



The International Tsunami Museum: Researchers Making a Difference in Thailand

— an invited comment

On December 26, 2004, a 9.1-magnitude earthquake created a devastating tsunami that struck 12 countries around the Indian Ocean. Nearly 230,000 people lost their lives, and 2.3 million people were left homeless. Tens of thousands remain unaccounted for. Estimated property damage and economic losses were in the tens of billions of dollars. In Thailand alone, the death toll reached 5,600, with 8,400 people injured.

After the tsunami, I traveled twice to the Khao Lak region of Thailand with a Western Washington University graduate student and a licensed clinical social worker to interview hundreds of survivors who were living in temporary shelters. We were joined by four Thai nurses from Prince of Songkla University in Thailand who vol-

unteered to work with us. Khao Lak experienced extreme devastation, and thousands lost their homes and jobs.

Our objectives in conducting these interviews were to examine the prevalence and predictors of post-traumatic stress disorder (a set of psychological and physical symptoms that may develop after people experience a life-threatening event), post-traumatic growth (an increased awareness of life priorities and positive life changes that can occur as a result of experiencing a traumatic event), and the role of culture in relation to distress and growth. The project is the most recent in a series of post-disaster studies my research team has been conducting for the past 15 years.

Our interviews with the tsunami survivors revealed that many people were fearful about future tsunami

threats. They did not have a good understanding about the warning signs of a tsunami, how to evacuate, or how tsunamis form. Many interviewees also reported symptoms associated with post-traumatic stress disorder, such as constantly thinking about future tsunami threats and having difficulty sleeping. They also did not realize how millions of people around the world had pulled together to help those affected by the tsunami. Like other disasters, the tsunami challenged people's sense of control, predictability, safety, and trust.

The survivors we spoke with asked us to tell them how the tsunami formed, about the worldwide response to provide aid, and about the new tsunami warning system that is being built in the Indian Ocean. We explained, for example, that the tsunami warning system utilizes a network of buoys that measure wave height and transmit the information via satellite to monitoring stations.

The survivors told us that this information helped alleviate their fears about future tsunami threats and their anxiety. Hearing about how the world community came together to develop a tsunami warning system made them feel grateful, and learning that the warning system would give them lead time to go to a safe location helped reestablish their feelings of control. For our team, the question then became, "How might we convey this information to large numbers of people at minimal cost?" Little did I know that a new chapter was about to unfold.

Applying Research Findings: Building the International Tsunami Museum in Thailand

As a team, we decided that an educational museum created with great care and sensitivity could help people understand the event that changed so many lives by showing how the tsunami formed and affected the environment, as well as how organizations, businesses, and individuals around the world rallied to help. Exhibits also could discuss the warning signs of a tsunami and how to evacuate, and could describe the new tsunami warning system being built in the Indian Ocean. And, by illustrating hope, resilience, and the human spirit, the museum could help people move forward with their lives.

We spoke with a businessman in Khao Lak who had a vacant building, and he generously made a space available for the museum. When I returned to the United States, I designed an independent study project at Western Washington University so students could be involved in the project and help design exhibits for the museum. The five students who participated gained an increased interest in research and learned how research findings can be applied to promote education, mental health, social responsibility, and compassion. In 2007, the project received the Action Teaching Award from the Social Psychology Network—an award that recognizes teaching activities that lead to a better understanding of psychology and to a more just, compassionate, and peaceful world.

Because the museum would be located in an area visited by tourists from around the world, it was crucial that the exhibits present information in both Thai and English. Four students at the University of Washington

translated the exhibits into Thai, and a graphic designer at Western Washington University worked with a native Thai speaker to create the museum exhibits, based on the text and graphics we provided.

The Dean's Fund for Excellence at the School for Humanities and Social Sciences and the Center for Cross-Cultural Research at Western Washington University provided \$9,000 to establish the museum and to conduct a research project in Khao Lak. These funds also covered part of the students' expenses to travel to Thailand. In December, 2006, I traveled with four students and a volunteer to Khao Lak to set up the museum.

“By illustrating hope, resilience, and the human spirit, the museum could help people move forward with their lives.”

On December 21, 2006, after working many 16-hour days building the museum, we opened the International Tsunami Museum. In the first three months of operation, more than 10,000 people from all over the world visited the museum, and visitor comments were overwhelmingly positive. One Thai visitor said that he had never seen a map of the Indian Ocean or heard about how an earthquake can cause a tsunami. The *Phuket Gazette*, a newspaper published 80 miles to the south in an area also struck by the tsunami, wrote of the museum, "In a subtle and ethical way, visitors are introduced to the tragic events of the December 26, 2004, tsunami."

Action Research and Community Service: Helping Children at Local Village Schools

Other visitors to the museum included teachers and students from local village schools, for whom we provided transportation to the museum. During their visit, teachers told us about the significant challenges that schools and students wrestled with in the aftermath of the tsunami. Water wells at some schools were contaminated, children went to school without breakfast and were fed soup for lunch (the only meal of the day, for many), and buildings needed repairs (such as fixing holes in the wall to keep poisonous snakes from entering the classroom). Some schools also did not have funding to replace teachers who retired or were transferred to another school. We considered what we might do to help the children and schools—yet another new chapter was about to unfold.

The museum has now partnered with All for Villages, Inc., a 501(c)(3) non-profit organization. Admission to the museum is free, but visitors can leave a voluntary donation if they wish, and 100% of the donations are passed on to five village schools. These funds are providing potable drinking water, more nutritious and substantial lunches daily, and supplies. They are also being used to repair buildings and have allowed the schools to hire four teachers and two teaching assistants for the year. Donors also

are supporting 12 children who are orphans, and we have built a home for an orphan and her grandparents.

Many people cannot visit the museum because they do not live close by. With a grant from Psychology Beyond Borders, we are now producing a video that will be freely distributed to schools along the coast in Thailand. The video will include the same content that is presented in the museum and will educate viewers about the warning signs of a tsunami, the new tsunami warning system, how to evacuate, and how the world came together to help survivors. Versions in both English and Thai will be available. In March 2008, I will return to Thailand to distribute the video and assess its effectiveness. We may seek funding to translate the video for use in Indonesia and in other tsunami-prone countries. This is especially timely given the recent large magnitude earthquakes that continue to strike off the coast of Indonesia.

Many children who became orphans as a result of the tsunami are living with their grandparents, and for some, living conditions are dire. One six-year-old girl and her three-year-old brother had lost both parents, and their grandparents are living in extreme poverty. For work, their uncle—a man in his 40s who is without one leg—scrapes hardened rubber from the bowls that hang on rubber trees. He earns US\$1.50 to \$2 per day, and his income is the primary means of support for the entire family. When we visited, the exterior wall in the bedroom of their home was made of husks from palm trees, and the tin roof over the living room had two- to three-inch holes. Rain came pouring in as we spoke with the fam-

ily over the loud roar of water falling on the roof. My Thai colleague who oversees the museum and I hired a contractor, and the family moved into their new home two months later, just before the rainy season. This is just one example of how the museum has changed survivors' lives.

For the many of us who have never experienced a disaster such as the 2004 tsunami, it is sometimes difficult to understand how one project can make a difference in so many lives. But perhaps it was best stated by Dale Boe of Bellingham, Washington, whose brother-in-law lives in Khao Lak and lost his business during the tsunami. "A lot of the organizations from around the world helped with the tsunami recovery, but now they are gone. Many people are still hurting and need help, and the International Tsunami Museum projects are making a real difference in the lives of children and families."

I am deeply grateful to the following people, who helped make the museum a reality: Sawitri Assanangkornchai, Mehnaaz Begum, Dale Dinnel, Dale and Nimnual Boe, Wiworn Kesavatana, Adam Moller, Rochelle Parry, and Heidi Sattler-Philips.

To view photos of the International Tsunami Museum and the school projects, please visit www.wwu.edu/~tsunamimuseum.

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Call for Papers: Annual Student Paper Competition

The Natural Hazards Center announces its fifth annual Hazards and Disasters Student Paper Competition. Papers may present current research, literature reviews, theoretical arguments, or case studies. Subject matter may include, but is not limited to, floods or floodplain management, Hurricane Katrina, earthquakes, climate change, warning systems, hazard mitigation, emergency management, vulnerability, or other topics relevant to the social and behavioral aspects of hazards and disasters.

Papers will be judged on originality, organization, and demonstrated knowledge of the topic. One undergraduate and one graduate winner will receive \$100 each; mention in the *Natural Hazards Observer* newsletter; publication on the Natural Hazards Center Web site; and an invitation to the Annual Hazards Workshop in Boulder, Colorado, including registration fees. The deadline for submissions is March 14, 2008. Additional information, including eligibility and criteria, is available on the Natural Hazards Center Web site at www.colorado.edu/hazards/awards/paper-competition.html.

FEMA Emergency Management Institute (EMI) Training

EMI serves as the national focal point for the development and delivery of emergency management training courses to enhance the capabilities of federal, state, local, and tribal government officials; volunteer organizations; and public and private sectors to minimize the impact of disasters. Course delivery includes emergency management training in areas of natural and human-caused hazards, exercise design and evaluation, and public information.

EMI offers an Integrated Emergency Management Course (IEMC) curriculum of exercise-based (tabletop and functional) training, which emphasizes the integration of emergency operations center functions performed by public officials and emergency managers in disaster preparedness, response, recovery, and mitigation phases. State and local governments may also request community-specific IEMCs tailored to their jurisdictions and specific hazard. For more information, please visit the IEMC Web site at <http://training.fema.gov/emi-web/IEMC> or contact William Tschumy at william.tschumy@fema.gov or (301) 447-1095.



Hazards around the World

Below are brief descriptions of some of the most recent natural hazards and disasters that have occurred around the world. The list is not intended to be all-inclusive, but rather a representation of those hazards that have generated significant impacts, whether physical, social, or both.

Cyclones and Hurricanes

Cyclone Sidr—Bangladesh

On November 15 Cyclone Sidr, a Category IV storm, struck Bangladesh, forcing the evacuation of 3.2 million people from coastal areas. The cyclone originated from a depression in the Bay of Bengal, then hit offshore islands and made landfall across the southern coast of Bangladesh. The storm had a radius of about 300 miles and generated wind speeds of 135-150 miles per hour. As of November 19, official reports estimated the initial death toll at around 3,100, with that number expected to escalate after rescuers reach outlying islands. Reports indicate that over 27 million people from 25 districts were affected by the severe cyclonic storms. Many structures, roads, and crops were damaged or destroyed, and the cyclone also caused power outages that resulted in a near-countrywide blackout for over 36 hours.

Earthquakes

Earthquake—California, United States

A magnitude-5.6 earthquake struck the San Francisco Bay Area on October 30. The quake occurred on the southern end of the Calaveras Fault, which is only capable of generating a 6.4-magnitude or lower temblor, according to the U.S. Geological Survey. The tremor, which was centered about nine miles northeast of San Jose, was the strongest to hit the Bay Area since the 1989 Loma Prieta earthquake. There were no reports of injuries or serious damage.

Earthquake—Chile

An earthquake that measured 7.7 on the moment magnitude scale struck northern Chile on November 14. The epicenter was located 783 miles north of the Chilean capital of Santiago and was felt as far away as La Paz, Bolivia, located high in the Andes Mountains. Although authorities initially issued a tsunami warning, it was later lifted. At least two people were killed, and approximately 150 were injured. An estimated 4,000 homes were destroyed and 15,000 residents displaced. According to the U.S. Geological Survey, the earthquake resulted from the release of stress generated by the subduction of the Nazca Plate beneath the South American Plate.

Floods

Flooding—West Africa

Torrential rains and flash floods that began in August have affected about 1.5 million people in at least 18 countries on the African continent. Hundreds of thou-

sands have been displaced, and in some cases entire towns and villages have been submerged. The flooding has destroyed houses and staple crops and has polluted drinking water sources such as wells and canals. Many subsistence farmers have lost their livelihoods after fields were flooded or roads washed away. According to the United Nations, the flooding could lead to locust infestations and outbreaks of diseases such as cholera and dysentery.

Flooding—India and Bangladesh

In September an estimated 13.5 million people were marooned or displaced by severe flooding in India and Bangladesh. The flooding resulted from the region's June-September monsoon season and was described as the worst flooding in decades. In India, more than 2,200 people were killed by the flooding and rains, and in neighboring Bangladesh the casualties exceeded 1,000. The flood-induced devastation in India threatened seasonal crops in some areas, which could mean food shortages. A report issued by Bangladesh's Ministry of Primary and Mass Education revealed that 2,571 schools had been affected, including 45 that were completely destroyed and 1,920 that were partially damaged.

Flooding—Southern Mexico

In late October, torrential rains in Mexico's southern state of Tabasco caused the region's worst flooding in history. As many as half of the 750,000 residents of the capital city of Villahermosa were forced to flee their homes, according to Catholic Relief Services, and officials estimated that about 70,000 people were housed in 279 shelters. The latest reports indicated that 17 municipalities in the state of Tabasco were completely under water, with flood waters reaching up to 40 feet deep in some areas. The flooding was triggered by the overflowing of the Carrizal and Mazcalapa Rivers, due to continuous rain.

Wildfires

Wildfires—California, United States

More than 250,000 people were forced to evacuate their homes as wildfires raged through southern California in October. The fires, which included at least 15 separate burn areas in seven counties, were fed by gale-force winds and burned approximately 267,000 acres stretching from Santa Barbara to the Mexico border. About 1,500 National Guard troops were deployed to help with evacuation. In San Diego County, seven fires forced the largest evacuation ever, including the entire towns of Ramona and Rancho Santa Fe. By late October, the fires had been mostly contained.

Congress Overrides Presidential Veto of Water Resources Bill

On November 2, 2007, President Bush vetoed a bill authorizing \$23 billion in water resource projects, saying that it was too costly. Congressional Democrats responded angrily, asserting that Bush was insensitive to the hurricane-damaged Gulf Coast, which would have been a major beneficiary of the legislation, *The New York Times* reported on November 3.

The bill, called the Water Resources Development Act, included authorization of \$3.5 billion in work for hurricane-ravaged Louisiana and nearly \$2 billion for restoration efforts in the Florida Everglades. Critics of the bill said it was not only costly, but also failed to provide for changes to the Army Corps of Engineers (Corps), which would be tasked with performing most of the work. In his veto message, President Bush stated that the bill “lacked fiscal discipline” and that its cost had risen more than 50% after it emerged from a House-Senate conference committee. He also said a backlog of projects for the Corps meant that many projects in the bill would never be financed or completed.

On November 6 the House overrode the veto with a 361 to 54 vote, and on November 8 the Senate voted 79 to 14 to override the veto. President Bush has now cast five vetoes—four of which have occurred since Democrats took control of Congress in January 2007. The veto override represented the first of Bush’s seven-year presidency. While lawmakers in both chambers and of both parties had quickly issued statements criticizing the veto, some taxpayer rights’ groups praised it, agreeing that it was too expensive. Source: *The New York Times*, November 3 and November 7, 2007.



New Strain of Bird Flu Virus is Threat to Humans

Researchers at the University of Wisconsin recently identified a strain of the H5N1 bird flu virus that may affect the upper respiratory tract of humans. Other strains of the virus have not grown well in the nose and throat of humans, due to the lower temperatures. The average body temperature of a bird is 106 degrees F, whereas the average temperature of the nose and throat of a human being—the site where the virus usually enters—is only 91.4 degrees F.

The newly discovered mutation allows H5N1 to live in the cooler temperatures of the human respiratory tract. The potential threat lies in progressively evolving strains that allow the virus to pass more easily from one human to another. Only 330 cases of bird flu have been identified in humans by the Centers for Disease Control and Prevention (CDC) and the World Health Organization since 2003, none of which have been reported in the United States. Though the virus still remains a threat to Europe and Asia as repeated outbreaks have been identified in poultry throughout farmlands over the past year, no two outbreaks of the disease are ever the same, and mutations of the virus have not been identified as pandemic.

Delays in Formaldehyde Testing of Trailers Put Hurricane Victims at Risk

The Federal Emergency Management Agency (FEMA) has still not tested 56,000 occupied travel trailers for possible health risks from formaldehyde after problems were detected more than 19 months ago, *The New York Times* reported on October 18. The trailers were being sold to Hurricane Katrina and Rita victims who lost their homes in the 2004 and 2005 storms. Sales were halted in July, but 10,839 trailers had already been auctioned off by the General Services Administration (GSA) within a 12-month period. At a Congressional hearing in July, both FEMA and the Centers for Disease Control and Prevention (CDC) promised to begin studies weeks after stopping the sales. Teams were deployed more than two months later to assess the unoccupied trailers. The CDC commented that this preliminary effort was necessary to lay the groundwork for the study. FEMA had planned to begin charging occupants rent in an effort to encourage people to move into unsubsidized housing by March 2008, but agency officials felt this initiative no longer made sense with possible health liabilities surrounding the government-provided housing. The Environmental Protection Agency (EPA) lists formaldehyde as a colorless gas that has been shown to cause cancer in animals and may cause cancer in humans. To read the full article, visit www.nytimes.com/2007/10/18/us/18fema.html.

More Than \$400 Million in Tax Credits Allocated to Katrina GO Zone

In October, the Department of Treasury Community Development Financial Institutions (CDFI) Fund decided to award \$3.9 billion in tax credits to 61 awardees investing in rural and urban low-income communities across the United States. The awards are being made under the 2007 round of the New Markets Tax Credit (NMTC) Program and will include \$400 million allocated specifically for the redevelopment and reconstruction of the Hurricane Katrina Gulf Opportunity Zone (GO Zone). The NMTC program was created by Congress in 2000 to provide individual and corporate taxpayers with a credit against federal income taxes for making qualified equity investments in Community Development Entities (CDE). The CDEs are required to invest the proceeds in low-income communities. For more information, visit www.dhs.gov/gulfcoastrebuild.



New Satellite to Monitor Ocean Dynamics

A new multinational ocean-observing satellite scheduled to launch in June 2008 will provide scientists with detailed measurements of ocean circulation and global sea level variations. The Ocean Surface Topography Mission (OSTM) on the Jason-2 satellite (OSTM/Jason-2) will be a follow-up to the Jason mission, which has been providing global ocean surface data to researchers since 2001. The new satellite will extend the time series of ocean surface topography measurements to accomplish two decades of observations. Applications include improved measurements of ocean circulation and global sea-level change and monitoring of El Niño/La Niña events, tides, and waves. The mission is a collaboration of the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the Centre Nationale d'Etudes Spatiales (CNES), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). For more information, visit <http://sealevel.jpl.nasa.gov/index.html>.

New United Nations (UN) Office to Use Space Technology in Disaster Mitigation

In October, a new United Nations Outer Space Affairs (UNOOSA) office tasked with using space technologies to respond to all stages of global disasters opened in Bonn, Germany. The new office aims to carry out the UN Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER). Unlike other recent initiatives where space-based information is used for humanitarian and emergency response, UN-SPIDER is the first to employ the technologies to cover all stages of disaster, including the risk reduction phase, which could significantly cut the loss of lives and property. UN-SPIDER will provide all countries and interested organizations universal access to space-based information and services on disaster management and will have a considerable impact on the way space-based information is used in dealing with disasters around the world. The program, established by the UN General Assembly in December 2006, hopes to assist countries and organizations by acting as a gateway to space-based information for disaster management support. UN-SPIDER offices are also scheduled to open in Beijing and Geneva. For more information on UN-SPIDER, visit www.unoosa.org/oosa/en/unspider/index.html.



Warning System to Protect Californians from Flash Floods and Debris Flows

A debris flow and flash flood warning system developed jointly by NOAA's National Weather Service (NWS) and the U.S. Geological Survey (USGS) will help protect southern Californians from potentially devastating mudslides and flash floods in and around burn areas created by the October wildfires. Post-wildfire debris flows are closely linked to precipitation and are more predictable than other landslides. The USGS has developed precipitation thresholds that help identify potential debris flows in recent burn areas and provides this information to NWS forecast offices in southern California. A flash flood monitoring and prediction tool enables weather forecast

offices to monitor precipitation, and if rainfall approaches the thresholds developed for burn areas, they will incorporate wording about debris flow hazards into flash flood warnings and public information statements. Flash flood warnings are communicated directly to local emergency managers and to the public through the Emergency Alert System and the NOAA Weather Radio-All Hazards. Even before the fires started, the agencies had agreed to extend the debris flow and flash flood warning system pilot project, started in September 2005, for another year. In a 2005 report, the agencies outlined the initial plan for the project, identified the need to expand the warning system nationwide, and focused on developing improved technologies to characterize flash flood and debris flow hazards. The project will continue to cover San Luis Obispo, Santa Barbara, Ventura, Los Angeles, San Bernardino, Orange, Riverside, and San Diego Counties, most of which were affected by the October wildfires. To read the full NOAA press release, visit www.noaanews.noaa.gov/stories2007/20071107_southcalwarning.html.



FEMA Begins Drafting Guidance Documents for Specific Regional Events

The Federal Emergency Management Agency (FEMA) recently began drafting a disaster plan for the San Francisco Bay Area in preparation for a potentially devastating earthquake. This is one of many event-specific plans the agency has quietly started to develop for states that are vulnerable to particular catastrophic events. Other "base plans" in the works include blueprints for a Category 5 hurricane in the Miami area and for a large earthquake along the New Madrid fault, which extends from southern Illinois to northeastern Arkansas. In the past, FEMA's primary role has been to review plans drafted by state emergency management agencies, and these duties were repeatedly clarified by Homeland Security Secretary Michael Chertoff just last spring. However, continuing pressure from legislative officials to take a

more aggressive stance on state planning, as well as other objections regarding the agency's deficiencies during the response and recovery efforts of Hurricane Katrina, may have influenced the agency to partner more closely with states during the initial drafting stages of planning. Administrator R. David Paulison calls this shift in FEMA's role a "culture change." FEMA's regional offices have taken the role of writing these guidance documents.

FEMA Provides More than \$5.6 Million in Aid to Southern California Following Wildfires

Two weeks after wildfires tore through seven California counties, more than \$5.6 million in federal funds was in the hands of individuals and families affected by the disaster. Nearly 15,000 Californians had registered through the Federal Emergency Management Agency (FEMA) for federal and state disaster assistance. As a result of President Bush's disaster declaration on October 24, 2007, and at the request of Governor Arnold Schwarzenegger, residents and business owners in Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura Counties who were affected by the wildfires were eligible to apply for federal and state individual assistance. Funds can be used to help find temporary housing when homes are either destroyed or made unlivable by the fires; pay for home rebuilding or repairs; replace personal property not covered by insurance; and assist with necessary disaster-related expenses. To read the full FEMA press release, visit www.fema.gov/news/newsrelease.fema?id=41602.

Bush Administration Edits Testimony on Health Risks from Global Warming

In October, questions circulated as to whether testimony reported by the Centers for Disease Control and Prevention (CDC) to Senate committees accurately reflected findings on health risks posed by global warming. The testimony supposedly went through a normal review process, which included editing by the Office of Management and Budget (OMB), but statements related to public health concerns due to climate change were cut from the testimony. Instead, the testimony focused on measures already taken by health agencies to prepare for future challenges to public health.

The *Associated Press* was the first to report these changes, and the draft testimony was circulated and posted online by several private groups, such as Climate Science Watch. The testimony, written by CDC director Dr. Julie L. Gerberding, was cut in half from its original 12 pages. Criticism came from Democratic legislative officials, including members of the Senate Environment and Public Works Committee and non-profit advocacy groups. However, Republicans on the committee sided with the administration and called the edits a normal part of the review process. To access the full article, visit www.nytimes.com/2007/10/25/science/earth/25climate.html.

Questions Remain at Close of 2007 Hurricane Season

As the 2007 Atlantic hurricane season officially came to a close on November 30, scientists at the National Oceanic and Atmospheric Administration (NOAA) carefully reviewed the weather patterns that yielded lower-than-expected hurricane activity across the Atlantic Basin. The United States was largely spared from significant landfalling storms; however, two back-to-back Category 5 hurricanes hit Central America.

As a whole, the 2007 Atlantic hurricane season produced 14 named storms, including six hurricanes, two of which became major hurricanes. NOAA's August update to the seasonal forecast predicted 13 to 16 named storms – of which seven to nine would be hurricanes, including three to five major hurricanes of Category 3 strength or higher. An average season has 11 named storms, with six becoming hurricanes, including two major hurricanes. According to Gerry Bell, lead seasonal hurricane forecaster at NOAA's Climate Prediction Center, the 2007 Atlantic hurricane season produced the predicted number of named storms, but the combined number, duration, and intensity of the hurricanes did not meet expectations.

The climate patterns predicted for the 2007 hurricane season—an ongoing multi-decadal signal and La Niña—produced the expected below-normal hurricane activity over the eastern and central Pacific regions. However, La Niña's impact over the Atlantic was weaker than expected, which resulted in stronger upper-level winds and increased wind shear over the Caribbean Sea during the peak months of the season (August-October). This limited Atlantic hurricane formation during that period. NOAA's scientists are investigating possible climate factors that may have led to this lower-than-expected activity.

All in all, one hurricane, one tropical storm, and three tropical depressions struck the United States: Tropical Depression Barry came ashore near Tampa Bay, Florida, on June 2; Tropical Depression Erin hit southeast Texas on August 16; Tropical Depression Ten came ashore along the western Florida panhandle on September 21; Tropical Storm Gabrielle hit east-central North Carolina on September 9; and Hurricane Humberto struck the upper Texas coast on September 13. To read the full NOAA press release, visit www.noaanews.noaa.gov/stories2007/20071129_hurricaneend.html.

Record-Setting Tornado Season in United States

A total of 87 tornadoes were reported in the United States from October 17-19, 2007, which set a new record, according to NOAA's Storm Prediction Center in Norman, Oklahoma. The outbreak also contributed to the monthly total of 105 tornado reports—the second highest for October, behind the 117 tornadoes reported in October 2001. The preliminary number for the three-day outbreak significantly surpasses the previous October outbreak record of 63 tornadoes set along the Gulf Coast from southeast Texas to Florida and Georgia from October 23-27, 1997. Two weather systems that co-existed over the coun-

try were the primary cause of the record-setting outbreak, according to the Storm Prediction Center. This set up conditions that allowed two different tornado-spawning systems to occur simultaneously over the United States. A low pressure system in the Gulf of Mexico was the primary cause of storms that produced six tornadoes on October 17 through the morning of October 19 in the coastal regions of Texas, Louisiana, Mississippi, and the Florida Panhandle. The major weather producer associated with the remaining 81 tornadoes was an upper-level trough of low pressure that extended from the Central Plains through the Great Lakes. Intense thunderstorms developed ahead of this system, and tornadoes were reported over a large portion of the central U.S. from southwestern Missouri to middle Tennessee, and from central Mississippi through lower Michigan. To read the full story, visit www.noaanews.noaa.gov/stories2007/20071031_tornado.html.



Proceedings from Hazards and Disasters Researchers Meeting Now Available Online

The proceedings from the 2007 Hazards and Disasters Researchers' Meeting are now available online. The proceedings offer a collection of short papers presented at the two-day meeting held in Boulder, Colorado, on July 11 and 12, 2007, following the annual hazards workshop.

The meeting brought together more than 100 researchers who presented findings related to hazards and disasters. The research presentations addressed aspects related to vulnerable populations, risk and decision making in hurricanes, recovery and reconstruction, and multiorganizational collaboration. The proceedings are available at www.colorado.edu/hazards/workshop/researcher_meeting.html.



Title IX: New Standards for Private Sector Preparedness

On August 3, 2007, President Bush signed into law the “Implementing the 9/11 Commission Recommendations Act of 2007” (S. 4). Within this law is Title IX, which specifically addresses private sector preparedness. Inside Title IX is Section 524, which deals specifically with a “Voluntary Private Sector Preparedness Certification and Accreditation Program.”

This legislation raised the level of debate about the merits of Section 524 within the business sector disciplines of business continuity, security, and crisis management. Soon after the passage of this new law, the American Society for Industrial Security (ASIS) released a new document, titled “Management Systems for All-Hazards Risk - Standard of Best Practices,” and immediately began promoting this new release as a solution to the need for a standard to underpin the new “voluntary certification and accreditation” program. This position created a division between ASIS and the current “standard” in this arena mentioned prominently in the 9/11 Commission Recommendations—the NFPA 1600 Standard on Disaster/Emergency Management and Business Continuity Programs. At stake in this debate are the management programs that have been developed, are underway, or have yet to be built dealing with the critically important issue of true “business preparedness.”

The History of Private Sector Preparedness

The roots of private sector preparedness trace back to two key discipline-specific crisis management and recovery activities: (1) “disaster recovery,” a discipline that began in the late 1960s when computer “crashes” meant losses of invaluable data and processing capabilities, and (2) “civil defense,” the forerunner of today’s emergency response and management programs. The emphasis on technology and data-related recovery processes combined with security-related concerns resulted in initial private sector programs focusing on information security and data redundancy. However, over the course of time, business preparedness programs increased in scope and responsibility to incorporate five aspects of disaster/emergency management, which include prevention, mitigation, preparedness, response, and recovery.

As private sector preparedness programs grew in recognition across industries, national coordinating groups formed to identify best practices and set standards for business continuity. For instance, in the late 1980s the Disaster Recovery Institute (DRI) was founded in order to develop a centralized knowledge base on contingency planning. Over time, DRI grew to become the recognized standard accrediting body for business continuity world-

wide and established the industry’s international standard with the Professional Practices for Business Continuity Planners. In addition, the National Fire Protection Association established a Disaster Management Committee in 1991 to develop key guidance documents for disaster management. The resultant document, NFPA 1600, has undergone numerous revisions since the inception of the committee and now stands as the “Standard on Disaster/Emergency Management and Business Continuity Programs.”

The “Professional Practices” identified by DRII and cross-referenced in the NFPA 1600 include conducting risk evaluation, business impact analysis, and preparedness audits on a regular basis; developing a process for the management of critical resources and logistics, such as identifying a repository for key documents and supplier contact lists; identifying key employees and preparing them to respond to a variety of incidents; and developing and implementing plans for business continuity and continuity of operations. Included in this is a commitment to move away from being purely “reactive” to being more effective in pre-planning, response, restoration, and recovery.

“Included in this is a commitment to move away from being purely ‘reactive’ to being more effective in pre-planning, response, restoration, and recovery.”

As discussed below, the NFPA 1600 and the Professional Practices identified by DRI International have served as the standard by which to measure effective business continuity programs. As such, they are now being recognized by federal legislators as part of an effective strategy to prepare our nation’s critical infrastructure to protect against and recover from future disasters.

9/11 Commission

In November 2002, the National Commission on Terrorist Attacks upon the United States (also known as the 9/11 Commission) was charged “to prepare a full and complete account of the circumstances surrounding the September 11, 2001 attacks.” The bi-partisan Commission conducted an international review, which included more than 1,200 interviews and the analysis of over two million document pages, and prepared a report that was published in July 2004.

Within the 9/11 Commission Report, specific references are made to the fact that 85% of the nation's critical infrastructure is currently controlled by the private sector; however, few of these organizations have adopted or implemented specific preparedness measures, such as Incident Command, in preparing for disaster events. Therefore, the Commission developed a set of recommendations for private sector preparedness, including plans for evacuation, adequate communication capabilities, and continuity of operations.

In addition, the Commission asked the American National Standards Institute (ANSI) to develop a consensus on a "National Standard for Preparedness" for the private sector. ANSI responded by convening safety, security, and business continuity experts from a wide variety of industries and associations, as well as from federal, state, and local government stakeholders. They recommended that the Commission endorse NFPA 1600 as a common set of criteria and terminology for preparedness, disaster management, emergency management, and business continuity programs. The Commission stated that they "encourage the insurance and credit rating industries to look closely at a company's compliance with the ANSI standard in assessing its insurability and creditworthiness." In addition they wrote, "We believe that compliance with the standard should define the standard of care owed by a company to its employees and the public for legal purposes. Private sector preparedness is not a luxury; it is a cost of doing business in the post 9/11 world. It is ignored at a tremendous potential cost in lives, money, and national security."

During the first quarter of 2007, private industry representatives, including The Goodyear Tire & Rubber Company, had the opportunity to provide comments to the team developing S.4. ("Improving America's Security Act of 2007"). The Senate Committee on Homeland Security and Governmental Affairs focused on a bill addressing a host of issues, from homeland security grants, information sharing, and terrorist travel to private sector

preparedness, infrastructure protection, and weapons of mass destruction. Goodyear's comments and support for the legislation referenced its business continuity process, which is built on the foundation of DRII Professional Practices and NFPA 1600, as referenced above.

S.4. was ultimately passed on a 371-40 vote in the House and an 85-8 vote in the Senate, and President Bush signed the legislation on August 3, 2007. Title IX, Private Sector Preparedness, mandates that a voluntary private sector preparedness accreditation and certification program be developed within 210 days of the bill's implementation. The program must address a variety of topics, including a formal structure for certification, standards to be followed, and methods of sharing information. Included in this 210-day window is a requirement for the Secretary to submit to the Senate and House a "Report to Congress"—a report with a summary of recommendations on implementing the process. With this, Goodyear anticipates that the private sector will be consulted in the development of these recommendations and that the following items will be included in the report:

- Development of guidance and recommendations
- Identification of best practices
- Use of voluntary consensus standards
- Certification process for those who seek it voluntarily under the program
- Management and implementation of accreditation and certification
- Demonstration of ability to certify private sector entities
- Business justification for preparedness and adoption of voluntary preparedness standards

Organizations may continue to make recommendations on voluntary certification and how it may affect private industries by communicating with elected representatives in Congress, the ANSI, and the Private Sector Office of either the Department of Homeland Security (DHS) or the Federal Emergency Management Agency (FEMA).

To most observers, it is clear that the landscape of global risk is changing, and not necessarily for the better. New threats are emerging, and existing threats are growing in potential impact at a rate far exceeding the pace at which solutions to eliminate categories of risk are being created. The issue of "private sector preparedness" in the very broadest sense has now been raised and addressed in the form of federal law, and those of us engaged in private industry preparedness efforts are being given a golden opportunity to help shape the fulfillment of the very need that created the industry. Such an opportunity is a rare thing indeed, and we would be wise to weigh—quickly but yet carefully—the means we choose and the standards we select to help our business sector realize the value inherent in true preparedness.

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IIASA Summer Fellowships for Graduate Students

The International Institute for Applied Systems Analysis (IIASA) is an international institution, supported by the U.S. and 18 other governments, engaged in scientific research aimed at providing policy insight on issues of regional and global importance in the following areas: energy and technology, natural resources and environment, and population and society.

Each summer the IIASA, located in Schloss Laxenburg near Vienna, Austria, hosts a selected group of graduate students, primarily doctoral, from around the world in its Young Scientists Summer Program (YSSP). These students work closely with IIASA's senior scientists on projects within the Institute's three theme areas. Funding is available to cover travel to IIASA and a modest living allowance.

The 2008 YSSP dates are June 2-August 29, and applications are due no later than January 15, 2008. An online application form, along with more information, is available at www.iiasa.ac.at/yssp/register/. General questions can be sent to Tanja Huber, YSSP Coordinator, at yssp.support@iiasa.ac.at.

PreventionWeb

PreventionWeb, which launched on November 15, 2007, is a new information service that will increase knowledge, networking, and action on disaster risk reduction (DRR). The new Web portal will provide a common tool for both specialists and non-specialists interested in or working in DRR-related fields. PreventionWeb is a project of the United Nations International Strategy for Disaster Reduction (UN/ISDR) secretariat and is expected to become a tool for DRR practitioners in the way that ReliefWeb has served the humanitarian response community. The site will feature DRR news, country reports, publications, good practices, fact sheets, networks and communities, and audio and video content. It will also contain a listing of all major disaster risk reduction initiatives.

The beta release period will emphasize content development by calling for contributions from the disaster risk community, including UN, international, non-governmental, academic, and civil society partners. To view an online demo with audio commentary, visit www.preventionweb.net/english/about/. To submit news, initiatives, events, or other information to PreventionWeb, visit www.preventionweb.net/english/submit/.

New NOAA Mapping Tool Provides Instant Hazard Information

In response to the need for communities to readily access hazard risk information, the National Oceanic and Atmospheric Administration (NOAA) Pacific Services Center created the Hazard Education and Awareness Tool (HEAT)—an innovative tool that brings hazard information to one location and helps prepare communities for natural disasters. HEAT merges Google Maps technology with spatial-hazards data and displays detailed maps of hazard risks in an easy-to-use template format. Users can enter an address into the search boxes and find out instantly whether it is located in a hazard-risk zone.

The Hawaii Tsunami Hazard Information Service was developed using the HEAT template and is currently serving as a pilot site for the tool. The service allows Hawaii residents and visitors to search an address or island area. The address search then returns an interactive tsunami-risk map, along with information on emergency planning, disaster response and preparedness kits, and when to evacuate. The HEAT template is available to any organization, and the only requirements are hazard-map data, a basic Web server, and free Web-mapping software. The tool's search functionality can be readily distributed to other local disaster management agencies and integrated within their Web sites. To see how Hawaii is applying the HEAT template, visit www.csc.noaa.gov/psc/tsunami/. To find out how HEAT can be used in your community, contact Russell Jackson at russell.jackson@noaa.gov.



Contracts and Grants

Below are descriptions of recently awarded contracts and grants related to hazards and disasters. An inventory of awards from 1995 to the present is available at www.colorado.edu/hazards/resources/grants/.

Coping with Natural Hazard Risk: Civil Engineering, Floods, and Landslides in the Modernization of Japan. Funding Organization: National Science Foundation, \$223,135. Three years. Principal Investigator: Philip Brown, Ohio State University, (614) 292-0904, brown.113@osu.edu.

This project explores how technical and social responses to widespread flooding and landslides in Japan changed during its transition to a modern society. Highly decentralized in 1800, by 1900 the Japanese state had become a strong and capable state. The responsibility for addressing hazards moved largely from districts and villages to the national government. The new government (1868-1912) transformed local administration and taxation, re-defining the resources available to villages to address floods and landslides just as new engineering techniques entered Japan from the West. An in-depth case study of Niigata (a region that faces the Sea of Japan) prefecture is used to explore how local, prefectural, and national political and administrative organizations adapted to the challenges of natural hazards and addressed changing opportunities and problems associated with new practices in civil engineering. The project is grounded in the traditional tools of the historian—careful reading of archival sources and qualitative analysis. Primary emphasis is on exploration of the records of multiple levels of government, engineering societies, public interest groups, and newspaper reports. Precipitation data for the past century, along with soil maps and digital elevation models, will be used to supplement traditional historical sources in order to consider the impact of natural conditions when making comparisons over time and space. Comparison of Niigata with other regions of Japan helps to assess the applicability of conclusions drawn from Niigata to Japan as a whole and generally to modernizing societies.

Cyclones, Cones, and Confusion: A Study of Visual Communication. Funding Organization: National Science Foundation, \$51,791. 18 months. Principal Investigator: Gina Eosco, American Meteorological Society, (202) 737-9006, eosco@ametsoc.org.

The U.S. Census Bureau estimates that 34.9 million Americans live in hurricane-prone areas along the East Coast. With the U.S. experiencing a natural period of heightened tropical cyclone activity, combined with the possible effects of global climate change, there is an increasing need to communicate hurricane warnings and associated risks effectively. In addition, there is growing concern that decision makers, emergency managers, and the public are misinterpreting visual displays of critical hurricane track forecasts, called the “cone of uncertainty,” which may lead to ill-informed decisions.

Despite improved accuracy of hurricane forecasts and warnings, if the visual risk communication is ineffective, then people will not understand them. This research includes two main parts, both of which rely heavily on interviews and have an associated real-time observation trip. Interviews with forecasters and other hurricane specialists will provide information about what they believe the public should understand. In addition, a visit to the National Hurricane Center during a possible hurricane threat to the United States will provide real-time observation of how graphics are created and disseminated to the public. Second, despite empirical evidence suggesting public confusion regarding the graphic, no one has yet collected data on people’s perception and understanding of the graphic. Interviews with members of the public will allow the development of such information, which will enable comparison between the forecasters’ intent and public interpretation of the graphic. This study contributes to the intersection of meteorology and visual communication and will explore the possibilities of maintaining the integrity of the meteorological science while integrating visual perception theories and public views with the long-term goal of creating a graphic that meets both needs.

Designing Resilience for Communities at Risk: Decision Support for Collective Action under Stress. Funding Organization: National Science Foundation, \$734,995. Three years. Principal Investigator: Louise Comfort, University of Pittsburgh, (412) 648-7606, lkc@pitt.edu.

This project addresses the problem of collective action in communities exposed to continuing risk. Mobilizing coordinated action across a diverse community to reduce loss of lives and property and to maintain continuing operations in the face of emerging danger is a task common to all regions of the world. Recent disasters, such as the 2005 hurricanes on the Gulf Coast and the 2004 Sumatran earthquake and tsunami, illustrate the difficulty of this task, despite existing disaster plans and policies. The mobilization of collective action is a long-standing problem in organizational theory, involving individual, group, and organizational decision processes that are often in conflict. This research goes beyond the standard organizational approaches to solve the problem of collective action by integrating a technical information infrastructure to extend human problem solving capacity. This research will test a socio-technical model of decision support that enables human managers to address complex challenges under stressful conditions more effectively than organizational strategies alone. The findings will demonstrate more creative and effective human decision-making capacity, as technical means of decision

support offer more focused, timely, and valid information to a broader range of decision makers operating in a region exposed to risk. The project team will test the conceptual framework in a non-Western setting to explore the same processes of human decision making under risk. Findings from this study will inform the global discussion of disaster risk reduction, mitigation, and decision making under uncertainty. These findings will contribute to self-organizing processes of risk management for underserved groups, as well as communities exposed to continuing risk in both western and non-Western cultures. The findings will offer a means of enabling communities to assess, manage, and reduce risk more effectively on a daily basis, while building effective relationships with wider networks of resources and support to counter extreme events. It will build on human capacity for learning and contribute to more effective reduction of risk.

Human Factors and Ergonomics in Disaster Management Information Exchange. Funding Organization: National Science Foundation, \$117,080. One year. Principal Investigator: Pamela McCauley-Bell, University of Central Florida, (407) 823-6092, mcbell@mail.ucf.edu.

This project addresses the dearth of knowledge regarding the impact of communication ergonomics on the information exchange systems of an emergency response effort. Information exchange during a disaster event is vital to ensure the coordination of response efforts, to manage the allocation of resources, and to prevent further harm from occurring. Yet the unpredictability and urgency associated with natural or man-made disasters presents a unique set of extraordinary conditions in which ordinary methods, procedures, and infrastructure are often proven inadequate. In a substantial disaster situation, the psychological, physiological, and cognitive states of individuals are increasingly stressed. In particular, communication ergonomics may be impacted not only by the introduction of new, unfamiliar, and possibly unidentified stressors, but also as a consequence of challenges arising from numerous organizations simultaneously responding to the event without the ability to share needed information. Proper evaluation of the human impact on disaster information exchange systems is vital to ensure effective communication during a disaster situation. Human reliability modeling, human computer interaction, and cognitive ergonomics all need to be considered when designing information exchange systems. This project will involve working with first responders such as the U.S. Army Corps of Engineers, the Orange County Florida Emergency Response Office, the Federal Emergency Management Agency (FEMA), the University of Central Florida Disaster Response Team, and various private companies that served as contractors in Hurricanes Katrina, Rita, and Wilma, to explore a novel approach that considers information exchange systems in disaster management as a human-systems interface design problem. The goal is to develop a methodology, collect data, and validate the methodology during the 2007 hurricane season. The University of Central Florida campus will serve as the test bed environment to model disaster occurrence.

Developing an Online Center for Global Geography Education (Phase 2). Funding Organization: National Science Foundation, \$495,481. Three years. Principal Investigator: Michael Solem, Association of American Geographers, (202) 234-1450, msolem@aag.org.

This project is expanding the undergraduate activities and resources of the Center for Global Geography Education (CGGE), which has been creating an online collection of geography resources for international collaborative learning at the Association of American Geographers (AAG). An earlier Phase 1 grant from the National Science Foundation supported the developing and testing of three Web-based course modules: Nationalism, Global Economy, and Population. These modules were used by undergraduates in different countries to investigate geographic issues and share perspectives in a collaborative, online learning environment. The impacts of the modules on student learning were evaluated in classroom trials with over 500 undergraduates in 10 countries. Overall, students demonstrated significant gains in their knowledge of geographic concepts, and the vast majority of those who participated in the trials displayed a very positive attitude both before and after the project. However, the evaluation also indicated that moderate revisions to the modules would enhance their effectiveness in promoting undergraduate awareness of international perspectives. The evaluation also suggested that the modules be redesigned to increase their flexibility, positioning them to better serve a wider variety of undergraduate courses and geographical contexts. Finally, the Phase 1 project yielded useful signposts to guide a targeted analysis in this Phase 2 project. The Phase 2 project is modifying and updating the existing modules and developing three new modules focused on migration, natural hazards, and global climate change. It is also measuring the impact of international collaboration on the knowledge and perspectives of geography undergraduates in multiple settings and is expanding and diversifying the student and faculty networks involved in CGGE collaborations.

Interdependent Response of Complex Urban Infrastructures Subjected to Multiple Hazards. Funding Organization: National Science Foundation, \$285,730. Three years. Principal Investigator: Leonardo Duenas-Osorio, William Marsh Rice University, (713) 348-5292, leonardo.duenas-osorio@rice.edu.

The accelerated growth of modern cities is creating unique challenges to the interdependent urban infrastructures that support contemporary technical, social, and economic vitality. Infrastructures such as power grids, water distribution networks, and telecommunication systems are growing in size and complexity at a pace that prevents understanding of the effects of this rapid evolution on their functionality and resilience. If natural hazards or human-induced disruptions strike, urban infrastructures become the object of the perturbation and the means for prompt recovery. This dual role demands understanding of the mechanisms that enable failure propagation within and across urban systems, and the strategies that can be adopted to improve their residual

functionality and recovery time in the event of unforeseen disruptions. This project seeks to develop high fidelity models for interdependent urban infrastructures that can capture cascading failures and interdependencies. The adopted approach will simultaneously model network topology, internal flow patterns, and the pathways that support interaction across different systems. These models will quantify global interdependent effects and help prioritize intervention actions to improve redundancy and accelerate urban recovery if disruptions occur. Interdependent optimization, which requires coordination of multiple objectives and constraints, will yield the most desirable socio-technical strategies. This project also supports the concept of system-level thinking for the new generation of civil engineers. A new course on Complex Urban Systems at Rice University and guided-visits to utilities of the city of Houston, Texas, will provide students the opportunity to engage in modern problem-based learning strategies. This project will also create an enriched summer experience for undergraduate students interested in urban infrastructures and working on network data mining and interdependent failure analysis problems. Since urban systems reach multiple demographics, a culturally and ethnic diverse pool of interns is expected to bring in unique perspectives and insights for their analysis.

Modeling Community Response and Economic Impacts of Risk Amplification Following a Terrorist Strike. Funding Organization: National Science Foundation, \$749,998. Three years. Principal Investigator: William Burns, California State University San Marcos, (760) 750-4269, bburns@csusm.edu.

This study seeks to model the dynamic complexity of a community's behavioral response to a terrorist strike and to estimate the economic impacts of this response. Emergency response systems, information and communication channels, and social support organizations are likely to interact with the particular characteristics of a terrorist event to both amplify and mute these impacts. The investigators will develop statistical and economic models, and interviews with community leaders and first responders will provide input for assessing emergency response systems. Public response will be based on data gathered from a longitudinal survey using three scenarios (earthquake, bomb blast, anthrax release) that unfold over time consistent with crisis news reporting. An economy-wide model based on the behavior of individual businesses and consumers, informed by the risk perception surveys and analyses, will provide estimates of the direct and indirect impacts of risk amplification. First responders, health care providers, local administrators, and educators stand to directly benefit from a better understanding of the effects of their policies and practices. Findings from this project should prove especially useful to Department of Homeland Security officials. Researchers in areas such as risk assessment, communications, community planning, epidemiology, and risk perception will find the system dynamics model useful as a simulation tool for their own investigations.

Strengthening Qualitative Research through Methodological Innovation and Integration: Community Resources and Disaster Resilience. Funding Organization: National Science Foundation, \$160,035. Two years. Principal Investigator: Margarethe Kusenbach, University of South Florida, (813) 974-2595, mkusenba@cas.usf.edu.

For many decades, mobile home parks in Florida have provided affordable housing choices and viable communities to their residents. Yet Florida mobile home parks are becoming increasingly unstable places to live due to the state's development boom and the recent increase in hurricane strikes. Despite being a particularly sizable and vulnerable group of people, mobile home park residents have received little scholarly attention in the past. Little is known about the communities of mobile home park residents and the conditions under which they thrive or fail or about residents' ability to prepare for and cope with natural hazards. The scholarly aim of the study is to promote understanding of the complex role that communities play during disasters. The study pursues four specific goals: to assess the "community resources" of four carefully selected research sites (mobile home parks and surrounding areas) through a combination of qualitative and quantitative indicators; to explain the existing variations in community profiles; to assess the "disaster resilience" of residents at each research site; and to discuss the impact of community resources on the disaster resilience of residents via developing and testing a range of hypotheses. The study combines qualitative and quantitative research methods commonly used in sociology, anthropology, public policy analysis, urban planning, and geography in an innovative manner. Procedures include descriptive statistics, geographic information systems (GIS), community assessment, ethnographic observation, and approximately 100 in-depth interviews. One of the broader impacts of the study lies in its potential for policy, specifically for improving the protection of vulnerable communities before, during, and following natural disasters.

Second Issue of Research Digest Now Online

The Natural Hazards Center is proud to announce the second issue of its new electronic publication titled *Research Digest*—a quarterly online compilation of recent research related to hazards and disasters. It provides the complete references and abstracts (when available) for current research in the field. The goal of *Research Digest* is to advance and communicate knowledge on hazard mitigation and disaster preparedness, response, and recovery within an all-hazards, interdisciplinary framework. The current issue includes more than 175 articles cataloged between August and mid-November, 2007. *Research Digest* is compiled and edited by Center staff and includes more than 35 peer-reviewed publications. Check out the past and current issues online at www.colorado.edu/hazards/rd.



Resources

Below are brief descriptions of some of the resources on hazards and disasters that have recently come to the attention of the Natural Hazards Center. Direct Web links are provided for items that are available free online. Other materials can be purchased through the publisher and/or local and online booksellers.

Publications, Reports, and More

All-Hazards

Beyond Disasters: Creating Opportunities for Peace (A Worldwatch Report). Michael Renner and Zoë Chafe. 2007. ISBN: 978-1-878071-82-8. 56 pp. \$9.95 (print copy or PDF). Worldwatch Institute; www.worldwatch.org.

Recorded disasters nearly doubled between 1987 and 2006, while the number of people affected by these disasters increased more than 10 percent. In this Worldwatch Report, Michael Renner and Zoë Chafe examine the recent experiences of Indonesia's Aceh province, Sri Lanka, Kashmir, and others and suggest ways to better integrate disaster and conflict responses. The authors note that the human toll taken by natural disasters is increasing, adding to the list of deadly challenges faced by poor communities and countries worldwide. The report concludes that the intersection of disasters, conflict, and peacemaking requires interdisciplinary responses from governments, international donors, and civil society.

Catastrophe, Creativity, and the Renewal of Civilization. Thomas Homer-Dixon. 2007. ISBN: 978-1-59726-064-0. 448 pp. \$25.95 (hardcover). Island Press; (800) 621-2736; www.islandpress.org.

Is energy scarcity the world's fate—a downward spiral that ultimately spells the collapse of society? Homer-Dixon addresses this question by examining the possibility that these crises can actually lead to renewal for humans and the planet. The book takes the reader on a mind-stretching tour of the management, or mismanagement, of disasters over time. From the demise of ancient Rome to contemporary climate change, the author analyzes what happens when multiple crises compound to cause “synchronous failure.” Homer-Dixon's wide-ranging expertise makes his insights and proposals particularly acute, as people of all nations try to grapple with how we can survive tomorrow's inevitable shocks to our global system.

Disciplines, Disasters, and Emergency Management. David A. McEntire, Editor. 2007. ISBN: 978-0-398-07743-3. 370 pp. \$89.95 (hardcover). Charles C Thomas Publisher, Ltd.; (800) 258-8980; www.ccthomas.com.

Disasters such as the 9/11 terrorist attacks, the Indian Ocean tsunami, and Hurricane Katrina illustrate the salience and complexity of disasters. This book presents a review of what is known about catastrophic events from the standpoint of various academic areas of study. The introductory chapter by the editor provides a discus-

sion of the importance of and difficulties associated with multi- and interdisciplinary research on disasters and emergency management. Well-known scholars join efforts with budding students who have recently been exposed to the disaster management profession, their review of our current level of knowledge represents 23 disciplines including geography, engineering, sociology, gerontology, public administration, international relations, law, environmental management, criminal justice, and information science. In addition to comparing the similarities and differences among the findings from diverse fields of study, the book suggests that scholars may increase their comprehension of disasters by focusing attention on the unique concept of vulnerability.

The Shock Doctrine: The Rise of Disaster Capitalism. Naomi Klein. 2007. ISBN: 978-0-8050-7983-8. 558 pp. \$28.00 (hardcover). Henry Holt Publishers, LLC; (800) 258-8980; www.henryholt.com.

In this book, author Naomi Klein examines the myth that the global free market triumphed democratically. Exposing the thinking, the money trail, and the puppet strings behind the world-changing crises and wars of the last four decades, *The Shock Doctrine* is the story of how America's “free market” policies have come to dominate the world—through the exploitation of disaster-shocked people and countries. In contrast to the popular myth of this movement's peaceful global victory, Klein shows how it has exploited moments of shock and extreme violence in order to implement its economic policies in so many parts of the world. At the core of disaster capitalism is the use of cataclysmic events to advance radical privatization combined with the privatization of the disaster response itself. By capitalizing on crises created by nature or war, Klein argues, the disaster capitalism complex now exists as a booming new economy and is the violent culmination of a radical economic project that has been incubating for 50 years.

Southern Rural Sociology. M.A. Brennan and Courtney G. Flint, Guest Editors. 2007. Vol. 22, No. 2. Southern Rural Sociological Association. www.ag.auburn.edu/auxiliary/rsra/.

This special issue of *Southern Rural Sociology* focuses on rural communities and disasters. Article topics include disaster recovery in rural communities, local disaster response, collective response to Hurricanes Katrina and Rita, the Mississippi business environment before and after Katrina, and rural disaster mitigation.

Towards a Culture of Prevention: Disaster Risk Reduction Begins at School (Good Practices and Lessons Learned). United Nations International Strategy for Disaster Reduction (UNISDR), Advocacy & Outreach Unit. 2007. 156 pp. Free online. www.unisdr.org/eng/about_isdr/isdr-publications/11-education-good-practices/education-good-practices.pdf.

This publication is part of ongoing efforts made under the theme "Disaster Risk Reduction Begins at School," a theme selected for the World Disaster Reduction Campaign 2006-2007 coordinated by the UN/ISDR secretariat in cooperation with the UNESCO. This report presents 35 examples from 29 countries of how to make children safer in their classrooms and educate them about disasters. Each three- to five-page section describes the initiative and its impacts, results, lessons learned, and potential for replication.

Climate Change

Climate Change and Land Degradation. Mannava V.K. Sivakumar and Ndegwa Ndiang'ui, Editors. 2007. ISBN: 978-3-540-72437-7. 623 pp. \$229.00 (hardcover). Springer; (800) 777-4643; www.springer.com.

This book was written for organizations and agencies interested in sustainable land management. The climate resources and the risk of climate-related or induced natural disasters in a region must be known in order to accurately assess sustainable land management practices. Only when climate resources are paired with management or development practices can land degradation potential be assessed and appropriate mitigation technologies developed. The book, based on an international workshop held in Arusha, Tanzania, presents state-of-the-art papers, real world applications, and innovative techniques for combating land degradation. It also offers recommendations for effectively using weather and climate information for sustainable land management practices. Included are chapters on extreme events, drought, fire weather, landslide prevention, and effective use of early warnings.

Climate Change and Insurance: Disaster Risk Financing in Developing Countries. Eugene N. Gurenko, Editor. 2007. ISBN: 978-1-84407-483-9. 88 pp. £57.00 (hardcover). Earthscan; +44 (0) 125 630 2699 (UK); www.earthscan.co.uk.

Climate change brings about a new set of major economic risks arising from changing weather patterns, extreme weather events, and rising sea levels. Those most at risk are developing countries that have been bearing the major brunt of disaster-related losses, despite considerable post-disaster donor aid. One adaptation solution that is rapidly gaining the support of countries and international donors is a risk transfer to the global reinsurance and capital markets. This book examines the role of insurance in reducing vulnerability and mitigating the impacts of climate change, particularly in developing countries. It includes contributions from leading insurance and climate experts and provides the rationale for and design of a climate 'insurance' system involving the private sector, international donors, and governments.

Earth under Fire: How Global Warming is Changing the World. Gary Braasch. 2007. ISBN: 978-0-520-24438-2. 295 pp. \$34.95 (hardcover). University of California Press; (800) 777-4726; www.ucpress.edu.

In 1999 author Gary Braasch, an award-winning photojournalist, began a journey around the world to observe and document environmental changes resulting from recent climate change. In this book, he brings the reader along to witness firsthand what he saw as he crossed both the Antarctic and Arctic Circles, trekked above 15,000 feet in the Andes Mountains, dove near damaged coral reefs, and followed scientists into the field on four continents. In more than 100 photographs, including dramatic before-and-after comparisons, Braasch recorded communities, landscapes, and animals at risk because of receding glaciers, eroding coastlines, rising sea levels, and thawing permafrost. In the accompanying text he surveys the science behind climate change. Alongside Braasch's words and images are essays by scientists who discuss the impacts of climate change on the oceans, biodiversity, fresh water, mountain cultures, plants and animals, and human health.

Global Climate Change. Paul McCaffrey, Editor. 2007. ISBN: 0-8242-1059-X. 192 pp. \$50.00 (paperback). The Reference Shelf, Vol. 78, No. 1. H.W. Wilson; (800) 367-6770; www.hwwilson.com.

This volume is a compilation of 29 articles published from 2001-2005 on the subject of global climate change. The articles, taken from newspapers and magazines such as *The Washington Post*, *The New York Times*, *National Geographic*, *Time*, and *Science*, cover the scientific principles of global warming, the media debate, the effects of climate change and global warming on different areas of the world, the future impact, and solutions such as alternative energy sources. The book explores the science surrounding global warming, as well as the arguments of climate-change skeptics, and charts how the phenomenon has already affected the planet and how it is likely to do so in the future. In addition, the question of what, if anything, humans can do to offset or neutralize global warming is examined.

Hot House: Global Climate Change and the Human Condition. Robert Strom. 2007. ISBN: 978-0-387-34179-8. 306 pp. \$27.50 (hardcover). Springer; (800) 777-4643; www.springer.com.

Global warming is an extremely complex subject that is addressed by almost all sciences, including many aspects of geosciences, atmospheric sciences, the biological sciences, and even astronomy. It has also recently become the concern of other diverse disciplines, such as economics, agriculture, demographics and population statistics, medicine, engineering, and political science. In this book, planetary scientist Robert Strom attempts to address these complex interactions, integrate them, and derive meaningful conclusions. The book provides a complete, easy-to-read explanation of past and present global climate change, causes and possible solutions to the problem, and the reasons why the subject is such a politically charged issue.

UN Chronicle. June 2007. Vol. XLIV, No. 2. United Nations Department of Public Information. (917) 367-9326; www.un.org/chronicle.

Through unique perspectives, this special issue of the *UN Chronicle* offers a comprehensive snapshot of where we currently stand with regard to climate change. Article titles include: Before the Next Disaster Strikes, Devastating for the World's Poor, The Health Effects of Climate Change, Global Early Warning Systems Needed, and Interaction of Climate Change and Land Degradation.

The U.S. Economic Impacts of Climate Change and the Costs of Inaction. 2007. 52 pp. Free online. Center for Integrative Environmental Research, University of Maryland; www.cier.vmd.edu/climateadaptation/.

Climatic changes anticipated in the United States—from rising sea levels to stronger and more frequent storms and extreme temperature events—will have impacts on the natural environment and human-made infrastructures. These impacts will vary across regions and sectors of the economy, leaving future governments, the private sector, and citizens to face the direct and indirect costs accrued from increasing environmental damage and disruption. This study presents an overview of climate impacts on economic sectors in the United States and asserts that a national policy for immediate action to mitigate emissions and adapt to unavoidable impacts will significantly reduce the costs of continued climate change.

Earthquakes

Earthquake Early Warning Systems. Paolo Gasparini, Gaetano Manfredi, and Jochen Zschau, Editors. 2007. ISBN: 978-3-540-72240-3. 349 pp. \$169.00 (hardcover). Springer; (800) 777-4643; www.springer.com.

During the past few decades, economic losses and human casualties due to natural disasters increased exponentially, mainly because of the increased density of population and industry in high hazard areas. Although the prediction of earthquakes is not practicable yet, current technology allows prompt identification of the onset of dangerous seismic events before they hit urban areas. Earthquake early warning (EEW) can provide an advance alert within a few tens of seconds—a lead time that may minimize property damage and loss of lives in metropolitan areas and aid emergency response. Written for academics, researchers, and scientists, this book provides information on the major EEW systems in operation and on different blocks that form an early warning system.

Floods

National Flood Program and Policies in Review—2007. 2007. Free online. Association of State Floodplain Managers (ASFPM); www.floods.org/Publications/NFPPR_2007.asp.

This report is the most recent of the ASFPM's periodic review of national floodplain management policy. Throughout this document, the ASFPM recommends floodplain and watershed effectiveness, both for risk reduction and for the protection of their natural and beneficial functions.

Value of Properties in the National Flood Insurance Program. 2007. Free online. Congressional Budget Office; www.cbo.gov/ftpdocs/82xx/doc8256/06-25-FloodInsurance.pdf.

This report is the result of an examination of the data for 10,000 properties insured under the National Flood Insurance Program (NFIP). It shows that a significant fraction of the subsidized policies are written for high-value properties—a fact that is attributable more to the prevalence of such properties in the program than to a disproportionate allocation of subsidies to high-value properties. Even so, for some categories, subsidized properties are worth more than unsubsidized properties. The tendency toward above-average values in the NFIP is particularly evident for some property subgroups, notably nonprincipal residences and nonresidential properties.

Hurricanes and Coastal Hazards

Ensuring Disaster: State Insurance Regulation, Coastal Development, and Hurricanes. Mercatus Policy Series, Policy Comment No. 14. Daniel Sutter. 2007. 16 pp. Free online. Mercatus Center, George Mason University; (703) 993-4930; www.mercatus.org/publications.

This report examines how state insurance regulation affects societal vulnerability to hurricanes. States provide insurance for high-risk properties at below-market rates primarily through insurance pools. As of early 2007, seven states, including Louisiana and Mississippi, have wind pools, with over 1.8 million policies and a total liability of over \$500 billion. Pools and guaranty funds create an inefficient insurance market and inefficient growth in coastal areas; this report recommends four state policy responses.

The Housing Voucher Choice Program: More than Just a Lagniappe for New Orleans. Mercatus Policy Series, Policy Comment No. 13. Emily C. Schaeffer. 2007. 15 pp. Free online. Mercatus Center, George Mason University; (703) 993-4930; www.mercatus.org/publications.

This paper addresses the provision of public housing in New Orleans in the aftermath of Hurricane Katrina. It includes a discussion of the situation prior to Hurricane Katrina and an evaluation of the policy options available to public housing authorities. The author asserts that the Housing Voucher Choice Program is the mechanism most capable of serving the short-term goal of relief assistance and long-term goal of creating a housing program that best serves the needs of the community.

Hurricanes and the Middle Atlantic States. Rick Schwartz. 2007. ISBN: 0-978-6280-0-4. 416 pp. \$32.95 (hardcover). Blue Diamond Books; (703) 719-6973; www.bluediamond-books.com.

This is the first book-length reference that examines the tropical cyclone history of the U.S. Mid-Atlantic region. Although the book's focus is on Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and Washington, D.C., readers from adjacent states will also find relevant material. The book offers chronological profiles of significant storms, from Jamestown to the present, as well as 200 black-and-white photographs, track maps, and human interest stories.

Power to the Neighborhoods: The Devolution of Authority in Post-Katrina New Orleans. Mercatus Policy Series, Policy Comment No. 12. Sanford Ikeda and Peter Gordon. 2007. 18 pp. Free online. Mercatus Center, George Mason University; (703) 993-4930; www.mercatus.org/publications.

New Orleans faces the tough challenge of rebuilding after the Hurricane Katrina disaster. An influx of competition could improve the rebuilding process and the long-term life of New Orleans. This Policy Comment, as part of the Mercatus Policy Series, explores how allowing communities to decentralize in order to stimulate economic growth could be a plan uniquely suited to post-Katrina New Orleans.

Through the Eye of Katrina: Social Injustice in the United States. Kristin A. Bates and Richelle S. Swan. 2007. ISBN: 978-1-59460-288-7. 420 pp. \$40.00 (paperback). Carolina Academic Press; (919) 489-7486; www.cup-press.com.

The events surrounding Hurricane Katrina provide a case study of the continuing social divide in the United States. These scholarly articles examine the continued struggle for social justice from the perspectives of communication, criminology, education, ethnic studies, history, justice studies, law, political science, and sociology. The collection of articles is divided into three sections representing the causes of, consequences of, and responses to social injustice as illustrated through Hurricane Katrina.

Tsunami

Tsunami and Its Hazards in the Indian and Pacific Oceans. Kenji Satake, Emile A. Okal, and Jose C. Borrero, Editors. 2007. ISBN: 978-3-7643-8363-3. 392 pp. \$69.95 (paperback). Birkhauser Verlag AG; (617) 876-2333; www.birkhauser.com.

Since 1960, the Tsunami Commission, established by the International Union of Geodesy and Geophysics, has held a biannual International Tsunami Symposium (ITS). This edited volume contains 20 contributions of leading scientists, most of which were presented at the 22nd International Tsunami Symposium in summer 2005. Consolidated findings based on hydrophone records, seismometer readings, and tide gauges are presented. Reports of post-tsunami surveys and numerical simulations for tsunamis, such as the 2004 Indian Ocean event, as well as geological studies of tsunamis in Japan and Central and North America are given. Probabilistic tsunami hazard analysis, tsunami warning systems, and methods to predict tsunamis and mitigate their hazards are discussed.

Volcanoes

Supervolcano: The Catastrophic Event that Changed the Course of Human History. John Savino and Marie D. Jones. 2007. ISBN: 978-1-56414-953-4. 146 pp. \$17.99 (paperback). New Page Books; (800) 227-3371; www.newpagebooks.com.

Supervolcanoes are considered one of the five biggest threats to humankind, along with asteroids, nuclear war, disease, and global warming. But of those, supervolcanoes are the only threat that cannot be prevented.

Approximately 75,000 years ago, an event occurred that almost wiped out human life. According to a stunning new theory, this singular event may also have completely altered the genetic evolution of humankind. It was an event that released 3,000 times the energy of Mt. St. Helens. This book explores this eruption of the Toba supervolcano in Sumatra, Indonesia, its far-reaching impact, and the strong possibility of another supervolcano eruption in our lifetime.

Wildfire

FACES: The Story of the Victims of Southern California's 2003 Fire Siege. Robert W. Mutch. 2007. 104 pp. Free online. The Wildland Fire Lessons Learned Center; (520) 799-8760; www.wildfirelessons.net/documents/FACES.pdf.

This report is a case study of the people who lost their lives in the 2003 California fires. Author Bob Mutch closely followed southern California's 2003 fire siege in the print and visual media and was shocked at the tragically large number of people who were killed in the fires: 22 residents and 1 firefighter. A few months after the fires, Mutch searched the Internet for lessons learned and after-action reports from the event. From his findings, he prepared this report to honor those individuals who perished by telling their stories.

Using Social Science to Understand and Improve Wildland Fire Organizations: An Annotated Reading List. 2007. 82 pp. Free online. United States Department of Agriculture/Forest Service; Rocky Mountain Research Station; www.treeseearch.fs.fed.us/pubs/28646.

The wildland fire community has spent the past decade trying to understand and account for the role of human factors in wildland fire organizations. Social research that is relevant to managing fire organizations can be found in disciplines such as social psychology, management, and communication. However, such research has been published primarily for scientific and business audiences, and much of the fire community has not been exposed to it. This compilation of knowledge from a variety of social science disciplines can be used to improve organizational practices related to firefighter and public safety, to assess the effectiveness of safety campaigns, and to improve firefighter safety trainings. The annotated reading list summarizes approximately 270 books, articles, and online resources that address scientific and management concepts helpful for understanding the human side of fire management.

Updates

Extreme Weather: A Guide and Record Book, Second Edition. Christopher C. Burt. 2007. ISBN: 978-0-393-33015-1. 320 pp. \$25.95 (paperback). W.W. Norton; (212) 354-5500; www.wwnorton.com.

(Resources Continued on Page 23)

Web Sites of Interest

Tsunami Hazard Information Service

www.csc.noaa.gov/psc/project_pages/tsunami.html

This site enables Hawaii residents and visitors to search an address or island area and obtain an interactive tsunami-risk map and access information on emergency planning, disaster response and preparedness kits, Hawaii's tsunami warning system, and instructions on when to evacuate. It is the current pilot site for the Hazard Education and Awareness Tool (HEAT), created by the National Oceanic and Atmospheric Administration (NOAA) Pacific Services Center.

African Marine Atlas

<http://iodeweb2.vliz.be/omap/OMAP/index.htm>

The African Marine Atlas provides substantial maps, images, data, and information to coastal resource managers, planners, and decision makers from various administrative institutions and agencies in Africa. It includes over 800 downloadable data products derived from the fields of marine geology, hydrology, atmospheric science, the biosphere, geopolitics, and socio-economics.

Capacity for Disaster Reduction Initiative

www.unisdr.org/cadri/

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

All India Disaster Mitigation Institute

www.southasiadisasters.net

The All India Disaster Mitigation Institute (AIDMI) is a community-based action research and action advocacy organization that has been working towards bridging the gap between policy, practice, and research in disaster management over the past two decades. AIDMI's mission is to reduce the vulnerability of poor communities by increasing mitigation efforts through learning and action to ensure water, habitat, food, and human security.

Arctic Report Card 2007

www.arctic.noaa.gov/reportcard/

An international team of research scientists has created a peer-reviewed Web site, Arctic Report Card 2007, which tracks multiple changes in the arctic environment. While the 2007 loss of summertime sea ice is the most dramatic example, changes are also seen in the atmosphere, on land and in the ocean, and as shifts in the location and abundance of arctic species. The Report Card is organized by NOAA and will be updated annually.

The Riskipedia

www.theriskipedia.com

This Web site is a platform where anyone in the world can access information on risk and risk management, add new content, and edit existing content. The Riskipedia is a wiki, designed so that all information on risk and risk management is available to everyone in an easily searchable forum.

PreventionWeb

www.preventionweb.net/english/

PreventionWeb, a new information service to increase knowledge on disaster risk reduction, provides a common tool for both specialists and non-specialists interested or working in the area of disaster risk reduction to connect, exchange experiences, and share information. The Web site is a project of the secretariat of the United Nations International Strategy for Disaster Reduction (UN/ISDR).

Forest Service National Avalanche Center

www.avalanche.org/~nac/

This U.S. Forest Service Web site provides information related to the basic steps of how to recognize and travel safely in avalanche terrain. Included is information for skiers, snowboarders, snowshoers, and snowmobilers. The site also features an interactive backcountry tour and a list of avalanche centers.

NFAOnline

www.nfaonline.dhs.gov

NFAOnline is a Web-based training system from the U.S. Fire Administration's National Fire Academy that provides user-friendly training and materials for fire and emergency services personnel, first responders, emergency managers, and the general public. Subjects include Community Safety Educators, Emergency Response to Terrorism, and Emergency Medical Services.

Top 10 Killer Tornadoes

www.livescience.com/environment/top10_killer_tornadoes.html

This *LiveScience* feature explores the top 10 deadliest tornadoes in U.S. history. The slideshow format provides users with pictures of the event, a fatality count, and the tornado's Fujita scale ranking. The deadliest tornado was the March 18, 1925, Tri-State Tornado, which killed 695 people and injured more than 2,000.

FEMA: Federal Response to the California Wildfires

www.fema.gov/hazard/wildfire/ca_2007.shtml

This site serves as a central node of information on the Federal Emergency Management Agency's role in the response to the California wildfires. Included on the site are specific responsibilities of other government agencies, information on donations and volunteering, and tips for recovery and rebuilding.



Conferences and Training

Below are the most recent conference announcements received by the Natural Hazards Center. A comprehensive list of hazards and disasters meetings is available at www.colorado.edu/hazards/resources/conferences.html.

The Inland Empire: Towards a More Humane Metropolis—Riverside, California: January 24, 2008. Organizers: University of Massachusetts Amherst and the Lincoln Institute of Land Policy. Speakers and panelists from southern California and elsewhere will examine some of the environmental and social challenges confronting the Riverside-San Bernardino region, one of the fastest growing and most hazardous metropolitan areas in the United States. The meeting is the second regional workshop based on The Humane Metropolis: People and Nature in the 21st Century City, a series that began in Pittsburgh in 2007 and tentatively will continue in Baltimore later in 2008.

platt@geo.umass.edu
www.humanemetropolis.org

Earthquake Engineering Research Institute (EERI) Annual Meeting—New Orleans, Louisiana: February 6-9, 2008. "Hurricane Katrina: Lessons for Earthquake Risk Reduction" is the theme of the 60th Annual Meeting of the Earthquake Engineering Research Institute, to be held in New Orleans' French Quarter. This conference is an opportunity to capture lessons from the largest natural disaster in U.S. history: Hurricane Katrina. With close to 30 presentations over three days, the program is designed to appeal to professionals and researchers in the multidisciplinary earthquake risk reduction fields. Sessions cover topics such as restoring critical lifelines after a catastrophe, impacts on the energy sector, offshore infrastructure design, enhancing the resilience of hospitals, scenario-driven catastrophe planning, the achievements of 75 years of strong-motion seismology, and responding to and recovering from a large-scale urban event.

eeri@eeri.org
www.eeri.org/news/meetings/08AM/

2008 Annual Healthcare Information and Management Systems Society Conference & Exhibition—Orlando, Florida: February 24-28, 2008. This conference brings together healthcare information technology (HIT) professionals, physicians, nurses, HIT executives, pharmacists, and vendors from around the world. Sessions will focus on a variety of health-related topics, including the retail health phenomenon, e-Discovery, and patient-centric electronic health records (HER).

jpaton@himss.org
www.himssconference.org

48th Annual Floodplain Management Conference—Wollongong, New South Wales, Australia: February 26-29, 2008. Organizers: International Conferences & Events (ICE) Australia, Wollongong City Council, and Floodplains Management Authority. This conference will feature a

number of outstanding local and international speakers, concurrent sessions, a trade display, and exhibits. Field trips will also be part of the program. The conference attracts practitioners and representatives from government agencies and provides an opportunity to meet and extend contacts.

fmawollongong@iceaustralia.com
www.iceaustralia.com/fmawollongong/

Advanced Training Course on Spatial Planning as a Strategy for Mitigation and Adaptation to Natural Hazards—Santiago de Compostela, Spain: March 3-8, 2008. This Advanced Training Course is designed to enable specialists to share their expertise and provide opportunities to both young scientists and decision makers to learn more about these problem areas and the new scientific insights in the matter. The course addresses the perspective of strengthening the role of mitigation in risk management through spatial planning. Innovative approaches will show how to translate the concepts of sustainability and vulnerability assessment into effective measures in an integrative program that assembles risk analysis and management and spatial planning. Prevention and reduction of exposure to natural hazards are reviewed as key mitigation strategies.

upaleo@usc.es
www.xente.mundo-r.com/science/atc/index.html

Australian Disasters Conference 2008—Canberra, Australia: March 11-14, 2008. Organizer: Emergency Management Australia. With the theme "Surviving Future Risks," this conference will provide participants with the opportunity to hear a diverse range of speakers from the fields of emergency management, community safety, and risk reduction. It will offer the opportunity for interaction with representatives from a broad range of disciplines, while the exhibition display and social events will provide further opportunities for networking and discussion on community safety issues.

ema@ema.gov.au
www.ema.gov.au

International Symposium on Mitigative Measures on Snow Avalanches—Egilsstadir, Iceland: March 11-15, 2008. Organizer: Association of Chartered Engineers in Iceland. The aim of this symposium is to connect three themes: snow engineering, environment, and society. The goal of the meeting is to get a glimpse of the future, facilitate exchange of experience and ideas, and find ways of cooperating in order to improve living in areas threatened by avalanches.

kristjana@congress.is
www.orion.is/snow2008

Urban Water Management—Louisville, Kentucky: March 31-April 2, 2008. Organizer: Pennwell Corporation. This conference, titled “An Integrated Water Quality Conference & Exhibition,” will focus on the integration of stormwater best management practices (BMPs), Phase II regulations, green infrastructure, and funding of municipal water management programs. It will also cover design, construction, maintenance, and emerging technology for urban water quality.

joanieh@pennwell.com

<http://uwm08.events.pennnet.com/fl/index.cfm>

Solutions to Coastal Disasters—Oahu, Hawaii: April 13-16, 2008. Organizer: The Coasts, Oceans, Ports and Rivers Institute (COPRI) of the American Society of Civil Engineers (ASCE). This conference is designed for coastal planners, managers, social scientists, engineers, geologists, biologists, economists, oceanographers, meteorologists, property owners, elected officials, and others interested in the coast. The series was developed to provide formal and informal venues for the exchange of information, tools, and ideas relating to coastal hazards. It will include plenary and technical sessions, exhibits, posters, field trips, and social events that encourage participant interactions.

ewatson@asce.org

<http://content.asce.org/conferences/cd2008/>

International Conference on Earthquake Engineering and Disaster Mitigation—Jakarta, Indonesia: April 14-15, 2008.

Organizers: Indonesian Earthquake Engineering Association (IEEA) and Institut Teknologi Bandung (ITB). This international conference, titled “Earthquake Disaster Risk Reduction: Engineering Challenges after Recent Disasters,” will provide an opportunity to share views and experiences regarding lessons learned from recent and past earthquakes, enabling scientists, practicing engineers, and government officials to formulate action plans for anticipating future earthquakes. Session topics will include advances in earthquake engineering; disaster mitigation and management, rehabilitation, and reconstruction; case histories; on-shore and off-shore earthquake resistant facilities; and tsunami warning systems. Two optional post-conference activities will be provided.

iceedm08@si.itb.ac.id

www.si.itb.ac.id/iceedm08

5th International Conference on Information Systems for Crisis Response and Management (ISCRAM)—Washington, DC: May 4-7, 2008. The general theme of ISCRAM 2008 is “Creating Advanced Systems for Inter-organizational Information Sharing and Collaboration.” This conference provides an important networking opportunity where the latest research on the design, development, use, and evaluation of information systems for crisis response and management are presented and discussed. The meeting will take place at the George Washington University and is hosted by the Institute for Crisis, Disaster, and Risk Management.

www.iscram.org

11th AGILE International Conference on Geographic Information Science—Girona, Spain: May 5-8, 2008. Organizer: Servei de Sistemes d’Informació Geogràfica i Teledetecció (SIGTE), Universitat de Girona. Titled “Taking Geoinformation Science One Step Further,” this program will offer paper presentation sessions, plenary roundtable debates, poster sessions, and pre-conference workshops. The goal of the conference is to provide a venue where participants may share ideas; explore on-going research and future developments, including state-of-the-art applications; and network with the professionals from academia, industry, and government who are interested in promoting geographic information (GI) teaching and research activities among GI laboratories at the European level. Session topics will fall within the fields of geo-information, geomatics, and geocomputation.

agile2008@sigte.udg.edu

www.agile2008.es

4th International Symposium on Flood Defense—Toronto, Ontario, Canada: May 14-16, 2008. Organizer: Institute for Catastrophic Loss Reduction. Entitled “Managing Flood Risk, Reliability, and Vulnerability,” this conference provides a unique opportunity to bring the interdisciplinary group of flood experts together to share critical knowledge from regional and international perspectives. The focus of the Toronto meeting will be a new perspective of flood risk management and assessment—one that recognizes flood risk reduction as an integral part of water resource management and that aims to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital systems.

twaddington@iclr.org

www.flood2008.org/flood/

UNESCO-ERCE Ecohydrological Processes and Sustainable Floodplain Management Opportunities and Concepts for Water Hazard Mitigation, and Ecological and Socioeconomic Sustainability—Lodz, Poland: May 19-23, 2008. Organizer: European Regional Centre for Ecohydrology. This conference will unite specialists from various disciplines, with the aim of contributing to the perception of floodplains as an integrative element of strategies to manage water-related disaster risks and enhance opportunities for sustainable management. Sessions will be organized around regional perspectives (Asia, Africa, Australia, Europe, North and South America). The goal is to present a range of contrasting philosophies and associated practical approaches appropriate for different parts of the world. Lectures will reflect different scales of problem solving, ranging from large-scale systems (e.g., the Aral Sea, the Danube River Basin, the Florida Everglades, the Great Lakes, etc.) to small ones (e.g., single watersheds and streams).

e.wolanski@aims.gov.au

www.erce.unesco.lodz.pl/

Climate Change: From the Geological Past to the Uncertain Future: A Tribute to André Berger—Louvain-la-Neuve, Belgium: May 26-29, 2008. Organizers: Louvain-la-Neuve University, Brussels Free University, and Ghent University. This symposium celebrates the retirement of André Berger, who has been a key figure in the world of climate modeling since his 1978 publication of an algorithm to calculate the changes in the Earth orbit that trigger glacial-interglacial cycles. Scientists worldwide, including some of the most authoritative experts on quaternary climatic changes, past climates reconstruction, and climate modeling will summarize some of the most intriguing and outstanding questions about the astronomical theory of paleoclimates.

michel.crucifix@uclouvain.be
www.uclouvain.be/berger2008/

18th World Conference on Disaster Management (WCDM)—Toronto, Ontario, Canada: June 15-18, 2008. Organizer: The Canadian Centre for Emergency Preparedness. The theme of this conference is “Resiliency - Individual, Community and Business.” Participants will be from diverse backgrounds, including emergency management, business continuity, emergency response, risk management, IT disaster recovery, emergency health, and other related disaster management disciplines. The conference aims to provide a unique venue for disaster management professionals from around the world to present, network, and learn.

cwright@divcomevents.com
www.wcdm.org

International Geological Congress—Oslo, Norway: August 6-14, 2008. Organizer: International Union of Geological Sciences. In collaboration with the International Union of Geological Sciences (IUGS) and other international and national organizations, the National IUGS Committees in the five Nordic countries (Norway, Denmark, Finland, Iceland, and Sweden) will host this meeting. The symposia will be arranged in three categories: interdisciplinary global themes, major themes concerning the Nordic countries and the Arctic, and the disciplines comprising the earth sciences. A special session on educational outreach programs will explore the effective communication of information related to the geosciences, natural hazards, and the environment, and will feature presentations by geoscientists who have transmitted the excitement and utility of the geosciences to residents of their communities through service and education.

secretariat@33igc.org
www.33igc.org

31st International Geographical Conference—Tunis, Tunisia: August 12-15, 2008. For this major geographical event, the National Organizing Committee of the 2008 Tunis Congress has planned a scientific agenda to further develop the reflection and debates of the past two decades, while highlighting new paradigms and promoting new stances to geographers. “Building Our Territories Together” will be the major theme of the Congress. Three major issues

will be discussed: the territory, the operational orientation of geography, and the role of the players. Other topics include the evolution of geographical thought, cultures and civilizations for human development, and the Renaissance of the Mediterranean. Tunis 2008 will provide an ideal forum for geographers to express and confront their visions on the major issues of our time.

a.hayder@igc-tunis2008.com
www.igc-tunis2008.com

2008 International Public Works Congress & Exposition—New Orleans, Louisiana: August 17-20, 2008. Organizers: American Public Works Association (APWA). This conference will showcase public works professionals displaying outstanding qualities of innovation, leadership, and resourcefulness in meeting the challenges of engineering and technological ingenuity, as well as leadership and resiliency. Presentations will share lessons learned, “how we did it” case studies, strategies for addressing emerging trends, and practical and relevant methods for dealing with the critical issues facing public works today. A special track will be reserved for presentations highlighting the renewal and recovery efforts in the Gulf States region.

kwilson@apwa.net
www.apwa.net/SpeakAtCongress/

31st International Conference on Coastal Engineering—Hamburg, Germany: August 30-September 5, 2008. Organizers: Coastal Engineering Research Council (CERC) of the American Society of Civil Engineers (ASCE). Session topics will include coastal processes; coastal, shore, and estuarine structures; ports, harbors, and waterways; coastal environment; coastal risks; and coastal development. Sessions are expected to investigate different issues of theory, measurement, analysis, modeling, and practice. The conference will offer short courses, technical sessions, and poster sessions.

icce2008@hamburg.baw.de
<http://icce2008.hamburg.baw.de>

7th International NCCR Climate Summer School: Key Challenges in Climate Variability and Change—Centro Stefano Franscini, Monte Verità, Ticino, Switzerland: August 31-September 5, 2008. This summer school unites young scientists and leading climate researchers in a scenic southern Swiss Alpine setting for keynote lectures, workshops, and poster sessions. Session topics will include pertinent aspects of climate physics; climate phenomena and processes from seasonal to centennial time ranges; assessment of predictability and approaches to prediction and operational tools; and associated impacts of climate change on society. The courses cover a broad spectrum of climate and climate impact research issues and foster cross-disciplinary links. Each topic includes keynote plenary lectures and workshops with in-depth discussion in smaller groups.

nccr-climate@giub.unibe.ch
www.nccr-climate.unibe.ch/summer_school/2008/

(Continued from Page 18)

Government Accountability Office Reports

The following Government Accountability Office (GAO) reports are available free online at www.gao.gov. Printed copies are also available (first copy is free, additional copies are \$2.00 each). To order, contact the GAO: (202) 512-6000, TDD (202) 512-2537; www.gao.gov/cgi-bin/ordtab.pl.

Natural Hazard Mitigation: Various Mitigation Efforts Exist, but Federal Efforts Do Not Provide a Comprehensive Strategic Framework. August 22, 2007. GAO-07-403. 74 pp.

Global Health: U.S. Agencies Support Programs to Build Overseas Capacity for Infectious Disease Surveillance. September 28, 2007. GAO-07-1186. 51 pp.

Wildland Fire Management: Better Information and a Systematic Process Could Improve Agencies' Approach to Allocating Fuel Reduction Funds and Selecting Projects. September 28, 2007. GAO-07-1168. 103 pp.

Geostationary Operational Environmental Satellites: Progress Has Been Made, but Improvements Are Needed to Effectively Manage Risks. October 23, 2007. GAO-08-18. 37 pp.

Influenza Pandemic: Opportunities Exist to Address Critical Infrastructure Protection Challenges That Require Federal and Private Sector Coordination. October 31, 2007. GAO-08-36. 44 pp.

Hurricane Katrina: Ineffective FEMA Oversight of Housing Maintenance Contracts in Mississippi Resulted in Millions of Dollars of Waste and Potential Fraud. November 16, 2007. GAO-08-106. 52 pp.

A Ranking of U.S. Volcano Threats

The United States has an abundance of potentially dangerous volcanoes, but knowledge about the eruptive history of individual volcanoes varies greatly. To be effective, a system that ranks volcanic threat must use both hazards and exposure factors that are general enough to be easily applied to most or all volcanoes.

The U.S. Geological Survey (USGS) Volcano Hazards Program has funded the development of a methodology to systematically rank volcanic threat. John W. Ewert, of the USGS Cascades Volcano Observatory, and colleagues created a ranking of 169 volcanoes in the United States and the Commonwealth of the Northern Mariana Islands, based on scores assigned to each one for various hazard and exposure factors. Fifteen factors define the hazard, and nine factors define the exposure. The system emphasizes frequency and magnitude of eruptions among the hazards factors and population size among the exposure factors. Three separate scores are then calculated: hazards, exposure, and the overall threat.

Using this ranking system, 18 U.S. volcanoes have a score that places them into the "Very High" overall risk threat category, including Kilauea and Mauna Loa in Hawaii; Baker, Rainier, and St. Helens in Washington; and Augustine and Redoubt in Alaska. In addition, 37 volcanoes fall into the "High" overall risk threat category, 26 of which are in Alaska. The volcano rankings in the study can be used to prioritize long-term hazard assessment and response planning, to aid an analysis of monitoring needs, and to guide mitigation activities.

To access the abstract or order the full article published in the November 2007 issue of the *Natural Hazards Review*, visit <http://scitation.aip.org/nho>.

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Copies of the *Observer* and the Natural Hazard Center's electronic newsletter, *Disaster Research*, can be downloaded free from the Center's Web site:

www.colorado.edu/hazards/

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Support the Natural Hazards Center

The success of the Natural Hazards Center relies on the ongoing support and engagement of the entire hazards and disasters community. The Center welcomes and greatly appreciates all financial contributions. There are several ways you can help:

1. **Support Center Operations**—Provide support for core Center activities such as the *Disaster Research* e-newsletter, annual workshop, library, and the *Natural Hazards Observer*
2. **Build the Center Endowment**—Leave a charitable legacy for future generations
3. **Help the Gilbert F. White Endowed Graduate Research Fellowship in Hazards Mitigation**—Ensure that mitigation remains a central concern of academic scholarship
4. **Boost the Mary Fran Myers Scholarship Fund**—Enable representatives from all sectors of the hazards community to attend the Center’s annual workshop

To find out more about these and other opportunities for giving, visit:

www.colorado.edu/hazards/about/contribute.html

Contact Diane Smith at diane.smith@colorado.edu or (303) 492-6818 to discuss making a gift.

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