canada's response to the 1998 crash of Swissair 111, the United States' response to 9/11, and the United

Kingdom's response to the recent terrorist attacks on London transport.

Exceptions to this norm have included incidents that involved Israelis, where exceptional efforts were made to satisfy the strict requirements of a rabbinic court: after an air crash in Sudan, an Israeli police forensic anthropologist hired human trackers to find the bones of the Israeli pilot. Also, there have been disasters in which a large number of the fatalities were not nationals of the country of incident. In some of these instances, removal of the bodies to their home countries was allowed. In 1985, after an air crash involving U.S. soldiers in Gander, Newfoundland, Canada relinquished the bodies to the United States. Following the 1990 fire aboard the *Scandinavian Star*, the ferry was towed into the Swedish port of Lysekil; the bodies were removed and taken to Oslo, Norway, the point of origin for the ill-fated voyage. Similarly, the bodies of the victims in the 1977 KLM-Pan Am collision in Tenerife (Canary Islands) were flown to the originating countries, the Netherlands and the United States, respectively.

Despite these exceptions, the first major change to the handling of mass casualties is considered to be the 2002 nightclub bombings in Bali. So many of the dead were Australian that Indonesia agreed to let the Australian Federal Police serve as the lead agency in support of the Indonesian police. The two countries worked together to identify the dead and investigate the bombings. The formal agreement between the two countries and the informal assistance received from other countries marked the beginning of truly multinational mass-casualty efforts.

Efforts in Sri Lanka and Thailand

The response to the tsunami demonstrated similar efforts. In Thailand and Sri Lanka, an unprecedented agreement allowed hundreds of foreign police and forensic scientists from dozens of countries to work cooperatively to identify the bodies. It was agreed that everyone would follow strict Interpol Disaster Victim Identification (DVI) procedures and only fingerprints, dental records, or DNA would suffice as proof of identity. Final procedural approval rested with the host government: the Thai police in Thailand and the chief coroner in Sri Lanka.

In Thailand, bodies were laid on the ground in temple courtyards. Only those who had been visually identified were buried or cremated. But in Sri Lanka, many of the dead had been buried, forcing Austrian, German, and British police to locate foreign graves and request exhumation orders. DVI was performed on all of the dead in Thailand, including the Thais, which was initially less successful because of the lack of predeath data, such as fingerprints and dental records. In Sri Lanka, most of those identified were foreigners because the government had ordered foreign bodies to be shipped to the morgue in Colombo. They placed no restraints on the burial of

indigenous dead. Sri Lankans were only formally identified if they were buried with foreigners and their bodies were among those exhumed.

As recently as the 2002 Bali bombings, matching up predeath and postdeath Interpol forms involved sorting through paper. The tsunami response was much more sophisticated. Data was entered into two computer systems, DVI System International (everything but fingerprints), which is based on Interpol's standards, and SAGEM, the French version of the Federal Bureau of Investigation's (FBI) Automated Fingerprint Identification System. Both generated possible matches.

Despite the cooperative efforts and the technological advances, not everything worked. Some European investigators used methods others objected to. Errors were made in entering data, sometimes because of illegible handwriting. And initial DNA samples were often inadequate and contaminated, which ultimately led to a change in the way samples were taken.

Contributions to Mass-Casualty Identification

Among the tsunami's many legacies are the establishment of DVI System International as the international software standard for victim identification and the familiarity of Interpol's pre- and postdeath forms to police everywhere. Another development is the acceptance of an FBI technique for obtaining fingerprints from the second layer of skin by boiling hands. And because of the problems with DNA, it is no longer seen as the solution to all problems of identification. Most important, however, is the fact that there is increased solidarity among the international mass-death network of police and forensic scientists. Despite these advances, it seems unlikely that the full extent of these improvements and relationships will be called on in the near future for it is hard to imagine an event similar to the tsunami, one that kills people from every continent but Antarctica and is as welcoming to foreign assistance and involvement as Thailand and Sri Lanka.

The tsunami response raises questions:

- Is it appropriate to spend so much money identifying victims of a mass-death incident?
- Is it appropriate that individuals from some countries are identified while others are buried in mass graves?
- Would wealthy countries (e.g., those in Europe or North America) commit sufficient resources to identify all the dead if thousands or tens of thousands died in an incident within their boundaries?

Cultural, religious, and legal matters affect the emphasis on recovery and identification of the dead. Some view bodies as empty husks. Westerners believe a body should be identified for emotional reasons—closure—and to eliminate legal complications. Yet the question re-

mains: How many dead is too many to justify processing all who died?

Past disaster research about handling of the dead comes from developed countries—the United States, Canada, Italy, and Japan.[\(3,4,5,6\)](#) The tsunami findings, part of a study funded by the National Science Foundation and headed by Henry Fischer of Millersville University of Pennsylvania, come from a cross-cultural study involving scores of countries. The results, which could have relevance for future mass-death situations, whether caused by a natural hazard, a terrorist attack, or, perhaps, even a pandemic, were shared with Interpol, discussed at the 2005 Hazards Research and Applications Workshop in Boulder, Colorado, and will be the subject of a full session at the World Congress on Sociology's International Research Committee on Disasters meeting in Durban, South Africa, in July. For years, E.L. Quarantelli and others have been calling for cross-cultural research.[\(7\)](#) Perhaps the study of the handling of the tsunami dead will be the start of a long-desired trend.

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- (4) Pine, Vanderlyn. 1974. Grief work and dirty work: The aftermath of an air crash. *OMEGA* 5 (4): 281-86.
- (5) Quarantelli, E.L. 1979. The Vaiont Dam overflow: A case study of extra-community responses in massive disasters. *Disasters* 3 (2): 199-212.
- (6) Nishimura, Akiyoshi. 1997. Medical examination report on the Great Hanshai earthquake. In *Proceedings of the 3rd International Symposium of the International Advances in Legal Medicine*, ed. Choei Wakasugi, 234-38.
- (7) Quarantelli, E.L., and Verta Taylor. 1976. Some needed cross-cultural studies of disaster behavior. Paper presented at the Natural Hazards Symposium, Canberra, Australia. ♦

Banda Aceh tsunami museum

Funded by the Hyogo prefectural government, the Japanese Red Cross and other organizations, the Indonesian government plans to build a tsunami museum in Banda Aceh to commemorate the devastating December 24, 2004 tsunami and its victims. ♦

NTHMP Final Meeting Notes

November 1, 2006, Silver Spring, MD

Opening Remarks were given by the NTHMP Chair, John Jones (NOAA)

Subcommittee briefs from the previous day's meetings were presented:

Mitigation Sub-Committee – Chris Jonientz-Trisler (FEMA)

- Comments to hazard mitigation report are due Nov 22, 2006
- Funding frustration – more work needs to be done
- Funding should be based on risk and relative maturity of state
- How to draw in new states
Would require them to create a 5 year plan
- TsunamiReady Changes
- Re-convening of the Mapping Sub-Committee was discussed

Action Items

- Specific Action Items from the Mitigation Sub-Committee will be included in the minutes of the subcommittee meeting (distributed by the Sub-Committee Chair)

Warning Coordination Sub-Committee - Paul Whitmore (NOAA)

- Reviewed Action Items
- Review panel for scientific criteria
- Follow-up regarding problems with NOAA weather radio coverage
- Review current warning message structure

Action Items

- Specific Action Items from the Warning Coordination Sub-Committee will be included in the minutes of the sub-Committee meeting (distributed by the Sub-Committee Chair)

NTHMP SDR and GAO Recommendations - David Green (NOAA)

- SDR (Sub-Committee for Disaster Reduction) calls for actions in nine areas
- The NTHMP program is expanding
- The proposed framework for governance of the NTHMP has not been officially approved
- The GAO report has proposed 6 recommendations for the program
- The NOAA administrator to meet with FEMA and USGS regarding multi-agency requirement for loss estimation software that was identified in the GAO report.

SDR Implementation Plan Actions –Jenifer Rhoades (NOAA)

- Response to SDR Framework Document

- Provided an overview and timeframe for the draft implementation plan
 - Draft for NTHMP Review by end of Nov. 2006
 - Final Plan March 2007
- The states requested a copy of the draft plan as it is currently exists. Jen stated that the plan will be sent out after the conference
- Questions regarding how the individual plans are being incorporated into the overall plan
 - Jen indicated that the more detailed individual plans can be used as guiding documents within NTHMP

Action Item

- Send out draft to NTHMP for review (Rhoades)

Tsunami Data Management Plan - Susan McLean (NOAA)

- Presented an overview of the plan (copies were provided)
- Adding pre-historic tsunami data to a separate National Geophysical Data Center (NGDC) database
- Talking to NOAA librarian regarding how to add a bibliographic database
 - 1 librarian salary (cost)
- Question regarding the status of NTHMP website
 - Would like it to have the capability to look at specific areas (meta data)
- Missing model input data
- Questions on real-time access and mirroring for the states

Action Item

- Request that all surveys be sent to the Pacific Region
- How do states contact in NOAA for now and in the future for bathymetric and topographic information?
- Is NOAA in touch with Navy Research Lab regarding what they are doing in this area?

NTHMP Assessment - Jenifer Rhoades (NOAA)

- Response to GAO Recommendation for an assessment of NTHMP
- NTHMP Telecom in July determined an external review would be best. Team was formed to come up with review criteria and a list of recommended external reviewers.
- Jen provided an overview of the review criteria
- Looking at holding the review for a period of 3-5 days in March
- Presented a list of potential reviewers

Action Item

- Requested NTHMP provide comments to Jenifer on what was presented at the meeting. Assessment criteria distributed at meeting; Information on the assessment will be sent out to NTHMP and request comments by a specific date. (Rhoades)

Tsunami Research Review Plan - Eddie Bernard (NOAA)

- National Tsunami Research Plan, Draft 10/27/2006 – Copies distributed for review
- Plan will be finalized March 2007
- Comments on draft due December 31, 2006
- Strategic Plan for Tsunami research
 - NOAA and USGS make up 80% of federal funds in this area
 - Mostly on warning infrastructure
- Report recommendations
 - Enhance and sustain tsunami education
 - Improve warnings
 - Develop effective mitigation tools
 - Understand impacts of tsunamis on coasts
 - Improve characterization of tsunami sources
 - Develop tsunami data acquisition, archival and retrieval system
- Discussed Action items
 - What to do next with the report?
 - Do we need to do an annual review?

Additional ideas

- Publish report as a NOAA technical bulletin
- Produce a brief action plan which also identifies who should have lead responsibility
- Develop a research agenda for the national program
- USGS stated that the draft report will be of use to them
- NSF will help direct proposal but not funding

John Jones stated that the federal partners needed to get together and determine what items from the Research Plan should go into the implementation plan.

U.S. Draft Coastal Hazard Assessment - Paula Dunbar (NOAA)

- Joint NOAA (NGDC) and USGS effort to respond to the SDR
- Presented an overview of the report which will be sent out for review. Comments are due on December 4, 2006.
- Went over a table in the report that captured tsunami event runups by state and region, deaths, dollar damage, and total number of runups. Data was from NGDC database for the years 1690 to present.
- There was questions from the group concerning why the report only looked at US deaths in the US Caribbean and not exposure of Americans for the whole of the Caribbean. May need to add a caveat to the report to state that the view/coverage was limited to responding to the SDR

Federal Partner Briefs

NSF (National Science Foundation):

Global Seismic Network – David Simpson (IRIS)

- Operated by USGS Laboratory in New Mexico and University of California
- Consists of 141 stations around the world that feed data to the warning centers
- Free and open data located on the internet
- The best seismographic machine was made by a Swiss individual who is retiring. Currently there is no replacement identified

Reasons for success

- Accepted Standards
- Open data policy
- Fundamental application
- Long-term and stable applications

National Science Foundation- Rick Frigaszy

- Overview of grant program and how the funds are distributed
- 6.3 million went to tsunami program research in FY05
- other than support for the Tsunami wave basin through NEES, the amount of funding for tsunami research depends on competitiveness of proposals – there is no budget at NSF dedicated only to tsunami research
- All NFS data that is produced through the grants are published and made public
- Very competitive process

U.S. Geological Survey – Bill Leith

- Overview of what they have done to improve the warning system
 - Upgrades to the National Earthquake Information Center
 - Upgraded the software and hardware for Hydra
 - Increased staff 24X7
 - Improved speed and accuracy of earthquake information
 - Release initial data and then updates rather than wait for additional data
 - Upgraded sensor stations
 - Expanded network in the Caribbean
- Mapping of faults and slopes
 - Research grants
- On-line data
- Earthquake notification system now sent to email and wireless devices
- CISN displays
- Working with the state of Washington to visit tribes and giving training on computers and use of CISN

NOAA

David Green

- Risk assessment is where we are heading
- Moving from warnings to forecasting
- Working on rolling up the various plans

Vasily Titov

- Overview of report *The Potential for a Tsunami for Pearl Harbor, HI*

FEMA – Dave Maustad

- Working on mitigation maps and flood maps as part of FEMA's flood insurance program
- Discussed FEMA's joint pilot effort with NOAA and USGS for modernization of flood hazard maps. Distributed copies of the Seaside Oregon Tsunami Pilot study dated August 2006.
- Need to incorporate education in state mitigation plans
- Stated that FEMA's flood insurance program can cover tsunamis
- Stated that all 50 states have approved hazard plans and that roughly 9000 communities have approved plans – the plans are not yet in a database for retrieval

NIST (National Institute of Standards and Technology) – Jack Hayes

- Presented an overview of the National Earthquake Hazards Reduction Program
- Was reauthorized in October 2004 (PL 180-360) for 2005-2009
- Program oversight includes:
 - Coordination committee (Directors of NOAA, USGS, FEMA & NSF as well as OMB & White House Office of Science Technology and Policy)
 - Advisory committee (11 members all non-federal, 3 yr terms, report to Director of NIST)
- Programs strategic plan is posted on website www.nehrp.gov
- Management plan is being developed
- Working on how to handle a coordinated multi-agency budget
- Have stakeholder conferences
- Required to report to Congress annually
- Conducting a gap analysis for the program

NOAA Public Affairs – Theresa Eisenman

- Presented an overview of NOAA is using the media to educate the public
- Asked how NOAA public affairs could be of assistance to the program and states
- Comments from participants:
 - Would like developed after event media reports
 - Advice/assistance on getting media's attention /coverage of tsunami tests
 - Proactive web presence that would contain immediate updates
 - Provided input regarding b-roll located at the ITIC

- Help with crafting National Tsunami Hazard Program Message
- A focus group with national media to help the states get their message out
- Setting up of a sharing arrangement with the states for media monitoring information

House Science Majority Staffer- Amy Carroll

- H.R. 1674 for \$30 million – 70% warning, 20% NHTMP, 10% Research
- Difference in funding levels between house and senate, was not worked out prior to recess
- Elections will have an impact on budget – maybe a lame duck session- Agencies are under a continuing resolution

NTHMP Final Meeting Notes

November 2, 2006 Silver Spring, MD

Jenifer Rhoades re-convened the meeting.

Tsunami Mapping Sub-Committee Re-instatement – George Priest (Oregon/Dogami)

- Last meeting of the group was 3 years ago – no action on items
- Question for group, “Should the group be re-established?” – Answer was “Yes.”
 - Goals
 - Scientifically creditable maps
 - Useful maps that are used
 - Virtual community of maps

Action Items

- 5 pacific states and Puerto Rico send summaries of their mapping procedures to George Priest for compilation and distribution
- What would be the objective of group effort?
 - Structure
 - Will NOAA support the group and provide leadership
 - Host web site/blog/forum – information needs to be accessible
 - Technology transfer
 - Funding out of National program
- Alaska will work with NGDC to develop a way to show the data
- Should NTHMP establish minimum review standards for map products?
- Peer review of NTHMP maps?
- Benchmark testing and peer review journal articles
- Send George Priest inundation map review process

Steering Committee Meeting

Steering Committee Voting Structure

- It was put on the floor that NTHMP needed to official determine a new voting structure due to its expansion from a membership of 5 states to 28 states, territories and commonwealths.

Several proposals were discussed:

- Proposal #1
 - USGS – NOAA-FEMA-NSF - 1 vote each
 - Western states, HI, and AK – 3 votes
 - Southern states, PR, and VI – 2 votes
 - Eastern States – 1 vote
- Proposal #2
 - USGS – NOAA-FEMA-NSF - 1 vote each
 - Eastern and southern states – 1 vote
 - PR and VI – 1 vote
 - Western states, HI, and AK – 3 votes
- Proposal #3
 - USGS – NOAA-FEMA-NSF - 1 vote each
 - Western states, HI, and AK - 1 vote each
 - PR and VI – 2 votes
 - Eastern States – 1 vote
- Proposal #4
 - Group PR, VI, and Southern states
 - Eastern States
 - Western states, HI, and AK
- Proposal #5
 - CA, OR, WA, AK, HI – 5 votes (1 ea.)
 - 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)
 - FEMA-USGS-NOAA-NSF – 2 votes each

Federal total -8 State total -10

Tie vote goes to chair

Written proxy from a non-attending member must verify voting preference

A motion to vote to accept Proposal 5 was put on the floor and seconded. Proposal #5 was unanimously accepted by the group as the new steering committee voting structure.

Proposal Structure

Jenifer Rhoades discussed the current information contained in the proposals. She stated that the current proposals did not reflect the true needs of the states. She asked if NTHMP would like to have a revised proposal structure in place for the next annual meeting.

It was suggested that proposals should include 5-year budgets as well as outcomes, needs/requirements to be used to validate funding requests.

A motion was proposed that Jen (NOAA) develop a structure template for the 5 yr budget plan and will

include objectives and performance measures and seconded. The Motion passed.

Proposals

Hawaii – Walt Dudley and Jeanne Johnston

- Provided information on the tasks they will accomplish with funding in FY2007.
- Discussed a possible multi-state effort to have a Tsunami-POD/Van that could be taken to various locations around the country for tsunami education and outreach efforts.
- Oregon expressed interest in collaborating on the effort – to work toward a proposal for next year. Oregon also asked for any other products that others have created so he can use it for their new program.

Oregon – George Priest

Alaska – Scott Simmons

California – Rich Eisner

Puerto Rico – Christa Von-Hillebrandt

USVI (U.S. Virgin Islands) – Christa Von-Hillebrandt (rep)

Guam – Leo Espia

- Program has more requirements than estimated funding. Discussion on how to help Guam through partnerships without increase expense.
- Discussion on bringing states on board at a higher level of readiness. Especially since the Federal partners have gone through the smaller steps.
- Discussion on using Homeland Security grants for buying the sirens instead of putting it in the NHTMP budget requests.

Southern States – Paul Whitmore (rep)

CREST (NOAA-Cooperative Remote Sensing Science and Technology Center) – Craig Weaver

Action Item - need to get together before next meeting to discuss Dave Green's effort on USGS Tsunami Warning- another path to get the word out

Question for USGS if their will be a time when CREST will be funded by another source. Answer was NO. It was proposed that Jones bring up USGS overhead costs at the Federal partners directors meetings. Long term NOAA support for technical infrastructure (CREST)

American Samoa – Jeff LaDouce (rep)

Washington State – George Crawford

- Presented an overview of the state's program and the following priorities that were identified by the governor.
 - Evacuation maps
 - Private land access
 - Mitigation workshops
 - Exercises and drills
 - Business project
 - TsunamiReady program
 - Unified response from government
 - Alerts and notifications
- The greatest response to the program has been the local tribes

NOAA – Jen Rhoades

NTHMP Budget Proposal Vote

- Jen stated that the program is using the 2006 funding level of 2.291 million and that the proposal requests exceed that amount. She also discussed the current budget situation at NOAA (Continuing Resolution) and how that will impact when the states receive the FY07 funds (sometime after April 2007).
- John Jones then presided over the discussion about how the program dollars would be dispersed in 2007.
- A budget allocation was proposed, a motion was given to accept the proposal, seconded, voted on and passed unanimously.
 - A copy of the approved budget allocation will be attached to this document.

Contract Status – Jen Rhoades

Jen mentioned the current 5-year contract with the original states will expire in June 2007. She will be working on new contracts between each state and NOAA during the fiscal year. The new contract will be for 5 years.

Next Meeting

A motion was proposed to hold only one national meeting each year and to have each NTHMP Region hold a separate meeting during the year (versus two national meetings per year). The motion was seconded and passed.

A motion was proposed to hold the next annual meeting in Hawaii during the Week of October 29, 2007. The motion was seconded and passed.

Washington State volunteered to host the meeting in 2008 to coincide with the Earthquake workshop in Seattle during the same time period.

End of Meeting Summary Discussions

- Looking for a robust NTHMP website; NOAA will resolve
- Need to keep meetings more focused on NTHMP items

- Need to keep some of the Feds that left early through the state presentation portion of the meeting
- Mapping Sub-Committee Meeting to be held at Sandy Point. A motion was proposed to have Roger Hansen (UAK) be Chair of the Mapping Sub-Committee. The motion was seconded and passed.
- Need to give feedback to states that had their projects not funded
- George Crawford will take lead on letters for Governors' signature

Meeting was commenced by John Jones. ♦

Tsunami Warning and Education Act passed

Legislative history (109th Congress):

HOUSE REPORTS: No. 109-698 (Comm. on Science).

SENATE REPORTS: No. 109-59 accompanying S. 50

(Comm. on Commerce, Science, and Transportation).

CONGRESSIONAL RECORD, Vol. 152 (2006):

Dec. 6, considered and passed House.

Dec. 8, considered and passed Senate.

The Tsunami Warning and Education Act became Public Law 109-424

An Act to authorize and strengthen the tsunami detection, forecast, warning, and mitigation program of the National Oceanic and Atmospheric Administration, to be carried out by the National Weather Service, and for other purposes. NOTE: Dec. 20, 2006 - [H.R. 1674]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, NOTE: Tsunami Warning and Education Act.

SECTION 1. NOTE: 33 USC 3201 note SHORT TITLE.

This Act may be cited as the "Tsunami Warning and Education Act".

SEC. 2. <<NOTE: 33 USC 3201.>> DEFINITIONS.

From: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_public_laws&docid=f:publ424.109 (full text of the act) ♦

Vietnam to open tsunami warning centre

Vietnam authorities say the country's first tsunami warning centre will be operational at the weekend.

The Hanoi-based centre will issue alerts using information from the country's 25 existing observation stations as well as warnings from centres in the Asia-Pacific region, including the United States.

From:

<http://www.radioaustralia.net.au/news/stories/s1841765.htm>

NEWS

NOAA's first Indian Ocean buoy

In a December 1, 2006 press release, a tsunami buoy was installed midway between Thailand and Sri Lanka, near the Andaman and Nicobar Islands. The cost of the device (about \$450,000) will be paid jointly by Thailand and the United States. The buoy is one of 22 tsunameters planned for the Indian Ocean's regional tsunami warning system.

The Nation, Phuket Gazette announced on Dec. 11, 2006, that the buoy had responded well during testing. In 2007 it is planned that 3 more buoys will be put in place off the coast of Phuket.

To see a mini-video of the buoy's deployment, go to http://www.thaisnews.com/news_detail.php?newsid=197876 (Andaman News TV11 Phuket)

Homeland Security to provide every public school with hazard warning radios

The U.S. government is planning to supply hazard warning radios to all 97,000 public schools in the United States, according to a breaking AP story.

The National Weather Service, part of the National Oceanic and Atmospheric Administration, operates more than 950 short-range radio stations. It has encouraged schools, business and homeowners to buy warning radios that are activated with a broadcast signal that automatically turns a radio on and announces a potential hazard.

The Homeland Security Department now has decided to provide \$5 million to make sure these radios are in every public school, NOAA Administrator Conrad Lautenbacher said. Originally conceived as a means to deliver weather warnings, the system now covers all hazards; for example, terrorism, abducted children and derailed trains carrying toxic materials.

Of course, it takes more than just having the warning radio. School authorities have to know what to do when an alarm sounds.

In announcing the plan to distribute the radios, NOAA pointed out that more than 10,000 major thunderstorms, 2,500 floods and 1,000 tornadoes hit the U. S. annually, and that hurricanes threaten the Gulf and East coasts.

Six states--Washington, Tennessee, North Carolina, Maryland, Florida and Mississippi--already mandate use of the radios in schools. NOAA said those schools will also be included in the new program to make sure they have the most recent models. Also included will be tribal schools and public schools in U.S. territories.

Typically the radios are smaller than a clock radio, have a battery backup in case of power loss and are sold at electronic and other stores for \$20 to \$80. Most can be programmed to respond only to warnings for a specific area, a county or city, for example.

Distribution is expected to begin in October and should take a few months.

The NOAA radio system covers about 97 percent of the country with the few gaps in some sparsely populated mountain areas.

<http://blog.lib.msu.edu/redtape/?p=1510>

D-River Wayside gets new tsunami siren—almost

By Garret Jaros

The News Guard, January 24, 2007

LINCOLN CITY — A new tsunami warning siren guaranteed to be loud enough to wake the dead has been installed at the D-River Wayside State Park.

The five-hour project to install the siren Jan. 22 was a joint effort of Pacific Power, City of Lincoln City, North Lincoln Fire and Rescue and the Community Emergency Response Teams, which handed out information about tsunamis. Pacific Power crews, along with NLFRC personnel, bolted the giant siren to the top of a 50-foot utility pole and then secured the pole with crushed rock, about eight feet below the ground.

Currently five warning sirens stand in Lincoln City, but this is only the second of its kind in the county. (The other was installed in Cutler City.)

"This one is really important, because it is such a popular site," said Fire Marshall Doug Kerr. "This is the most popular wayside park in Oregon."

The cost of the siren ran about \$14,000. The city paid a total of \$25,000 for the D River siren and its controllers.

The siren, which has its own backup battery, will not go into operation for about a month, when an electrical line is connected.

The old siren, which is mounted atop the public restroom at the park will continue operations until then. It offers 102 decibels, but it is muffled a bit because its sound goes out in every direction. The new siren is 128 decibels and rotates the direction in which it sends out its siren. The siren is activated by a tone sent from the police station.

From:

http://www.thenewsguard.com/news/story.cfm?story_no=5815
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Cold War-era siren to become tsunami warning

CORVALIS, Ore. (AP)—A forgotten Cold War-era defense siren set off by a prankster at Oregon State University to herald the new year is going to Astoria to serve as a tsunami alert, officials say.

Not tested since the 1980s, the siren atop Covell Hall went off at midnight on New Year's Day, rotating and emitting varying pitches heard across town.

Now that the relic's been brought to the university's attention, it will soon be put to use again in Astoria to serve as part of a tsunami warning system.

Oregon State Police Lt. Phil Zerzan, station commander at OSU, was on patrol when the alarm sounded. A history buff, he began to research the siren's history.

"It's kind of an interesting relic," he said, noting that not many people with knowledge of the siren still work at Oregon State. It was part of a system designed to warn Corvallis, Lebanon, Albany and Junction City of a coming nuclear attack.

The siren is the only one of its kind on campus, and probably in the greater Corvallis area, Zerzan said. The Thunderbolt siren was manufactured in the early 1950s and still bears the Civil Defense logo. In addition to the siren, Covell hall, which was constructed in the late 1920s, has a bomb shelter in the basement.

The electro-mechanical mustard-yellow siren stands about 25 feet tall. It relies on blower, chopper and rotator motors to create a roar that projects in all directions.

After the siren went off on New Year's, OSU public safety officers and maintenance workers scrambled to figure out how to stop the noise. It finally turned itself off after about 10 minutes.

Oregon State officials then cut power to the device. Undaunted, the prankster struck again last week, triggering the siren in the morning, the Gazette-Times newspaper reported.

The first time, it was a cute and clever prank that didn't cause much damage, but "doing it a second time crossed into the annoying zone," Zerzan said. The person responsible sent an anonymous e-mail to the student newspaper and facilities services, explaining the motivation behind the prank and apologizing for any trouble it caused.

The motivation? "A fun little project," the e-mail said. The person promised not to trigger the siren again.

From:

<http://www.oregonnews.com/article/20070119/NEWS/70119007> (The News-Review online)

Reprinted with permission from The News-Review, Roseburg, Oregon, Jan. 19, 2007

Scientists creating coastal relief models to aid tsunami forecasting

A team of scientists from the National Oceanic and Atmospheric Administration (NOAA) National Geophysical Data Center and the Cooperative Institute for Research in Environmental Sciences (CIRES) is creating high-resolution digital elevation models (DEMs) to support tsunami warning systems and improve coastal flood forecasting. Considered a key step in NOAA's effort to prepare U.S. coastal communities for tsunami and storm-driven flooding, the DEMs are constructed from near-shore sea-floor depth and land elevation data to create detailed models of coastal relief.

The NOAA/CIRES research team has already created DEMs for several key coastal communities on the east and west coasts, as well as in Alaska and Puerto Rico.

They expect to complete more than 100 DEMs for other communities in the coming years. Once a DEM is finished, it is delivered to the NOAA Pacific Marine Environmental Laboratory in Seattle, Washington, where it is incorporated into tsunami model scenarios that simulate offshore earthquakes, the resulting tsunami movement across the ocean, and the location and magnitude of resultant coastal flooding. Ultimately, NOAA's Tsunami Warning Centers will use these simulations to issue flood forecasts resulting from an earthquake-generated tsunami. The coastal DEMs will also be useful for predicting storm surge damage from hurricanes and other natural events. Completed DEMs, accompanying graphics, and more information about their development and use are available from the NOAA Web site, www.ngdc.noaa.gov/mgg/inundation/.

From: National Hazards Observer, v. 31, no. 3, p. 3

Australian Capital Territory (ACT) opens new tsunami warning centre

According to a press release on December 1, 2006, the "Australian Tsunami Warning Center (ATWC), based at GeoScience Australia, is a world class monitoring system designed to detect high impact tsunamis reaching countries in the Asia Pacific region."

The new centre, operating 24 hours a day, will monitor 39 Australian and 70 international monitoring stations. "Working in conjunction with the Bureau of Meteorology, the new centre aims to deliver a tsunami warning to the Australian Emergency Services who will then deliver the message to the public within ninety minutes."

From:

<http://news.ninemsn.com.au/article.aspx?id=167807>

NIMS compliance package now available

The National Incident Management System (NIMS) was developed so that responders from different jurisdictions and disciplines could work together to deal with natural disasters and other emergencies. NIMS benefits include a unified approach to incident management; standard command and management structures; and support for preparedness, mutual aid, and resource management. The NIMS Integration Center (NIC), within the Department of Homeland Security's Federal Emergency Management Agency, oversees all aspects of NIMS including the development of compliance criteria and implementation activities at federal, state, and local levels. Fundamentally, the center provides guidance and support to jurisdictions and incident management and response organizations as they adopt the system.

Homeland Security Presidential Directive 5, "Management of Domestic Incidents," requires that states, territories, local jurisdictions, and tribal entities adopt NIMS. During fiscal years (FY) 2005 and 2006, states were asked to "self certify" their NIMS compliance. However, by September 30, 2007, jurisdictions will be required to

comply more formally with the FY07 NIMS requirements to receive FY08 emergency preparedness grants. In FY07, all jurisdictions must meet specific performance-based metrics that will be used to:

- Gather information on the current state of NIMS compliance,
- Identify best practices and areas that may require further technical assistance,
- Provide continued guidance and feedback, and
- Assist with the refinement of metrics and/or data-gathering tools.

An FY07 NIMS Compliance Package has been delivered to the nation's governors to aid this process. Additionally, a redesigned NIMS Capability Assessment Support Tool (NIMCAST) will be available in early 2007. NIMCAST is a Web-based self-assessment designed to aid state, local, and tribal organizations and jurisdictions in determining their capabilities and compliance with requirements established in NIMS.

More information is available from the NIMS Integration Center Web site, www.fema.gov/emergency/nims/. The new compliance package is available online at www.fema.gov/emergency/nims/whats_new.shtm. Questions about NIMS and the new compliance procedures can be directed to the NIMS Integration Center: NIMS-Integration-Center@dhs.gov or (202) 646-3850.

From: National Hazards Observer, v. 31, no. 3, p. 7

Farewell Christa!

Christa Rabenold, the *Natural Hazards Observer* editor, left the Center in early November to pursue work with AMEC Earth and Environmental assisting local governments to develop hazard mitigation plans. During her time at the Center, Christa published 16 *Observers*, endless *Disaster Research* e-newsletters, and oversaw the first major overhaul of the *Observer's* look and organization in nearly a decade. Her dedication and attention to detail brought a new standard of excellence to the Center's publications and projects that we will strive to uphold in her absence.

She will be missed as an integral part of the Center's staff, but we are excited that she will still be a part of the hazards and disasters community. **We wish her well and look forward to working with her in her new role in the future.** [*TsuInfo Alert* editor's emphasis]

From: Natural Hazards Observer, v. 31, no. 3, p. 13

Jamaica tsunami warning center

According to an article published January 24, 2007, the Jamaican government was awaiting the signing of a memorandum of understanding with the U.S. in order to begin construction on a tsunami warning center. The terms of the MOU state that the US will provide equipment, training and testing of the sites. The facility will have nine stations.

From: <http://www.jamaica-gleaner.com/gleaner/20070124/lead/lead7.html>

Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and connected seas

The first meeting between Member States to establish the ICG for the North-Eastern Atlantic, the Mediterranean and Connected Seas Tsunami Warning and Mitigation System took place in Rome, 21-22 November 2005.

The meeting confirmed that a European-North African TWS is urgently needed as the Atlantic Ocean, including the Mediterranean, is the second largest source of tsunamis around the globe.

Given the short geographical distances between possible sources and coastal target regions of an impact (i.e. in the Mediterranean), a regional TWS for Europe has to rely on a dense net of seismic stations to provide timely forecasts and warnings.

The ICG decided to have an initial tsunami warning system in place by the end of 2007.

During its last session in May 2006 in Nice the NEAM member states agreed to draft an action plan in the intersessional period to be amended during the upcoming ICG/NEAMTWS-III in Bonn in February 2007.

From: <http://ioc3.unesco.org/neamtws/>

Progress for Caribbean tsunami early warning system

St. Augustine, Trinidad & Tobago W.I. – September 13, 2006

Some 250 million people in the Caribbean and adjacent areas stand to benefit from a project aimed at increasing the capacity of the Seismic Research Unit (SRU) to detect, monitor and provide early warning of tsunamis and related geologic hazards in the region. Through the generous support of the American people and the United States government via the United States Agency for International Development's Office of Foreign Disaster Assistance (USAID/OFDA), the Seismic Research Unit of the University of the West Indies has secured a U. S. \$249,680 grant which will be used to significantly upgrade the Unit's seismic monitoring network and will facilitate the development of information sharing policies between earthquake monitoring agencies in the Caribbean, Central America and the northern countries on the South American continent. These activities are critical for the advancement of a Caribbean tsunami early warning system.

Head of the SRU, Dr. Richard Robertson, stated that, "We are indeed grateful for the support of the American people with this very important project. At the SRU we monitor seismic activity for all of the English-speaking islands of the Eastern Caribbean and so it is vital that our monitoring network be upgraded so as to facilitate the development of a tsunami warning system (TWS) for our

region. As active participants of the Intergovernmental Oceanic Commission's effort to establish a TWS we are well positioned to ensure that our plans fit within the framework of the broader initiatives."

The USAID-funded project has two primary components: (1) to upgrade the existing monitoring network and (2) to establish clear policies for exchanging data between seismological agencies in different countries. As part of the first objective, earthquake monitoring (seismic) stations will be upgraded on St. Kitts, southern Dominica, Saint Lucia, St. Vincent, Tobago and Trinidad so as to improve accuracy and to reduce delays in processing earthquakes. A sub-set of the stations will also publish data to a regional Tsunami Warning Centre in real-time. Under a separate project, three installations have already been provided on the islands of Barbados, Grenada, and Barbuda through the United States Geological Survey (USGS). When completed, each seismic station will have the capability to detect and report potential tsunami-generating earthquakes in less than 3 minutes during normal working hours.

As was clearly demonstrated during the 2004 Boxing Day tsunami in the Indian Ocean, the effects of a tsunami can be widespread and several countries may be devastated by a single event. The second component of the project is, therefore, aimed at setting up guidelines for data exchange between countries in the region. For example, under this component if an earthquake that could possibly generate a tsunami were to be detected by an agency in Costa Rica a set policy as to how this information is communicated to Martinique would already be established. In April of this year, USAID funded a meeting of Regional Seismic Network Operators from the Caribbean Basin to determine the current monitoring capacity of the region and to establish data sharing protocols. Coordinated by the SRU, the meeting was successful in providing agencies with an opportunity to chart the way forward.

Tsunamis are natural phenomena that are often triggered by earthquakes, volcanic eruptions and submarine landslides. Over the last 500 years, tsunamis rank as the fourth most destructive of the natural phenomena to have affected the Caribbean islands. Scientists estimate that there are about 1-2 potentially destructive tsunamis per century affecting the Caribbean and while this rate is relatively low, tremendous population growth and rapid increase in coastal development in the region have led to increased vulnerability and consequently risk, from tsunamis.

This USAID-funded project is an 18-month project that is part of a larger programme coordinated by the IOCARIBE—The Caribbean Charter of the Intergovernmental Oceanic Commission—to establish a tsunami early warning system for the Caribbean and adjacent areas. The SRU will be working closely with the Caribbean Disaster Emergency Response Agency (CDERA),

National Disaster Coordinators and with seismological organizations with the Caribbean. The objectives of the programme will be implemented within the context of ongoing efforts to establish a Tsunami and Coastal Hazards Warning System for the Caribbean and Adjacent Areas.

Further details on the project will be posted on the SRU's website at www.uwiseismic.com.

The University of the West Indies, Seismic Research Unit
<http://www.uwiseismic.com>

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IOC Intergovernmental Co-ordination Group for the tsunami and other coastal hazards warning system for the Caribbean Sea and adjacent regions

To prevent loss of life and destruction of property, and mitigate against catastrophic economic impacts, the people of the Caribbean region have an immediate need for a Coastal Hazards Warning System linked to the soon-to-be-established Global Earth Observation System of Systems (GEOSS). The primary purpose of the system will be to provide timely and accurate forecasts and warnings of coastal flooding and associated hazards due to tsunami, storm surge and hurricanes.

Considering conclusions reached at the World Conference on Disaster Reduction (Kobe, Japan, 19–22 January 2005) and UNESCO/IOC call to establish a Global Tsunami Warning System within the Global System of Systems (Ref. UNESCO DG speech 31.01.2005, Ministerial Meeting on Regional Cooperation on Tsunami Early Warning Arrangements, Phuket, Thailand and Ref. 1, 2, 3, 4 and 5), the UNESCO's Intergovernmental Oceanographic Commission (IOC) through its IOCARIBE-Sub-Commission and jointly with UN-ISDR, WMO and UNEP CAR-CU organized the "International Conference for the Development of a Tsunami and Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions" in Mexico City, Mexico, from 1 to 3 June 2005. In line with the recommendations of the Communiqué adopted at this international conference, the 23rd session of the UNESCO/IOC Assembly adopted IOC Resolution XXIII-13, by which it decided to establish an Intergovernmental Coordination Group (ICG) for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions.

Following with the implementation of Resolution mentioned above, the Intergovernmental Oceanographic Commission of UNESCO (IOC) jointly with WMO and ISDR is convening the First Session of the IOC Intergovernmental Co-ordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions was held in the United Nations House, Bridgetown, Barbados, 10-12 January, 2006.

Objectives:

1) To coordinate the activities of the tsunami and other coastal hazards system;

- 2) To organize and facilitate as appropriate the exchange of seismic, sea level and other data at or near real-time and information required for the interoperability of the tsunami and other coastal hazards system;
- 3) To promote the sharing of experience and expertise related to tsunami and other coastal hazards warning and mitigation for the Caribbean and Adjacent Regions Basin;
- 4) To promote tsunami and other coastal hazards research; To promote the establishment and further development of national tsunami and other coastal hazards warning and mitigation capacities in accordance with standard protocols and methods;
- 5) To develop, adopt and monitor implementation of work plans of the tsunami and other coastal hazards warning system in the Caribbean and Adjacent Regions, and to identify required resources;
- 6) To promote implementation of relevant capacity-building;
- 7) To liaise and coordinate with other tsunami and other coastal hazards warning systems;
- 8) To liaise with other relevant organizations, programmes and projects;
- 9) To promote the implementation of the ICG within a multi-hazard framework;
- 10) To keep under constant scrutiny the status of the system and how it satisfies the needs.

Countries and Territories of the Region (30): Antigua and Barbuda, Bahamas, Barbados, Belize, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, France, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, The Netherlands, Nicaragua, Panama, Salvador, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, United Kingdom, USA and Venezuela.

Participating Agencies: IOC / UNESCO, WMO, UN-ISDR, UNEP (CAR/CU)

Participating Regional Agencies: CARICOM, CDERA, CEPREDENAC, OAS

Other International Agencies and invited countries: IHO, IMO, IADB, CDB, WB-GEF, USAID, USA, PADF, CARICOM, PAHO, Caribbean Tourism Organisation, Canada, Japan, Norway.

Major IOC/IOCARIBE Programmes and Groups and Bodies Participating: IOCARIBE-GOOS, GLOSS, IOCARIBE Tsunami Group of Experts, JCOMM, ITIC and the Pacific Tsunami Warning Center (PTWC).

From: <http://ioc3.unesco.org/cartws/>

2nd tsunami seminar kicks off work in Iran

The seminar will be attended by envoys from Inter-Oceanic States Commission of the United Nations Economic, Social and Cultural Organization UNESCO, United Nations Organization, World Meteorological Organization, Director of Iran's Meteorological Organization, Science Ministry officials, head of Interior

Ministry's Unexpected Events Headquarters, researchers and university professors.

Tehran seminar comes in the aftermath of the catastrophic tsunami incident in south-east Asia in 2004, which inflicted irrevocable damage and caused astronomical death tolls.

Since the 2004 tragedy, many world bodies and organizations, including UNESCO, World Meteorological Organization and UN Incident Confrontation Institute, have shown strong resolve to familiarize people and deploy alarm systems in tsunami prone countries.

One tsunami alarm system is due to be deployed on the Iranian coast of the Sea of Oman, director of Iran's National Oceanography Center said.

Vahid Chegini also stated that in case a tsunami starts emerging in the said region, its early devastating waves will cause havoc, destruction and annihilation on the Iranian coasts within only 15 to 30 minutes.

From:

<http://www.payvand.com/news/06/sep/1227.html>

Greece to start tsunami alert system

It has been announced that, within 18 months (from November 2006), Greece will build a tsunami warning center in the southeast part of the Ionian Sea, a site known for high seismicity.

The tsunami warning centre will receive information from the pressure gauges, seismographs and wave sensors that survey the sea basin.

Ottawa, Canada, upgrade tsunami warning system

In January 2007, Public Safety Minister Stockwell Day announced a new high-tech warning system for the Atlantic Coast of Canada.

"We...recognize that there is a much lower risk in the Atlantic than in the Pacific," said David McCormack of the Geological Survey of Canada. "But it's not zero."

Government officials said the improvements cost \$250,000, with annual maintenance of the system pegged at \$125,000.

The earthquake monitoring networks will be under the watch of several federal departments and the U.S. National Oceanic and Atmospheric Administration."

From: <http://www.canada.com>

Tsunami watch Friday [Jan. 12, 2007, Queen Charlotte Islands, Canada]

A tsunami watch was issued last Friday evening at 9:14 pm, after an 8.2 magnitude earthquake was recorded at 8:23 pm in the Kuril Islands just north of Japan. The watch was in effect from the northern tip of Vancouver Island to Alaska.

The Ministry of Public Safety says the provincial notification system worked well. Media, communities at risk and emergency officials were all notified of the watch, with more than 2,400 phone calls being made, as

well as 435 emails and 900 faxes going out. The watch was cancelled at 11:42 pm, when it was determined that there would be no impacts to coastal BC.

Types of Tsunami notifications From the Provincial Emergency Program

When there's seismic activity that could affect coastal communities, an information bulletin is issued by a warning centre in Palmer, Alaska. These bulletins are available to government agencies, the media and the general public through the WC/ATWC website and e-mail.

When the Provincial Emergency Program receives a notification, emergency management staff assess the info to determine if BC coastal areas may be threatened. The info is sent to local government emergency officials. The notification system quickly sends information where it's needed: at the local authority level, and to the news media which can get it quickly to the public.

Tsunami Information Message--An awareness notification.

Tsunami information messages may be issued based only on preliminary seismic information without confirmation of a tsunami wave. They provide advance alert to areas that could be impacted.

Tsunami Watch

Notification based on early seismic information that provides advanced alerting to areas that could be impacted if a tsunami has been generated. When communities are issued a Watch, local emergency plans should be activated, and local authorities should prepare for possible evacuation in the event that their area is upgraded to a Warning.

Tsunami Warning

This is the highest, most serious level of tsunami notification. Warnings are issued when there's imminent threat of a tsunami or confirmation of a tsunami wave. When communities are issued a warning, local emergency plans should be activated and public safety actions taken. Such actions are likely to include the immediate evacuation of at-risk areas and restricting access to emergency response routes and coastal beaches. Warnings are updated as conditions change.

Tsunami Advisory

Advisories may be issued to populations within areas not currently in either Warning or Watch status when a tsunami warning has been issued for another region. An Advisory indicates that an area is either outside the current Warning and Watch regions, or that the tsunami poses no danger to that area. After issuing the Advisory monitoring of the event will continue. As conditions warrant, the Advisory will either be continued, upgraded to a Watch or Warning, or ended.

Tsunami Cancellation

A cancellation is issued when a Warning or Watch message has been issued but where damaging waves have not been generated.

Tsunami All Clear

This is issued when a tsunami has been generated and the threat of further tsunami is over. It's to advise stakeholders that the tsunami event is over and no further waves are expected.

From:

<http://www.qciobserver.com/ARTICLES.ASPX?ARTICLE=2485> on January 19, 2007. (Queen Charlotte Islands Observer, Canada. www.qciobserver.com). Reprinted with permission

Hazard-related needs of Pacific and Indian Ocean islands addressed

This year (2006), NOS (NOAA's National Ocean Service) focused on helping Pacific and Indian Ocean island communities prepare for potential environmental hazards, such as tsunamis and floods. NOS introduced a new computer system that allows users to type in an address and get quick, site-specific information about the potential hazards for that location. New homeowners, developers, and city and state policymakers have access to this system, which is greatly increasing awareness in the Pacific islands about the risks involved when living by the sea.

From: National Oceanic and Atmospheric Administration, 2006, NOAA's National Ocean Service--2006 accomplishments: National Oceanic and Atmospheric Administration, p. 11.

SAIC unveils commercial tsunami buoy

Science Applications International Corporation today announced the successful completion of testing of a buoy developed to provide early warning detection of tsunamis. The SAIC tsunami buoy (STB) was deployed Oct. 25, 2006, approximately 200 nautical miles west of San Diego in 3,876 meters of water.

The location is approximately 28 nautical miles from a National Oceanographic and Atmospheric Administration (NOAA) Deep-ocean Assessment and Reporting of Tsunami (DART(TM)) buoy that has been used in part to evaluate the performance of the STB.

The genesis of SAIC developing a tsunami warning capability began after the December 26, 2004 Indian Ocean tsunami tragedy and has continued to build and mature since that catastrophe. With the goal of developing an end-to-end tsunami warning capability that can be integrated into international disaster warning systems, SAIC engineers determined that the cornerstone of this effort would be the development of a technically advanced, commercially available, deep-ocean sensor that could match the capabilities of the NOAA DART(TM) system

that currently protects the coastal United States. Additionally, the STB has been designed to handle additional meteorological and oceanographic sensors that could be required in various ocean regions of the world.

As a major support contractor to NOAA's National Data Buoy Center, SAIC has extensive experience building, deploying and maintaining the DART(TM) buoys. The SAIC STB team built on this background as well as decades of experience designing and deploying ocean sensors in support of other U.S. government agencies to develop a commercial version of the DART(TM) buoy to meet the emerging requirements of the international marketplace.

On November 15, 2006, during this test period, the Kuril Islands experienced an 8.3 magnitude earthquake which generated a small tsunami that propagated across the Pacific Ocean. Approximately nine hours later the SAIC tsunami buoy detected and reported the first tsunami waves arriving in the area. The nearby NOAA DART(TM) also detected the tsunami waves.

Just as in earlier laboratory testing throughout the Kuril Island tsunamigenic event, the SAIC tsunami buoy demonstrated it can match the operational capabilities of NOAA's DART(TM) system during actual tsunami conditions.

From: <http://www.huliq.com/6542/saic-unveils-commercial-tsunami-buoy>

Reprinted with permission from HULIQ—Breaking News, article submitted by Nymphadora 1-16-2007.

See also:

<http://biz.yahoo.com/prnews/070116/dctu006.html?.v=79>

DART buoy



WEBSITES

<http://www.alertnet.org/thenews/newsdesk/T299428.htm>

“Japan, one of the world’s most seismically active nations, began an alert system using satellites to instantly transmit warnings of natural disasters, such as tsunamis, to speed up evacuations.

Tremors occur in Japan at least every five minutes, and the country accounts for about 20 percent of the world’s earthquakes of magnitude 6 or higher....

The new system, [is] called :”J-ALERT.”

<http://www.tsunami.noaa.gov>

New “Tsunami” website, with links to tsunami basics, NOAA’s role, information for kids, preparedness information, and U.S. response and plans.

www.cityofseaside.us/tsunamiinfo/

The City of Seaside’s (Oregon) tsunami education website.

<http://www.oregongeology.com/sub/earthquakes/Coastal/TsunamiIntro.htm>

Seaside’s (Oregon) Tsunami Awareness Program

<http://www.tsunamiready.noaa.gov/>

NWS Coastal Zone Management contacts for TsunamiReady program, with links to Eastern region, Southern region, Western region, and Alaska-Pacific region.

http://www.ngdc.noaa.gov/seg/hazard/tsu_db.shtml

NOAA/WDC Historical Tsunami Database at NGDC (National Geophysical Data Center)

The Historical Tsunami Database consists of two *related* files containing information on tsunami events from 2000 B.C. to the present in the Atlantic, Indian, and Pacific Oceans; the Mediterranean and Caribbean Seas.

The Tsunami Source Event Search provides information on the source of the tsunami. These data include source location, date, and time, event magnitude, maximum water height, total number of deaths, injuries and damage for the event.

Advanced Tsunami Source Event Search

NOTE: Some events do not have runup information; other events have many locations where a runup height was recorded.

The Tsunami Runup Search provides information on locations where tsunami effects occurred. These data include arrival date and time, travel time, maximum water heights, horizontal inundation distances, deaths, injuries, and damage for specific locations.

Advanced Tsunami Runup Search

The Tsunami database files can also be displayed and extracted with the ArcIMS Interactive Map

http://marinij.com/marin/ci_5082668

Coastal Marin unprepared for tsunami, study warns.

PUBLICATIONS

Coral reefs article

Catherine M. Kunkel, Robert W. Hallberg, and Michael Oppenheimer have studied the effects of coral reefs on tsunamis and published their finding in the December 14th issue (2006) of the journal *Geophysical Research Letters*. The article is entitled “Coral reefs reduce tsunami impact in model simulations.”

“For our purposes, we assumed that the health of the reef would only be important in terms of the drag it exerted on the wave,” said Catherine Kunkel. “If you have a healthy reef, it has lots of live coral branching out, sticking a lot of small obstacles into the water. A dead reef, on the other hand is not as rough—it tends to erode and exerts less drag on the wave.”

“The general conclusion is that a healthy reef might provide twice as much protection as a dead one,” Oppenheimer said. “This could translate into sparing large sections of inshore area from destruction.”

From: <http://news.mongabay.com/2006/1218-tsunami.html>

2006 Hazards Workshop abstracts and summaries available online

In July 2006, hazards researchers and professionals, including federal, state, and local government officials; representatives from nonprofit organizations and private industry; scholars; and other interested individuals, convened in Boulder, Colorado, for the Natural Hazards Center’s 31st Annual Hazards Research and Applications Workshop. Participants debated, explored, and shared information on a wide range of issues.

To share some of the ideas and discussions presented during the workshop, the Center publishes brief summaries of all sessions, abstracts of the research presented, and descriptions of the projects and programs discussed. Intended as a resource for those who were unable to attend, as well as for those who were, these session summaries, abstracts, and other workshop materials are available online at

www.colorado.edu/hazards/workshop/archives/2006/

From: *Natural Hazards Observer*, v. 31, no. 3, p. 2

Wiley Higher Education series

As mentioned in the November [*Natural Hazards Observer* (Vol. XXXI, No. 2, p. 19)], Wiley Higher Education has introduced a new series of monographs on emergency management intended to present core concepts and principles in the discipline. Each book is supported by instructor manuals, “self check” tests and other assessment tools, PowerPoint presentations, and companion Web sites. John Wiley & Sons; (877) 762-2974; www.wiley.com/go/pathways/.

Introduction to Emergency Management. Michael K. Lindell, Carla Prater, and Ronald W. Perry. ISBN 0-471-

77260-7. 2007. 616 pp. \$51.95. Recent devastation caused by tsunamis, hurricanes, and wildfires has highlighted the need for well-trained professionals who can develop effective strategies in response to such disasters. This text provides readers with the tools needed to address all phases of emergency management. It covers everything from the social and environmental processes that generate hazards to vulnerability analysis, hazard mitigation, emergency response, and disaster recovery.

Hazard Mitigation and Preparedness. Anna K. Schwab, Katherine Eschelbach, and David J. Brower. ISBN 0-471-79019-2. 2007. 600 pp. \$51.95. This book will help readers apply their knowledge and skills to create communities that are resilient to the impacts of all types of hazards. The text clearly presents the major principles involved in preparing for and mitigating disasters, as well as real-world examples of the different tools and techniques that emergency managers have used to minimize disaster impacts.

Technology in Emergency Management. John C. Pine. ISBN 0-471-78973-9. 2007. 283 pp. \$51.95. Today, technology plays a vital role in ensuring the effective implementation of a management plan during an emergency. This volume not only provides a detailed overview of the technology now used, it also clearly explains how the technology is applied in the field. Thus, readers not only learn how to use modern technology in emergency planning, response, recovery, and mitigation, they also learn the key organizational and programmatic elements that must be in place to ensure that technology is used most efficiently to support the emergency management process.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 14

Handbook of Disaster Research

Havidán Rodríguez, Enrico I. Quarantelli, and Russell R. Dynes, editors. ISBN 0-387-3233107. 2006. 611 pp. \$249. Springer; (800) 777-4643; www.springer.com.

Written for researchers and graduate students in varied disciplines, the contributions in this book present an interdisciplinary and international approach to disasters, based on the principle that disasters are social constructions. The book focuses on social science disaster research and its theoretical, methodological, and practical applications. Attention is given to the concept of “disaster”; methodological issues relating to disaster research; and how disaster research is being used in emergency management curricula and in emergency operations. Authors discuss community processes that are evoked by disasters, including warnings, search and rescue, coordination, organizational adaptation, dealing with death and injury, recovery, and media coverage in disasters. Some contributions focus on the relationship between disaster and development, the popular culture of disasters, new dimensions of disaster research, and the number and type of disasters expected in the future.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 14

Tsunami and Disaster Management: Law and Governance.

C. Raj Kumar and D.K. Srivastava, editors. ISBN 962-661-306-8. 2006. 291 pp. \$52.00. Sweet & Maxwell Asia; www.sweetandmaxwellasia.com.

A collaborative effort by 15 internationally respected academicians, practitioners, and disaster management experts, this work deals with issues in disaster management highlighted by the 2004 Southeast Asia earthquake and tsunami and their implications for government reform in Asia and beyond. Among the topics addressed are legal and governance questions; disaster management and victims' rights; and disaster management and humanitarian relief and rehabilitation. The book also looks at the level of preparedness in the countries affected by the tsunami and ways to improve the responsiveness and availability of aid and relief.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 15

A Networked Approach to Improvements in Emergency Management.

International City/County Managers Association (ICMA). 2006. 16 pp. Free online. ICMA; <http://icma.org/main/ld.asp?ldid=20120&hsid=1&tpid=23&stid=31>.

After Hurricanes Katrina and Rita, all levels of government recognized that the "command and control" approach to emergency management had significant shortcomings. State and local governments have stepped up their efforts to develop better solutions, all of which rely on more sophisticated, organized networks and partnerships. This ICMA paper describes why such changes are needed and offers specific recommendations for improving the nation's intergovernmental emergency management system. Building on lessons learned from recent disasters, it presents an ambitious new approach based on a network of partnerships among cities and counties and supported by state governments and a sophisticated database.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 15

If Disaster Strikes Will You Be Covered? A Homeowner's Insurance Guide to Natural Disasters

2006. 38 pp. Free online. Federal Alliance for Safe Homes;

http://flash.org/pdf/7-13-06FLASH_Insurance_Guide.pdf.

This guide from the Federal Alliance for Safe Homes and the Actuarial Foundation provides homeowners with information about the major perils that threaten property, the applicable insurance products and forms, and steps to take to mitigate potential losses from natural disasters.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 15

Assessing Coastal Vulnerability: Developing a Global Index for Measuring Risk.

United Nations Environment Programme (UNEP). 2006. 64 pp. Free online. UNEP; www.unep.org/Dewa/products/publications/2006/CVI_PM65_Final_05.pdf.

About 41% of the world's population lives in the coastal zone (within 100 km of shore), which accounts for only about 7% of the earth's habitable land area. The average population density in the global coastal zone increased about 12% from 1990 to 2000, and nine of the world's ten most densely populated cities are located in coastal areas. Coastal inhabitants are exposed to windstorms, waves, tidal surges, and rising sea levels, and their vulnerability increases as coastal and marine ecosystems are degraded and natural defenses lost. This assessment gives an overview of current global coastal monitoring; analyzes the relationship between socioeconomic and environmental indicators in coastal zones; and reviews the relationships among human activities, environmental threats, and coastal environments in terms of population pressure, land cover, geographic exposure, the probability of natural hazards, and the coping capacities of coastal communities. The study developed a preliminary Coastal Vulnerability Index, which assigns a rough measure of each country's relative vulnerability based on its exposure to natural hazards and its individual coping capacity.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 17

Global Survey of Early Warning Systems: An Assessment of Capacities, Gaps and Opportunities toward Building a Comprehensive Global Early Warning System for All Natural Hazards.

2006. 60 pp. Free online. Secretariat of the International Strategy for Disaster Reduction; www.ewc3.org/upload/downloads/Global_Survey.pdf.

In early 2005, the United Nations initiated a global survey of capacities and gaps in early warning systems, with a view to establishing a worldwide system for all natural hazards, building on existing national and regional capacity. This report synthesizes the findings of the survey, which found that early warning system technologies are now available for almost all types of hazards and are in operation in at least some parts of the world. Further, considerable progress has been made in developing the knowledge and technical tools required to assess risks and to generate and communicate predictions and warnings. However, there are many gaps and shortcomings, and the world is far from having a global system for all hazards and all communities.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 20

Moving Beyond the Tsunami: The WHO Story.

ISBN 92-9022-242-5. 2006. 79 pp. Free online. World Health Organization; www.searo.who.int/en/Section23/Section1108/Section1835/section2053.htm.

With anecdotes, photographs, statistics, and a chronological narrative, the World Health Organization (WHO) pieces together in this report a summary of the public health impacts of the tsunami that struck Southeast Asia in December 2004, along with the lessons that can be learned from the disaster and the world's response to it. Among the observations are that countries that had a better health infrastructure in place were able to respond more effectively to the health needs generated by the disaster and that protecting the environment is key to mitigating the impact of natural hazards. WHO offers these recommendations for improved health care after future disasters: 1) invest in public information professionals at the country and regional levels, continuously building good relations with the media; 2) establish a ready database of experts who could be mobilized in times of emergency; and 3) coordinate with NGOs and other partners to establish mechanisms for dealing with the supplies and assistance that will be received.

From: *Natural Hazards Observer*, v. 31, no. 3, p. 20

Green Coast—For nature and people after the tsunami

Free e-newsletter about efforts to restore coastal nature and recover livelihoods of the people in tsunami-hit regions. To subscribe, go to <http://www.wetlands.org/greencoast/En/newsletter.aspx>.

SYMPOSIUM/CONFERENCES

February 28-March 2, 2007

ICG/IOTWS-IV will hold the Fourth Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System. It will be hosted by the Government of Kenya and be held at the White Sands Hotel in Mombasa, Kenya. For more information: <http://ioc3.unesco.org/icg/>

March 14-16, 2007

The 2007 Pacific Risk Management Ohana (PRiMO) annual meeting will be co-sponsored by the Pacific Disaster Center this year and held at their headquarters, 1305 N. Holopono Street, Kihei, Maui. For more information: <http://www.csc.noaa.gov/psc/FHMPPI/primo07.html>.

March 25-28, 2007

DRJ's spring world 2007; Orlando, Florida. Organizer: *Disaster Recovery Journal* (DRJ). DRJ conferences focus on all aspects of disaster recovery, contingency planning, and business continuity through plenary and breakout sessions, workshops, exercises, and networking opportunities. An exhibit hall will showcase the latest products and services in the industry. www.drj.com/conferences/orl2007/

From: *Natural Hazards Observer*, v. 31, no. 3, p. 20

April 10-11, 2007

Partners in Emergency Preparedness. Tacoma, Washington. Offered by Center for Distance and Professional Education, Washington State University, in partnership with the Washington State Emergency Management Division and the American Red Cross serving King and Kitsap Counties. The Partners in Emergency Preparedness Conference is the largest and most successful regional emergency preparedness conference in the Pacific Northwest and is intended for representatives of businesses, schools, government, nonprofit agencies, emergency management, and volunteer organizations. Conference registration begins February 1, 2007.

Washington State University Center for Distance and Professional Education, (800) 942-4978. <http://capps.wsu.edu/emergencyprep>

From: *Natural Hazards Observer*, v. 31, no. 3, p. 24

July 22-26, 2007

Coastal Zone 2007. Portland, Oregon. Sponsors: National Oceanic and Atmospheric Administration (NOAA) and others. This biennial coastal zone conference (of which this is the fifteenth) is the largest international gathering of ocean and coastal management professionals in the world. Participants represent federal, state, and local governments, academia, nonprofit organizations, and private industry. The conference gives these attendees a platform to discuss the issues facing the world's coasts and oceans—including coastal hazards—and a forum for discovered new strategies and solutions.

Jan Kucklick, NOAA, (843) 740-1279;

Jan.Kucklick@noaa.gov; www.csc.noaa.gov/cz/

From: *Natural Hazards Observer*, v. 31, no. 3, p. 27

October 2007

The twenty-second session of the ICG/PTWS will be hosted by Instituto Oceanografico de la Armada (INOCAR) of Ecuador, in Guayaquil. For more information: <http://ioc3.unesco.org/ptws>. ♦

FEMA, Dept. of Homeland Security Preparedness Directorate and representatives of state and local emergency managers recently unveiled a new icon for emergency management to replace the Cold War-era icon.



Full press release: http://www.emergency-management.net/pdf/2006/EM_logo_paper_2.pdf

TsuInfo Alert does not endorse any specific product. These articles are included to inform readers about new warning systems and new methods of hazard warning dissemination

--Mobile phones used as portable warning systems--

Tsunami warning delivered worldwide by SMS

By Satirat Dam-ampai

From:

http://www.scandasia.com/viewNews.php?news_id=2761&coun_code=se

Reprinted with permission

“Tsunami warning to mobile phones is a brand new service that will be useful to holiday tourists visiting Thailand resorts and other places in high-risk areas,” said a managing director of RM Consult, Roar Moe.

“We will offer the Tsunami SMS warning to all over Scandinavia for consumers. This is a low-cost subscription because we want many travelers to use it,” he added.

The warnings are delivered as “Flash SMS:” that overrides all other information in the mobile phone display. Under normal conditions, new warnings shall arrive within 3 minutes.

Subscribers can choose either pre-paid annual or holiday subscriptions.

RM Consult is the company that offers management solutions for tsunami warning via mobile phones. The company has signed an agreement with the Norwegian Ministry of Foreign Affairs to support Norwegian Embassies and General Consulates around the Pacific and Indian Oceans with the tsunami SMS warning system.

10 Embassies and Consulates have been participating in a one-year trial to test this life-saving alarm system for mobile phones.



Tsunami Alarm System

With the Tsunami Alarm System you are able to live at the sea or visit your favorite coastal destinations, without being concerned about your safety. Subscribe to the Tsunami-AS to receive these life-saving alarms reliably and expeditiously on your mobile phone wherever in the world you have GSM coverage. You will also protect the lives and health of your family and children.

The Tsunami Alarm System receives earthquake and tsunami warning information from a multiplicity of seismic measuring stations and tsunami warning stations from different countries all over the whole world. As a subscriber, you can be sure that your Tsunami Alarm System does not miss any warnings and that any tsunami warning will result an alarm being sent to your mobile telephone as soon as possible.

When we send a tsunami alarm to our subscribers, it is particularly important that it does not go unnoticed. Therefore we send 3 SMS back-to-back. In this way, you become aware of the message on your display at any time of day or night and you will be able to ascertain when and where the tsunami is expected. The Tsunami Alarm System reliably ensures that our subscribers and other people you may want to warn can apply life-saving measures several minutes before the arrival of a destructive tsunami.

The Tsunami Alarm System works everywhere in the world covered by the GSM network assuming that your mobile telephone is logged into a GSM network in the country where you are staying. Even in the poorest developing countries and in remote areas, the GSM network is usually just as well-developed as in highly developed countries, such as Europe or the USA. When you travel in areas accessible to tourists, you should not encounter any problems with the reception of mobile phone signals. The following principle applies: Wherever you can use your mobile telephone for calls, your Tsunami Alarm System will also be able to receive tsunami warnings.

From: <http://www.tsunami-alarm-system.com/en/tsunami-alarm-system/tsunami-alarm-system.html> (3MFuture Ltd. & Heindl Internet AG) ♦

Experts discuss tsunami early warning system for Mediterranean

Feb. 7, 2007

Bonn, Germany (dpa) – Experts from 26 nations gathered in Bonn on Wednesday for a three-day conference on a tsunami early-warning system for the North Atlantic and Mediterranean regions.

Full story:

<http://www.earthtimes.org/articles/show/28230.html> ♦

Material added to the NTHMP Library,
January-February 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.

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INFREQUENTLY ASKED QUESTIONS

COMPILED BY LEE WALKLING

What is the difference between runup and inundation? (Test question, to see if you've been paying attention.)

“When a tsunami strikes, it does so as a tide-like flood, a wall of water, or a breaking wave, and it strikes repeatedly until each of the waves has passed. The runup is the vertical height of a wave as it washes ashore and can be tens (even hundreds) of meters high and vary unpredictably from one wave to the next.

The inundation distance measures the horizontal distance of a tsunami's reach landward from the shoreline. It is not unusual for inundation distances to be as great as hundreds of meters. The 3-4km inundation distance measured in Banda Aceh, Indonesia, following the recent tsunami, was unusually large. Coastal areas that are less than 15m above sea level and within 1.6km of the shoreline are particularly susceptible to tsunamis. Other areas may be especially tsunami-prone because of their on- and offshore topography or their coastal setting, which can affect the size and impact of tsunami waves. Reefs, bays, river entrances, undersea features, and the slope of the beach can alter the shape and power of a tsunami as it meets land.”

From: Rabenold, Christa, 2005, *Tsunami warning systems and policy in the United States*: University of Colorado at Denver, 37 p.

Tsunamis can be generated by underwater earthquakes, landslides, volcanic eruptions, edifice collapse, meteor impacts and, according to the last issue, glacial outburst floods. Is there anything else that should be on the list of generating mechanisms?

Pyroclastic flows. “Pyroclastic flows entering the sea may cause tsunamis at coastal volcanoes worldwide, but geophysically monitored field occurrences are rare...Any volcano within a few kilometers of water and capable of generating hot pyroclastic flows or cold debris flows with volumes greater than $5 \times 10^6 \text{m}^3$ may generate significant and possibly damaging tsunamis during future eruptions.”

From: Mattioli, G. S. and others, 2007, Unique and remarkable dilatometer measurements of pyroclastic flow-generated tsunamis: *Geology*, v. 35, no. 1, p. 25.

What is a pyroclastic flow?

A density current of clastic rock material, usually very hot and composed of a mixture of gases and particles.

From: *Glossary of Geology*; 5th ed.

What is clastic rock?

Rock or sediment composed principally of broken fragments derived from preexisting rocks or minerals and that have been transported some distance from their place of origin.

From: *Glossary of Geology*; 5th ed.

Since this has degenerated into a Tsunami 101 Pop Quiz, next question: What is a tsunami earthquake?

“There is a class of earthquakes called tsunami earthquakes that cause tsunamis larger than expected from their seismic waves. The slow slip is one of the known characteristics of tsunami earthquakes.”

From: Seno, T.; Hirata, K., 2007, Did the 2004 Sumatra-Andaman earthquake involve a component of tsunami earthquakes?: *Bulletin of the Seismological Society of America*, v. 97, no. 1A, p. S296-S306. ♦

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. ♦



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