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Volume 12, Number 3 June 2010

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It has been reported that emails to the editor (lee.walking@dnr.wa.gov) have been bounced back or have received an error message. It is still the correct work email address. (If you type the address, make sure there are two L's in my last name.) However, if you still encounter problems contacting me via email, try the alternative route via TsuInfoAlert@gmail.com.

National Geophysical Data Center Tsunami Data Archive [abstract]

By Kelly J. Stroker, Paula K. Dunbar, and Ruth Brocko

Eos (American Geophysical Union Transactions), v. 89, no. 53, p. F1733, 2008

NOAA's National Geophysical Data Center (NGDC) and co-located World Data Center for Geophysics and Marine Geology long-term tsunami data archive provides data and derived products essential for tsunami hazard assessment, forecast and warning, inundation modeling, preparedness, mitigation, education, and research. As a result of NOAA's efforts to strengthen its tsunami activities, the long-term tsunami data archive has grown from less than 5 gigabytes in 2004 to more than 2 terabytes in 2008. The types of data archived for tsunami research and operation activities have also expanded in fulfillment of the P.L. 109-424. The archive now consists of: global historical tsunami; significant earthquake and significant volcanic eruptions database; global tsunami deposits and proxies database; reference database; damage photos; coastal water-level data (i.e., digital tide gauge data and marigrams on microfiche); and bottom pressure recorder (BPR) data as collected by Deep-ocean Assessment and Reporting of Tsunamis (DART) buoys.

The tsunami data archive comes from a wide variety of data providers and sources. These include the NOAA Tsunami Warning Centers, NOAA National Data Buoy Center, NOAA National Ocean Service, IOC/NOAA International Tsunami Information Center, NOAA Pacific Marine Environmental Laboratory, U.S. Geological Survey, tsunami catalogs, reconnaissance reports, journal articles, newspaper articles, internet web pages, and email.

NGDC has been active in the management of some of these data for more than 50 years while other data management efforts are more recent. These data are openly available, either directly on-line or by contacting NGDC.

All of the NGDC tsunami and related databases are stored in a relational database management system. These data are accessible over the Web as tables, reports, and interactive maps. The maps provide integrated web-based GIS access to individual GIS layers including tsunami sources, tsunami effects, significant earthquakes, significant volcano events, and various spatial reference layers such as topography, population density, and political boundaries. The map service also provides ftp links and hyperlinks to additional hazards information such as the NGDC collection of hazard photos. The NGDC website also provides a Keyhole Markup Language (KML) file, updated nightly, containing tsunami sources and runups.

URL: <http://www.ngdc.noaa.gov/hazard/tsu.shtml> ♦

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
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The views expressed herein are those of the authors and not necessarily those of
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ISSN 1938-5064



Risk communication media—Tips and best practices for using new tools to communicate effectively

By Dr. Tim L. Tinker, Grant McLaughlin, and Michael Dumlaio

Disaster Resource Guide 2009, p. 112-114

To subscribe to the GUIDE, a free publication, visit

www.disaster-resource.com

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Risk and crisis communicators face pressure to adapt to the changing 21st-century landscape. With new threats like terrorist attacks, biological warfare, and cyber security breaches, critical information and messages must reach broader populations faster and with higher impact than ever before. With these and other new threats constantly emerging, it is essential to understand how changing trends and innovations such as social media (e.g., YouTube, Facebook, Twitter and more) are shaping the what, why, how and timing of public—and private—informational and call-to-action messages during times of crisis.

Recognizing these challenges and opportunities, public health and emergency management professionals are taking advantage of the rapidly evolving communications landscape of social media to reach more people with more relevant messages during public health and safety emergencies. Social media is allowing them to have direct access to the public on everything from salmonella-related food recalls to disease outbreaks and weather emergencies.

“It speeds up communication and, for all practical purposes, it speeds up awareness,” said Georges Benjamin, executive director of the American Public Health Association.

To gain a better understanding of how social media is shaping the way crises are communicated and responses are coordinated, the Expert Round Table on Social Media and Risk Communication During Times of Crisis met on Mar. 31, 2009, at the APHA headquarters in Washington, D.C. This select group of thought leaders and practitioners engaged in public health, emergency response and crisis communications agreed that the use of social media during emergencies is leading to a road map to help disaster planners, emergency managers and public health officials craft a unified strategy on applying social media to communicating with the media, the public, and key stakeholder groups.

What is social media?

Social media is the various electronic tools, technologies and applications that facilitate interactive communication and content exchange. Wikipedia—itsself a social media tool, as any Internet user can add to its content—defines social media as “media designed to be disseminated through social interaction [and] created

using highly accessible and scalable publishing techniques.”

These various interactive communication and content exchange vehicles are being used by individuals as well as organizations and government agencies during high risk and high concern situations.

Blog—Short for “Weblog,” it is a type of Web site that is frequently updated and usually maintained by an individual. Conversational in tone, a blog contains commentary, descriptions of events and other materials such as video or graphics. The Internet has millions of blogs.

Microblog—A form of blogging (e.g., Twitter and Plurk) that allows users to write and publish brief (i.e., up to 140 characters) updates that can be viewed and commented on by the community or by a restricted group.

Podcast—A Web-based audio or video digital media file that is available on the Internet for downloading to a personal audio/video player.

Social Networking Site—An online community such as Facebook and MySpace that allows users to connect, interact and exchange information with those who share interests or activities.

Text Messaging (or Texting)—The exchange of brief messages over mobile devices.

Wiki—Collaborative Web pages or a collection of pages that allow all users to contribute or modify the content.

Widget—A portable piece of self-contained code (i.e., a small application) that can be embedded into a Web site or program to perform a specific function.

Social Bookmarking—A Web site (e.g., Delicious and Digg) on which a virtual community can exchange links to Web pages and store them for future use.

Really Simple Syndication—RSS is a file that contains frequently updated information (news headlines, blog posts) to which one can subscribe and is accessible by using programs called feed readers or aggregators.

Image/Video Sharing—A user-generated Web site (e.g., YouTube, Flickr) that allows users to upload pictures or videos and to view or comment on material uploaded by others.

Virtual World—A computer-based, simulated environment (e.g., Second Life, Whyville) in which users interact with each other via avatars or virtual representation of themselves.

Internet Forum or Message Board—Online discussion Web site on which users can discuss issues, share views, and exchange information.

Mobile Web Site—A Web site that is accessible via a mobile device such as a cell phone, personal digital assistant or other portable gadget that is connected to a public network.

Social media’s role in high risk and high concern situations

According to Wikipedia, “Social media supports the human need for social interaction with technology, transforming broadcast media monologues (one to many) into social media dialogues (many to many). It supports the democratization of knowledge and information, transforming people from content consumers into content producers.”

Such broad, strategic public engagement was largely missing when the New Orleans levees broke after Hurricane Katrina made landfall in August 2005. In today’s environment, however, lack of awareness is no longer an issue. Citizens not only consume information from multiple sources, they provide it as well. For example, during the November 2008 terrorist activity in Mumbai, the victims themselves broke the news to a worldwide audience by using their mobile phones to upload emerging information on YouTube, Twitter and Flickr.

How can risk and crisis communicators manage so much raw information? How can they handle messaging, public outreach and response in light of social media’s immediacy? The answer lies in collaborating with the public and partnering with social networks. Effective public outreach campaigns must now be far more conversational than ever before.

“Social media is obviously about more than how we reach out to the public and educate the public,” said Nathan Huebner, emergency risk communication specialist and lead for the emergency Web sites of the Centers for Disease Control and Prevention. “It’s about the public talking to us. It’s also about the public talking to the public.”

How to use social media during emergencies

Experts gathered at the round table shared experiences and insights into how their organizations leverage social media devices and practices to strengthen and broaden their social networks, empower citizens to share information, and manage public outreach. The following guidelines should be followed when using social media to engage with the public:

Make social media efforts message driven, not channel driven.

Embrace every possible teaching moment, which will allow your social media networks to grow.

Tap into all available resources. If you have a large cadre of volunteers, consider training them as social media ambassadors.

Keep messages brief and pertinent. Social media users tend to scan rather than thoroughly read the information.

Make sure you can receive public input. Social media involve you in talking to the public as well as the public talking to you and to each other.

Use social media to support a unified message. Instead of creating a new message to use for social media,

use social media to support your existing message in a larger communication model.

Have a Plan B in place. What will you do if phone lines are jammed or computers are down?

Forge partnerships for sharing methods and messages. Federal agencies and the private sector, for example, need to reach out to one another.

Focus on people when formulating your communication plan. Networks of people will get the work done, even when there is no electricity.

Avoid elitism. It is not helpful to believe that people in charge know more and that the general public is prone to misbehavior.

Shift your way of thinking about how to communicate with your audience. New technologies are not simply new types of media with which to do the same old things.

Avoid “shiny new object” syndrome. Quickly adopting every new social medium that emerges as soon as it emerges is not necessary.

How to establish social media best practices

As public and private health officials and crisis communications experts use social media to get out their messages, they are establishing some notable best practices along the way. Whether using Twitter, YouTube and blogs at the Federal Emergency Management Agency, Flickr and Facebook at the American Red Cross or a combination of social media at National Public Radio, some commonalities have emerged:

Develop a research agenda that will allow you to evaluate the effectiveness of social media in a disaster communications model.

Use subject matter experts to help with data collection.

Initiate a cultural shift. Allow your group or agency the room to grow in developing a new approach to social media. This is where leadership is key.

Get feedback from users in the community.

Be aware of the three main barriers to adopting social media: 1) leadership buy-in, 2) sustainability, and 3) information technology and access issues.

Remember that people are in a social media environment because they want to be; they are not being forced to be there.

Seek ways to address technical hurdles (e.g., mobile phone towers not working during a hurricane).

Think partnerships. For example, use groups such as APHA to help you expand your social media communications tools. Such groups might not have the same constraints as a government agency. It’s all about partnering—with your leadership and with your community.

Keep trying. Best practices will emerge.

Balance core capacity with social media capacity. Know that part of any communications strategy includes balancing time and resources.

Be relevant. Do not “spam” users with too much information.

Choose a few social media tools and develop them well.

Realize that social media is a moving target. Be flexible and use volunteers and community members to help you adapt your communications strategy accordingly.

Focus on building relationships. Work to give the public a way to engage.

The use of social media tools in risk and crisis communications will continue to evolve and change and so will these initial best practices. As Grant McLaughlin, Booz Allen Hamilton principal and an expert in strategic communications, marketing, and stakeholder outreach, said, “The tools and tactics are still emerging, and as they mature, we’ll be able to better define measures of effectiveness and next steps.”

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Maintenance of U.S. tsunami detection buoys difficult and costly, GAO reports

By Matthew Harwood

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Reprinted by permission from the 04/30/2010 (13:45) online *Security Management* magazine Web connection <http://www.securitymanagement.com/news/maintenance-us-tsunami-detection-buoys-difficult-and-costly-gao-reports-007108>

The National Oceanic and Atmospheric Administration (NOAA) is having a hard-time maintaining its network of expensive high-tech tsunami detection buoys, according to a Government Accountability Office (GAO) report released Wednesday at <http://www.gao.gov/new.items/d10490.pdf>

Known as the Deep-ocean Assessment and Reporting of Tsunamis (DART) program, this network of 39 buoys makes up the early-warning system to protect 767 U.S. communities at risk of tsunamis—large, devastating waves, typically generated by seismic events or undersea landslides—that can destroy coastal and island communities. (For more on the DART program's roll out, read "Tsunami Warning," by former editor Robert Elliot in the Sept. 2007 issue of *Security Management*

at <http://www.securitymanagement.com/article/tsunami-warning>)

The last significant tsunami hit U.S. soil in September 2009, when a series of waves hit American Samoa, killing 190 people and wiping out coastal infrastructure. In February, NOAA scientists initially feared Hawaii could get pounded by a massive tsunami after the 8.8 earthquake off Chile, but fortunately only 3-foot tsunami waves hit the state's shores.

The DART system consists of surface-level buoys connected by mooring lines to ocean-floor-anchored recording devices that monitor seismic activity. Data from the recording devices is transmitted to a satellite in 15-minute intervals until an event triggers transmissions at 15-second intervals. The satellite then delivers that data to two tsunami warning centers based in Alaska and Hawaii, respectively. The centers are responsible for warning U.S. coastal states, island territories, and over 90 countries when a tsunami threat occurs.

The buoys, however, are expensive and temperamental. Last year, DART operation and maintenance cost \$12 million, or 28 percent, of NOAA's total tsunami budget for the fiscal year.

Reliability is another problem. At any one time, the NOAA reported that data from the buoys was available about 84 percent of the time and one to two buoy outages occur each month. There's two primarily reasons for this: human error and "Old Man Winter."

Most buoy outages occur due to problems with mooring lines. "According to data from NOAA's National Data Buoy Center... failure of mooring lines accounted for almost 60 percent of DART buoy outages from December 2005 to November 2009," the GAO reports. "Center officials told us that mooring lines fail for a variety of reasons, including ship collisions and vessels that tie up to a buoy."

Winter makes it difficult to keep the buoys working because the NOAA can't make its regular maintenance rounds because of harsh ocean conditions.

The NOAA told the GAO it wants to significantly improve its buoy network's data availability rate. Currently the NOAA is trying to identify stronger mooring materials while it also explores moving some buoys to less hostile waters. These improvements are critical, the GAO explains, because "[w]hen DART buoys are out of service, they cannot detect tsunamis or transmit data to the tsunami warning centers."

[NOTE: The online report includes diagram of DART buoy system and a world map of buoy placement.] ♦



FEMA's Disaster Reserve Workforce Division

(articles from their newsletter ON CALL)

NOTE: The Reserve force is the largest component of FEMA's Disaster Workforce. Reservists are personnel authorized by the Stafford Act (Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 93-288). Currently there are more than 8,000 Reservists geographically dispersed throughout the country.

History of disaster legislation

By Anna Marie Baca, Office of Chief Counsel

Prior to September 30, 1950, Congress funded disaster recovery on an incident-by-incident basis. The inefficiency and inconsistencies of passing an individual law every time a community was in distress prompted Congress to enact the Federal Disaster Relief Program.

The Federal Disaster Relief Program was not intended to supersede existing State relief programs, but was created to "provide an orderly and continuing means of assistance by the Federal Government to States and local governments in carrying out their responsibilities to alleviate suffering and damage resulting from major disasters," and was designed to "supplement the efforts and available resources of States and local governments." The Federal Disaster Relief Program of 1950 only authorized the Federal government to assist local and State governments in disaster response efforts.

Realizing that reestablishment of the community was often outside of the scope of the local government's abilities, Congress passed the Disaster Relief Act of 1966 to update existing legislation and expand Federal assistance into the recovery arena.

President Jimmy Carter created FEMA by Executive Order on March 31, 1979. On July 15, 1979, President Carter then transferred all the disaster related statutory authority that had been vested in the Presidency, or in other Federal agencies, to FEMA.

Under Executive Order 12148, FEMA absorbed "functions from the Departments of Defense (civil defense) and Housing and Urban Development (federal disaster assistance), [the] General Services Administration (federal preparedness), and the Office of Science and Technology Policy (earthquake hazards reduction)." These programs include some that were created to provide civil defense from malicious attacks against the homeland. Executive Orders 12127 and 12148, therefore, consolidated authority for both manmade and natural disaster preparation, mitigation, response, and recovery within a single federal agency.

With concern about the use of the disaster authority for responding to non-major disasters, Congress undertook a comprehensive study and review of its disaster

programs, and subsequently passed the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 ("Stafford Act").

The Stafford Act, still the major legislation under which FEMA operates today, provides a framework for continued disaster relief.

The Homeland Security Act of 2002 was passed on November 25, 2002, to restructure various aspects of the Federal government following the September 11, 2001, terrorist attacks. Stemming from the Homeland Security Act was the creation of the Department of Homeland Security (DHS) - a consolidation of many different existing agencies, specifically those with aspects devoted to combating terrorism. FEMA was incorporated into DHS due to its mission to respond to disasters in the United States, regardless of their cause.

Following the deficiencies in the federal government's response to Hurricane Katrina, on October 4, 2006, the Post-Katrina Emergency Management Reform Act of 2006 ("PKEMRA") was passed. PKEMRA overhauled the government's approach to managing preparedness at the federal level.

Disaster legislation is not just for people. Two days after the adoption of PKEMRA, Congress passed the Pets Evacuation and Transportation Standards Act ("PETS Act"). This Act mandates that FEMA's preparedness plans "take into account the needs of individuals with pets and service animals prior to, during, and following a major disaster or emergency."

The legislative genealogy of FEMA is very much alive. The House Transportation and Infrastructure Committee recently reported a bill, HR 6658, which included Sec. 103, a provision to allow disaster Reservists access to the same health care system available to full-time FEMA employees. Currently this bill awaits consideration by the full House after the summer recess. This is exciting news for Reservists, but keep in mind that the road from proposal to the required Presidential signature is often long and rocky.

From: ON CALL, Disaster Reserve Workforce News, September 2008

Disaster generalists and "surge capacity"

By Marsha Clark, DRWD Surge Capacity Force Branch Chief

When a disaster exceeds the number of normally available resources to respond, FEMA relies on what is known as "surge capacity" to obtain additional workers. These additional workers either come from an external surge resource, or from an internal surge resource.

While the Post Katrina Emergency Management Reform Act authorizes FEMA to draw on other federal agencies for disaster workers (external surge), FEMA's primary internal surge resource is the Disaster Generalist Group.

Generalists supplement the disaster workforce during catastrophic or multiple events, serving in Applicant Services, . Community Relations, and Debris Monitoring. Before we reach out for external surge forces, DRWD first reaches into its Generalist Group.

FEMA's Generalist Group — established in late 2006 under the (then) Response Division, but now managed by DRWD's Surge Capacity Section — represents a unique capability within the Agency's mission.

One of the FEMA "urban legends" is that Generalists do not have same status as other reservists. That is FALSE! Generalists have the exact same status as other reservist. FEMA now counts 1,342 Generalists among its 7,945 Disaster Reservists.

During 2008, Generalists deployed for response and recovery operations in Iowa and Missouri floods, as well as Hurricanes Fay, Gustav, Hannah and Ike.

Training for Generalists remains a concern for DRWD. After providing entry level training for 1,800 Generalists in 2006, training for Generalists primarily occurs online or at Joint Field Offices.

DRWD's Readiness Branch is working with the Emergency Management Institute and the cadres to implement a training and credentialing plan for all reservists. This initiative will include overviews of multiple programs and job titles to allow for utilization of Generalists in a variety of positions.

From: ON CALL, Disaster Reserve Workforce News, March/April 2009

Credentialing basics

This issue of "On Call" focuses on one topic — it's a mini-guide to FEMA's Credentialing Plan and explains why it is being implemented and what it means for the Agency as a whole, Joint Field Operations and Reservists' roles and careers. A key aspect of the Disaster Reserve Workforce Division's (DRWD) mission is setting up a Credentialing Program that ensures the Disaster Workforce meets national standards of performance and is capable of completing tasks in a timely and consistent manner during disaster operations.

Historically, attempts to implement a standard credentialing program were isolated to specific Cadres or Regions and were not uniform throughout the agency. The end result has been media criticism, Congressional concerns, remedial actions recommended by the Government Accountability Office and the Department of Homeland Security and concerns from communities and individual disaster victims.

On a macro level, there are two main reasons why FEMA needs credentialing. First and foremost, it is the law. In addition, standardized credentialing aligns Agency practices with the National Incident Management System. On a micro level, credentialing is the process that affirms whether an employee meets the

professional performance standards required by his/her disaster position.

Once a Cadre-specific credentialing plan is completed, a Reservist will be responsible for creating a personal credentialing portfolio. It will include task-book assessments and performance appraisals from each deployment, training transcripts from the Emergency Management Institute and Automated Deployment Database, licenses and certifications. This information will be entered into the migration software tool to determine an employee's credentialing type: Trainee, Basically Qualified, Fully Qualified or Expert.

Credentialing and migration will be done in a phased approach, with a targeted completion date of 2011. Cadre specific credentialing plans will be completed throughout 2009 and 2010, followed by the cadre workforce migration. Reservists will be notified of their cadre's credentialing efforts, including migration, as each plan is completed. Details, resources and contacts are available throughout this issue of "ON CALL."

From: ON CALL, Disaster Reserve Workforce News, November/December 2009

FEMA's newest cadre—Long-term community recovery

FEMA's 24th and newest cadre—Long-Term Community Recovery (LTCR)—works with federal, state, and local governments, as well as non-profits and the private sector, to help disaster-impacted communities recover long term. The LTCR cadre began operations in May and operates as part of ESF-14, whose mission is to promote successful long-term recoveries for communities suffering extraordinary damage.

In an interview, Victoria Salinas, Deputy Branch Chief for Long-Term Community Recovery, said, "LTCR gets involved when normal recovery programs are not adequate for their long-term recovery. We attempt to fill the gaps through our coordination and technical assistance roles. There's a growing recognition that long term recovery is complex and is a new frontier for emergency management."

Salinas says LTCR is involved in the recovery process "from day one" of a disaster. Chuck Heltsley, LTCR Cadre Coordinator, elaborated. "The first thing LTCR does is determine if there's a long-term mission. Sometimes when we go out the assessment results show Individual Assistance, Public Assistance, Mitigation and the Small Business Administration will be sufficient for recovery and LTCR will not be needed.

Recently, LTCR has been working in Georgia following the floods. Heltsley explained the process. "The staff did an assessment of 23 Georgia counties and, working with the Federal Coordinating Officer and State Coordinating Officer, determined that only three

cities needed targeted long-term help. LTCR is coordinating other federal programs and providing targeted assistance to the communities. This is not an open-ended mission.”

Before the LTCR cadre was formed, Heltsley said, Reservists with needed skills were drafted from other cadres. The new cadre is being built from scratch. It now has 15-20 Reservists, and “another 18 or so new people with new skill sets are coming on board.”

When asked about the future development of the LTCR Cadre, Salinas said the goal of the headquarters-based group is to develop a group of highly trained specialists “that will allow us to have more nimble operations and more regional expertise. Right now, the cadre is very Headquarters-dependent because only one FEMA office has an ESF-14 coordinator.” Eventually, the LTCR cadre will have a team of people able to understand the long-term community recovery process and conduct an operation that fully complements and supports the needs of the community, she added.

This means no two LTCR operations will ever be the same, according to Salinas. “It’ll be different every time we go out — whether we’re in Georgia, New York or Texas. This is one of the reasons the cadre, and the Reservists that serve in it, will be so dynamic.”

From: ON CALL, Disaster Reserve Workforce News, January/February 2010

ON CALL newsletter archives

http://www.fema.gov/pao/on_call_archives.shtm

For most current issue: www.fema.gov/dae/index.shtm ♦

The human face of disaster—Building resiliency

[abstract] By Laurie D. Pearce

Geological Society of America, v. 41, no. 7, p. 211-212.

“Geoscientists are critical in assessing the likelihood of earthquakes, floods, or volcanoes occurring; local disaster managers need to know what to plan for in order to reduce the probability or impacts of hazardous events.

When a disaster does occur geoscientists often convene on the site to learn more about what happened. Data is collected, new insights are gained and debated, and the findings are published in peer-reviewed journals; and the life of the research continues. But often, in the dry technical jargon, the real story is forgotten.

Disasters affect people—they affect the young, the old, the poor and the rich. Disasters may injure some and kill others; they may damage or destroy homes and businesses and the community; but disasters also leave behind less physically visible impacts. While a home can be rebuilt within a year, the emotional impact may last for decades. What are the potential psychosocial or emotional health consequences? What are some of the key steps in helping communities accept, adapt and

become stronger, healthier and more resilient? And how can geoscientists assist in this rebuilding process?”

The guiding principles for the *International Declaration of Psychosocial Rights* (see below), signed and adopted at the 2009 World Congress on Disaster and Emergency Medicine, provide some concrete examples of how geoscientists can collaborate with local decision makers to enhance local capacity for short, medium and long term recovery.

Declaration of Psychosocial Rights

World Conference on Disaster and Emergency Medicine (WCDEM 2009); World Association of Disaster and Emergency Medicine (WADEM) International Psychosocial Task Force Guiding Principles – May 15, 2009

Be It Resolved that:

1. Everyone, including responders, survivors, families, in the broader context of communities affected by all hazard natural and man-made disasters, including war, are entitled to integrated, holistic, sustainable Psychosocial supports, interventions and training – that are respectful of diversity, culture, and gender.
2. It is the professional responsibility of leaders, i.e. those who are privileged to know and understand Psychosocial (PS) principles and concepts, to proactively engage policy makers in order to integrate and main-stream the adoption of PS principles and training into all aspects of human resource capability-based planning.
3. Given the increasing frequency and virulence of disasters, risks, threats, and global conflicts, there is an urgent, social imperative to mainstream creative, flexible, PS programs and policies into all levels of government and nongovernmental programs - recognizing the unique nature of each disaster.
4. It is essential to enhance and mobilize local capacity, capabilities, of individuals, families and communities and to link local capacity to response and recovery teams for short, medium and long term response and recovery.
5. There is a responsibility for responders and decision makers to work with the “Fifth Estate”, i.e. the media, to present and report accurate news and updates; and further to integrate and imbed the media in purposeful /beneficial ways.
6. It is urgent that governments recognize and provide early PS education, supports to students and teachers from primary through to post secondary levels. Community leaders, teachers, decision makers, religious and government leaders must be empowered to ensure that effective, evidence-informed PS interventions, include long term cost benefit analysis, and that these elements are included in emergency planning, preparedness, response and recovery.
7. PS planning be evidence-informed, as well as multi-dimensional, collaborative, coordinated and integrated.

Similarly, PS leadership must be flexible, adaptive and collaborative, and willing to work with trans-boundary and interdisciplinary stakeholders.

8. Over the disaster continuum, Psychosocial supports must value and respect the dignity and human rights of affected populations and responders.

9. It is imperative that WADEM and its world wide membership champion the integration, mainstreaming, and adoption of Psychosocial and Disaster Behavioural Health into all aspects of pre hospital and post disaster emergency medicine.

10. Greater investments and support be accorded to PS research and investigation to ensure that programs, policies and pre and post hospital interventions and decision making, are evidence-based and evidence-informed

We, the participants of the WCDEM 2009, acknowledge and applaud the determination of the global pre hospital and disaster medicine “Community of Practice” as it moves forward to promote a climate of Psychosocial research and practice through sustainable knowledge translation, knowledge exchange and knowledge mobilization.

It is timely that this international Declaration of Psychosocial Rights, as developed by the WADEM International Psychosocial Task Force at the World Congress on Disaster and Emergency Medicine (WCDEM) Pre Congress Workshop, May 13, 2009, be recognized and affirmed. It is through the efforts of WADEM and its international partnerships that these Guiding Principles which address human factors, including psychosocial capability based planning, community resiliency and capacity building, in pre and post disaster contexts will be recognized and valued for posterity.

Signed on this, the 15th day of May, 2009 in the City of Victoria, Canada, at the World Congress on Disaster and Emergency Medicine (WCDEM 2009) by the WADEM International Psychosocial Task Force Co-Chairs Drs. Gloria Leon and Carol Amaratunga, on behalf of the WADEM International Psychosocial Task Force membership.

From: www.mvcr.cz/soubor/declaration-of-psychosocial-rights-pdf.aspx◆

Smartphones: The next-generation emergency alert system

By Timothy Coleman on May 13, 2010

Emergency Management

<http://www.emergencymgmt.com/safety/Smartphones-Emergency-Alert-System.html>

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Modernizing America's alert notification apparatus is imperative and can be done by leveraging mobile platforms and smartphone technologies to more effectively

disseminate crucial, actionable information to civilians in crisis situations.

Integrating alert notifications across dynamic smartphones and other mobile platforms can be achieved to ensure that an updated system leverages smartphones and geo-location features of mobile systems while also being extremely resilient and optimized for fluid and ever-changing operational environments.

In September 2009, the U.S. Government Accountability Office (GAO) released a less-than-stellar report on the state of affairs of America's national-level emergency alert system in a report titled “Improved Planning and Coordination Necessary for Development of Integrated Public Alert and Warning System”. Several important takeaways from the GAO report were:

There are limitations in how alerts are disseminated to the public.

New technologies have not been adopted.

The current alert system relies on a technological backbone that is nearly 50 years old.

Disseminating relevant information

According to a recent Pew Research public opinion poll, 26 percent of Americans receive their news and information from cell phones. Additionally the poll found that 43 percent of those under 50 receive news on their mobile phones. These two findings demonstrate an important factor when considering how best to modernize emergency alert notification systems as it has serious implications for enhancing the distribution of timely information. In particular, mobile phone technology adoption rates and the use of these ubiquitous devices as a main informational portal for civilians is a key component to re-engineering future alert systems.

Keeping this in mind, it's vital to recognize the importance of cell phones and smartphones as a critical link to broadcasting emergency alerts to citizens. In December 2008, 32 percent of consumers used a smartphone. Compare that number with December 2009 when it increased to 42 percent of consumers. The figures are significant as the adoption rate of smartphones is projected by the Nielsen Company, a marketing and media information company, to reach 50 percent and begin to overtake feature phone adoption by the third quarter of 2011.

Dispensing with legacy platforms

It's important to view smartphones and other mobile phone platforms as a critical link for modernizing and improving the effectiveness of emergency alert notification.

Current emergency alert systems largely focus on simple SMS or push notification gateways. This works as a means to dispense vanilla information about a crisis, but it does little to provide visibility, context and guidance. Leveraging the embedded benefits of

smartphone technologies allows the next generation of emergency alert notifications to capitalize on GPS and geo-located targeting of alerts.

With a national emergency alert notification system rooted in a piecemeal infrastructure created in part, nearly 50 years ago, it's no wonder the GAO concluded that "capabilities have remained unchanged" and that FEMA "has made limited progress" in overhauling or modernizing the system.

Additionally Congressional action in 2006 mandated the creation of a Commercial Mobile Alert System, which focused on cellular and pager devices. However, bureaucratic infighting and a refusal to appreciate the increasingly interconnected world of communication devices has hampered significant progress.

The Emergency Alert System, especially at the national level, is wholly inadequate and seems years away from using present-day technology or the obvious civilian preference for mobile devices. The question is whether alert systems should begin to be modernized at the local level.

Creating a new normal

Emergency management officials need the capability to deliver trustworthy, location-specific information from incident commands directly to the civilian in a crisis. Emergency management authorities need the ability to easily visualize the crisis zone, receive field reports, assess civilian distribution patterns and civilian responses in real time. These kinds of systems will allow authorities to subdivide a region by area code, geography or custom selection, and send information and instructions specific to these areas.

Emergency alerts to smartphones would enable location-specific instructions for evacuation and updates on hazards, points of interest and new reports in real time. Emergency alert systems targeting smartphone users would provide an unparalleled level of actionable information to the affected civilian population. Such alerts would enable an end-user to access libraries of crisis-relevant information on first aid and disaster preparedness and also send out "I'm OK," "I am hurt," or "I am trapped" notifications to their social networks.

Using the innate benefits of smartphones as a means to deliver actionable emergency alerts to the civilian populace during a crisis would use the preferred platform that's becoming the default standard for communications. Given the increasing adoption rate of smartphones throughout the country, it's conceivable to assume that this trend is just beginning.

To achieve operational agility and use pervasive civilian-centric technologies, cloud computing and the use of various support modules will increasingly become necessary. Ensuring that such systems have built-in redundancies for geo-location message targeting

using multiple map providers like Bing, Google, OpenStreet Map, etc. will have to become the standard. Additionally using standard push notification gateways, SMS alerts, and allowing for multiple operating modes for the emergency alert system, depending upon data network availability, will help to ensure the system's utility, resonance and effectiveness.

If all politics are local then perhaps it's time to drive home the message that the next generation of emergency alert notification systems need to start at the localized incident area of greatest consequence. Ultimately the reality is that with faster data networks and more location-enabled devices, contextual communication during an emergency is possible today. The only real questions that remains are: When will we start to leverage these trends and technologies and will we do that before the next crisis arrives?

About the author: Timothy W. Coleman is co-founder of CiviGuard, a leading provider of Emergency Communication 2.0 platforms that deliver location-aware alerts and guidance to civilians.
<http://www.civiguard.com> ♦

REGIONAL REPORTS

OREGON

Coast could get tsunami tower

"In the wake of catastrophic earthquakes in Haiti and Chile, Cannon Beach is considering building an evacuation tower to help residents escape the tsunamis triggered by quakes.

The \$4 million tower would be the first of its kind for a U.S. community and would hold at least 1,000 people.

"It's going to be distinctive," said Jay Raskin, a former mayor and an architect who is leading the effort to get the tower built.

For the full story, visit
<http://www.nytimes.com/2010/04/15/us/15tsunami.html>

[EDITOR'S NOTE: When only a summary or excerpt of a report is published, with the URL for the full report, it is usually because reprint permission was not granted, or there wasn't time to request it.]

WASHINGTON

Ilwaco recognized as TsunamiReady and StormReady

Ilwaco, WA, has completed NOAA's National Weather Service StormReady® and TsunamiReady™ programs, better equipping the city to handle severe weather and tsunamis. The City of Ilwaco, supported by the Pacific County Emergency Management Council, fulfilled a rigorous set of warning and evacuation cri-

teria, including the development of a formal hazardous weather plan.

The City of Ilwaco, as well as the entire peninsula is vulnerable to tsunamis and severe weather due to its location on the Washington coast, at the mouth of the Columbia River. As we experienced in the December storms of 2008, it's not if, but when we will experience the next disaster. These programs raise public awareness and preparedness which are essential for the safety of our citizens.

The City of Ilwaco was able to achieve this recognition because of the planning partnerships we have within our county along with state and federal agencies like the National Weather Service. The continuing support of the Pacific County Emergency Management Director Stephanie Fritts and Deputy Director Denise Rowlett has raised awareness throughout the county.

Aided by the focus and support brought to this important subject by the Pacific County Commissioners and County Sheriff John Didion, the citizens of Ilwaco will be better prepared for the next event.

At the January 27th ceremony in the new Ilwaco Community Building, a recognition letter and Tsunami-Ready™ and StormReady® road signs were presented to city council officials, Gary Forner, Gini Chin, Will Greene, and Pacific County Emergency Management Director Stephanie Fritts.

From: <http://pcema.blogspot.com/2010/02/ilwaco-recognized-as-tsunamiready-and.html>

Grays Harbor County-wide tabletop earthquake-hazmat exercise [June 3]

The Grays Harbor County Local Emergency Planning Committee is sponsoring an Earthquake/Hazardous Material Tabletop Exercise on June 3 from 8 am to 1 pm. Please make every effort to attend as it will have an effect on the entire County. Businesses, response agencies, local governments, school districts, hotels, motels, fire districts and community groups will benefit from attendance. From East County to the Coast, from the Pacific County line into the Quinault Indian Nation, you will be impacted by the event. The exercise will be held at Aberdeen Elks Club, 1712 S Boone St, Aberdeen, WA.

Attention! Cities, towns, fire districts, businesses, response agencies, public works, CERT teams, schools, colleges, groups, media and citizens--The Grays Harbor County Wide Tabletop Earthquake/ Hazmat Exercise will allow you to test your specific disaster plans for an earthquake scenario which will impact your specific location plus it will test the ability of the entire County to respond to an associated train derailment/ hazardous material incident due to the earthquake at a populated shopping mall area.

Please make every effort to attend this exercise as this type of scenario has a high probability of happen-

ing in Grays Harbor County. We will apply the scenario to your specific location to allow you to mitigate your own issues as well as attempt to send relief to other areas of the County.

This is a tremendous opportunity to work on your specific disaster plans, to learn about the response you could expect or be asked to give and to enhance your working relationships with the responders and agencies who will assist in mitigation of the problems.

Members of the Region 3 Homeland Security Incident Management Team will be at the exercise to assist in training members of our County in specific command positions.

If you or anyone from your specific entity are interested in this type of training, please let me know, (Planning, Incident Command, Finance, Logistics, Liaison, Public Information Officer, Operations).

If you only learn one thing from participating in the exercise, you are that much farther down the path to helping your citizens in their time of need!

From: Charles T Wallace, Deputy Director of Emergency Management, Grays Harbor County, WA
(360) 580-2281
cwallace@co.grays-harbor.wa.us
[rec'd May 18, 2010]

ATLANTIC AND GULF COASTS

Overview of collaborative project to develop tsunami hazard assessments for the US Atlantic and Gulf Coasts [abstract]

By Annie M. Kammerer, Uri S. ten Brink, and Vasily V. Titov

Eos (American Geophysical Union Transactions) v. 89, no. 53, p. F1756, 2008.

In response to the 2004 Indian Ocean tsunami, and in anticipation of new license applications, the United States Nuclear Regulatory Commission (US NRC) initiated a long-term research program to improve understanding of tsunami hazard levels for coastal facilities on the U.S. Atlantic and Gulf Coasts. For this effort, the US NRC organized a collaborative research program with researchers at the United States Geological Survey (USGS) and the National Oceanic and Atmospheric Administration (NOAA). Key researchers from universities and other groups have also made important contributions to this program. The work undertaken represents the combined effort of a diverse group of marine geologists, geophysicists, geotechnical engineers, and hydrodynamic modelers.

The Atlantic and Gulf Coasts are the focus of this program due to the number of existing and proposed nuclear facilities located on these coasts and because less is generally known about tsunami hazard on these coasts. Because the US NRC is interested in under-

standing hazard associated with the rare large tsunami that may occur over long time periods (in excess of 10,000 years), the research program considers both seismic and landslide tsunamigenic sources. It also includes the study of both large far-field sources and near-field sources. The study of tsunamigenic landslides is a key difference between this research program and other tsunami hazard assessment programs.

In the initial phase, significant effort was focused on identifying and characterizing offshore near-field landslides and on understanding their regional distribution along the coasts. Once early results were obtained, modeling of one of the larger slides was initiated to better understand the hazard posed by the slides identified. Important properties of the slide, such as flow velocity, were characterized through work that included analysis of the dynamic elements. The research related to far-field tsunamigenic landslides has similarly focused on collecting existing information and assessing the potential impact to the coasts.

The focus of seismic sources focused on the Hispaniola-Puerto Rico-Lesser Antilles subduction zone and the enigmatic zone of large earthquakes west of Gibraltar. These source areas were investigated, an evaluation of their tsunamigenic potential was undertaken, and the potential for hazard to the U.S. coastline was considered.

As part of the current phase, the USGS will conduct field investigations in key locations for the purpose of filling existing data gaps. Investigations will also continue to assess landslide potential in the Gulf of Mexico and to determine the source of the 1755 Lisbon earthquake. The potential for developing tools and data to undertake probabilistic tsunami hazard assessments (PTHA) will also be a key focus of later phases of the program.

Simultaneously, the NOAA MOST tsunami generation and propagation model is being enhanced to include landslide-based initiation mechanisms and is being validated with case studies. The enhanced MOST model will be used to investigate the tsunamigenic sources characterized by the USGS, with the goal of creating an estimation of deterministic tsunami hazard levels for the length of Atlantic and Gulf Coasts.

Links to Atlantic and Gulf Coast hazard assessments:

1) U.S. States and Territories National Tsunami Hazard Assessment: Historical Record and Sources for Waves Paula K. Dunbar, NOAA; Craig S. Weaver, U.S.G.S. Prepared for the National Tsunami Hazard Mitigation Program, August 2008
http://nthmp.tsunami.gov/documents/Tsunami_Assessm ent_Final.pdf

2) Tsunami hazard along the U.S. Atlantic coast
https://darchive.mblwhoilibrary.org/bitstream/handle/1912/2965/ten%20Brink_MG.pdf?sequence=1
 Marine Geology, v. 264, 2009

3) NOAA/West Coast and Alaska Tsunami Warning Center—Atlantic Ocean response criteria
<http://tsunamisociety.org/282WhitmoreEtAla.pdf>

4) Tsunami Hazard Assessment at Nuclear Power Plant Sites in the United States of America
 U.S. Nuclear Regulatory Commission NUREG/CR-6966 PNNL-17397
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6966/cr6966.pdf>

**PUERTO RICO, VIRGIN ISLANDS, HAITI,
 CARIBBEAN REGION**

**NWS recognizes Manati Municipality as
 TsunamiReady™**



Left to Right, Angel Perez PREMA Zone, Heriberto Sauri PREMA Director, Christa Hillebrant, PRSN Director, Israel Matos WFO San Juan MIC, Emma Rosario Manati EMA, Hon. Juan A. Cruz, City Mayor, Brenda Colon, Manati EMA, Hector Vega, Manati EMA, and Wilda Omaris PRSN.

Manati Municipality, Puerto Rico, has earned the National Weather Service TsunamiReady™ designation, better equipping emergency managers to prepare and warn its citizens about tsunamis.

The Manati emergency management team fulfilled a rigorous set of warning communication and evacuation planning criteria that establish preparedness standards for tsunami with the cooperation and support of the Puerto Rico Seismic Network and the Puerto Rico Emergency Management Agency.

From:

http://www.srh.noaa.gov/sju/?n=2009_manati_tsunamiready

Puerto Rico TsunamiReady communities

Communities	
<ul style="list-style-type: none"> • Aguada • Aguadilla • Anasco • Carolina • Dorados 	<ul style="list-style-type: none"> • Lajas • Manati • Mayaguez • Ponce • Rincon

TsunamiReady Summit--Summary and Resolution

The TsunamiReady Summit was held May 10-14, 2010 in Mayagüez, Puerto Rico. The meeting was organized by the Puerto Rico Seismic Network of the University of Puerto Rico at Mayagüez with funding from NOAA and USAID. It was attended by ninety-six (96) participants from the local, regional, state, national and Caribbean emergency management agencies and earthquake and tsunami monitoring institutions from Puerto Rico, Virgin Islands, the wider Caribbean and the US mainland.

Over the past 500 years more than 100 tsunamis have been observed in the Caribbean with at least 3510 people having lost their lives to this hazard in just the past 150 years. The source of most Caribbean tsunamis are local earthquakes, which can generate waves that reach the coastal zones within minutes and affect the shores for hours. Nevertheless, other documented sources of historical and potential tsunamis are regional and distant earthquakes, submarine landslides and volcanic eruptions, many of these also short fused. With the dramatic increase in population and infrastructure along the Caribbean coasts, today, millions of coastal residents, workers and visitors are vulnerable to tsunamis.

The purpose of the Summit was to update the participants about the TsunamiReady program and provide them with tools so that they can strengthen their Tsunami preparedness and to empower non TsunamiReady communities to pursue the TsunamiReady guidelines. In light of the presentations and discussions on the best practices in Puerto Rico as well as on the US mainland and the greater Caribbean the Participants:

Recognized the great vulnerability of tsunamis in the region and the need to strengthen tsunami education, preparedness and readiness,

Acknowledged the 10 TsunamiReady communities in Puerto Rico and the significant advances that have been made in Puerto Rico with the implementation of the Program and the responsibilities that are acquired with the recognition,

Recognized that the TsunamiReady program is an effective program to help protect the life, property and livelihood of people from tsunamis in coastal communities by helping emergency managers,

government officials and community leaders to recognize hazard areas, improve tsunami warning reception and dissemination capabilities, prepare response plans, and educate residents and visitors. Some of the aspects of TsunamiReady highlighted were:

- TsunamiReady engenders uniformity of preparedness activities, enthusiasm, pride of recognition, and provides a good starting point for communities to prepare for a tsunami.
- TsunamiReady provides a pro-active approach.
- TsunamiReady should also include a post-event or recovery phase.
- TsunamiReady recognition ensures that communities uphold program standards by requiring them to be evaluated every three years to maintain their TsunamiReady status.
- TsunamiReady needs to ensure that it integrates different sectors of the community including those such as school children, elderly, special needs, media, volunteers, health sector and the tourism industry.

In addition, the participants of the non US Caribbean recognized the TsunamiReady program as a best practice for tsunami preparedness and a useful model for developing and strengthening tsunami preparedness programs and endorsed that the TsunamiReady program be expanded to the non US Caribbean and that communities that meet the guidelines be recognized as such. In support of this effort the following recommendations were made:

- A strategy to expand TsunamiReady to other nations needs to be developed.
- Licensing agreements and verification be managed internationally thru UNESCO IOC and its Intergovernmental Coordination Groups for the Tsunami Warning System and implemented with the support of regional organizations (CDEMA, SRC, CEPREDENAC, PRSN), ICG CARIRBE EWS recommended Caribbean Tsunami Information Center and Caribbean Tsunami Warning Center, ITIC and NOAA NWS.
- Another option for licensing agreements that should also be considered are those that could be established between NOAA and a non US jurisdiction.
- Positive experience with the TsunamiReady program in Puerto Rico can be leveraged when extending the program to other Caribbean nations.
- U.S. National Tsunami Hazard Mitigation Program and NWS Tsunami Ready Program and other specialized tsunami resources and programs would be helpful in supporting nations beginning the process.
- Multilingual nature of the Caribbean needs to be considered and materials would be required in at

least French, Spanish and English. Some materials in these language already exist which could be used.

- Puerto Rico, CDEMA and mainland USA tsunami response plan templates can be shared.
- It was noted that for many Caribbean countries, the tsunami hazard zones have not been determined. In these cases it is recommended that evacuation maps and response plans be based on basic assumptions and rules-of-thumb pending more detailed inundation studies. Existing assumptions and guidelines should be shared with these states.
- Identify pilot communities in the region that can be used as an initial rollout for the Caribbean and the international community
- The Participants noted the need to identify national and international funding for Caribbean communities to achieve TsunamiReady status and research.
- **Noted** with concern that tsunami products issued for the Caribbean by the warning centers vary throughout the region and this inconsistency could present a problem for emergency response and urge the next ICG to consider the standardization of tsunami products,
- **Recognized** the ICG CARIBE EWS recommended early establishment, of the Caribbean Tsunami Information Center and the Caribbean Tsunami Warning Center would help advance the TsunamiReady program and tsunami preparedness efforts by providing educational and technical resources and promoting a greater sense of regional ownership,
- **Concurred** that good outreach and media training programs are necessary so that consistent and uniform messages are issued facilitating an appropriate response,
- **Expressed** support for the CARIBE WAVE and LANTEX 11 and other tsunami exercises that can be used to validate and motivate preparation of tsunami emergency response plans,
- **Noted** that hurricane preparedness dominates emergency management preparedness and response efforts and **recommended** that common aspects of tsunami and hurricane efforts should be capitalized upon to leverage the tremendous hurricane preparedness efforts as well as part of the all hazards initiatives, including earthquakes,
- **Welcomed** the efforts underway by the NOAA National Weather Service to strengthen the TsunamiReady program in the US and
- **Acknowledged** with great appreciation the Puerto Rico Seismic Network of the University of Puerto Rico at Mayaguez for the organization and conduct

of the TsunamiReady Summit and NOAA and USAID for providing the corresponding funding.

ACRONYMS

CDEMA
Caribbean Disaster Emergency Management Agency
CEPREDENAC
Central American Disaster Prevention Center
CTIC
Caribbean Tsunami Information Center
ICG CARIBE EWS
Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazard Warning System for the Caribbean and Adjacent Regions.
ICG
Intergovernmental Coordination Groups
IOC
Intergovernmental Oceanographic Commission
PRSN
Puerto Rico Seismic Network
SRC
University of the West Indies Seismic Research Center
UNESCO
United Nations Educational, Scientific and Cultural Organization
USAID
United States Aid for International Development

Online TsunamiReady Resources:

TsunamiReady
Program: <http://www.tsunamiready.noaa.gov>
US National Tsunami Hazard Mitigation Program: <http://nthmp.gov>
US Tsunami Program: <http://tsunami.gov>
Puerto Rico Seismic Network: <http://prsn.uprm.edu>
From: Mayagüez, Puerto Rico, May 14, 2010
Submitted by Christa von Hillebrandt-Andrade

Tsunami hazard potential in the Caribbean (2010 report)

<http://woodshole.er.usgs.gov/projects/2921C4X.pdf>

Haiti-Earth Imagery supports recovery efforts

Earth Imaging Journal, v. 1, no. 7 p. 18-19
Earthwide Communications LLC
Reprinted with permission

Following the January 2010 earthquake, an international cast of imagery providers was among the disaster's first responders.

The earthquake that leveled the Haitian capital of Port-au-Prince made current maps of little use, significantly challenging rescue workers. Earth observation

satellite images helped by providing updated views of the post-earthquake landscape and infrastructure.

Imagery sources

To meet the requirements of the rescue teams in Haiti, high-resolution imagery was needed from optical and radar sensors. Through a joint initiative dubbed “the Charter,” (see “A concerted global effort” below), the international space community quickly acquired satellite imagery, including data from Japan’s ALOS, CNES’s SPOT 5, DigitalGlobe’s WorldView and QuickBird, GeoEye’s Geoeye-1, Canada’s RADARSAT-2 and the European Space Agency’s ERS-2 and Envisat. Satellite imagery acquired immediately after the event was compared with situation maps generated from archived satellite data to identify major changes on the ground caused by the disaster.

Comparing maps from before and after the event allowed rescue workers to distinguish the hardest-hit areas and identify passable routes for relief and rescue workers. The maps also helped identify areas that were suitable for setting up aid camps with medical support and shelter.

Additionally, light detection and ranging (LiDAR) data acquisition—funded by the World Bank through a joint effort of the Rochester Institute of Technology, Global Facility for Disaster Reduction and Recovery, and ImageCat—helped to define distribution routes around the island to more quickly deliver relief aid. Merrick Advanced Remote Sensing software from Merrick and Co. was used for LiDAR data visualization, analysis and processing. The LiDAR mapping activity also provided appropriate data to USGS earthquake scientists to analyze the fault line to predict future events.

A concerted global effort

Following the Haiti earthquake, the French Civil Protection authorities, the Public Safety of Canada, the U.S. Geological Survey’s American Earthquake Hazards Program and the United Nation’s Stabilization Mission in Haiti requested satellite data of the area from the International Charter on Space and Major Disasters. The initiative is aimed at providing satellite data free to those affected by disasters anywhere in the world.

In addition, the U.S. National Geospatial-Intelligence Agency supported the U.S. State Department, the U.S. Agency for International Development, the U.S. Southern Command and the U.S. Department of Homeland Security with analysis, unclassified commercial satellite imagery and geospatial intelligence products of the Haitian areas devastated by the earthquake. NGA provided public access to some of its geospatial intelligence products (e.g., imagery and maps) as they became available via NGA’s crisis response portal, NGA-Earth (www.ngs-earth.org). ESRI and Google Earth also sent requests for imagery that could be distributed freely on

Web sites set up by those organizations specifically for access by governmental bodies and rescuers in Haiti.♦

NEWS

A global system of in situ sensors, communication satellites and in situ actuators dedicated to the nearly-real-time detection and mitigation of natural disasters [abstract]

By Michael Bevis, *Eos* (American Geophysical Union Transactions), v. 90, no. 22, p. JA11-JA12.

Most of the 230,000 lives lost in the Indian Ocean tsunami of December 2004 could have been saved if the victims had had 5-15 minutes notice of the tsunami’s arrival, provided that the local authorities had had some evacuation plan in place, e.g., running up hill when a klaxon sounded, or retreating to low cost shelters constructed to provide a vertical escape from inundation. Similar structures, equipped with supplies of drinking water, food, blankets, etc., could save countless thousands of people from drowning in flood-prone locations such as Bangladesh or the delta region of Burma, or dying in the aftermath of such events. Given sufficiently rapid communications, a disaster nowcasting system could also order the closing of gas mains, or the powering down of electricity networks, as well as the sounding of klaxons, only tens of seconds before an earthquake wave strikes a major city such as Los Angeles. The central and critical requirement for mitigating natural disasters is two-way communication. Imagine a globally accessible internet collecting event-triggered messages from arrays of sensors (that detect inundation, for example) so they can be analyzed by centralized computer systems in nearly real-time, which then send instructions to alarm systems and actuators in the areas at risk. (Of course, local authorities would have to be involved in planning the local responses to alarms, in constructing rescue facilities, and in educating their populations accordingly). Only a constellation of satellites could provide a communications system with global accessibility and the required robustness. Such an infrastructure would allow the international community to exploit the many common elements in the detection, assessment and response to unfolding disasters.

Natural Hazards Center library project features children in disaster

Researchers studying children in disaster will soon find a unique resource at the Natural Hazards Center. The Natural Hazards Center Library has received a \$5,000 Carnegie-Whitney Grant to create Children of the Storm, an annotated bibliography and associated database of resources related to children and disaster.

This project is an attempt to critically review and highlight best practices pertaining to children in disaster. The ultimate goal of Children of the Storm is to produce a comprehensive database and physical section of the Natural Hazards Center Library that will be publicized and presented at the 2010 Natural Hazards Research and Applications Workshop in Broomfield, Colorado, in July.

From: Disaster Research 545, April 22, 2010

Job announcements

For emergency managers: see the NEMA website: <http://www.nemaweb.org/home.aspx> and scroll down to Career Opportunities.

GAO report on FEMA long-term disaster recovery

The Federal Emergency Management Agency's Long-Term Community Recovery branch is useful, but could benefit from some clarity and follow-through when assisting governments recover from disaster, according to this report by the Government Accountability Office. The GAO found that while FEMA long-term recovery assistance was valued by state and local officials, the criteria for when FEMA offers the assistance was vague. The extent of the assistance was also problematic, being implemented too soon in some cases and not extending long enough in others.

From: Disaster Research 545, April 22, 2010

Sunday crowds give cops a hard time post-tsunami

CHENNAI: Minutes after the tsunami alert was sounded, the city police went about with the task of clearing beaches and shutting shops on the beachfront. But after the initial bout of cooperation from the public, the task soon became one of crowd control rather than disaster management.

To say that public memory is short is perhaps an understatement. Under the scorching sun, policemen had a tough time dealing with the crowds of eager onlookers.

Efforts by the hassled policemen to clear the beach were often met with wry comments like, "Don't you know? We saw the news flash. The tsunami is not coming today. So why can't we stand here?"

Curiously, the scene resembled the scenario after the first tsunami had struck the coast on December 26, 2004. Hundreds were injured after the second and third tsunami waves struck on that fateful day.

Even those running beachfront establishments refused to cooperate with the police and insisted on staying open. Shops were shut only after the police sealed all roads along and leading to the beach.

Authorities of the Ashtalakshmi temple in Besant Nagar initially complied by shutting the beach-facing entrance and instead, opening the side entrance. But that was as far as they would go. Repeated requests from the police to shut the temple so that devotees would stop heading towards the seafront were met with a flat refusal.

Similarly, the Velankanni Church was kept open for Sunday prayers.

Despite the public's languid attitude, police officials were not willing to take any chances. Senthamarai Kannan, DCP, Adyar, said, "The alert itself was not a joke. The exercise became a test for us. Today, we learnt how fast we can react and mobilise in the face of a tsunami threat."

By Shyam Balasubramanian, *ExpressBuzz*
10 May 2010 03:41:00 AM IST

<http://expressbuzz.com/cities/chennai/sunday-crowds-give-cops-a-hard-time-post-tsunami/172162.html>

Undersea Internet cables 'could detect tsunamis'

An Indian-origin researcher has proposed what he claims is a cheaper and effective way of detecting an approaching tsunami, by using undersea Internet cables to sense its electric field.

Monstrous tsunami waves, like the one that killed over 200,000 people in the Indian Ocean in 2004, create an electric field as they form. This field could be sensed by a network of underwater sensors which would be too expensive to build.

However, only five countries own such sensor arrays—the U.S., Australia, Indonesia, Chile and Thailand—partly due to the high cost of installation. Now, Manoj Nair and his team at the National Oceanic and Atmospheric Administration in the U.S., have suggested the cheaper way of using the undersea telecommunications cables to detect tsunami's electric field, the 'New Scientist' reported.

The electric field is created as electrically charged salts in seawater pass through the Earth's magnetic field. Computer modelling by Nair's team shows that the electric field generated by the tsunami that struck south-east Asia in 2004 induced voltages of up to 500 millivolts. Their calculations show this is big enough to be detected by volt-meters placed at the end of the fibre-optic and copper cables that carpet the floor of the Indian Ocean.

<http://beta.thehindu.com/sci-tech/technology/article95494.ece>

<http://www.defence.pk/forums/world-affairs/47890-current-induced-submarine-cables-may-provide-tsunami-warning.html>

PUBLICATIONS

***Recovery Times* Newsletter**

Recovery Times is published by the Federal Emergency Management Agency and the state's emergency management office with the help from other federal agencies and departments. *Recovery Times* is produced, when the circumstances of a disaster warrant, in cooperation with federal, state and local agencies and volunteer organizations to provide timely recovery information for

victims of a particular disaster. Comments and inquiries about *Recovery Times* may be directed to the FEMA Helpline at 1-800-525-0321.

From: <http://www.fema.gov/rt/>

Recommendations for an effective national mitigation effort

A 2009 White Paper, funded through a cooperative agreement between the National Emergency Management Association and the Federal Emergency Management Agency, promoting stronger partnerships, increased resilience, and disaster resistance for a safer nation.

From: <http://www.nemaweb.org/?3177>

U.S. Tsunami Preparedness-NOAA Has Expanded its Tsunami Programs, but Improved Planning Could Enhance Effectiveness

This April 2010 Report to Congressional Committees (GAO-10-490) by the U.S. Government Accountability Office (16 pages) is available online: http://nthmp.tsunami.gov/GAO_report_d06519.pdf.

WEBSITES

<http://www.firstresponder.gov/Pages/Default.aspx>
FirstResponder.gov

Whether you're new to FirstResponder.gov or an old fan, there's plenty to love about the site's recent facelift. The folks at the Department of Homeland Security have dolled up their usual offerings to include a blog, news stories, and a focus on field technology.

Resources are easily found by discipline and there's even space to tell tales of your own first response successes. Of course all the same great grant, training, and library resources are still available, too.

From: Disaster Research 545, April 22, 2010

<http://www.arrrl.org/home>
American Radio Relay League

While organizations large and small grapple with the impact of new social media, it might be a good time to remember the original. Amateur radio operators have been providing disaster communications since the earliest days of the medium and the American Radio Relay League Web site helps them know what to do. With information on emergency certification, preparedness, and responding to disaster, the ARRL site is a great resource for operators and emergency organizations alike.

From: Disaster Research 545, April 22, 2010

<http://quakesmart.org/index.php/home>
QuakeSmart

Before an earthquake rocks their bottom line, QuakeSmart will help companies reinforce their business plans against disaster. Part of a FEMA Mitigation Direc-

torate project to get communities back on their feet after disaster, QuakeSmart offers companies resources to analyze risk, keep employees safe, and join the preparedness conversation.

From: Disaster Research 542, Mar. 11, 2010

<http://www.fels.upenn.edu/news/making-most-social-media>

Making the most of social media

Okay, you can't take it any more—you're ready to set your local government up on Twitter, Facebook, and RSS just to get the social media worshippers off your back. Before you do, take a moment to read *Making the Most of Social Media: Seven Lessons from Successful Cities*. The University of Pennsylvania's Fels Institute of Government examined governments using social media and condensed that information into a handy guide for any organization about to dip its toes into this vast sea.

From: Disaster Research 542, Mar. 11, 2010

<http://www.heritagepreservation.org/REPP/>
Heritage preservation's risk evaluation and planning program

This site is the result of a recent program that tried to determine how risk evaluation coupled with preparedness measures might keep cultural and historic artifacts safe during disaster. Having determined that risk evaluation is an important first step in emergency planning for cultural institutions, Heritage Preservation has shared the information—including lessons learned, tools and tips, and project news—on a page dedicated to the effort.

From: Disaster Research 542, Mar. 11, 2010

http://www.nhrl.unsw.edu.au/news/2010-03-02_Chile_tsunami.html

Education and public apathy letting side down in tsunami early warning (2nd March 2010)

A public education campaign and more resources for emergency services are essential if Australians are to be kept safe from the threat posed by tsunamis, experts say.

The warning from the Australian Tsunami Research Centre at the University of New South Wales comes in the wake of the devastating Chilean earthquake and subsequent tsunami that swept across the Pacific Ocean on Sunday.

Australia's Tsunami Early Warning System worked well in the hours after the magnitude 8.8 quake, but public indifference to the threat put lives at risk, the Centre's Co-Directors Professor James Goff and Associate Professor Dale Dominey-Howe said.

Full report is online at URL listed above.

<http://www.nhrl.unsw.edu.au/>
Australian Tsunami Research Centre, Natural Hazards Research Laboratory.

The University of New South Wales (Sydney, Australia) is the home of the Australian Tsunami Research Centre, Natural Hazards Research Laboratory.

“The Australian Tsunami Research Centre and Natural Hazards Research Laboratory (ATRC-NHRL) is a global leader in tsunami research and natural hazards. The centre comprises 18 senior researchers and PhD students examining hazard processes such as earthquakes, tsunamis, volcanic eruptions, landslides, climate change and tropical cyclones and storms.

The ATRC-NHRL uses an innovative coupled human-environment systems' framework to explore the mechanics of hazard processes, their frequency-magnitudes and distributions and the impacts of natural hazard processes on biophysical and human socio-economic systems. This centre is unique in the Australasian region in that it utilises the combined skills of geologists, geographers, engineers, sociologists, policy scientists and ecologists to gain a holistic understanding of the hazards phenomena.

The work of the ATRC-NHRL is globally relevant as research is being used to inform new emergency risk management policy in Australia, Australasia, NW Europe and the USA. Senior staff are recognised global leaders in their fields of expertise. Significant opportunity exists to build further collaboration with research scientists and centres of excellence around the world.”

From: the Home page of ATRC-NHRL.

CONFERENCES

July 12-15, 2010

Rebuilding sustainable communities with the elderly and disabled people after disasters.

University of Massachusetts, Boston. This conference examines long-term sustainable community recovery and rebuilding needs in post-disaster environments. Specific issues to be addressed include the status of elderly and disabled people after disasters, the participation of the elderly and disabled in local, regional, and national post-disaster reconstruction policies, plans, and programs, and the role of women with disabilities in formulating and implementing reconstruction policies.

From: Disaster Research 544, April 9, 2010

July 25 - 29, 2010

The Tsunami Society will hold its Fourth International Tsunami Symposium in Toronto, Canada, in conjunction and mutual co-sponsorship with the 9th US National & 10th Canadian Conference on Earthquake Engineering.

The joint conference will provide the opportunity to expand the scope and themes to include the equally important engineering aspects related to both earthquake and

tsunami dynamic motions. and impact on coastal structures and critical infrastructure facilities.

From:

<http://tsunamisociety.org/4thTsunamiSymposiumToronto2010.pdf> ♦

Material added to the NTHMP Library

May - June 2010

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.

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Tsunami warning services for the U.S. and Canadian Atlantic coasts [excerpt]

By Paul M. Whitmore, William Knight
Eos (American Geophysical Union Transactions), v. 89, no. 53, p. F1756 [abstract].

In January 2005, the National Oceanic and Atmospheric Administration (NOAA) developed a tsunami warning program for the U.S. Atlantic and Gulf of Mexico coasts. Within a year, this program extended further to the Atlantic coast of Canada and the Caribbean Sea.

Warning services are provided to U.S. and Canadian coasts (including Puerto Rico and the Virgin Islands) by the NOAA/West Coast and Alaska Tsunami Warning Center (WCATWC) while the NOAA/Pacific Tsunami Warning Center (PTWC) provides services for non-U.S. entities in the Caribbean Basin. The Puerto Rico Seismic Network (PRSN) is also an active partner in the Caribbean Basin warning system.

While the nature of the tsunami threat in the Atlantic Basin is different than in the Pacific, the warning system philosophy is similar. That is, initial messages are based strictly on seismic data so that information is provided to those at greatest risk as fast as possible while supplementary messages are refined with sea level observations and forecasts when possible. ♦

VIDEO-CD-DVD RESERVATIONS

To reserve tsunami videos, CDs or DVDs, contact 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. **These programs are available to all NTHMP participants, with a 3-week loan period.**

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. ♦



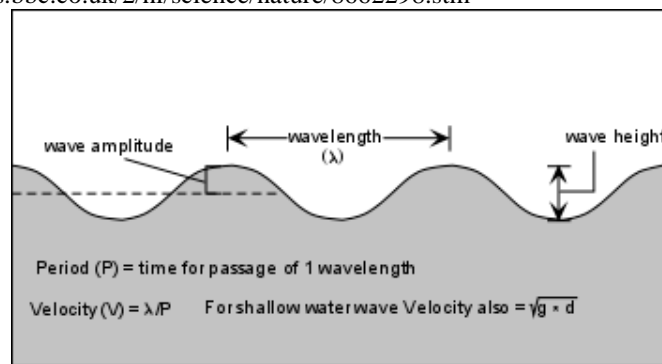
NEW! Tsunamis: Know What to Do! (8 min. DVD)

INFREQUENTLY ASKED QUESTIONS

According to Vasily Titov, Director of NOAA's Center for Tsunami Research, tsunami warnings aren't being understood. Why?

"We're scientists and we're really proud of our models and our accuracy but we realized after the Chilean tsunami that when we convey this information to the public there is a gap between what we are saying and what is understood. When we say there is a two-meter wave amplitude expected, the general person imagines a two meter wall of water. But that's not what amplitude means—tsunami would very rarely come as a wall of water. It refers to the amplitudes at tide gauges and it is peak to trough. It will not be the wave height that a surfer or someone on the beach sees."

For full story: <http://news.bbc.co.uk/2/hi/science/nature/8662298.stm>



Wave amplitude - refers to the height of the wave above the still water line, usually this is equal to 1/2 the wave height. Tsunami can have variable wave height and amplitude that depends on water depth.

What does the Disaster Reserve Workforce Division do?

Disaster Reserve Workforce Division established to help meet agency mission (2008)

FEMA's disaster reservists, national and regional cadre managers, program managers and all ten regions now have a centralized office solely dedicated to the unique aspects of preparing, training, supporting and deploying the disaster workforce, with particular emphasis on the disaster reserve workforce.

After numerous studies over many years, the new Disaster Reserve Workforce Division (DRWD) will actually implement the first reengineering of the Stafford Act's intermittent workforce in recent memory. With an eye toward paving the way for a long-term program based on pre-disaster readiness management, Administrator Paulison appointed Donna M. Dannels, a 25 year FEMA veteran and Senior Executive to lead the new office. Her main objective is to implement standards and systems to better support, train and deploy the disaster reserve workforce.

Admiral Harvey Johnson shared his perspective on a transformed disaster reserve workforce during his more than two-hour presentation to a conference of national and regional cadre managers in March 2008. Admiral Johnson stated that bolstering the reserve workforce program, better training, and better support of reservists were his top priorities. In his closing comments to the more than 130 workforce participants, the Admiral candidly summed up the current leadership's vision for mission success, which relies heavily on a stronger more robust disaster workforce.

"It is not enough to just leave it (the Agency) better than you found it, but better positioned for future success."

From: ON CALL, FEMA Reservists' News, May 2008.

For more information, see the articles on pages 6-8.♦



LATE BREAKING NEWS

Warning System to operate in the northwestern Pacific Ocean, providing critical data for the Kuril Islands and Kamchatka Peninsula



MCLEAN, Va., May 24 /PRNewswire-FirstCall/ -- Science Applications International Corporation (SAIC) (NYSE: SAI) today announced it has been awarded a contract for the production and delivery of an SAIC Tsunami Buoy (STB) system by the Far Eastern Ecological Center, Yuzhno-Sakhalinsk, for the Far Eastern Regional Hydro-meteorological Research Institute (FERHRI), Vladivostok, Russian Federation. The STB system will be one of the key sensors monitored by the Tsunami Warning Center in the Russian Far East, and will serve as the ocean segment of the Russian Federation tsunami warning system network currently in development.

SAIC is scheduled to deliver the system in early fall of 2010.

Full report at <http://www.prnewswire.com/news-releases/saic-to-provide-tsunami-buoy-system-to-russian-federation-94727769.html> (downloaded May 24, 2010)

Eyewitness account of 26 December 2004 tsunami in Phuket, Thailand

Full report: <http://www.dailymail.co.uk/femail/article-1280494/The-wall-water-waist-high-rising-Then-second-wave-hit--Carol-McGiffin-survived-2004-tsunami.html?ito=feeds-newsxml>

Anchorage Museum unveils 3 new exhibits

by Channel 2 News staff

Saturday, May 22, 2010

ANCHORAGE, Alaska -- Saturday was opening day at the Anchorage Museum for three new exhibits. Museum officials unveiled the Imaginarium Discovery Center, the Thomas Planetarium and the Smithsonian Arctic Studies Center to the public.

The Imaginarium features the world's largest indoor tsunami tank, while the Arctic Studies Center houses hundreds of Alaska Native artifacts.

From: <http://www.ktuu.com/Global/story.asp?S=12527508>

Scientific conference prompts tsunami action plan—Valparaiso begins marking evacuation routes and safety zones

By Lauren Gold

20 May 2010 01:50

http://www.santiagotimes.cl/index.php?option=com_content&view=article&id=18883:scientific-conference-prompts-tsunami-action-plan&catid=1:other&Itemid=38

“Large earthquakes and their tsunamis,” the recent conference at the Pontifical Catholic University of Valparaiso (PUCV), has made the city a global epicenter for earthquake and tsunami awareness. Appropriately, the city this week began carrying out its new “Emergency and Tsunami Evacuation Plan” by calling attention to its 11 flood zones.

The conference, which was organized by American Geophysical Union (AGU), is considered the most important scientific event relating to seismology ever to be held in Chile. It aimed to foster a more complete understanding of earthquakes of magnitude 9 or above, called “giant” earthquakes, and their resulting tsunamis.

For the full report, visit the website given above. ♦