

TsuInfo Alert

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

National Tsunami Hazard Mitigation Program

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

Contents

Volume 11, Number 5 October 2009

<i>Special features</i>		<i>Departments</i>	
FEMA Director Craig Fugate	1	Hazard mitigation news	12
USVI receives NOAA grant for tsunami preparedness	3	Websites	13
So, you want to run an exercise?	4	Publications	13
New report details research on tsunami hazard, Cannon Beach	7	Emergency Management offices	15
Seeing is believing	8	Material added to NTHMP Library	14
Fatigue management in emergency management context	9	IAQ	16
Tsunami warning system bound for Aleutians	10	Video reservations	17
Tsunami symposium sees NOAA research forecast in action	11	Unanswered questions	18
Tsunami-resistant buildings in Oregon?	11	NASA tsunami research makes waves in science community	19
Perceiving 'stayers' and 'leavers' from Katrina	18	Long arm of climate change reaches geological disasters	20
Commission's suggestions put kids over pets in disaster	20		

FEMA Director Craig Fugate on survivors, money, and *Star Trek*

By Dan Whipple

Natural Hazards Observer, v. 34, no. 1, p. 18

www.colorado.edu/hazards/

Changing vocabulary is a first step in the effort to manage hazards and disasters as a partnership among the federal government, the states, the local governments and the community, Federal Emergency Management Agency administrator Craig Fugate says.

"I'm doing my little social science experiment. I'm changing vocabularies one word at a time," Fugate says. "We call people 'survivors,' not 'victims.' We've always looked at the public as a liability. Everything was based on the proposition that they were there waiting for people to take care of them."

He adds, "You can't look at the public as a liability. You have to look at them as a resource. The survivors are the ones we have to empower."

Fugate gave the opening keynote speech at the 34th Annual Natural Hazards Research and Applications Workshop in Broomfield, Colorado, on Thursday, July 16, 2009.

In his talk, Fugate continued a theme that was prominent in his confirmation hearings in April. In his opening statement at that time, before the U.S. Senate Committee on Homeland Security and Governmental Affairs, he said, "We have to begin looking at our citizens as a resource, not as a liability in our plans. We have to integrate and build capacity and capability at the local level, the state, and federal level. It has to incorporate the volunteer, faith-based and community-based organizations, and the private sector."

At the Workshop, Fugate reemphasized the cooperative and coordinated effort necessary to plan for, respond to, and mitigate hazards. "FEMA by itself is oftentimes nothing more than a funding mechanism," he says. "We may set policy and guidance and things through those mechanisms, but the bottom line is: It's money."

But all of the activity that goes into dealing with disasters "is really a team effort," he says. "It is not just FEMA. It is our parent agency the Department of Homeland Security, it's the entire federal family...But, hey, guess what? Who's got more fire trucks? Us or local and state government?"

Disasters are best managed locally, Fugate says, "But that doesn't mean they're by themselves."

Fugate was upbeat about the potential for new technology and social networking to provide information and education during disasters. Holding up his Blackberry, he said, "This is the tricorder of *Star Trek* fame. It's my communicator, it's geo-aware...I can send my location out. I can send pictures and video out. I can actually send out my observations, too."

(continued on page 3)

TsuInfo Alert

is prepared by the Washington State Department of Natural Resources
on behalf of the National Tsunami Hazard Mitigation Program,
a State/Federal Partnership funded through the National Oceanic and Atmospheric Administration (NOAA).

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

This publication is free upon request and is available in print (by surface mail), and at
<http://www.dnr.wa.gov/ResearchScience/Topics/GeologyPublicationsLibrary/Pages/tsuinfo.aspx>
Participants in the TsuInfo program can request copies of reports listed in this issue from:

Washington Geology Library
Washington Department of Natural Resources
Division of Geology and Earth Resources
1111 Washington Street SE, MS 47007
Olympia, WA 98504-7007
360/902-1473
fax: 360/902-1785
e-mail: lee.walkling@dnr.wa.gov

The views expressed herein are those of the authors and not necessarily those of
NOAA, the Washington Department of Natural Resources, or other sponsors of
TsuInfo Alert.

ISSN 1938-5064



(continued from page 1)

He says that there has been some resistance in bureaucratic circles to using social networking information because “this is not official.” He was optimistic about the possibilities of changing behavior because of the wealth of information available from social networking. He cited the example of a rumor that spread in Florida that gasoline prices would be reaching five dollars after a hurricane knocked out some refineries. The information wasn’t correct, but people nonetheless bought up gasoline supplies trying to beat the price increase.

This power to get people moving, changing behavior in the face of crises is an untapped potential resource in times of disaster, he said.

Fugate’s “little social science experiment” appeared to have an immediate impact at the Workshop at least, as speaker after speaker in later sessions caught themselves mid-sentence, cutting off the word “victim” after the first syllable and replacing it with “survivor.” He also persuaded everyone to call him “Craig,” instead of “Mr. Fugate” or some other unwieldy title.

Reaction to Fugate’s speech was positive. “I see a time of greater positive change coming to FEMA and the emergency management profession if Craig is given time and support necessary to allow him to expand the vision that he created for emergency management in Florida to the whole country,” said Bob Goldhammer of the International Association of Emergency Managers.

Emphasizing that he was speaking for himself and not for his organization, Goldhammer adds, “One might think that changes in FEMA operation and policies will happen quickly, but I don’t think that will be the case. As fervent as Craig is, and as much as emergency managers want to see things happen, he will have to operate within the confines of a fairly well-established hierarchy of duties and agendas.”

“This constraint applies not only to FEMA but within government as a whole. It would be challenging enough to try to steer a new course for the agency if everything around it was stable, but with all the changes that are taking place within the federal government—especially with the new administration selecting new people for leadership positions—I believe it is going to take some months or longer to see the impacts of the policies that Craig is promoting,” Goldhammer says. ♦

USVI receives NOAA grant for tsunami preparedness

Published on Monday, August 24, 2009
Caribbean Net News

<http://www.caribbeannetnews.com/news-18412--19-19--.html>

Reprinted with permission

ST THOMAS, USVI -- The US Virgin Islands Territorial Emergency Management Agency (VITEMA) has received a \$42,000 grant from the National Oceanic and Atmospheric Administration (NOAA) to begin work on tsunami preparedness in the Virgin Islands.

“This project will enable the Territory under the leadership of VITEMA to provide preparedness and mitigation activities as well as to integrate tsunami response with emergency response plans. The direction for VITEMA as a response coordinating agency which has been charted by Director Mark A. Walters and supported by the Office of the Governor is inclusive of not only hurricanes but all natural disasters including earthquake and tsunamis,” Governor John deJongh said over the weekend.

To assist in coordinating the technical and scientific aspects of its tsunamis preparedness, VITEMA has secured the services of retired professor and oceanographer Roy Watlington as a consultant to organize this activity, according to VITEMA Director Mark Walters. Watlington will assist VITEMA in organizing and convening the core membership of the US Virgin Islands National / State Working Group for tsunami preparedness.

“As VITEMA continues to move forward on all fronts including our preparedness for any type of disaster, this award by NOAA will allow the Virgin Islands to enhance its response to the threat of tsunamis. While much of our attention is now focused on hurricanes, we also realize that we are in an active seismic zone which may generate tsunamis such as the one in 1867,” Walters said.

The tsunami preparedness program will result in a level of territory-wide tsunami awareness that will match the preparedness status of other advanced US communities and in “Tsunami Ready” status for the US Virgin Islands.

Once the program is fully developed, evacuation plans will be published; evacuation routes will be publicized; general tsunami information brochures will be published and distributed to schools, community leaders, staffs of agencies with emergency functions and community centers in at-risk areas.

The three at-risk coastal communities in the Virgin Islands will be proposed to the National Weather Service for recognition as a “Tsunami Ready” ready area, which will mean completion of inundation modeling and mapping, identification and publicizing of evacuation routes, installation of signage and a program of staff training and public education about tsunami risk and response in the selected areas. ♦

So, you want to run an exercise?

(Tony Callan introduces the first in a series of articles on exercise management)

Tony Callan

Australian Journal of Emergency Management, v. 24, no. 2, p. 59-62

Reprinted with permission

Abstract

A substantial amount of resources and effort are committed by agencies and organisations at all levels to the design, conduct and evaluation of emergency management exercises. Many of these exercises are heralded as great successes, while others fall open to criticism for a whole range of reasons.

Introduction

As an emergency manager, who has been involved in the design, conduct and evaluation of exercises for more than 20 years, I am regularly approached by others seeking assistance to 'run an exercise'. Often these people have only participated in or observed an exercise and now fill a role in their organisation that is required to conduct exercises.

My first question to them is usually phrased along the lines of, 'so, you want to run an exercise?' This will almost certainly receive a hesitant 'yes' or other affirmative response.

The second question is an open question, 'what did you have in mind?' This receives various types of responses, however, the most common reply will include a detailed description of a well-thought-out and elaborate scenario. Examples have included planes crashing into harbours, wide spread epidemics or contamination events infecting many states and disastrous natural events wiping out whole communities.

Once I get the scenario off their chest, it is time to get down to what it is that they really want to achieve by running an exercise. Questions like 'why are you conducting an exercise?', 'what is the purpose or aim of the exercise?', 'what objectives do you hope to achieve?', 'what scope of the exercise?', 'what factors might assist or limit the conduct of the exercise?', and 'who are the participants?' need to be clarified before one can truly begin to look at the design, conduct and evaluation of an exercise.

This article will look at what is required to design, conduct and evaluate an exercise. It will provide an overview of an exercise management process and is the first in a series of articles on exercise management. Future articles will look at: identifying and analysing why exercises are conducted, various types of exercises and their application, planning and documenting an exercise, conducting an exercise, evaluating an exercise, and why do we exercise?

Exercises by themselves are not the panacea to all emergency management problems. They are, however, a legitimate element of any program of continuous improvement or emergency preparedness.

Continuous improvement within an agency, organisation or group of organisations, such as the emergency management communities, will almost certainly include elements of assessment, planning, training, education, resourcing and evaluation. In the absence of an actual event or response, exercises have proven to be an effective way of evaluating and improving our emergency management arrangements at all levels.

Emergency management exercises have many uses. These include, but are in no way limited to; testing plans, evaluating arrangements, evaluating equipment, practising procedures, training people and/or demonstrating capability. Whatever the purpose of an exercise, it is essential to ensure that those involved at all levels and at all stages through the exercise process are well aware of why we are conducting a particular exercise.

The exercise management model

The success of any exercise will almost certainly be enhanced by the adoption of a structured approach to its design, conduct and evaluation.

The Exercise Management Model provides such an approach. It is taught at the Emergency Management Australia Institute (EMAI) in its Exercise Management Course and has been adopted by a number of Australian agencies as a method for the design, conduct and evaluation of exercises. The Exercise Management Model is consistent with the approach adopted by the Australian Defence Force and the methodology adopted by the US Department of Homeland Security within its Homeland Security Exercise and Evaluation Program (HSEEP).

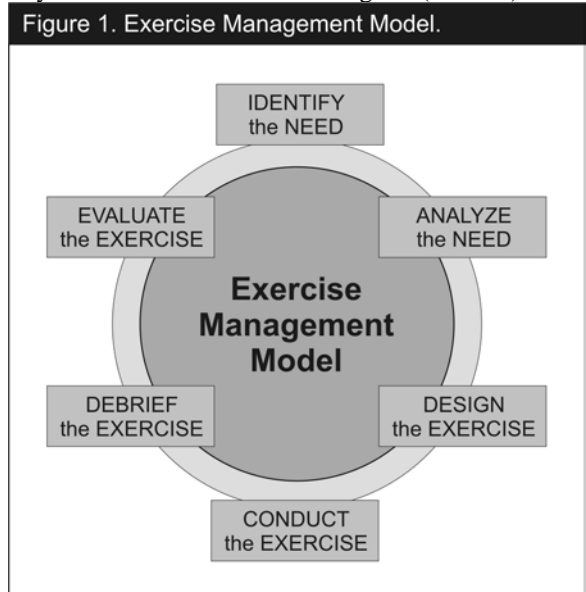


Figure 1. Exercise Management Model

This model takes a cyclical approach to exercise management, whereby one phase is dependent upon the substantial completion of the previous and the outcomes of an exercise can contribute to the inputs or development of future exercises.

The elements of the Exercise Management Model are discussed below.

Identifying and analysing the need

The first step in the process is to ask why are we conducting an exercise?

Exercises should begin with a specific **need** to test, evaluate, assess, practise, train or demonstrate aspects of policy, plans, procedures, systems, training of individuals or group performance. This need may have been identified from past planning, training, exercises, actual responses or as a legislative or regulator requirement, such as with the conduct of airport exercises.

Once it is determined *why* we are conducting an exercise, this can be analysed to determine the aim and objectives to be achieved by the exercise.

The aim should tell us, in a short concise statement, why we are conducting the exercise. An example might be: *The aim of this exercise is to test the effectiveness of the response arrangements documented in the xxx Airport Emergency Plan.*

The exercise **objectives** will build on the aim and provide an indication as to the expected outcomes from the exercise. Building on the aim stated above, examples of objectives may include:

*Assess the ability of emergency services to perform their prescribed roles during the response to a large aircraft incident on the xxx Airport.

*Assess the ability of the xxx Airport owners to provide access to emergency services and support their needs during the response to a large aircraft incident on the Airport.

As a rule of thumb, the number of objectives for an exercise should be kept to less than five. In a multi-agency exercise, each agency involved may wish to identify their own agency objectives. If allowed, these must be consistent with the overall objectives of the exercise. For example, a response agency wishing to assess its response times to the airport, may be outside the scope of the exercise described above.

Exercise managers need to be mindful of how they will identify if the exercise objectives have, or have not, been achieved. An effective way of doing this is to identify a number of actions or tangible outcomes that can be observed or measured which indicate an objective has been met or not met. These performance measures or performance indicators should be documented and agreed upon, so it is clear what is expected of participants during the exercise.

Design the exercise

Once the aim and objectives have been identified it is time to look at the scope, type and participants for the exercise.

The scope will identify what is included in the exercise and may also identify what is not included in the exercise. It is important that this be established early in the design phase, as there is a tendency for other influences to impact on the scope. Any variation to the scope may mean that the aim and objectives need to be reviewed. (This is called “scope creep” and at best should be avoided.) For example:

The scope of the exercise will be limited to:

- The response arrangements documented in the xxx Airport Emergency Plan, and
- Those agencies listed as having responsibilities during the response to an airport emergency.

There are three broad types of exercise used by emergency managers. These are discussion, functional and field exercises. Each of these has a number of variations and it is important to select the type of exercise that will best suit the aim, objectives and scope of a particular exercise. For example, a discussion exercise would not be suitable for assessing the performance of a particular role. In the airport exercise example, if one of the objectives was to familiarise emergency services with their roles during a response, a discussion exercise may be appropriate.

The participants and their level of participation need to be carefully assessed. Exercise managers need to pay particular attention to who should be involved and their particular role during an exercise. Once agreed, details need to be clearly communicated during the design of the exercise and articulated in exercise documentation.

An issue with emergency management exercises is that conflicting commitments can often limit participation. To avoid this, participants need to be engaged at the earliest opportunity and continually informed of developments during the design phase of the exercise.

Once the exercise aim, objectives and scope have been endorsed and the type of exercise and participants agreed, it is time to give consideration to the detailed scenario and look at what needs to be done before conducting an exercise.

The size and complexity of an exercise will indicate how much preparation is required. A simple exercise can be designed by an experienced exercise manager, however, more detailed exercises may require a dedicated team and many months of preparation. Exercise design will also require a range of meetings and detailed documents. One thing is certain, exercises do not occur by osmosis and the amount of time and effort applied to the preparation will almost certainly contribute to the success of the exercise.

Conduct the exercise

Exercise managers often focus on the exercise itself as the end state. The reality is that the conduct of the exercise includes those activities that involve the participants and exercise staff in the lead up to the exercise, during the exercise and immediately after the exercise.

Before the exercise, it is essential to ensure that all participants and exercise staff are aware of what is required of them during, and immediately after, the exercise. This should occur by way of written information in advance of the exercise and a briefing immediately before the exercise. Suggested topics for the briefing include:

- Exercise aims and objectives
- Roles and responsibilities during the exercise
- Information, communication and/or technology systems
- Action in the event of unforeseen circumstances
- Post exercise requirements
- Appropriate parts of the scenario

In addition to briefing participants, sufficient time should be allowed to establish and test the facilities and the resources required to conduct the exercise.

If careful attention is paid to pre-exercise activities, all will be in place for the person appointed to the role of Exercise Director to commence the exercise.

During the exercise, activities should occur in a predetermined way. This will commence with the Exercise Director starting the exercise, right through to its termination. These activities should occur in accordance with a pre-determined script, often referred to as the 'master schedule.' The master schedule should detail when particular activities are expected to take place, when exercise inputs should occur and if appropriate, information about the actions or responses expected from participants.

After the exercise, it is essential to ensure that all participants, directing staff and role players are aware that the exercise has concluded. A typical way to do this is to conduct a "hot debrief" to wrap up activities and to disengage participants and staff from the exercise activities. A hot debrief should bring the exercise scenario to a logical conclusion and advise those involved of any follow up activities, such as formal debriefs and evaluation activities. In addition to this, any resources, facilities or sites used during the exercise need to be returned to the pre-exercise state.

Debrief the exercise

All exercises benefit from a formal debrief at some stage following the conclusion of the exercise. The aim of such is to identify whether or not the exercise met its aim and objectives. It is also an opportunity to allow

participants and participating organisations to reflect on their performance during the exercise.

Debriefs have typically looked at what went well, what could be improved and recommendation that should be considered for future activities. More recently, there has been an inclination for agencies to replace debriefs with a process referred to as an After Action Review (AAR). While the concept of an AAR sits well in some circumstances, its purpose differs from that of a debrief and those responsible for conducting exercises are encouraged to include some form of formal debrief, as described above, following their exercise.

When conducting debriefs, it is essential that the outcomes are recorded and made available to those involved. These outcomes will contribute to any review or evaluation process applied to an exercise.

Evaluate the exercise

I have been involved in substantial exercises where the only form of evaluation was a quick debrief conducted immediately following the exercise. A written report may or may not have been issued and little or no follow-up action occurred. While this may be appropriate for small scale exercises, there is certainly a need to ensure that the outcomes of exercises are given the due degree of consideration they deserve.

To this end it is recommended that a process for evaluating an exercise be considered right from the very first exercise planning meeting. The evaluation process may run in conjunction with the exercise planning process and those appointed to evaluation positions should wherever possible work independently of those planning and conducting the exercise. The evaluation process should include both: how the participants respond to the developing scenario and also the way in which the exercise was designed and conducted. The latter point is often overlooked in the evaluation process and requires greater attention by exercise managers.

An evaluation process needs to be useful, accurate, ethical, feasible and cost effective. The Australasian Evaluation Society provides prudent information and guidance on evaluation that should be considered by exercise managers.

The outcomes of the exercise evaluation process should ultimately contribute to the way in which future exercises are conducted and the way in which emergency management agencies manage their responsibilities in the real event.

Conclusion

The amount of time, effort and resources that are required to design, conduct and evaluate an effective exercise should not be underestimated. All but the simplest of exercises will require a team of people dedicated to the tasks required to conduct an exercise. This team needs to work in a cohesive manner and have a common under-

standing of the requirements of the process adopted, such as the exercise management model described above.

The exercise design needs to be centered around a clearly defined aim, objectives and scope. The exercise manager should make use of the aim, objectives and scope to ensure that his exercise is not derailed by an overly ambitious scenario or other agenda.

Reference

Australian Evaluation Society (2006), *Guidelines for the ethical conduct of evaluation*, Website viewed July 2006, www.aes.asn.au

Australian Defence Force (2004), *Exercise planning and conduct*, Commonwealth of Australia

Australian Government (2007), *Australian government exercise management course*, workbook and instructor notes

Emergency Management Australia (2001), *Australian emergency manual series, Managing exercises*, Commonwealth of Australia

Homeland Security (2007), Homeland Security exercise and evaluation program (HSEEP), *Exercise planning and conduct*, U.S. Department of Homeland Security

About the author

Tony Callan has been involved in emergency management for more than 25 years, either as a responder, or in a management role. He currently works with the Australian Government Department of Agriculture, Fisheries and Forestry where he is responsible for ensuring that the Department has arrangements in place for managing its responsibilities during the response to emergencies that impact on primary production industries. Throughout his emergency management career, Tony has also been involved in the design, conduct and evaluation of exercises from a local level, right through national exercises.

[Editor's note: the photographs accompanying the article were not included. I can mail copies of the print article, with illustrations; contact me via mail or email. See page 2.] ♦

New report details research on tsunami hazard assessment for Cannon Beach (Oregon)

Press release, Oregon Dept. of Geology - 08/03/09
<http://www.oregongeology.org/sub/news&events/archives/press-release-2009-08-03.pdf>

A newly published study shows large portions of the Cannon Beach area would be inundated by a worst case tsunami generated by a Cascadia Subduction Zone

earthquake. This report, published by the Oregon Department of Geology and Mineral Industries (DOGAMI), details the underlying research that went into the production of new tsunami evacuation maps for the Cannon Beach area.

This new research shows that run-ups (how high above sea level a tsunami would push inland) from a Cascadia Subduction Zone earthquake are much higher in worst-case scenario events than previously estimated.

George Priest and Rob Witter of DOGAMI led a team of world renowned researchers, scientists and computer modelers in a two year investigation of tsunami hazards in the Cannon Beach area that is serving as the pilot project for a complete re-mapping of the Oregon coast for tsunami inundation.

One of the most important tasks for DOGAMI is helping coastal communities understand and mitigate for the risk of possible tsunamis. Communities located in exposed, low-lying areas along the Oregon coast face the risk of inundation by tsunamis produced by earthquakes around the Pacific Rim far from Oregon, as well as local earthquakes on the Cascadia Subduction Zone.

Cannon Beach was chosen for its relatively small size, variety of topography, rich record of Cascadia tsunami deposit, and detailed historical observations of tsunami inundation from the 1964 tsunami generated by the magnitude 9.2 Prince William Sound earthquake in the Gulf of Alaska. The ultimate objective of this new study was development of a cost-effective, improved approach for tsunami hazard assessment of the Oregon coast by DOGAMI.

This work is being complemented by a similar investigation, in progress now, of the southern Oregon coast centered on the Bradley Lake-Bandon area where a similarly rich record of paleotsunami deposits exists.

A related study, Open-File Report O-08-12, Prehistoric Cascadia Tsunami Inundation and Runup at Cannon Beach, Clatsop County, Oregon, was released in December 2008.

The brochure and map base on these two reports can be found online at:

<http://www.oregongeology.com/pubs/tsubrochures/CannonEvac.pdf>

This is the first of a new generation of tsunami evacuation brochures that will result from the remapping of the entire Oregon coastline for tsunami inundation.

This investigation was supported by the National Oceanic and Atmospheric Administration (NOAA), the City of Cannon Beach, the Cannon Beach Rural Fire Protection District, and the Seaside School District.

Both can be purchased from the Nature of the Northwest Information Center (NNW), 800 NE Oregon Street, Suite 177, Portland, Oregon, 97232. You may also call NNW at (503) 872-2750 or order online at <http://www.naturenw.org>. There is a \$4 shipping and handling charge for all mailed items. ♦

Seeing is believing

From: *Coastal Connections*, v. 7, no. 4, p. 1-3.

Reprinted with permission

High-accuracy land elevation and seafloor data are musts for coastal professionals making credible, critical decisions. The [NOAA Coastal Services] Center's on-line inventory can end the data search.

Topography, bathymetry, topobathy, lidar—these technical terms for elevation data are becoming part of the daily vocabulary for coastal professionals who must contend with threats that cross the land-sea interface, from hurricanes to inundation, and sea level rise to tsunamis.

Until recently, however, precise land elevation and seafloor data were often highly sought after but difficult to locate. That's because documentation on the data was not centralized but housed by countless agencies and institutions across the nation.

That state of affairs has changed for the better with an on-line data inventory of the Southeast Atlantic, Gulf of Mexico, and Lake Ontario coastal regions. The Topographic and Bathymetric Data Inventory is a product of the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center (see www.csc.noaa.gov/topobathy/viewer/).

This new inventory creates a happier situation for coastal modelers—and those who make decisions based on their products—than the dilemma that confronted some of them during the hurricane season of 2005.

“Fast is fine, but accuracy is everything.”.....Xenophon, ancient Greek historian

Xenophon has a point—but not one that was any help to Maria Honeycutt.

Four summers ago, Honeycutt, now a climate and hazards policy analyst with NOAA's Coastal Services Center, was working as a technical assistance contractor for the Federal Emergency Management Agency (FEMA) when the two-headed hydra of Hurricanes Katrina and Rita roared ashore.

After the hurricanes, Honeycutt and her colleagues were immediately given the task of reanalyzing coastal flood hazards along the Gulf coast of Mississippi and Louisiana and producing recovery maps to help guide post-storm reconstruction. Long before Katrina made landfall, FEMA and the State of Mississippi had been working to update the Flood Insurance Rate Maps (FIRMs) used by state and local officials to administer the National Flood Insurance Program. Unfortunately, the hurricanes struck before the new FIRMs were ready.

Honeycutt and her team were under pressure to complete the fastest, most accurate and up-to-date flood

recovery maps possible. A mad scramble began to locate and process the necessary data and products.

“Suddenly we needed all of the data yesterday; plus we had to figure in all the ways that these hurricanes had changed our understanding of the flood risks,” says Honeycutt. Mississippi's Governor Haley Barbour expected the results on his desk by November 14—only 11 weeks after Hurricane Katrina—and public officials wanted to use the maps to make reconstruction decisions potentially affecting thousands of Mississippians.

To create the recovery maps, Honeycutt and her team had to compile and analyze data on every recorded storm that had hit the northern Gulf coast. “There were so many needs—historical flood information, Katrina and Rita high-water marks, high-resolution topography [land elevation] and bathymetry [seafloor] data. We had people scouring the country, because the data were scattered everywhere.”

Data inconsistencies were not acceptable. “We learned by mid-October that the State of Mississippi had collected important lidar data for the three coastal counties as part of the ongoing FIRM update—but then we discovered that the newest data for two counties had gone through post-processing and quality-control while the data for the third county had not. Needless to say, we didn't dare use new, high-resolution data for two counties and older data for the third,” notes Honeycutt.

“Through a heroic effort, the team responsible for the lidar processing worked around the clock to get the final county's data to us in early November,” she stresses. “We finished a technical analysis of that county's flood risk, mapped the updated flood data for all three counties, did the quality control, and got everything up on the project website in less than 10 days!”

Honeycutt and her colleagues survived the ordeal, and the flood recovery maps were placed on Governor Barbour's desk on deadline, as promised. But the experience was an enormous wake-up call—for coastal managers on the Gulf Coast and around the nation—on the need for a centralized inventory of highly accurate coastal data.

“We are drowning in information but starved for knowledge.” John Naisbitt, author

“After the 2005 hurricane season, we saw that resource managers and others really needed a centralized place on-line where they could locate an index of the best available elevation data for their area,” says Lynne Betzhold, a hazards and remote sensing specialist on contract with the NOAA Coastal Services Center. “But they also needed access to all that is known about the data,” she emphasizes.

The Center collected information from agencies at all levels of government that provide topographic or bathymetric data at no cost or for a small fee. Special assistance

was provided by the U.S. Army Corps of Engineers, U.S. Geological Survey, North Carolina Floodplain Mapping Program, and NOAA's National Geophysical Data Center. Background and supplementary information related to the data sets was also collected. The resulting inventory is one of several products featured on the Center's on-line resource, Roadmap to a Seamless Topobathy Surface (see www.csc.noaa.gov/topobathy/).

The newest component of the inventory, the Topobathy Inventory Interactive Viewer, enables users to "zoom" to areas of interest in the Southeast Atlantic and Lake Ontario coastal regions, where pop-up boxes list the available data sets.

Also on-line are the Gulf of Mexico Inventory Maps, which list data sets in a pdf format searchable by location and collection date.

"When our customers first see how many data sets are in the inventory, it's easy for them to become overwhelmed by questions," says Betzhold. "We've designed the inventory so that users not only learn about the available data sets but also gain access to as much contextual information as we can supply," such as the following:

- Vertical and horizontal accuracy
- Horizontal and vertical datum references (for example, the North American Datum of 1983 and North American Vertical Datum of 1988)
- Data ownership and contact information
- A feature enabling the user to print the map extent displayed on the screen
- Up to 20 attributes posted, to give users a better sense of the data set quality

"I have a nickel and you have a nickel. Let's rub our nickels together and get a quarter!" Margaret Davidson, director, NOAA Coastal Services Center

Maria Honeycutt recites Davidson's phrase with a laugh. "In the coastal management community we talk about 'leveraging resources' all the time, because it helps us prioritize in an era of dwindling budgets." With that idea in mind, says Honeycutt, people can use the Center's data inventory as a leveraging tool.

"Whenever I attend workshops on coastal hazards or inundation or sea level rise, participants say that their biggest priorities are high-resolution topography and bathymetry, because it helps so much with making decisions," notes Honeycutt. "Knowing that, agencies and stakeholders can use the Center's data inventory as a leveraging tool to locate data that can be used for free, or to find out the data gaps that exist, and then can partner with other agencies to help fill the gaps."

Whatever potential users decide to do with the information, Honeycutt knows that they are in a much better position than she was in 2005. "People who have used the inventory tell me they were able to find the

data they needed in 10 minutes, because someone at the Center did the work. So the next time a hurricane hits, they will not have to call up 10 different people to find the right data, like I did."

Get lidar data for your region...It's easy!

You can locate lidar data from every coastal state, numbering more than 120 billion topographic and bathymetric points in all. Here's how:

See www.csc.noaa.gov/lidar/

1. Click Get It Now button
2. Click Download Data button
3. Search by area or state, or enter coordinates
4. Refine area of interest, if desired
5. Search results will be displayed—view and choose available data sets for download
6. Click Data Checkout for final data request

For more information, contact Lindy.Betzhold@noaa.gov



Fatigue management in the emergency management context

By Suzanne Robinson

The Australian Journal of Emergency Management, v. 24, no. 2, p. 71.

Reprinted with permission

In this project, fatigue management has been evaluated in the emergency management context, particularly in relation to New South Wales Department of Primary Industries (NSW DPI) emergency management activities.

Fatigue is a significant problem in emergencies, and particularly long time-frame emergencies like animal & plant pest and disease emergencies. However, much of the fatigue management research has been undertaken in areas other than emergency management, so it is not well known how well this fits into the emergency management context. To investigate this issue, fatigue management policies were accessed directly from emergency agencies across Australia. In the absence of sufficient of these, the focus was broadened to include other related industries whose guidelines were accessed from the web. A content analysis was undertaken to review the documents. The research revealed that the complex interactions between fatigue issues are not well understood and that fatigue management has been developed in other fields and not tested for its appropriateness in the complex emergency management context.

This study showed that a flexible risk management approach, rather than a prescriptive management approach, is most appropriate to the often complex, multi-agency, long time-framed emergencies that NSW DPI manages. The scarcity of information in the emergency management context highlights the need for future studies in better determining interrelationships and interactions

between fatigue factors and testing fatigue management systems in emergencies to evaluate their effectiveness in the emergency management context.

To obtain a copy of the full report please contact:

Suzanne Robinson
Manager General Emergencies Preparedness &
Response, and Deputy NSW Drought Coordinator and
Deputy NSW Locust Commissioner Emergencies,
Weeds & Pest Animals Branch
NSW Department of Primary Industries
Locked Bag 21
Orange, NSW 2800
Australia
Phone: (02) 6391 3680
Fax (02) 6391 3740
suzanne.robinson@dpi.nsw.gov.au
www.dpi.nsw.gov.au ♦

Tsunami warning system bound for Aleutians

By Van Williams, Alaska Newspapers Inc.
The Dutch Harbor Fisherman, July 23, 2009
<http://www.thedutchharborfisherman.com/news/show/6733>

Reprinted with permission

When Chris Babcock first arrived in King Cove in the early 1990s, he witnessed two different tsunamis that forced the lower levels of town to be evacuated.

He remembers how badly the warning system at the time needed to be upgraded. It finally was replaced around 2003, he said, except now the sound of the siren can be garbled if the wind is blowing just right.

“It’s a good siren, but if the weather is a certain way a lot of people can’t hear it in the low-lying areas unless they have their window open or their door open or they’re standing outside,” Babcock said. But that will soon change.

King Cove is one of five rural communities on the Aleutians set to receive a new all-hazard warning siren system within the next year courtesy of the Alaska Division of Homeland Security and Emergency Management. The new siren is primarily to alert people of tsunamis, but it can also be used for warnings about volcanic activity, windstorms, flooding and lost children. It can be heard from nearly a mile away.

After the loud siren gets everybody’s attention, a prerecorded voice message will say whether it’s a test or the real deal.

“I’m excited for this new system because not only can it be used for tsunami, but it could be used for broadcasting extreme weather conditions that could be coming through the communities such as blizzards, high winds, things like that,” Babcock said.

Babcock was one of the folks who spearheaded the effort to get King Cove a new warning system.

Makes sense, since he is the chief of the Fire Department and the emergency medical services coordinator.

“I presented it to our City Council and our city administrator and our mayor, and we’re really excited about it,” he said.

Best of all, the new warning system won’t cost the city of King Cove a penny because the project is being funded through a National Oceanic and Atmospheric Administration grant. “Any free money that can be thrown our way, we certainly try to get,” Babcock said. “This was a godsend because we have been trying to look at something better for warning the community because (the current) warning siren isn’t really adequate.”

Other Aleutian communities such as Adak, Atka, Nikolski and St. Paul also are slated to receive a new warning system. Installation has already been completed in other parts of the state, ranging from small villages such as Perryville, Whittier and Seldovia to larger towns such as Seward, Sitka and Valdez.

Alaska has been recognized by the National Tsunami Hazard Mitigation Program as having a high tsunami threat and long history of recorded destructive events caused by tsunamis.

Many of the remote locations have outdated or unserviceable warning systems, or worse, nothing at all. “I don’t know that there is an old system,” said Adak city clerk Peggy Campbell.

The intent of the system is to warn coastal communities of tsunami activity. Earthquakes, volcanic eruptions and landslides have the potential to generate a monster wave of water capable of destroying everything in its path.

That makes a place like Adak, which sits between the Bering Sea and Pacific Ocean, a danger zone. “We are getting a warning system not because we were threatened by tsunamis but because of the tsunamis that the earthquake activity around Adak causes,” Campbell said. “If you have an earthquake and it creates a tsunami, it warns others.”

Campbell, who has been living in Adak for about 15 months, said she’s already experienced two major earthquakes that each surpassed 7.0 magnitude.

“If you had a 7.2 in Los Angeles it would be leveled,” Campbell said. “Well, we get them — I wouldn’t say frequently — but I bet you we’ve had two that were beyond 7.0 since I’ve been here.” ♦

BONUS Infrequently Asked Question

What was the biggest volcanic explosion witnessed by humans?

Probably, it was the prehistoric eruption of Santorini around 1470 BC (date in question) off the island of Thera.

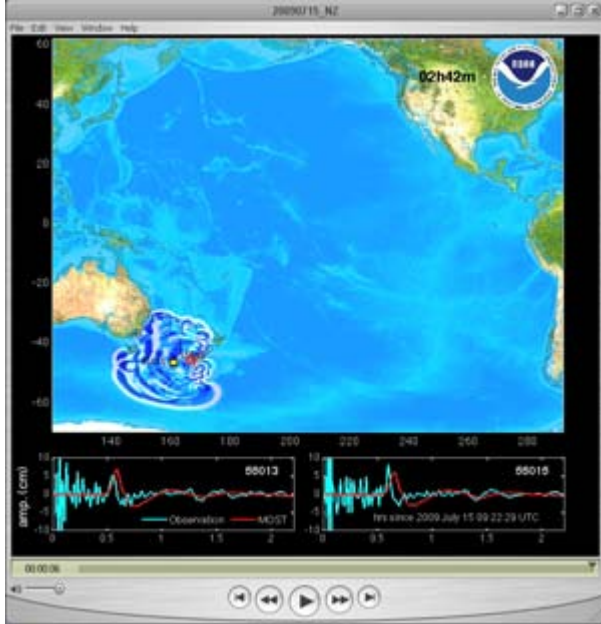
From: Bryant, Edward, 2001, *Tsunami—The underrated hazard*: Cambridge University Press, p. 222.

Tsunami symposium sees NOAA research forecast in action

July 17, 2009

<http://www.noaaneews.noaa.gov/stories2009/20090717/tsunami.html>

Reprinted with permission from NOAA



NOAA's Internet-based tsunami research forecast system.

[Download as Quicktime](#) (Credit: NOAA)

During a session on tsunami forecasting during an international meeting in Russia on July 15, scientists saw NOAA's Internet-based tsunami research forecast system in action.

A tsunami was generated by a large earthquake off the southwest coast of New Zealand. Vasily Titov, of NOAA's Pacific Marine Environmental Laboratory in Seattle, Wash., and session chair, immediately accessed the web-based NOAA tsunami forecast system and demonstrated, before a live audience of 60 international tsunami scientists, a real-time tsunami forecast.

His demonstration included real-time access to tsunami data from a nearby deep-ocean detection buoy, part of the DART® (Deep-ocean Assessment and Reporting of Tsunamis) real-time tsunami monitoring system, developed by PMEL. The buoys are positioned at strategic locations throughout the ocean.

"Using these tsunami data assimilated into a forecast model, he predicted live that the tsunami would not be destructive to the coastlines of New Zealand or Australia before the tsunami arrived at any large coastal communities," said Eddie Bernard, director of PMEL, who was present at the meeting. "His prediction was later validated as tide gauges in the area reported tsunami amplitude less than 50cm (1.5 feet) with no flooding."

Bernard said that he hopes the Internet-based system will become a new way of conducting research through community modeling for tsunami scientists.

Bernard noted that Titov, developer of NOAA's tsunami forecast system, grew up in Novosibirsk, Russia, a Siberian city located in the center of the Asian continent and is possibly the safest tsunami city in the world.

The Dusky Sound earthquake, which caused the tsunami, was the largest earthquake on the main islands of New Zealand in 75 years, said Bernard.

NOAA understands and predicts changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and conserves and manages our coastal and marine resources. ♦

Tsunami-resistant buildings in Oregon?

Posted: Friday, June 5, 2009 at 01:00 AM PT

By Sam Bennett

<http://djcoregon.com/news/2009/06/05/tsunamiresistant-buildings-in-oregon/>

Daily Journal of Commerce, Oregon

Reprinted with permission



Cannon Beach architect's design of new city hall could serve as a prototype

If a tsunami hits the Oregon Coast, there may not be enough time for everyone to reach higher ground. Researchers at Oregon State University suggest that people in coastal towns would have between 10 and 20 minutes to find a safe place, after an earthquake hits the Cascadia Subduction Zone off the Oregon Coast.

"We have a lot of tourists and older people in town," said Jay Raskin, a Cannon Beach architect and former mayor. "Getting people to higher ground is going to be difficult." Raskin has been working with OSU researchers on a solution: a new Cannon Beach City Hall that would withstand a tsunami and keep 800 to 1,000 people safe. Cannon Beach has approximately 1,700 residents.

Raskin said his design for a tsunami-safe city hall could serve as a prototype for other civic structures on the Oregon Coast, as well as other parts of the U.S. that would be vulnerable to a tsunami and earthquake. The new city hall would be a place where city officials could

“maintain government services and rebuild,” during the initial 12 hours after a tsunami, he said. The city hall would be 40 feet at its highest point and 15 feet off the ground.

Harry Yeh, a coastal and ocean engineering professor at OSU, said the Cascadia Subduction Zone causes an earthquake every 220 to 525 years, and the last one occurred roughly around the year 1700. The tsunami from that quake hit the Oregon Coast, as well as Japan. He said a recent study by the Oregon Department of Geology and Mineral Industries showed that almost all of the commercial areas in Cannon Beach would be inundated by a tsunami. The tsunami could cause buildings to collapse, roads to become blocked, bridges to perhaps fail and traffic to become jammed, he said. Raskin said the result would be that Cannon Beach and other coastal cities could be cut off from aid in the Willamette Valley.

Reaching higher ground would mean ascending to an elevation of 60 feet or higher, Raskin said. Since that may not be possible for the 1,700 residents, as well as tourists, he said the concept of a “vertical evacuation” is attractive.

Yeh said the 2004 Indian Ocean tsunami showed that reinforced concrete buildings can survive a tsunami. He said OSU researchers will use the university’s tsunami wave basin, the largest wave research facility in the world, to study the type of structure best suited for a tsunami on the Oregon Coast.

Raskin has created a schematic design of the city hall, but said he has not approached Cannon Beach city officials with a formal proposal yet. He said the tsunami-resistant city hall could be used in other coastal cities such as Seaside, Newport, Warrenton and Long Beach, Wash.

Already, Cannon Beach has become “proactive” about tsunami safety, Raskin said. The city’s coastal warning system includes a series of sirens that uses the sound of cows mooing. The city has also staged tsunami evacuation drills. ♦

NEWS

Closer to killing Comitatus? Pentagon wants authority to post reserves in disasters

A move by the Pentagon that would allow it to deploy national reserve forces to U.S. disaster and emergency areas has drawn fire from the nation’s governors and those concerned about civil liberties. Currently, those deployments are at the request and under the command of state officials.

The plan, which was recently proposed to Congress, has been criticized as everything from a power play that will cause confusion during disasters to the

death of Posse Comitatus—the 1878 law that prohibits the military from taking a law enforcement role in U.S. states. Past attempts to maim or dismantle Posse Comitatus—including George Bush’s post-Katrina stab at revising the doctrine—have been frequent enough to make many wary of changes, according to an article in *The Progressive*.

The National Governors Association (NGA) isn’t primarily concerned with what Mike German of the American Civil Liberties Union called the undermining of “a 100-year-old prohibition with no public debate and seemingly little understanding of the threat to democracy.” Instead, they’re more worried that a separate command would hinder, rather than help, when responding to large-scale emergencies.

“The strong potential exists for confusion in mission execution and the dilution of governors’ control over situations with which they are more familiar and better capable of handling than a federal military commander,” according to a NGA letter to Asst. Secretary for Homeland Defense Paul Stockton.

Federal officials, though, say that a change to Posse Comitatus is needed so they can provide quicker response, especially with so many National Guard troops tied up in Afghanistan and Iraq, according to an [Associated Press](#) report.

“The key here is that right now, we lack the authority to bring to bear the hundreds of thousands of trained reserve forces that in extreme circumstances might help governors deal with the disasters in their states,” Stockton said in an AP interview. “This provision would in no way impede or undermine or inadvertently reduce the authority that governors exercise under the United States Constitution.”

The NGA letter stated that it was unclear how giving the Department of Defense wider authority would help responsiveness and pointed out that it already has the authority to mobilize troops at a state’s request. A [Congressional fact sheet](#) on the matter released by U.S. Northern Command details the department’s reasoning for the proposal.

From: Disaster Research 530, Aug. 27, 2009

NHC Bibliography provides quick reference to hazards loss data

The Natural Hazards Center (University of Colorado, Boulder) is happy to announce the release of *An Annotated Bibliography of Hazards Loss Datasets* by Linsi Beckman.

The publication is a companion to the Hazards Loss Dataset Catalog, a key-worded, annotated bibliographic database where natural hazards loss datasets and related literature have been collected, cataloged, and described. The bibliography, just released in pdf, is a useful quick reference and entry point for a wide variety of users. The

source EndNote database is being prepared for electronic distribution so that others may extend this work.

Beckman is a senior geography major from California University of Pennsylvania who recently completed an internship hosted jointly by the Natural Hazards Center and the University of Colorado's Center for Science and Technology Policy Research. She created the catalog and the related bibliography with staff guidance from both Centers.

From: Disasters Research 528, July 30, 2009

Leave now or pay later: New Texas law puts price tag on rescues in evacuation zones

Those who choose to ignore mandatory evacuations in Texas better be able to weather the storm or ante up, thanks to a new law set to go into effect September 1 [2009]. The law gives local authorities the right to issue evacuation orders, remove individuals from evacuation zones, and charge those who refuse to leave for their rescues, according to a *Houston Chronicle* article.

"Psychologically, I think it gives people a little sense of urgency—especially for people that need that nudge," Kemah City Administrator Bill Kerber told the *Chronicle*.

Although police can now remove—not arrest or detain—people from evacuated areas, it's unlikely local authorities would have the time or manpower available to do so during a full-scale evacuation, according to the emergency responders quoted in the article. That's where the added incentive of financial liability for rescues comes into play, Maj. Ray Tuttoilmondo of the Galveston County Sheriff's Department told the *Chronicle*.

"It certainly seems reasonable that if a person has the ability to leave but chooses to wait until it's too late, and they have to be rescued, then maybe there needs to be some compensation," he said.

While the new legislation seems to smack of forced evacuations, many local officials view it as a tool to be used sparingly in cases of extreme danger and might not even evoke the liability portion of the law, according to the Brazoria County newspaper *The Facts*.

"It's kind of good and kind of bad," Freeport Mayor Larry McDonald told *The Facts*. "You can recover some of the money you're out of pocket, but I think it's our responsibility to do our best to get people out of harm's way no matter what the circumstance is."

From: Disaster Research 529, August 13, 2009

Iowa 911 call center first to allow emergency texts

As the world races through telephone technologies at a dizzying pace, at least one 911 call center in Iowa is keeping pace—relatively speaking. Black Hawk County, Iowa, became the first U.S. emergency call center with the ability to accept text messages Wed-

nesday [Aug. 12, 2009], according to an *Associated Press* report.

The county, which includes Waterloo, Evansdale, and Cedar Falls, is now offering the service to subscribers on the wireless network, but only when they're physically located in the county, according to the article. Although the service should be beneficial to the hearing impaired and those unable to speak safely during an emergency—kidnapping victims or hostages, for instance—calling is still the preferred method of contacting 911, technicians said. One drawback of texting is that emergency officials are unable to identify a caller's location from the text message.

Public safety telecommunications company Intrado, which upgraded the Black Hawk system, told the AP that it was working with other carriers to expand the service and allow for video and photo transmission, as well.

From: Disaster Research 529, August 13, 2009

PUBLICATIONS

The Roommates

What do you get when you bunk a wizard, a ninja, a barbarian, a robot, and a safety-savvy girl in the same house? A hilarious series of preparedness videos from the Bay Area Red Cross, that's what. Each of the six animated episodes of *The Roommates* edify and entertain, while interactive activities at the end of each reinforces new-found knowledge.

From: Disaster Research 530, Aug. 27, 2009

Citizen Corps Volunteer Liability Guide

Because concerns about personal liability can be an obstacle in soliciting and retaining emergency volunteers, the Federal Emergency Management Agency joined forces with the Public Entity Risk Institute to create the *Citizen Corps Volunteer Liability Guide*. The guide will help government and nonprofit volunteer managers understand and access liability laws, gauge risk, prepare volunteers, and improve liability legislation. Volunteer checklists and links to state laws are included.

From: Disaster Research 530, Aug. 27, 2009

WEBSITES

<https://ccdpcr.thinkculturalhealth.org/>

Disasters create culturally diverse victims and now U.S. Health and Human Services is offering a program to help disaster responders deal with them in a culturally competent way. The Cultural Competency Curriculum for Disaster Preparedness and Crisis Response is a free, four-part online course that equips workers with the

awareness and skills to provide culturally appropriate service during disasters. Students who complete the course can also receive Continuing Education credits.

From: Disasters Research 528, July 30, 2009

<http://www.sahana.lk/>

Sahana offers a free open source disaster management tool. In today's troubled economy, who doesn't like free, especially when it's coupled with the ability to track missing persons, manage volunteers and inventory, and view on-the-ground situations via GIS capabilities. With an easy interface and successful use in situations from Philippine mudslides to the Sichuan earthquake, Sahana is making a hit with governments and nonprofits.

From: Disaster Research 531, Sept. 10, 2009

SYMPOSIUM, CONFERENCES

Oct. 29 to Nov. 6, 2009

IAEM 57th Annual Conference, International Association of Emergency Managers, Orlando, Florida. This conference discusses current trends, information and technology in emergency management, and advances made by IAEM. Speakers include Federal Emergency Management Agency Administrator Craig Fugate, General Gerald Galloway, and *The Unthinkable* author Amanda Ripley.

From: Disaster Research 531, Sept. 10, 2009

Nov. 4-6, 2009

Disaster Risk Reduction for Natural Hazards

University College London, London, England. Registration open until filled. This meeting examines the concepts and processes of disaster risk reduction and stresses multihazard environments and multidisciplinary approaches in natural hazards research. Defining ways to make disaster risk reduction more effective in the future is emphasized.

From: Disaster Research 528, July 30, 2009 ♦

Material added to the NTHMP Library,

September - October 2009

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

Dudley, W.; Goff, J.; Chague-Goff, C.; Johnston, J., 2009, Capturing the next generation of cultural memories--The process of video interviewing tsunami survivors: *Science of Tsunami Hazards*, v. 28, no. 3, p. 154-170.

Gusman, Aditya R.; Tanioka, Yuichuro; Matsumoto, Hiroyuki; Iwasaki, Sin-Iti, 2009, Analysis of the tsunami generated by the great 1977 Sumba earthquake that occurred in Indonesia: *Bulletin of the Seismological Society of America*, v. 99, no. 4, p. 2169- 2179.

Imteaz, Monzur Alam; Imamura, Fumihiko; Naser, Jamal, 2009, Governing equations for multi-layered tsunami waves: *Science of Tsunami Hazards*, v. 28, no. 3, p. 171-185.

Power, William L.; Lukovic, Biljana, 2008, Using cluster analysis to optimize tsunami evacuation zones: *Eos (American Geophysical Union Transactions)*, v. 89, no. 53, Suppl., p. F1576.

Srisutam, Chanchai; Wagner, Jean-Frank, 2009, Multiple layer identification and transportation pattern analysis for onshore tsunami deposit as the extending tsunami data--A case study from the Thai Andaman coast: *Science of Tsunami Hazards*, v. 28, no. 3, p. 205-217.

Srivastava, Amit; Babu, G. L. Sivakumar, 2009, Analysis and design of reinforced earth wall for shore protection system against tsunami: *Science of Tsunami Hazards*, v. 28, no. 3, p. 186-204.

Vithanage, Meththika; Villholth, Karen G.; Mahatantila, Kushani; Engesgaard, Peter; Jensen, Karsten H., 2009, Effect of the Indian Ocean tsunami on groundwater quality in coastal aquifers in eastern Sri Lanka: *Science of Tsunami Hazards*, v. 28, no. 3, p. 218-231.

Walsh, Timothy J.; Arcas, Diego; Venturato, Angie J.; Titov, Vasily V.; Mofjeld, Harold O.; Chamberlin, Chris C.; Gonzalez, Frank I., 2009, Tsunami hazard map of Tacoma, Washington--Model results for Seattle Fault and Tacoma Fault earthquake tsunamis: *Washington Division of Geology and Earth Resources Open File Report 2009-9*, 1 sheet, scale 1:24,000.

Western States Seismic Policy Council, 2008, 2008 WSSPC annual report: *Western States Seismic Policy Council*, 1 v.

Wiegel, Robert L., 2009, Tsunami information sources--Part 3 and Part 4: *Science of Tsunami Hazards*, v. 28, no. 4, p. 232-346. ♦

TsuInfo Alert is printed on 30% recycled paper. The cost of 100% recycled paper is being investigated.

STATE EMERGENCY MANAGEMENT OFFICES
updated 3-31-2006

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

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

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

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

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

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

ALSO:

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

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

Guam Homeland Security/Office of Civil Defense
221B Chalan Palasyo

Agana Heights, Guam 96910
Tel: (671) 475-9600; Fax: (671) 477-3727
www.guamhs.org

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

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

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

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

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

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

CORRECTION

Because a 2008 issue was incorrectly used as a template
for the August 2009 *TsuInfo Alert*, Doug Sutherland was
shown as Lands Commissioner on page 2. Peter
Goldmark is the current Commissioner of Public
Lands at the Washington Department of Natural
Resources.



INFREQUENTLY ASKED QUESTIONS

In June 2009, the question was asked: Where do I find out who belongs to the Washington State/Local Tsunami Work Group (WSLTWG)?

John Schelling, Earthquake/Tsunami/Volcano Program Manager for the Washington Emergency Management Division provided this answer:

The Washington State-Local Tsunami Workgroup consists of representatives from various federal, state, tribal, and local agencies as well as staff representatives from the Washington congressional delegation. The tsunami-specific preparedness and education-oriented advisory group serves as an excellent conduit for coordination of tsunami public education, outreach, and training. Additionally, the group informs the state National Tsunami Hazard Mitigation Program representatives of local and tribal issues and needs. The multi-disciplinary group generally meets quarterly and the State Tsunami Program Manager from the Washington State Emergency Management Division serves as the Chair. Workgroup members include:

Counties:

Pacific County Emergency Management
Grays Harbor County Emergency Management
Clallam County Emergency Management
Jefferson County Emergency Management

Tribes:

Lower Elwha Tribe
Makah Tribe
Quileute Tribe
Hoh Tribe
Quinault Tribe
Shoalwater Bay Tribe

Washington State Agencies:

Emergency Management Division
Department of Natural Resources
Department of Transportation

Washington State Patrol
Washington State Parks

Federal Agencies:

NOAA – National Weather Service
NOAA – Pacific Marine Environmental Laboratory
Federal Emergency Management Agency
United States Geological Survey

Staff Representatives from Washington Congressional Delegation:

Senator Maria Cantwell
Representative Norman Dicks
Representative Jay Inslee

[Editor's note: I would be pleased to print an 'answer' from other states, provinces, countries, if they have formed Workgroups or similar groups.]

Which ocean or sea has had the most tsunamis?

Percentage distribution of tsunami in the world's oceans and seas:

<u>Location</u>	<u>Percentage</u>
Atlantic East Coast	1.6
Mediterranean	10.1
Bay of Bengal	0.8
East Indies	20.3
Pacific Ocean	25.4
Japan-Russian	18.6
Pacific East Coast	8.9
Caribbean	13.8
Atlantic West Coast	0.4

Source: Bryant, 1991

Reprinted in Bryant, Edward, 2001, Tsunami—The underrated hazard: Cambridge University Press, p. 15. ♦

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. ♦



Perceiving 'stayers' and 'leavers' from Katrina

By Dan Whipple

Natural Hazards Observer, v. 34, no 1, p. 6

<http://www.colorado.edu/hazards/o/archives/2009/sept/observerweb.pdf>

Survivors' decisions about whether to stay in New Orleans in the face of Hurricane Katrina or to evacuate were powerfully shaped by their environment and the resources they had at their disposal. But outsiders' perceptions of people who stayed were largely negative, even though "stayers" often had little real choice, according to new research.

Writing in the journal *Psychological Science*, Stanford University psychologist Nicole Stephens and colleagues conducted two studies to look at how observers and survivors "made meaning" after Hurricane Katrina. The first study analyzed how observers perceived survivors who evacuated versus survivors who remained in New Orleans. The second looked at how both "leavers" and "stayers" perceived themselves.

"Observers described leavers positively (as agentic*, independent and in control) and stayers negatively (as passive and lacking agency)," the study says.

But the second study found the two groups "relied on divergent models of agency*. Leavers emphasized independence, choice, and control, whereas stayers emphasized interdependence, strength, and faith. Although both leavers and stayers exercised agency, observers failed to recognize stayers' agency and derogated them because observers assumed that being independent and in control was the only way to be agentic."

Survivors who stayed adjusted themselves to the world, maintaining interdependence on other people. This may reflect a "compensatory secondary control." Those who stayed were mostly black and less wealthy than those who left, so they had fewer evacuation options.

"Rather than ask why stayers made bad 'choices' or inquire what was wrong with stayers," the paper concludes, "relief workers should perhaps have asked, 'What actions were possible in the resource-limited context of the stayers?' This alternate question acknowledges that all action is—and should be understood as—a product of what the individual can do given the resources of the sociocultural context."

Anthony Ladd, a sociology professor at Loyola University in New Orleans, says, he found the study "to be a valuable contribution to the disaster evacuation literature."

He adds, "In a nutshell, most people, lay and academics alike, have never really understood what this

city is, or how it works in unique ways from the rest of the country. Compared to national norms, New Orleans is poorer, more populated with minorities, older, less healthy, with fewer modes of transport, and much, much deeper community roots than most other areas of the United States, all of which—and research has shown this—played an important role in who was able to evacuate and who wasn't."

"But for almost everyone who was impacted by Katrina, there were a host of other factors that affect people's decisions here that don't usually exist in other places, factors like available roads to evacuate on, crime and looting after a hurricane, sick relatives, pets, an older housing stock, places to evacuate to, financial resources, and so on, that made the decision for most of us, whatever our rational calculus models might say. When we say we are 'Third World and Proud of It,' it is only slightly meant as a joke."

"But as the piece concludes, we have been inappropriately and harshly judged by the rest of the country in ways that really make many residents here angry—and with good reason. We are so sick of answering the same dumb questions about why we live here, why New Orleans should exist, what is wrong with us—you get the picture."

The Stephens, et al. paper is published in Volume 20, Number 7 of *Psychological Science*.

*[Editor's note: Agency is defined as the capacity, condition, or state of acting or of exerting power: action or activity. Agentic means exerting power or taking action.] ♦

Unanswered questions

In surfing the web, one realizes the public explains tsunami size by reference to the Richter Scale. There *is* a relationship between earthquake magnitude and tsunami generation. But several scientific sites can't make up their minds...6.5, 7.0, and 7.5 were given as the lowest Richter magnitude earthquake that could generate a tsunami.

Should you want to contribute to public awareness and education, you can answer these online questions:
1) Can a Richter scale measure a tsunami?
http://wiki.answers.com/Q/Can_a_Richter_scale_measure_a_tsunami
2) How high on the Richter Scale was the 2004 tsunami?
<http://www.blurtit.com/q5845335.html>

Note: At the Ask A Scientist: General Tsunami Information IAQ website (http://www.aktsunami.com/ask_Q&A/general.html), Elena Suleimani, Tsunami modeler/Research analyst, answers the question, Is there a scale associated with the severity of a tsunami? "Yes, there is a tsunami magnitude scale. The scale has many factors. For a Richter magnitude

it is the acceleration of the ground motion; for a tsunami scale there are many more factors than the Richter scale.” ♦

NASA tsunami research makes waves in science community

01.17.08, by Alan Buis

<http://www.nasa.gov/topics/earth/features/tsunami-20080117.html>

PASADENA, Calif. – A wave of new NASA research on tsunamis has yielded an innovative method to improve existing tsunami warning systems, and a potentially groundbreaking new theory on the source of the December 2004 Indian Ocean tsunami.

In one study, published last fall in *Geophysical Research Letters*, researcher Y. Tony Song of NASA's Jet Propulsion Laboratory, Pasadena, Calif., demonstrated that real-time data from NASA's network of global positioning system (GPS) stations can detect ground motions preceding tsunamis and reliably estimate a tsunami's destructive potential within minutes, well before it reaches coastal areas. The method could lead to development of more reliable global tsunami warning systems, saving lives and reducing false alarms.

Conventional tsunami warning systems rely on estimates of an earthquake's magnitude to determine whether a large tsunami will be generated. Earthquake magnitude is not always a reliable indicator of tsunami potential, however. The 2004 Indian Ocean quake generated a huge tsunami, while the 2005 Nias (Indonesia) quake did not, even though both had almost the same magnitude from initial estimates. Between 2005 and 2007, five false tsunami alarms were issued worldwide. Such alarms have negative societal and economic effects.

Song's method estimates the energy an undersea earthquake transfers to the ocean to generate a tsunami by using data from coastal GPS stations near the epicenter. With these data, ocean floor displacements caused by the earthquake can be inferred. Tsunamis typically originate at undersea boundaries of tectonic plates near the edges of continents.

"Tsunamis can travel as fast as jet planes, so rapid assessment following quakes is vital to mitigate their hazard," said Ichiro Fukumori, a JPL oceanographer not involved in the study. "Song and his colleagues have demonstrated that GPS technology can help improve both the speed and accuracy of such analyses."

Song's method works as follows: an earthquake's epicenter is located using seismometer data. GPS displacement data from stations near the epicenter are then gathered to derive seafloor motions. Based upon these data, local topography data and new theoretical

developments, a new "tsunami scale" measurement from one to 10 is generated, much like the Richter Scale used for earthquakes. Song proposes using the scale to make a distinction between earthquakes capable of generating destructive tsunamis from those unlikely to do so.

To demonstrate his methodology on real earthquake-tsunamis, Song examined three historical tsunamis with well-documented ground motion measurements and tsunami observations: Alaska in 1964; the Indian Ocean in 2004; and Nias Island, Indonesia in 2005. His method successfully replicated all three. The data compared favorably with conventional seismic solutions that usually take hours or days to calculate.

Song said many coastal GPS stations are already in operation, measuring ground motions near earthquake faults in real time once every few seconds. "A coastal GPS network established and combined with the existing International GPS Service global sites could provide a more reliable global tsunami warning system than those available today," he said.

The theory behind the GPS study was published in the December 20 issue of *Ocean Modelling*. Song and his team from JPL; the California Institute of Technology, Pasadena, Calif.; University of California, Santa Barbara; and Ohio State University, Columbus, Ohio, theorized most of the height and energy generated by the 2004 Indian Ocean tsunami resulted from horizontal, not vertical, faulting motions. The study uses a 3-D earthquake-tsunami model based on seismograph and GPS data to explain how the fault's horizontal motions might be the major cause of the tsunami's genesis.

Scientists have long believed tsunamis form from vertical deformation of seafloor during undersea earthquakes. However, seismograph and GPS data show such deformation from the 2004 Sumatra earthquake was too small to generate the powerful tsunami that ensued. Song's team found horizontal forces were responsible for two-thirds of the tsunami's height, as observed by three satellites (NASA's Jason, the U.S. Navy's Geosat Follow-on and the European Space Agency's Environmental Satellite), and generated five times more energy than the earthquake's vertical displacements. The horizontal forces also best explain the way the tsunami spread out across the Indian Ocean. The same mechanism was also found to explain the data observed from the 2005 Nias earthquake and tsunami.

Co-author C.K. Shum of Ohio State University said the study suggests horizontal faulting motions play a much more important role in tsunami generation than previously believed. "If this is found to be true for other tsunamis, we may have to revise some early views on how tsunamis are formed and where mega tsunamis are likely to happen in the future," he said.

JPL is managed for NASA by the California Institute of Technology in Pasadena. ♦

Commission's suggestions will help elevate kids over pets in disaster

Nearly a year after media reports decried that the nation's pets were better cared for than children during disasters, a commission mandated to study the situation released the initial draft of congressional report.

The *National Commission on Children and Disasters Interim Report* makes several strong recommendations for improving the condition of children during disasters, many of whom are likely to be at school or childcare facilities when calamities strike—leaving them without an parent or guardian to advocate for their safety. Without systems in place to meet the specific needs of children, past instances of “benign neglect” will continue, according to the report.

Among its recommendations, the commission suggests making children an immediate priority in emergency planning and applying national disaster planning standards to schools and government agencies that represent children. Providing appropriate and safe shelters for kids, creating an evacuee-tracking system to quickly reunify families, and prioritizing housing for those with children also made the list. The list is broken down by categories that include education and childcare, housing, evacuation, and disaster case management.

“The most vulnerable Americans in the most vulnerable settings are made even more vulnerable by government inaction,” Commission Chairman Mark Shriver stated in a [September 15 press release](#). “Disasters don't strike on government's timetable, which means the time for government to act is now.”

The commission, formed by Congress in 2007 to assess children's needs in disaster and emergency preparedness, response, and recovery, didn't itself act for nearly a year. Its first meeting came weeks after national media reported a lack of child-friendly facilities and dangerous conditions for Hurricane Ike's “littlest evacuees.”

Editorials in the *Washington Post* drew attention to the fact that, despite a bevy of measures put into place in recent years for pets, there was a “stunning lack of forethought about or preparation for” evacuating families with children.

Despite the delay in starting, the commission has completed its work within the two years required by Congress. The result, Shriver stated, is “a clear roadmap toward a disaster preparedness, response and recovery system that finally meets the unique needs of children.” The commission unanimously approved the interim report and will deliver it to the president and Congress before October 14.

From Disaster Research 532, Sept. 24, 2009

The long arm of climate change reaches geological disasters

By now, everyone's heard the story of climate change and disaster—disappearing ice caps, rising sea levels, increased hurricane activity, and a bevy of other impacts that could (and in some cases are) raining down on our warming planet. It seems the latest chapter, though, is still being penned by geologists and others investigating the slower, less obvious effects climate change might have on volcanoes and earth movement.

“The fact is we are causing future contemporary climate change,” Bill McGuire of the Aon Benfield UCL Hazard Research Centre at University College London, told *Nature*. “[Geological hazards are] another portfolio of things we haven't thought of.”

Until recently, that is. Volcanologists, oceanographers, climatologists, seismologists, and others with an interest in climate and geomorphological change met last week to discuss the topic at a conference hosted by the center. According to news reports, there was general consensus on several points—climate *is* affecting geology and there needs to be more awareness of exactly how.

“Climate change doesn't just affect the atmosphere and the oceans but the earth's crust as well,” McGuire is quoted as saying in a [Reuters' AlertNet article](#). “The whole earth is an interactive system. In the political community people are almost completely unaware of any geological aspects to climate change.”

According to some models—and scientists agree there is a need for more and better models—those geological aspects could feature mayhem of biblical proportions. Events could include a series of succeeding disasters such as more explosive volcanoes, which would trigger underwater landslides, which could in turn set off huge **tsunamis**.

The domino effect—and a large portion of the uncertainty surrounding what will actually happen—lies in the stability ice gives volcanoes, both by providing a protective cap and by moderating the rate at which magma decompresses, according to *Nature*. “As thick ice is getting thinner, there may be an increase in the explosivity of eruptions,” Hugh Tuffen of Lancaster University said in the article. Tuffen has studied volcanoes in many areas, including Iceland and Chile, and said that it would be hard to tell what the effects on different types of volcanoes would be without more research, according to *Nature*.

What we can say for sure is the same old climate change story. We need more information and to plan for worst-case scenarios—which is exactly what conference attendees plan to do. A follow-up meeting has been tentatively set for September 2011. “We still don't really know what the threat over the next 100 years will be,” says Tuffen. “I don't think we should be scaremongering, we should be thinking about hazard mitigation.”

From Disaster Research 532, Sept. 24, 2009