



New Developments and Shifting Focus in Mass Evacuation

— an invited comment

Over the past ten years, significant advancements have been made in the ability to carry out the mass evacuation of threatened urban centers. Today, nearly every hurricane-threatened state has some type of regional evacuation traffic management plan. Other strategies, such as phasing of evacuation orders and using buses to transport mobility-limited populations, are also being implemented.

Unfortunately, these new developments have come slowly and only after several significant and highly visible failures and close calls. A key reason for mass evacuation improvement is the issue is now viewed differently. Historically, evacuations were planned and managed locally by emergency management offices. There was often only modest coordination between neighboring local jurisdictions and even less between neighboring states. Now mass evacuations are coordinated over hundreds of miles and among multiple governmental jurisdictions. The cross-jurisdictional coordination of evacuations has also brought the involvement of state, local, and federal transportation agencies—the groups with domain-specific

transportation expertise and the resources to plan and manage transportation networks.

Even with these improvements, many gaps remain. Chief among these is assisted evacuation planning—moving to safety those without vehicles, the handicapped or those unable to evacuate themselves. Through a process of trial and error, it appears that most emergency management and transportation agencies are now comfortable with newer techniques like contraflow—the use of both incoming and outgoing freeway lanes for evacuation. However, it is clear that these same groups are not adequately prepared for transit-based evacuation plans in advance of disasters. Several recent nationwide studies have concluded that assisted evacuation planning is greatly lacking and, if needed today, would not protect individuals without transportation.

It is critical that the same slowly evolving trial-and-error process used for highway evacuation management is not repeated for assisted evacuations. The stakes are high and the potential for mass-scale loss of life is obvious. One of the ways to limit the

potential for future tragedy is to apply the tools of transportation system modeling to the problem. Since these developing plans have never been used, no one knows how well these types of complex evacuations will work. Simulation modeling at least will help to identify potential problems by testing the effects of alternative decision-making long before they would be used in actual practice.

This article briefly highlights the process by which evacuations have improved recently, most notably the benefits of collaborative evacuation planning. It also describes the current issues associated with assisted evacuation and efforts to address them. It concludes with a discussion of the development and application of state-of-the-art transportation models that are currently being applied and those envisioned to improve evacuations in the future.

Transportation/Emergency Management Collaboration

The problem of regional evacuations gained national attention in 1999 during the evacuation for Hurricane Floyd, which struck the Bahamas, then went up the east coast of the United States. The storm triggered what was the largest evacuation in U.S. history at the time. The monumental traffic jams across four states—from Florida to North Carolina—brought about the involvement of federal and state transportation departments for the first time. State DOTs, with federal leadership, began to take a more active role in developing mass evacuation plans in hurricane-threatened states. This was a critical development. Although the agencies preparing evacuation plans were experts in emergency management, they had little familiarity with or technical training in regional traffic management. As a result, techniques common to transportation engineers—like contraflow, demand management, transit planning, and traffic simulation—were not considered.

One of the outcomes of early planning was evident when the nation's first large-scale, pre-planned contraflow traffic management plan went into action in New Orleans for Hurricane Ivan in 2004. The results were less than satisfying. Hundreds of thousands of evacuees were stuck in day-long congestion. While it may be unrealistic to believe a major American city will ever be evacuated quickly and without congestion, the plan's shortcomings had been recognized. Simulation models had already identified where problems would occur. Some simple changes to correct many of these problems could have been made but were never seen by the people in charge.

To their credit, Louisiana officials responded to these problems within days after the Ivan evacuation. A task force of experts in law enforcement and transportation teamed up to develop a new, more robust regional traffic plan. Instead of "best guesses," alternative plans were tested and retested using traffic simulation models that showed the trade-offs between various control and routing measures. The plan, which was put into practice only weeks before Hurricane Katrina, is now credited with being instrumental in the mass movement of more people in less time than was then thought possible. The time required to evacuate New Orleans was a little more than half of earlier estimates. The U.S. Army Corps of Engineers had estimated a 72-hour evacuation period, but actual time was about 39 hours. Even more significantly, there were no deaths or injuries directly attributed to the evacuation.

While this was a remarkable achievement, it raises another question: Why did an evacuation just two weeks later—in Houston for Hurricane Rita—have no regional evacuation plan, causing another traffic nightmare? Now that Texas officials have learned

their lesson, a new regional highway evacuation plan for southeast Texas is in place.

Assisted Evacuation

In the wake of Katrina, the primary focus of evacuation planning has shifted away from highway management to planning for assisted evacuations. When society's most vulnerable members are unable to flee from the danger of mass emergencies, the impacts can be devastating. Emergency management officials have stated evacuation requires personal responsibility for one's own safety. The more someone relies on others or gives up this responsibility, the narrower their margin of safety becomes. However, to prepare for these conditions, several transportation agencies have become involved in the development of transit-based assisted evacuation planning.

Three recent studies—the 2007 National Conference on Disaster Planning for the Carless Society in New Orleans; a congressionally mandated study by the Transportation Research Board of the National Academies on The Role of Transit in Emergency Evacuation; and the Federal Transit Administration's National Study on Carless and Special Needs Evacuation Planning led by John Renne at the University of New Orleans—have brought many critical issues to light.

One of the findings of these studies is that the majority of the 38 largest metropolitan areas in the United States do not have plans that are sufficient to conduct evacuations for non-self-evacuators.

Despite the attention it has received, assisted evacuation remains a major problem because it is so complex. As the National Academies study points out, assisted evacuation often falls through the cracks of emergency planning because no single group seems to "own the problem."

Another issue is low- and non-mobile individuals are not a well-understood segment of the population. Identifying who is in need, finding out where they are located, and determining what types of transportation services are necessary for them, is a monumental task in any major metropolitan area. Complicating the situation is reluctance by many to reveal this type of information. Even if they did, it would have to be updated on a regular basis as resident populations changed.

From recent related work, it is also apparent that even when agencies do develop plans, practical details often complicate the process. Some examples include:

- Bus plans that don't include assurances bus drivers will be available to drive the buses.
- Contracts for ambulatory services in neighboring counties with single providers that have inadequate resources to provide concurrent services to both counties.
- Lack of planning to provide for the return of travel-dependent evacuees to their homes after the hazard passes.
- Self-registration lists that include only a tiny fraction of known evacuees.

New Research and Long Range Vision

In the hope we can be better prepared to perform transit-based assisted evacuations and avoid learning more hard lessons, methods are being developed and tested to permit modeling and evaluation of these conditions. A new generation of simulation tools is merging current knowledge of evacuation processes with enhanced computational capabilities to create virtual evacuation

scenarios using multimodal transport (i.e., automobiles, busses, pedestrians, etc.). These include TRANSIMS for the Multimodal Microscale Simulation of the New Orleans Emergency Evacuation Plan, Evacuation Models and Dynamics and the University Transportation Center on Evacuation and Transportation Resiliency at Louisiana State University with partners including Mississippi State University and the University of North Carolina.

One goal of these new models is testing the adequacy of current plans over any set of conditions. They include scenarios with greater levels of urgency resulting from less warning time; the potential for segment losses within the road network because of traffic incident lane blockages, road flooding, and other forms of malevolent activity; and greater or lesser rates of evacuee participation.

From a planning perspective, the new generation of models will also permit analyses of alternative traffic management strategies long before they are tested in real life situations. Some topics to be studied include temporary lane access configurations permitting early-stage evacuees to move unimpeded through congested downstream segments before hazardous conditions arrive and the use of bus- and ambulatory-only lanes to avoid trapping frail, elderly and critical care patients in mass traffic congestion. This research is currently being supported through federal agencies such as the Department of Homeland Security and the Department of Transportation.

Eventually all of this knowledge and capability should be combined into a single predictive planning and operational tool to forecast future conditions of surface transportation system operation within specific time frames—hours, days, or even weeks before they occur. Similar systems are already used for weather and flood forecasting. For years, the Louisiana State University Hurricane Center has provided operational support for emergency

management agencies with storm surge flood forecasts. These forecasts link storm movement, strength, and speed predictions with tidal and atmospheric characteristics to graphically illustrate the areas likely to flood, the depth to which they will be covered by water, and the time at which flood waters will arrive and recede.

The future evacuation traffic analysis system would use data about travel demand behavior during emergencies, such as where people begin their trips; where they go; what routes they take; and when they travel. Planners would predict how much traffic could be expected on the network, when it would occur, and what routes would be used. This would enable analysts to forecast the magnitude and duration of congestion, thus projecting travel times.

It would also permit them to determine when to issue and terminate evacuation orders, how to implement proactive traffic management measures and routing strategies, and estimate clearance times to keep evacuees from being trapped in traffic queues as hazardous conditions descend upon them. Perhaps more significantly, this visionary system would be able to predict the conditions in real-time—hours, days, or even weeks in advance and respond to the resultant conditions.

Emergency managers will continue to be challenged with more complex problems in evacuation. While they have responded well to the planning issues that they have been faced with until now, there is more work to be done. New challenges such as assisted evacuations with which we have less experience are arising. The tools of transportation engineering are well adapted to anticipating and addressing these questions. The knowledge we gain from them can be implemented to avoid future repetition of past poor performances.

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Texas Hurricane Evacuees Must Prove Citizenship

In the event of a hurricane in south Texas' Rio Grande Valley, residents will be checked for citizenship by the U.S. Customs and Border Patrol before any evacuations, according to a story in the *Rio Grande Guardian*.

Anyone who can't prove citizenship or legal residency will be held in "specially designed areas made to withstand hurricanes," Border Patrol Spokesman Dan Doty told the paper in May.

"By no means do we want to stop somebody from safely evacuating but we do, and we will do our job while we assist," Doty said. The policy was brought to light during a mock hurricane evacuation exercise, when Border Patrol agents were seen checking residents' documentation. Hurricane season in the valley begins in June.

Federal plans to check immigration status could delay time-sensitive departure efforts, scaring many undocumented Rio Grande Valley residents into staying behind, planners told the *Monitor*, another local paper. "It could certainly have a chilling affect," said Kevin Pagan, McAllen's emergency management coordinator.

Kathleen Tierney, professor of sociology and the director of the Natural Hazards Center at the University of Colorado, had similar concerns.

"The institution of this new policy seems out of line with the state's obligation to protect public health and safety in future hurricanes," Tierney observed. "A likely consequence of the policy is that people who fear citizenship checks will simply opt out of the evacuation process entirely. There is also the danger that particular groups within the population will be unduly singled out for scrutiny."

Cameron County executive Carlos Cascos told the Associate Press the government's primary role was to save lives. "The Border Patrol, if they choose to do this, it just stands to reason that it's going to hinder or slow down the evacuation process," Cascos said. "They won't leave if they fear they're going to be deported."

Homeland Security Secretary Michael Chertoff, speaking on Hurricane Awareness day, said, "I'd like to drive a stake through the heart of a misapprehension ... priority number one by a country mile is the safe evacuation of people who are leaving the danger zone. Instructions to the Border Patrol and Customs and Border Protection are clear. They are to do nothing to impede a safe and speedy evacuation of a danger zone. Now, obviously the laws don't get suspended, but it does mean that our priorities are to make sure we can move traffic along quickly."

Disaster Mitigation...Third in a Series

From “Problem” to “Opportunity” in Water Management and Flood Mitigation: Past Experience and Future Perspectives from the Netherlands

Setting the Stage

The following excerpt is from a soon-to-be-released “reality-fiction” novel titled *Storm over Europe—Katrina in the Netherlands*. It represents the text of an e-mail sent by one of the book’s characters (Hildebrand Borg, a meteorologist and early warning expert at the European Meteorological Centre in Naples, Italy) to his friends and family. The book is part of the International Katrina Book (IKB) project, which will be described later in this article and can be found on the Web site www.stormovereurope.org.

As you may have seen in the news, a number of weird things happened here in August. Originally we observed what looked like a moving sandstorm in the Sahara. Our satellite images confirmed circular turbulence inside this storm and anti-clockwise rotations with large cloud masses as the storm moved closer to and along the North African coastline. The storm—the Italians named it *Laura*, the French *Celine*, and the Moroccans *Saida*—caused major disruption in Libya and Sicily and wreaked further havoc as it moved farther west, just off the coast over the Mediterranean Sea towards Algeria, Tunisia, Morocco, and southern Spain.

The increasingly tropical weather patterns in August and the higher temperatures of the water in the Mediterranean, both of which have been recorded for some years now, seem to have provided ample fuel for this storm to develop into a ‘tropical depression’ and more.

Peak force winds were between 90-152 kilometers (61-95 miles) per hour, so we are talking about wind force of 11 or 12 on the scale of Beaufort or a Category 1 hurricane on the Saffir-Simpson scale.

I’m sure you know that “*Laura/Celine/Saida*” is forecasted to brush the Iberian Peninsula as a Category 1 hurricane, which might cause lots of damage and even claim some lives. We expect the storm to dissipate over the Atlantic Ocean but if it hits another area of low pressure from the Azores, we might see in those waters, for the first time, a huge hurricane develop—one that can rapidly gain strength and work its way northeast towards the English Channel.

The latest worst-case forecasts for that scenario is that *Celine*, as it will probably be referred to, will reach Category 4-5 hurricane levels with peak winds of 248 kilometers (155 miles) per hour and a storm surge of at least 6 meters (18 feet). It’s off the charts as far as Beaufort is concerned! The size of such a super-storm would also be remarkable: at one point it might grow to 300 kilometers, or 188 miles, wide. Its size might decrease somewhat as it travels over cooler waters, but the structure of the

storm is likely to remain intact when it makes landfall, supposedly near the Belgium-Dutch border. Wind and water damage are expected to be enormous, and if for any reason the storm slowed down or remained stationary, it would be catastrophic. In that case, we might have to prepare for something that defies description, other than perhaps the nickname of an F5 tornado on the Fujita scale: “the finger of God.”

Risk = Probability x Impact

Can an excerpt like the one above be considered an “unrealistic” scenario? According to many Dutch and European policymakers, the answer is yes. But when risk is defined as the relationship between probability and impact, think again. If a storm like Katrina made landfall in the Dutch-Belgian delta, economic impacts could be as high as 800 billion Euros (or \$1.2 trillion US) in the western, urbanized parts of the Netherlands that lie below sea level. With 55 percent of the Netherlands territory below sea level and with 60 percent of the population working there to produce 65 percent of the Dutch Gross Domestic Product (GDP) of \$600 billion US per year, it is safe to assume that the Dutch economy and infrastructure would be limping along at best and unable to produce for two to three years at worst. For economic reasons alone, the impact of a storm like Katrina could very well mean the end of the Netherlands as we know it. Well, how’s that for “impact”?

In 1953, the Netherlands was hit by a major seaside storm and surge that caused dramatic flooding. In response, the Dutch embarked on a very ambitious, long-term program to make the country safe from future major southwestern storm and springtide. “Never again!” was the battle cry. Dikes and state-of-the-art flood defenses were conceived, developed, and built over a period of 30 to 40 years—the so-called “Delta Works” program. The engineering required to complete the Delta Works not only became the world’s gold standard in flood defense, but the Dutch also ended up marketing and exporting their prowess in flood prevention engineering to other nations. Ever since, the Dutch government—convinced of its ability to keep the feet and homes of its citizenry dry no matter what—regularly assured its people that there was no need to worry: “Holland is safe behind its dikes.” And yes, it is true. The Dutch have had at least 800 years of experience in keeping their lowlands dry and reclaiming large parts

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of it from the water. A widely known adage describing the Dutch as perennial water experts goes as follows: "God created the world, but the Dutch created the Netherlands."

In recent years, this kind of self-complacency has evaporated, not only in the Netherlands but all over Europe. After experiencing the threat of major river flooding in the late 1990s, additional wake-up calls came in the form of the Indian Ocean Tsunami, the Stern report in the United Kingdom, the Intergovernmental Panel on Climate Change (IPCC), Al Gore's *An Inconvenient Truth*, and the images of Hurricane Katrina in the U.S. southern Gulf states. Many governments started to abandon their one-sided "prevention only" focus and added "consequence management." This included the Netherlands, where the question "what if?" could be increasingly heard.

One should bear in mind that the Dutch-Belgian deltaic region is more or less the "draining hole" of Europe and faces a triple threat from rivers, rising sea level, and land subsidence. But the "what-if?" question spawned another: Where could they find the kind of operational experience that would allow them to extract some of the lessons already learned elsewhere? Enter the United States.

Transatlantic Cooperation

Despite what many people think (even Americans), the United States is really not a country, but a continent. Here's why: If you drive for two hours in the same direction in the Netherlands, you will be in another country with another language and another culture. If you do the same in Texas, you might still be on the same ranch. If California were to declare independence tomorrow, it would rank among the top 10 countries, based on GDP. Conversely, the Netherlands is about the same size as Maryland with the population of Florida and the GDP of New York. Therefore, individual European countries are more akin to the American states, which means that the counterpart for the U.S. federal government is not so much Paris, Berlin, Rome, or London, but the European Union (EU)/Commission (EC) in Brussels.

Unfortunately, the link between Washington and Brussels is not functioning all that well. Part of the problem is many EU member states have delegated considerable legislative power to Brussels, but hardly any executive power. Yet, when you consider a storm like Katrina could affect 11 countries in Europe at the same time, what is needed to actually coordinate a European "federal" response: legisla-

tive or executive power? The “Feds” of Europe (sometimes rather irreverently referred to by Europeans as “Eurocrats”) have no executive mandate, no resources, and no FEMA in the event of, for instance, a Katrina-type disaster. Recognizing this, countries in Europe are looking to establish their own bilateral ties to learn from the considerable operational experience the United States has with emergency management, super-storms, early warning, major flooding, and evacuation.

One such initiative is the proposed establishment of a “Dutch-American International Centre for Water and Emergency Management” (DAIC-WEM) as a clearing-house for information and knowledge transfer. Interestingly, this Centre seeks to gather the best the United States has to offer in terms of operational research and experience and merge it with the best the Netherlands and Europe have to offer in terms of preventive flood protection engineering. The resulting toolbox would then contain enough experience and knowledge to be of use to many other low-lying, deltaic, coastal, or other regions in the world that face the threat of natural hazards. Think of small island nations, such as Bangladesh and Vietnam, as well as the recent disasters in Myanmar and China.

Another initiative is the International Katrina Book (IKB) project, from which the opening paragraph in this paper has been borrowed. A consortium with a wide range of participating partners—on either side of the Atlantic and elsewhere—has signed up to use the scenario described

in the book to generate focused feedback and extract data from within their networks of contacts.

Conclusion

DAIC-WEM and the IKB project are examples of international applied research projects that seek to establish a network-centric approach and a dialogue among disparate partners. By design, they have to lead us to conclusions and recommendations that have the potential to bring policy and practice closer together. This is important, because, if there is one problem that is commonly lamented the world over, it is that the functional distance between policy and practice is too great. Worldwide, there are plenty of people on the policy side and plenty of people on the practice side, but we are desperately short of those who are well-versed in both so they can bounce effortlessly back and forth. These are the people who generate projects that can bridge the gulf between the two sides. And when we can combine water management in the Netherlands with emergency management in the United States to help facilitate this process, then why not? What do we have to lose?

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Fewer Atlantic Hurricanes Under Warming Regime?

Higher average global temperatures by the end of the 21st century may mean rarer hurricanes and tropical storms in the Atlantic Ocean, according to research from the National Oceanic and Atmospheric Administration.

In a paper published in the May 18, 2008 issue of the journal *Nature Geoscience*, NOAA research meteorologist Tom Knutson and colleagues found the cause of the recent increase in the frequency of Atlantic hurricanes between 1980 and 2006 was likely the result of the tropical Atlantic warming more relative to other tropical ocean basins. When warming of all tropical ocean basins becomes more uniform, as expected under most global warming scenarios, there shouldn't be any increase in Atlantic hurricane frequency, the researchers say.

A regional climate model of the Atlantic Ocean basin reproduces the observed increase in hurricane frequency over the past 25 years or so, but then shows a decrease in hurricane activity as global ocean temperatures equilibrate.

Warm water provides the “power plant” for hurricanes. As ocean sea surface temperatures have increased in the Atlantic, hurricanes have become more frequent and stronger. Coastal damage from hurricanes has also increased, but that is largely the result of increases in development on the coasts, rather than from the timing or power of the hurricanes themselves.

Climatologists Michael Mann and Rasmus Benestad write in the online site RealClimate, (www.realclimate.org/index.php/archives/2008/05/climate-change-and-tropical-cyclones-yet-again/langswitch_lang/in#more-566) that the Knutson et al. paper is based on regional modeling that does not adequately deal with Atlantic tropical cyclones. “Since key aspects of those large-scale scenarios as far as Atlantic TC (Tropical Cyclone) activity is concerned ... are currently not confidently known, neither can we be confident using the model projections to say what will happen to Atlantic TC activity in the future.”

They add, “Given these considerations, we would argue that coastal homeowners, insurers, the re-insurance industry, and every other potential stakeholder in this debate would be wise not to take false comfort from the notion ... that climate change poses no future Atlantic hurricane threat.”



FEMA Releases Strategic Plan for 2008-2013

On April 16, 2008, the Federal Emergency Management Agency (FEMA) released its Strategic Plan for Fiscal Years 2008-2013. The plan supports one of the major goals set by the Secretary of Homeland Security for the department: to strengthen the nation's preparedness and emergency response capabilities. The plan sets the following five goals for building a strong and adaptable national emergency management system that better leverages existing national capabilities, emphasizes responsibility for individual preparedness, and enhances public and private sector partnerships:

- Lead an integrated approach that strengthens the Nation's ability to address disasters, emergencies, and terrorist events
- Deliver easily accessible and coordinated assistance for all programs
- Provide reliable information at the right time for all users
- Invest in people to ensure mission success
- Build public trust and confidence through performance and stewardship.

FEMA Administrator R. David Paulison said FEMA staff must continue to demonstrate a commitment to build an invigorated and stronger agency that efficiently uses national resources. The Plan and a "Plan-in-Brief" are available online at www.fema.gov/about/strategicplanfy08.shtml. Print copies can be obtained by calling the FEMA Publications Warehouse at (800) 480-2520.



NOAA Satellites Contribute to Rescue in North Atlantic

On April 10, 2008, satellites operated by the National Oceanic and Atmospheric Administration (NOAA) assisted the U.S. Coast Guard in responding to a distress call from the merchant vessel Sea Venus 1,200 miles east of Cape Cod, Massachusetts. The 577-foot Panamanian-flagged vessel, which had a crew of 23 aboard, was en route from Rhode Island to Belgium when a fire broke out in the engine room. NOAA's satellites detected a radio beacon signal from the vessel, relaying the ship's location to search and rescue personnel at the Coast Guard's Rescue Coordination Center (RCC) in Norfolk, Virginia. The Canadian Navy and two other merchant vessels in the area also provided critical coordination. In Canada, personnel based at RCC Halifax alerted the Coast Guard

at the RCC in Norfolk that they established voice communication with the Sea Venus' crew. After extinguishing the fire, 14 of the 23 crew members were safely transferred from the Sea Venus to its sister ship, the Olympian Highway; nine crew members remained onboard to await a tug from Halifax. NOAA's polar-orbiting and geostationary satellites are part of the international Search and Rescue Satellite-Aided Tracking System called COSPAS-SARSAT, which uses a network of satellites to quickly detect and locate distress signals from emergency beacons onboard ships and aircraft and from handheld personal locator beacons. COSPAS-SARSAT has been credited with more than 22,000 rescues worldwide, including more than 5,800 in the United States and its surrounding waters. The full NOAA press release can be accessed at www.noaa.gov/stories2008/20080411_sarsat.html.

National Hurricane Center to Implement New Hurricane-Tracking Technique

The National Hurricane Center (NHC) plans to implement a new technique that will help forecasters continuously monitor landfalling hurricanes, giving frequent, detailed images of a storm's location. The new system was developed by National Science Foundation (NSF)-funded researchers at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, and the Naval Research Laboratory (NRL) in Washington, D.C. The technique, known as Vortex Objective Radar Tracking and Circulation (VORTRAC), was successfully tested by the NHC last year. Relying on existing Doppler radars along

the U.S. coast, VORTRAC provides details on hurricane winds and central pressure every six minutes, indicating whether the storm is gathering strength in the final hours before reaching shore. The system can use radar data to calculate the barometric pressure at the center of a hurricane, a key measure of its intensity. To monitor the winds of a landfalling hurricane, forecasters currently rely on aircraft to drop instrument packages into the storm to gather data on winds and pressure. But due to flight logistics, the aircraft can take readings no more than every few hours, which means coastal communities may not be swiftly alerted to changes in approaching hurricanes. VORTRAC may also help improve long-range hurricane forecasts by using data from airborne Doppler radars or space-based radars to produce detailed information about a hurricane's far out to sea. Rapidly intensifying storms can catch vulnerable coastal areas by

surprise. In 2004, parts of Florida's southwest coast were caught unprepared when Hurricane Charley's top winds increased from 110 to 145 miles per hour in just six hours as the storm neared land. For more information, see www.ucar.edu/news/releases/2008/vortrac.jsp.

DHS Prepares for Presidential Transition

Nancy Ward, current head of the Federal Emergency Management Agency's (FEMA's) Region 9 territories, including California, Nevada, Arizona, Hawaii, and Guam, will become interim FEMA administrator on Inauguration Day, January 20, 2009. In the wake of a presidential transition, it is common practice to appoint temporary senior career officials to run key departments and agencies of the U.S. government until the incoming president can appoint new leaders. Top appointees of the previous administration usually depart with the predecessor, and new officials cannot be nominated and confirmed until months after the new president takes office. On several occasions, terrorist attacks have occurred close to or during elections and transition periods, both in and outside the United States. The 1993 World Trade Center bombing was only one month after Bill Clinton took office. By September 11, 2001, many Justice Department and FBI employees had not yet been appointed or even nominated. Because DHS was created during Bush's presidency, the agency has never gone through a transition from one administration to another, so the agency is taking thorough precautionary steps to avoid increased vulnerability during the transition. In addition to Ward, the department is lining up career officials to temporarily take the reins of about 50 disaster- and security-related government posts. The department will conduct a three-day exercise to give the interim leaders experience responding to a hypothetical incident.

CDC Reports Worst Flu Season in Four Years

According to the Centers for Disease Control and Prevention (CDC), the 2007-2008 flu season was the worst in four years. Health officials said that the number of adult deaths from flu and pneumonia was mainly due to the fact this year's flu vaccine failed to work against circulating viruses. A study conducted by the Marshfield Clinic in central Wisconsin reported that two of the three vaccine strains did not work against viruses, meaning the vaccine was only 44 percent effective in comparison to the average effectiveness of 70-90 percent. In March, nine percent of all reported adult deaths in 122 cities were from the flu or pneumonia and remained above the epidemic threshold for 13 weeks. Similar numbers of reported deaths have not been seen since the 2003-2004 season, which peaked above the epidemic threshold for only nine weeks.

Type A H3N2 Brisbane strain has been the cause of most hospitalizations and deaths and was absent from this year's vaccine. However, Marshfield data show the vaccine was 58 percent effective against the Brisbane virus. Though this year's vaccine had lower effectiveness rates than usual, officials from the CDC reminded people that it was 44 percent effective and probably reduced severity of viruses. Health officials continue to encourage everyone to get seasonal flu shots. To read a related CNN article, visit www.cnn.com/2008/HEALTH/conditions/04/17/flu.season.ap/.

USGS Says Illinois Earthquake Not Unusual

On April 18, 2008, a magnitude 5.2 earthquake shook the state of Illinois—the largest earthquake recorded in the Wabash Valley Seismic Zone since a 5.4 magnitude earthquake occurred in 1968. Tremors were felt as far west as Nebraska and Kansas, as far south as Atlanta, as far east as West Virginia, and as far north as the Upper Peninsula of Michigan. Because rigid bedrock underlies much of the Midwest, earthquakes east of the Mississippi are often more widely felt than those in the West. Seismologists from the U.S. Geological Survey (USGS) say earthquakes in the area are infrequent but not unexpected. Seismic activity is of great concern in the area, especially because of the adjacent New Madrid fault, which is known to generate severe earthquakes. The USGS has generated new earthquake hazard assessment maps that will be used to update building codes in the area. Many buildings in areas surrounding the Midwest were built before codes were implemented so they're not retrofitted to withstand ground shaking produced by large earthquakes. To read



the full USGS news release, visit www.usgs.gov/newsroom/article.asp?ID=1919.

NOAA Says Greenhouse Gases Rising Rapidly

In 2007, global levels of atmospheric carbon dioxide—the primary driver of global climate change—increased by 0.6 percent, or 19 billion tons, according to the National Oceanic and Atmospheric Administration (NOAA). In addition, methane levels rose by 27 million tons after nearly a decade with little or no increase. NOAA scientists released these and other preliminary findings as part of an annual update to the agency's greenhouse gas index, which tracks data from 60 sites around the world. The rate of increase in carbon dioxide concentrations has accelerated over recent decades along with fossil fuel emissions. Since 2000, annual increases of 2 parts per million (ppm) or more have been common, compared with 1.5 ppm per year in the 1980s and less than 1 ppm per year during the 1960s. Methane levels rose last year for the first time since 1998. Methane is 25 times more potent a greenhouse gas than carbon dioxide, but there's far less of it in the atmosphere—about 1,800 parts per billion. When related climate effects are taken into account, methane's overall climate impact is nearly half that of carbon dioxide. Many atmospheric scientists are concerned the increase in greenhouse gases is contributing to climate disruption and changing rainfall patterns, which could cause drought and an increase in storms worldwide. To read the NOAA press release, see www.noaanews.noaa.gov/stories2008/20080423_methane.html.

NOAA Uses New Tools to Measure Climate Change

The National Oceanic and Atmospheric Administration (NOAA) will activate a high-tech climate monitoring system in the United States known as the U.S. Climate Reference Network (CRN), which is scheduled to be fully operational by the end of the summer. The stations collect data on temperature, precipitation levels, wind speed, and solar radiation to monitor variations in averages and national trends. Each of these stations is placed away from urban areas to reduce confusion in the interpretation of results. NOAA is also modernizing the Historical Climatology Network (HCN), a system that tracks regional climate change and trends. The 1,000 stations replaced in the HCN will work in tandem with the CRN to feed accurate information to scientists studying climate trends in the United States. These stations relay observations to satellites and the NOAA's National Climate Data Center (NCDC), which posts the information online. More information can be found at: www.noaanews.noaa.gov/stories2008/20080424_climatechange.html.

NOAA Bolsters Tsunami Early Warning System

The National Oceanic and Atmospheric Administration (NOAA) recently installed the final two DART (deep-ocean assessment and reporting of tsunami) sta-

tions off the Solomon Islands, which completed the buoy network that includes 39 stations in the Pacific, Atlantic, Caribbean, and Gulf of Mexico. Tsunami sensors are now positioned between Hawaii and every seismic zone that could generate a tsunami that would impact the state and beyond, including the U.S. West Coast. Though the DART stations increase the ability to disseminate accurate tsunami information, state and local coastal communities are encouraged to increase awareness and improve resiliency to tsunamis by participating in the TsunamiReady Program (www.tsunamiready.noaa.gov), a public preparedness and education program. To read the NOAA press release, visit www.noaanews.noaa.gov/stories2008/20080310_buoy.html.

USGS Provides Imagery to Assess Impacts of Myanmar Cyclone

Landsat satellite imagery provided by the U.S. Geological Survey (USGS) helped aid rescue and recovery efforts in Myanmar in the aftermath of Cyclone Nargis' landfall on May 3. International emergency response teams used the Landsat images to assess the extent of flood damage caused by the cyclone in the affected region. The first maps of the area derived from the Landsat satellite were provided to agencies within hours of initial requests. The USGS provides Landsat imagery to other participating agencies under an agreement known as the International Charter Space and Major Disasters (Space Charter). One organization that made immediate use of USGS Landsat data was the United Nations Institute for Training and Research Operational Satellite Applications Programme (UNOSAT). The UNOSAT team, which consists of UN field workers, satellite imagery experts, geographers, geologists, development experts, computer programmers, and internet communications experts, developed maps showing the extent of cyclone flooding and population estimates in the flooded regions. The Space Charter consists of an international group of participating space agencies dedicated to providing satellite images to those affected by natural or human-induced disasters. Since its establishment in late 2000, the Space Charter has responded to more than 200 hazard events around the globe, including forest fires, earthquakes, tsunamis, oil spills, and flooding. To view USGS Landsat satellite images, visit www.glovis.usgs.gov.

New USGS Unmanned Aircraft Program Could Improve Hazards Response

The U.S. Geological Survey (USGS) is establishing a new program for earth observation using Unmanned Aircraft Systems (UAS). In dangerous and remote areas, such as polar regions, volcanic islands, and deserts, remote-controlled unmanned aircraft can provide detailed and timely data about the status of natural resources and environmental conditions. In many cases, UAS technology is the most cost effective way to gather earth observation data for a variety of applications such as managing

federal lands, investigating climate change, mapping and charting, conducting environmental risk assessments, and responding to natural and human-induced disasters. Even in less remote areas, manned aircraft flights may not be always be feasible and satellite-based observations can be hindered by coarse image resolution, limited sensor capabilities, or long periods between orbiting cycles. Data collection by UAS can be tailored to the required resolution and radiometric parameters of individual investigations. Offices for the new program will be located at the USGS facility in Lakewood, Colorado. Visit the USGS Land Remote Sensing Program at <http://remotesensing.usgs.gov>.

Large California Quake 'Virtually Assured' by 2040

The probability of a magnitude 6.7 earthquake in California in the next 30 years is "virtually assured," with a 99.7 percent probability of occurrence, according to the U.S. Geological Survey. But the devil is in the details. Southern California appears to be most vulnerable, with a 97 percent chance of that size quake in the next three decades, while the odds of northern California are about 93 percent. The chances of a very large quake— magnitude 7.5 or higher—in the state is a minimum of 29 percent, and a maximum of 65 percent. The fault most likely to rupture is the southern San Andreas fault, with a 59 percent average probability over the next 30 years.

The USGS made the assessment in the publication *Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)*. <http://pubs.usgs.gov/of/2007/1437/>

Government Accountability Reports (www.gao.gov)

Mine Safety: Additional Guidance and Oversight of Mines' Emergency Response Plans Would Improve the Safety of Underground Coal Miners. April 8, 2008. GAO-08-424. 59 pp.

High-Containment Biosafety Laboratories: DHS Lacks Evidence to Conclude That Foot-and-Mouth Disease Research Can Be Done Safely on the U.S. Mainland. May 22, 2008. GAO-08-821T. 29 pp.

Natural Catastrophe Insurance: Analysis of a Proposed Combined Federal Flood and Wind Insurance Program. April 25, 2008. GAO-08-504. 38 pp.

Status of Implementation of GAO Recommendations on Evacuation of Transportation-Disadvantaged Populations and Patients and Residents of Health Care Facilities. April 1, 2008. GAO-08-544R. 26 pp.

Highest Flood Level on Lower Mississippi Since 1973

On April 22, 2008, the U.S. Geological Survey (USGS) and the U.S. Army Corps of Engineers recorded the highest flood level on the lower Mississippi River since 1973. The flow occurred at Vicksburg, Mississippi, and measured 1.8 million cubic feet per second—enough water to fill more than 20 Olympic size swimming pools in one second, or more than 1.75 million pools in a day. The flood was caused by intense rainfall throughout the central plains and Ohio River Valley in March and April that eventually reached the lower Mississippi River Basin.

In March, forecasters at the National Oceanic and Atmospheric Administration (NOAA) predicted major spring floods in many regions of the United States, saying record rainfall and snowpack in some states would contribute to above-average flood conditions. In late March, more than 250 communities in a dozen states experienced flood conditions. To find current flood and high flow conditions across the country, visit the USGS WaterWatch Web site at <http://water.usgs.gov/waterwatch/flood>.



Disaster Research Online Newsletter Celebrates 500th Issue

On April 24, 2008, the Natural Hazards Center sent out its 500th issue of the Disaster Research (DR) e-mail newsletter. The DR was created in January 1989 by Bruce Crawford, an enterprising graduate student at the University of Delaware's Disaster Research Center. Bruce managed the newsletter in various experimental forms (moderated and unmoderated) until November of that year. However, like Dr. Frankenstein's creation, Bruce's innovation soon took on a life of its own. He found that graduate school and list management required a time commitment of about 36 hours a day. In November 1989, the Natural Hazards Center at the University of Colorado assumed responsibility for the DR and has been publishing the newsletter ever since. Since 1989, the DR's readership has grown from about 100 subscribers to nearly 4,500.

The DR's previous milestone edition, DR 400, was sent out January 21, 2004. Since then, the Natural Hazards Center has seen quite a bit of change. The following projects, products, and programs have been instituted or improved at the Center since 2004:

- The National Consortium for the Study of Terrorism and Responses to Terrorism (START): The START program was designed to harness methods and resources of social and behavioral sciences to better understand the formation and dynamics of terrorist groups and the social and psychological impacts of terrorist attacks. The Natural Hazards Center joined this DHS Center of Excellence project in May 2005.
- Collaborative Research: Warning Decisions in Extreme Weather Events (DRU): An Integrated Multi-Method Approach: This project examines the scientific and societal dimensions of warning decisions in extreme events, including how extreme weather warnings are communicated, obtained, interpreted, and used in decision making. The Center was awarded funding for this project in April 2008, and research activities will begin soon.



• Bay Area Preparedness Initiative (BayPrep): The role of the Natural Hazards Center in BayPrep is to conduct research and work in partnership with the Fritz Institute to address issues of disaster preparedness among community-based, faith-based, and other nonprofit organizations serving at-risk populations in the San Francisco Bay Area. The Center began work on the BayPrep project in April 2007.

• Research Digest: This quarterly online publication is a compilation of recent research in an easily accessible format for the hazards and disasters

community. Research Digest debuted in September 2007.

• NHC Web Site: The Center's Web site is a central node of information for the hazards and disasters community. A completely redesigned site was launched in September 2006.

• *Learning from Catastrophe*: This edited, peer-reviewed volume features a collection of 18 chapters from 39 researchers who conducted social science research during or immediately after Hurricanes Katrina and Rita made landfall on the U.S. Gulf Coast in September 2005. The book was published in late 2006.

• Quick Response Research Program: The Quick Response program offers social scientists small grants to travel to the site of a disaster soon after it occurs to gather valuable information concerning immediate impact and response. Since 2004, the Center has sent 61 research teams into the field; 27 of those teams performed fieldwork on Hurricane Katrina and its impact.

• Natural Hazards *Observer*: The *Observer* focuses on news regarding human adaptation and response to natural hazards and other catastrophic events. Currently, 16,400 subscribers receive the *Observer*. In September 2006, the bimonthly publication was given a makeover, and a crisper, cleaner design was introduced.



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 Nargis—Myanmar

On May 5, Tropical Cyclone Nargis struck the southwest region of Myanmar (formerly known as Burma), including the former capital, Yangon, and the rice-producing Irrawaddy Delta. The Category 4 storm battered the region with winds up to 120 miles per hour. A 12-foot storm surge wave caused most of the damage and casualties.

As of May 20, casualties were estimated at more than 77,738 people dead and 55,917 missing, but Western aid workers predicted those numbers could rise sharply. More than 95 percent of the region's homes were destroyed, and the United Nations estimated that 2.4 million people were affected by the cyclone.

Although aid agencies typically try to deliver relief supplies within 48 hours of a disaster, survivors had seen little evidence of a relief effort a week after the storm struck. Efforts were stalled largely by Myanmar political authorities. Survivors were left to mostly fend for themselves.

Earthquakes

Earthquake—China

On May 12, a magnitude 7.9 earthquake struck central China, devastating a region of small cities and towns in Sichuan and nearby provinces. The earthquake resulted from motion on a northeast striking reverse fault or thrust fault on the northwestern margin of the Sichuan Basin.

The quake hit 60 miles northwest of Chengdu in the middle of the school day and left hundreds of students and teachers trapped under the rubble of toppled schools. The Xinhua News Agency reported that 80 percent of the buildings in Beichuan County in Sichuan Province collapsed.

On Sunday, May 25, a magnitude-6.0 aftershock destroyed tens of thousands of homes and strained recovery efforts. As of May 26, the death toll was reported to be more than 65,000, with over 5.3 million buildings destroyed and 21 million damaged as a result of the initial event and its aftershocks.

The quake is considered the deadliest to hit China since 1976.

Earthquake—Midwest USA

A magnitude 5.3 earthquake struck southern Illinois on April 18. It was felt in areas up to 900 miles away. According to the U.S. Geological Survey, the epicenter was

located about 38 miles north-northwest of Evansville, Indiana. The quake occurred in the Wabash Valley fault system, which is adjacent to the New Madrid Seismic Zone.

In 1811 and 1812, three large earthquakes devastated the region around New Madrid, Missouri, and were felt throughout most of the country.

Volcanoes

Volcanic Eruption—Chile

On May 2, Chaiten Volcano in southern Chile began erupting for the first time in 9,000 years. The eruption triggered tremors and prompted evacuations. Volcanic ash rained over the town of Chaiten, which is located in Chilean Patagonia about 760 miles south of Santiago. About 5,000 people were evacuated, and one elderly person reportedly died during evacuation efforts. Regional airports were closed when satellite images revealed that the air was filled with ash. Ash clouds covered nearly a third of neighboring Argentina.

Tornadoes

Tornadoes—Central and Eastern USA

Three tornadoes touched down in central and southeastern Virginia in the United States on April 28. The first tornado struck the city of Suffolk, where most of the injuries occurred. The second hit Colonial Heights near Richmond, and the third struck near Lawrenceville. Early estimates by emergency officials put costs at about \$21 million.

The twisters injured more than 200 people, destroyed 48 homes, and damaged about 160 homes. In early May, about 25 tornadoes touched down in the central U.S. The state of Arkansas was hit the hardest, with seven people killed and about 400 homes damaged or destroyed. Then on May 10 and 11, a series of tornadoes swept through Missouri, Oklahoma, and Georgia, killing at least 23 people and leaving tens of thousands of residents without power.

Officials believed the death toll could rise even higher, once rescue workers finished searching through the rubble. One of the tornadoes severely damaged the town of Picher in northeastern Oklahoma, killing six people and injuring at least 150. During 2008, the central and southern regions of the United States have been hit hard by severe weather and tornadoes.

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/.

The Contribution of Social Capital and Social Organization to Disaster Recovery. Funding Organization: National Science Foundation, \$210,200. Three years. Principal Investigator: Frederick Weil, Louisiana State University and Agricultural & Mechanical College, (225) 578-1140, fweil@lsu.edu.

New Orleans' recovery from Hurricane Katrina has been an enormous task. Money from government, insurance, and business sources has often been slow in arriving or inadequate to meet needs. For many people, the nonprofit sector, especially faith-based and community organizations, and informal social networks have contributed as much or more to their well-being and ability to return and rebuild as have material resources.

Building on intellectual traditions that go back to Tocqueville's descriptions of democracy and community, this research draws on recent work on social capital and civic participation to explain how different communities have attempted to recover. The researchers will conduct surveys of Greater New Orleans residents who have, or have not, returned. The surveys will use standard telephone, door-to-door, and other methods. The goal is to assess which factors do the most to encourage return and rebuilding, help people to cope with stress, and develop community resilience. In particular, the investigators will (1) assess the physical damage and recovery of respondents' residences and surrounding neighborhoods, using Geographic Information Systems (GIS), and (2) survey leaders of the organizations to which respondents belong, asking about their strategies for recovery.

By combining the data with social surveys, the investigators will assess the relative success of different recovery strategies by relating them directly to outcomes in their corresponding communities.

The analyses contribute to the theoretical and empirical literature on social capital, social organization, civic engagement, civil society, the role of the nonprofit sector, community studies, and disaster recovery and resilience, as well as make methodological contributions in the areas of innovations in data collection, multi-level and geospatial-social modeling and analysis, and scientific-community interaction and partnership.

Enabling the Next Generation of Hazards and Disasters Researchers. Funding Organization: National Science Foundation, \$236,813. Three years. Principal Investigator: Thomas Birkland, North Carolina State University, (919) 513-7799, tom_birkland@ncsu.edu.

This education and training initiative is a comprehensive, creative program of mentoring for recently appointed junior faculty at research universities with an interest in natural hazards and disasters. This project

seeks to (1) identify and recruit another cohort of well-trained social scientists and engineers with an appreciation for the social aspects of hazards who will undertake research about societal aspects of extreme events; (2) engage this cohort of researchers in discussions about interdisciplinary social science scholarship as it relates to research about extreme events; (3) enable this cohort of researchers to undertake sustained research on these topics by providing tutorials on proposal development and research dissemination, particularly in scholarly outlets; and (4) foster an expanded network of social scientists undertaking research on extreme events.

These goals will be accomplished through a mentoring program involving scholars from a broad range of disciplines. The project includes two workshops, one-on-one mentoring, and research and writing activities.

A final evaluation report will assess the program's effectiveness. This project will attract junior faculty to a field of study from which a number of senior researchers are expected to retire soon. A major goal of the project is to identify and recruit scholars from underrepresented groups to this field of research.

National Earthquake Hazards Reduction Program (NEHRP). Funding Organization: National Science Foundation, \$85,000. One year. Principal Investigator: John Hayes, National Institute of Standards and Technology, (301) 975-5640, jack.hayes@nist.gov.

The National Earthquake Hazards Reduction Program (NEHRP) includes the Department of Homeland Security/Federal Emergency Management Agency (FEMA), National Institute of Standards and Technology (NIST), National Science Foundation (NSF), and U.S. Geological Survey (USGS). With the 2004 reauthorization of NEHRP (PL 108-360), NIST was established as the lead agency for NEHRP. In order to coordinate NEHRP activities among the four agencies as required by this reauthorization, NIST has established the NEHRP secretariat.

This award is an interagency agreement and provides partial support for the NEHRP secretariat administered by NIST. The secretariat facilitates the intellectual merit of NEHRP by coordinating various interagency activities, updating the NEHRP strategic plan, publishing the annual NEHRP report, and facilitating the NEHRP Advisory Committee for Earthquake Hazards Reduction.

The broader impact of NEHRP is to advance knowledge and promote innovation for earthquake loss reduction for all U.S. citizens. Through NEHRP, FEMA, NIST, NSF, and USGS work together to improve understanding, characterization, and assessment of hazards and vulnerabilities; improve model building codes and land

use practices; reduce risks through post-earthquake investigations and education; improve design and construction techniques; improve the capacity of government at all levels and of the private sector to reduce and manage earthquake risk; and accelerate the application of research results into practice.

Rebuilding New Orleans: Evaluating the Post-Disaster Planning Process. Funding Organization: National Science Foundation, \$126,082. One year. Principal Investigator: Robert Olshansky, University of Illinois at Urbana-Champaign, (217) 333-8703, robo@uiuc.edu.

The investigators will study urban planning for post-Hurricane Katrina reconstruction in New Orleans. Specifically, this research will study how plans affect reconstruction decisions made by public organizations, private investors, and individuals. In practice, planning is quite complicated, involving many actors who make many different types of plans. Plans are pieces of information that help people make decisions. This study will rely on news accounts, plan documents, internal memos, interviews, blogs, and films of planning meetings to look at how plans affected specific reconstruction decisions. This research responds to the critical opportunity to provide knowledge that can help develop planning strategies following the next catastrophic disaster.

The results will help municipalities, state agencies, and FEMA organize for reconstruction after future catastrophic disasters. In addition, it will contribute to urban planning education by broadening understanding of how plans work.

Social Relations and Community Solidarity: An International Comparative Analysis. Funding Organization: National Science Foundation, \$44,918. One year. Principal Investigator: James Hawdon, Virginia Polytechnic Institute and State University, (540) 231-8971, hawdonj@vt.edu.

Community solidarity, or community cohesion, is vital for a community's recovery. However, cohesion tends to decline after an initial surge immediately following a disaster or tragedy. Using data from mass shootings in Blacksburg, Virginia, and Omaha, Nebraska, in the United States and at Jokela High School in Finland, this research will examine how communities both grieve and restore a sense of normalcy after tragic events.

The main goal is to discover what types of social relations sustain community cohesion and provide the most efficient means by which community members can recover from a disaster. By extending research conducted at Virginia Tech to different types of communities and a different culture, the investigators will determine if the relationship between tragic events and community cohesion depends on the type of community that suffers the tragedy, and if the social relationships people use to deal with a disaster vary by type of community.

Like the Virginia Tech study, the community surveys will include measures of the social relations in which in-

dividuals engage and measures of recovery. The surveys include items that measure respondents' mental health, physical health, and fear of crime. By testing a general theory of community relations, the investigators will contribute to sociology by enhancing scholarly understanding of how communities operate and how they recover from disasters.

The findings will have theoretical implications for disaster research and community development research. Broader impacts include addressing fundamental issues of community and community building. The research may also provide strategies that can help communities recover from mass tragedies more quickly.

Warning Decisions in Extreme Weather Events: An Integrated Multi-Method Approach. Funding Organization: National Science Foundation, Three years. Principal Investigators: Jeff Lazo, University Corporation for Atmospheric Research, (303) 497-2857, lazo@ucar.edu, (\$330,932); Kathleen Tierney, University of Colorado at Boulder, (303) 492-6818, tierneyk@colorado.edu, (\$271,000); and Ann Bostrom, University of Washington, (206) 685-8198, abostrom@u.washington.edu, (\$145,850).

Appropriate information distribution and sound decision making during weather emergencies are critical to saving lives, reducing injuries, and protecting property. Several governmental and non-governmental organizations have placed a high priority on research to improve warning systems for extreme weather events.

This project addresses these needs by developing an integrated understanding of warning systems and processes, with a focus on hurricanes in Miami, Florida, and flash floods in Boulder, Colorado. The project will (1) address the role of uncertainty throughout the warning process, including information distribution and decision making; (2) develop an understanding of how scientific information is analyzed and transmitted through warning networks to diverse users; (3) identify the factors influencing organizational (e.g., media) and governmental decision making during extreme weather events; and (4) characterize public preferences for different attributes of forecast and warning information.

The project uses a multidisciplinary approach to understanding weather warning systems, system components, and their interactions. Integrating information and research methods from meteorology, sociology, economics, decision science, and public policy analysis, the project will generate new understanding about decision making, risk, and uncertainty regarding extreme weather events.

More specifically, the project will analyze how extreme weather warnings are communicated, obtained, interpreted, and used in decision making, as well as stakeholder perceptions of warning characteristics needed for sound decision making.

The project will help improve extreme event weather warnings and potentially reduce related injuries, deaths, and property loss.

New Madrid Seismic Zone Alive and Shaking

On April 18, 2008, a 5.2-magnitude earthquake struck a northern portion of the New Madrid Seismic Zone, putting cracks in a purported theory that the fault zone is “cold and dying,” according to the Institute for Business & Home Safety (IBHS). While the earthquake, which was centered five miles northeast of Bellmont, Illinois, did not result in major structural damage, it is a reminder of the risks facing residents in the New Madrid area, according to Dr. Timothy Reinhold, IBHS director of engineering and vice president.

The New Madrid Seismic Zone lies in the southern and midwestern regions of the United States, stretching to the southwest from New Madrid, Missouri. A group of scientists has recently been touting a theory that gauges the risks posed by the New Madrid fault as minimal. The same theory has been cited in arguments trying to water down building codes designed to protect homes and businesses against earthquake damage.

Illinois experiences one earthquake annually, according to the U.S. Geological Survey (USGS). The last quake to cause significant damage measured 5.0 in magnitude and occurred near Lawrenceville and Olney, Illinois, in 1987. In 1811 and 1812, three large earthquakes devastated the New Madrid region and were felt throughout most of the country.

USGS seismologists estimate the chances of an earthquake measuring 6.3 magnitude or greater striking the Midwest in the next 15 years at 40 to 63 percent. The likelihood jumps to 100 percent in 50 years.

For existing homes and businesses, IBHS offers the following guidance to protect interior valuables and appliances:

- Fit all gas appliances with flexible connections. Know where the main shutoff valve is located and how to turn it off.
- Anchor large appliances, especially water heaters, to walls using safety cables or straps.
- Lock the rollers of any large appliances or pieces of furniture.
- Anchor bookcases and filing cabinets to nearby walls.
- Install latches on drawers and cabinet doors to keep contents from spilling.
- Attach computers and small appliances to desks, tables or countertops.



For more information about how to protect your home from earthquake damage, visit www.disastersafety.org.

PERI Seeks Nominations for Board of Directors

The Public Entity Risk Institute (PERI), a nonprofit research institute focused on risk management training and education, is accepting nominations to fill two positions on its Board of Directors. Board members and former Chairs Yvonne Norton Leung and Gary Binger will step down from the Board effective December 2008. PERI's Board of Directors includes five members. The PERI charter mandates three members of the Board represent the interests of the public sector. The remaining two positions are filled by one representative of nonprofit organizations and one of small business interests.

The positions to be filled are for a nonprofit representative and a public sector representative.

The deadline for submitting nominations to the board nominating committee is August 1, 2008. Elections will be held on September 25 during the quarterly board meeting in Richmond, Virginia.

For more information or to submit your name for nomination, please send a short bio and letter explaining why you would like to serve on the PERI board to the attention of the PERI Nominating Committee at ghoetmer@riskinstitute.org. To learn more about PERI, visit www.riskinstitute.org.

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 available free online. Other materials can be purchased through the publisher and/or local and online booksellers.

Publications, Reports, and More

All-Hazards

Children, Youth and Environments—Special Issue. 2008. Free online. Children, Youth and Environments Center, University of Colorado; www.colorado.edu/journals/cye/18_1/index.htm.

Children, Youth and Environments is a free, online, peer-reviewed journal that publishes papers of varying topics; however, special focus is paid to articles concerning youths in environments of disadvantage and those with special needs. Its mission is to connect researchers, policy makers, and practitioners around the world in an interdisciplinary effort. This special issue examines vulnerability and resilience of children and youth regarding disasters and includes more than a dozen articles specifically related to children's experiences in disaster.

Women and Disasters: From Theory to Practice. Edited by Brenda D. Phillips and Betty Hearn Morrow. 2008. ISBN 978-1-4363-0879-3. 260 pp. \$18.69 (paper). 1-888-795-4274. Xlibris. www.Xlibris.com.

Women “are likely to respond, experience, and be affected by disasters in ways that are qualitatively different,” Phillips and Morrow say. This book, the third in a series on disaster from the International Research Committee on Disasters, explores the ways that women experience these issues. For instance, in a study of two Soviet earthquakes, researchers found that 18 percent of the dead were men, 47 percent women and 35 percent children. Other research found that women experience higher morbidity and mortality rates in famines. The book looks at several case studies, including floods and hurricanes, as well as women in emergency management and in post-disaster recovery. Two authors conclude in a final chapter, “It is evident that women have contributed in unprecedented ways in times of disaster. They are leaders in emergent organizations during and after disaster, especially those responding to structural response deficiencies resulting from restricted visions of response and recovery needs. Yet, women's activities and disaster contexts including their roles and experiences in emergency management are still largely understudied.”

In other work on women in disasters, University of Missouri-Columbia Professor Jacqueline Litt found that during Hurricane Katrina in August 2005 many people survived because of quick action by key women who, through pre-existing social networks, were able to mobilize for successful evacuation. “Women in normal times act as the glue for networks,” Litt said. “In emergencies they use those same skills. That pre-existing interdependence, trust and

knowledge is what made successful evacuations happen.” Litt's work was published in a special issue of the National Women's Studies Association Journal.

Proceedings of the 6th Rocky Mountain Region Disaster Mental Health Conference. Edited by George W. Doherty. 2008. ISBN: 978-1-932690-56-9. 104 pages. \$19.95 (paper). Rocky Mountain DMH Institute Press. 307-339-4818. www.LovingHealing.com.

This is the proceedings of a conference held in Cheyenne, Wyoming, on November 8-11, 2007. It covers several psychological health issues in disaster response and planning, including caring for first responders and developing a statewide disaster behavioral health plan.

“Where's the Fire?” Teamwork for Integrated Emergency Management. An article in *Conservation, The Getty Conservation Institute Newsletter*, Vol, 23, No. 1. 2008. 310-440-7325. www.getty.edu.

The Getty Conservation Institute is stepping in to highlight an area that doesn't usually get much attention in emergency planning—the protection of cultural heritage collections like paintings, sculptures and other artifacts. The article describes the efforts the Institute has made since 2004 to develop comprehensive cooperative plans to protect cultural artifacts in the event of a disaster affecting museum collections. Members from eight national museums in Asia and from nine in the Baltic states participated in courses between 2005 and 2007. In November 2007, “The participants engaged in several exercises, which included a simulation of an emergency – a fire at a local museum” in Ohrid, Macedonia. They cooperated with local emergency response units like fire, police, medical response and the Red Cross.

Summary of Suggestions from the Task Force for Mass Critical Care Summit. Asha Devereaux, M.D., et al., Supplement to *Chest*, May 2008. ISSN: 0012-3692. Free download at www.chestjournal.org.

U.S. and Canadian experts have developed a “comprehensive framework to optimize and manage critical care resources during times of pandemic outbreaks or other mass critical care disasters,” according to a news release summarizing the report.

In January, 2007, representatives of a wide variety of fields—bioethics, critical care, emergency medical services, infectious diseases, hospital medicine, law, military medicine, nursing pharmacy, state, local and federal government planning and response—met in San Diego to address delivering critical care to patients during disasters and

pandemics. “Most countries, including the United States, have insufficient critical care resources to provide timely, usual care for a surge of critically ill and injured victims,” said Asha Devereaux, M.D., of the Task Force for Critical Care. “If a mass casualty critical care event occurred tomorrow, many people with clinical conditions that are survivable under usual health-care system circumstances may have to forego life-sustaining interventions due to deficiencies in supply, staffing or space.”

The task force recommended a number of actions to deal with this eventuality, including that a hospital plan to have the ability to provide critical care for at least triple their usual intensive care unit capacity, and to sustain this surge for at least 10 days without external assistance.

Emergency Resource Guide. Washington Military Department Emergency Management Division and Washington State Department of Health. Free. 2007. 42 pp. Available electronically in English and Spanish at www.doh.wa.gov/phepr/factsheets.

From anthrax to winter storms, this publication offers plans and advice for dealing with household emergencies. It includes general personal preparedness, caring for pets, terrorism, nature and weather, diseases and biological agents, and many other potential household threats. Some of the fact sheets are also available on the Web site in Cambodian, Chinese, Korean, Russian and Vietnamese.

Older People in Emergencies: Considerations for Action and Policy Development. David Hutton, World Health Organization. 2008. \$15 (\$10.50 in developing countries). 44 pp. ISBN 978-92-4-154739-0. bookorders@who.int.

Of the 14,800 deaths in the 2003 French heat wave, 70 percent were older than 75. Of the 1,330 people who died in the wake of Hurricane Katrina, 71 percent were over age 60. In developed countries, 40 percent of people 65 and older suffer from chronic illness or disability. Worldwide about 20 percent of the population is disabled, 80 percent of those living in developing countries. “Older people have often been overlooked in disasters and conflicts,” the WHO report says, “and their concerns have rarely been addressed by emergency programmes or planners.” The report offers objectives for dealing with the needs of the elderly in the preparedness, response and operations, and recovery and transition phases of emergencies. Available in English and French.

Climate Change

Sudden and Disruptive Climate Change: Exploring the Real Risks and How We Can Avoid Them. Edited by Michael C. MacCracken, Frances Moore and John C. Topping, Jr. March, 2008. ISBN: 978-1-84407-477-8. 326 pp. \$166.00 (hardcover). Earthscan. www.earthscan.co.uk.

About 20 percent of the earth’s population lives within 30 kilometers (18 miles) of the coast, and 40 percent within 100 kilometers (30 miles). For these people, the issue of rising seas and stronger storms resulting from a warming

climate is not an academic one. The editors have compiled a series of papers dealing primarily with the impacts of sea level and greater storm intensity resulting from climate change. This book addresses the potential impact to human communities and to ecosystems. One paper looks at potential responses to rising ocean levels in metropolitan New York, Long Island and northern New Jersey, drawing on the experiences from existing sea barriers in the Netherlands, on the Thames, in Venice, and from other sites around the world. The final section of the book looks at steps that might be taken to address climate change and the associated costs.

Decadal-scale Climate Prediction in the North Atlantic. Noel Keenlyside et al., *Nature*, May 1, 2008 (Vol. 453, No. 7191. pp. 84-88)

People skeptical about the reality of climate change often point out that the world hasn’t warmed much over the past decade. But greenhouse warming isn’t the only factor in changes going on around the world. There is also “uncorrelated stochastic variability” – that is to say, “weather” – that affects global mean temperatures. In a paper in *Nature*, Noel Keenlyside of the Leibniz Institute of Marine Sciences in Kiel, Germany and colleagues demonstrated the short-term effects of weather can override the contributions of rising greenhouse gases for short periods. The paper predicts that there will be a slight cooling of the globe by 2030, at which point temperatures will catch up with the predictions from greenhouse gas warming.

Not everyone agrees with this assessment, however. The climate scientists at the Web site RealClimate (www.realclimate.org/index.php/archives/2008/05/global-cooling-wanna-bet/) say they’re willing to bet “serious money” – 2,500 Euros – that globe won’t cool over the next 20 years (absent, that is, a volcanic eruption or other event that spews cooling aerosols into the atmosphere).

Any cooling be short-lived. All the models continue to show substantial warming (0.8 degrees Celsius or about 1.5 degrees Fahrenheit) in the average global temperature by 2030.

Hurricanes, Floods, and Coastal Hazards

Journal of Flood Risk Management, Wiley-Blackwell. Published in partnership with the Chartered Institution of Water and Environmental Management. First issue, May, 2008. www.blackwellpublishing.com/jfrm_enhanced/.

Journal of Flood Risk Management is a new journal which “provides an international platform for knowledge sharing in all areas related to flood risk. Its explicit aim is to disseminate ideas across the range of disciplines where flood related research is carried out and it provides content ranging from leading edge academic papers to applied content with the practitioner in mind.” Articles in the May issue include an overview of the data on loss of life as a result of floods and flood mapping for urban flash floods, among

others. The journal provides free online access for institutions throughout 2008.

Managing Large-Scale Risks in a New Era of Catastrophes: Insuring, Mitigating and Financing Recovery from Natural Disasters in the United States. Wharton Risk Management and Decision Processes Center, March 2008. 387 pages. www.opim.wharton.upenn.edu/risk/library/Wharton_LargeScaleRisks_FullReport_2008.pdf

With “our nation facing large-scale risk at an accelerating rhythm,” the Wharton-Georgia State University team studied strategies for managing risks and the consequences of future disaster in the insurance industry. The report, which deals primarily with hurricanes, has 42 key findings in four subject areas: cause for concern; understanding the demand and supply of disaster insurance; protecting homeowners against natural disasters; and creating innovative solutions.

The cost of major U.S. disasters—mostly, but not entirely, hurricanes—has increased from \$53.6 billion in the 1950s to \$778.3 billion in the 1990s. The Wharton study uses two guiding principles in its examination of these increasing hazard losses: insurance premiums should be based on risk to encourage the insured to take cost-effective steps toward hazard mitigation; and any special treatment for homeowners living in hazard-prone areas should be shouldered by public funding, not by insurance premium subsidies. The report says long-term homeowners insurance could stabilize costs to homeowners in hazard-prone areas. It also says a data collection and information sharing entity could be created to inform decision makers about the extent of insurance penetration., possibly through a few questions about property insurance coverage on federal income tax forms.

Technological Hazards

Interstate 35-W (I-35W) Bridge Collapse and Response. 2007. Free online. U.S. Fire Administration; www.usfa.dhs.gov/downloads/pdf/publications/tr_166.pdf.

This technical report, released by the United States Fire Administration (USFA), examines the emergency preparedness for, and response to, the August 1, 2007, bridge collapse in Minneapolis, Minnesota, that killed 13 people and injured 121 others. According to the report, the local response to the bridge disaster demonstrated the value of comprehensive disaster planning and training. The city’s ability to respond had evolved over several years of investing heavily and widely in the elements that make a crucial difference when disaster strikes.

Earthquakes

NRC Seismic Research Program Plan: FY 2008-2011. Structural, Geotechnical & Seismic Engineering Branch, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission. January 2008. www.eeri.org/nrc_research_plan_public.pdf

Renewed interest in nuclear power generation as way to produce energy without producing associated green-

house gases is inspiring additional research on nuke safety. In January 2008, the NRC published its four-year plan to examine the potential hazards presented by seismic activity to nuclear power plants. The NRC considers 10,000-year ground motion, so a lot of the report’s attention is on extreme motions. Included in the plan is research on a maximum magnitude quake in the East Tennessee Seismic Zone; a database of earthquake records in the U.S. and Canada; analyses of extreme ground motion; and several other research protocols. One of the goals of the research is to reconcile the discrepancies in results obtained by NRC analyses and those performed by the nuclear industry, the report says.

Reducing the Risks of Nonstructural Earthquake Damage: State-of-the-Art and Practice report. Applied Technology Council. 2008. www.atccouncil.org/atc69.shtml.

A great deal of the damage caused by earthquakes is the result of stuff flying around, or pipes breaking, or cornices collapsing or other nonstructural features. In fact, the actual structural system of an engineered building in the United States typically represents only between 10 percent and 20 percent of the overall construction cost. The rest is “nonstructural.” But how much nonstructural features actually add to the harm done by quakes is difficult to calculate. Reducing the Risks has 17 recommendations for monitoring and reducing damage from nonstructural components in earthquakes. They recommend following a model established by the experience of California hospital and school construction which has used a coordinated approach to design, plan review and construction. Based on a three-pronged effort, the California system calls for: Clear and complete designs; detailed plan review, and; thorough construction inspection.

Tsunami

How Resilient Is Your Coastal Community? A Guide for Evaluating Coastal Community Resilience to Tsunamis and Other Hazards. U.S. Indian Ocean Tsunami Warning System Program supported by the United States Agency for International Development and partners, Bangkok, Thailand. 144 pp. January 2008. www.iotws.org

It has become apparent, this guide says, that “even without a major catastrophe such as a large tsunami, most coastal communities are not resilient to normally recurring hazards.”

This guide attempts to build on the lessons of the 2004 Indian Ocean tsunami to reduce risk to vulnerable communities. Coastal communities are vulnerable because of increasing populations along the coasts and the associated impacts from human activities. Resilient communities have governance that provides involvement and leadership; manage their coastal resources; optimize land use and structural design; are aware of hazards; have a warning and evacuation plan; provide emergency response; and have a disaster recovery plan. The report offers benchmarks and guidance for each core element it identifies to aid in improving community recovery from coastal hazards.

Web Sites of Interest

Fires, Floods, Earthquakes, and Tsunamis: A Human Rights Perspective for Major Mountain Hazards – Sharing Knowledge on Disaster Preparedness in the Himalaya Region

www.disasterpreparedness.icimod.org

This site, developed by the International Centre for Integrated Mountain Development (ICIMOD) in Nepal, is billed as a knowledge-sharing platform for disaster risk reduction. The site supplies key practitioners with knowledge in the field of disaster preparedness—mainly for floods, landslides, and earthquakes—and helps build capacity in multi-hazard risk assessment. It is community driven and serves as a dynamic online repository for materials such as publications, reports, articles, links, and news related to disaster risk reduction. The prime target countries for the site are Bangladesh, India, Nepal, and Pakistan.

Quiz: What to do in an Earthquake

www.nwcn.com/sharedcontent/features/flash/quake/during.html

Think you know what to do in case of an earthquake? Take the quiz and find out. It will your knowledge about how to protect you and your family in an earthquake. In addition to the quiz, you'll be given the safest actions to take during an event. Several Web sites are presented at the end of the quiz that will further increase knowledge of earthquake preparedness.

FEMA Employee Survey

www.fema.gov/news/newsrelease.fema?id=43230

A study conducted by the Department of Homeland Security (DHS) reveals employee satisfaction within the department. The electronic survey performed in October of 2007 asked employees questions related to organizational accomplishments, workforce management, goals of the agency, leadership, and communication. The goal of the survey was to acquire information in hopes of further improving the agency's programs and policies. This site contains a summary of the results specific to FEMA and its employees.

National Disaster Life Support Foundation

www.ndlsf.org

The National Disaster Life Support Foundation (NDLSF) aims to extend the educational and networking activities in disaster medicine. This site presents information about the organization and its partner institutions and also explains the seven courses offered by the NDLSF.

HFA-Pedia: Encyclopedia of the Hyogo Framework for Action

www.eird.org/hfa.htm

The regional unit for the Americas at the United Nations International Strategy for Disaster Reduction

has developed HFA-Pedia, a new online information tool that fosters the exchange of information about the Hyogo Framework for Action (HFA). HFA-Pedia is an online "wiki"-based site with an interactive encyclopedia database relating to the implementation of the HFA. It is available in English and Spanish.

National Response Framework (NRF) Resource Center

www.fema.gov/emergency/nrf/mainindex.htm

The National Response Framework (NRF) Resource Center provides information about the NRF, an overview of the National Incident Management System, links to training courses, and numerous reference documents that supplement the NRF. In addition, the site features briefings about the NRF that are geared toward specific stakeholders.

Open for Business® Online Training Program for Small Businesses

www.disastersafety.org/business_protection

This free online training program, from the Institute for Business & Home Safety (IBHS), is designed to help small businesses better plan for disaster. The series of training modules supplements the print version of the popular Open for Business® disaster planning toolkit. Each of the eight online modules runs less than 20 minutes, and users can set up automatic e-mail reminders to help them schedule and complete all of the sections over time. When all modules and accompanying homework are finished, the user will have a completed Open for Business® business continuity and disaster recovery plan.

National Hurricane Center Virtual Tour

www.nhc.noaa.gov/nhctour.shtml

Visitors to this new site can experience a virtual tour of the NOAA National Hurricane Center. The site provides panoramic views of different areas of the famous forecast facility, accompanied by audio and text descriptions. Included in the virtual tour are the National Hurricane Center operations, the Tropical Analysis Forecast operations, the NOAA Miami Regional Library, and the Miami National Weather forecast office.

Florida Division of Emergency Management (FDEM) Media Center

www.fdem-mediacenter.org

The Florida Division of Emergency Management's Interactive Media Center features numerous video public service announcements (PSAs), in both Spanish and English, on topics such as emergency supply kits, hurricane wind protection, pets and disaster, and family disaster plans. The site also presents videos of officials discussing lessons learned and a regular video blog from Craig Fugate, the director of the FDEM.



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.

International CRED Summer Course 2008: Assessing Public Health in Emergency Situations—Brussels, Belgium: July 7-18, 2008. The two-week intensive course familiarizes professionals with epidemiological techniques to help determine the impacts of disasters and conflicts. It introduces participants to the methods and tools of epidemiology in humanitarian emergencies. CRED showcases different uses of quantitative tools for the assessment of health needs in populations affected by catastrophic events.

bernadette.dubus@uclouvain.be

www.cred.be/Aphes/

2008 Seismic Engineering International Conference: Commemorating the 1908 Messina and Reggio Calabria Earthquake—Reggio Calabria, Italy: July 8-11, 2008. The conference will discuss the state of the art, best practices, and new research results in earthquake engineering and geotechnics.

mercea08@unirc.it

www.mercea08.org

Continental Divide Disaster Behavioral Health Conference: Preparing for Pandemic—Colorado Springs, Colorado: July 8-10, 2008. This interactive conference is designed to assist emergency management and all hazards planners, public health and homeland security officials, medical personnel, researchers, and behavioral health specialists to improve care provided to those affected by catastrophic events. Academic researchers and instructors are encouraged to attend. Leading civilian and military behavioral health experts will speak. The conference addresses disaster planning, response, and recovery issues and includes a day-long tabletop exercise.

www.uccs.edu/codivide

6th International Conference on Case Histories in Geotechnical Engineering—Arlington, Virginia: August 11-16, 2008. Professionals from countries from around the world will present their research findings. The conference aims to advance the state of the art and practice in several areas giving definitive direction to future work. Themes include case histories of unexpected behavior and failure of shallow, deep, and other foundations; failures of slopes, dams, embankments and landfills, including those on landslides and other mass movements; failure of geotechnical earthquake engineering; of engineering vibrations, vibration control for underground and surface constructions with specific emphasis on the urban environment.

prakash@mst.edu

campus.mst.edu/6icchge/index.html

Doctors for Disaster Preparedness 2008 meeting—Mesa, Arizona: July 11-13, 2008. DDP promotes homeland defense and prudent preparedness for disasters of all kinds,

including war or terrorism. Its annual meeting brings together American authorities on strategic and civil defense along with prominent scientists speaking on real threats or manufactured scares. Recent topics: global warming, ozone depletion, radiation hazards and radiation hazards.

ddp@ddponline.org

www.oism.org/ddp

2008 ASTHO-NACCHO Joint Conference: Becoming the Healthiest Nation in a Healthier World—Sacramento, California: September 9-12, 2008. This annual conference offers learning and networking opportunities for state and local health officials, and their public health partners from all geographical regions of the nation. Participants will be able to share perspectives and engage in dialogue on key public health practice issues. The conference features skills-building trainings, educational sessions, networking opportunities, and access to information about available resources.

www.astho.org

National Pediatric Trauma and Disaster Services Summit — Los Angeles, California: September 11-12, 2008. This meeting brings together more than 500 individuals from around the country to interact with interested and relevant demographic to discuss the current state of pediatric emergency services and disaster preparedness nationwide; deliberate about successes and challenges facing trauma networks; develop a consensus around a pediatric trauma and disaster research agenda; and discuss latest trends disaster communication and logistics support technology.

maribeth@bscmanage.com

www.ped-trauma-chla.info/

INTERGEO Conference and Trade Fair for Geodesy, Geoinformation, and Land Management—Bremen, Germany: September 30-October 2, 2008. This trade fair and conference is the world's largest communication platform for geodesy and geoinformation. Featured topics will include satellite systems, flood protection, polar research, and urban renewal in times of demographic and economic change. Over 1,500 experts will give presentations on the latest developments in the German and European markets. Participants will have the opportunity to get first-hand information on real-world scenarios from companies focusing on key topics within the industry.

ofreier@hinte-messe.de

www.intergeo.de/2008_en/englisch/index.php

9th Regional Training Course on Flood Disaster Risk Management—Bangkok, Thailand: October 6-17, 2008. The Flood Disaster Risk Management course is an integrated ap-

proach to the development of flood risk reduction strategies that involve engineering, settlement, development, public administration, and community-based strategies and land use planning with environmental consideration. This multi-disciplinary treatment of the flood problem and flood risk management enables a holistic view of the situation and the needed preparedness measures. Case examples of various responses at the national and local levels are presented to give the mitigation measures concrete applications.

adpc@adpc.net

www.adpc.net/v2007/TRG/

46th Annual Conference of the Urban and Regional Information Systems Association (URISA)—New Orleans, Louisiana: October 7-10, 2008. The URISA Annual Conference traditionally attracts professionals interested in management and policy discussions of information technology and geographic information systems issues. URISA 2008 will challenge participants to better manage, analyze, plan and implement technology for more effective and efficient government operations.

info@urisa.org

www.urisa.org/conferences/aboutannual

14th World Conference on Earthquake Engineering—Beijing, China: October 12-17, 2008. Started in 1956 and held every four years, the World Conference on Earthquake Engineering (WCEE) is the most influential and the largest professional event in the field of earthquake engineering. This year's meeting will serve as an international forum at which more than 3,000 specialists, government officials, and nongovernmental organization representatives in earthquake engineering and relevant fields will exchange their latest research results and technologies. It will also serve as an opportunity for vendors to display their latest products and services. The conference strives to promote innovation, transformative practice, and durable safety in reducing the impact of earthquakes on our society and natural environment.

pco@14wcee.org

www.14wcee.org

Gender and Climate Change Global Congress of Women in Politics and Governance—Makati City, Metro Manila, Philippines: October 19-22, 2008. Women parliamentarians, women in governance and environmental organizations, youth leaders, and media practitioners are encouraged to attend this meeting. The discussion on gender and climate change will be organized around identifying the challenges to action as well as defining the appropriate responses to effectively address the impacts of climate change. The focus of the discussions will revolve around defining and elaborating actions (i.e. preparedness, disaster risk reduction, adaptation, and mitigation) to cope with climate change and its impacts.

globalcongress2008@capwip.org

www.capwip.org

10th Annual Technologies for Critical Incident Preparedness

Conference and Exposition 2007—Chicago, Illinois: October 29-31, 2008. This annual conference highlights the technology and training tools currently available and being developed for the emergency responder community. The conference will provide a forum for emergency responders to discuss best practices and exchange information. Expected to draw 1,500 attendees and 150 exhibits, the three-day conference will bring together key leaders and decision makers—offering responders, business and industry, academia, and federal, state, tribal, and local stakeholders a unique forum to network, exchange ideas, and collaboratively address critical incident technology and preparedness needs, protocols, and solutions.

info@ctc.org

www.ctc.org

Institute for Business and Home Safety Annual Conference on Property Loss Reduction: Building Solutions through Science—Tampa, Florida: November 13-14, 2008. This year's conference will offer workshops, engaging speakers on a variety of topics important to the insurance industry, and discussions regarding the latest IBHS research. The annual conference on property loss reductions brings together professionals in the insurance industry, emergency management, government agencies, and academic institutions to discuss the latest developments in natural hazards mitigation.

info@ibhs.org

www.disastersafety.org/conference/

American Geophysical Union Fall Meeting—San Francisco, CA: December 15-19, 2008. The Fall Meeting provides an opportunity for researchers, teachers, students, and consultants to present and review the latest issues in all areas of earth and space sciences. Companies, publishers, government agencies, educational institutions, research facilities, scientific societies, and others will be exhibiting the latest in geophysical instruments, equipment, software, books and journals, minerals, fossils, and scientific programs at the meeting. The 2008 Fall Meeting is expected to draw 15,000 attendees.

fm-helo@agu.org

www.agu.org/meetings/

IAEM 56th Annual Conference & EMEX 2008: Putting a New Spin on Emergency Management—Kansas City (Overland Park), Kansas: November 15-20, 2008. The IAEM Annual Conference provides a forum for current trends and topics, information about the latest tools and technology in emergency management and homeland security, and advances IAEM committee work. Sessions encourage stakeholders at all levels of government, the private sector, public health, and related professions to exchange ideas on collaborating to protect lives and property from disaster. Emergency managers, homeland security officials, first response coordinators, private industry risk managers or contingency planners are encouraged to attend.

info@iaem.com

www.iaem.com/events/annual/intro.htm

The Pacific Coast Fire Conference: Changing Fire Regimes, Goals and Ecosystems—San Diego, California: December 1-4, 2008. Fire and fuel managers, planners, implementers, resource specialists, fire ecologists, decision makers, researchers, students, and fire fighters should all plan to attend. This conference will provide a timely forum for the exchange of information on the ecology and management of fire adapted and affected ecosystems along the Pacific Coast of the United States and adjacent Canada and Mexico in a time of changing climate and rapid population growth. The conference will feature opening and closing plenary sessions related to the conference theme.

kmurphy@fs.fed.us

www.humboldt.edu/pcfir/

8th Annual New Partners for Smart Growth: Building safe, Healthy, and Livable Communities—Albuquerque, New Mexico: January 22-24, 2009. This conference invites a variety of interdisciplinary participants and speakers to share experiences, insights, valuable tools, and strategies to encourage smart growth implementation. Topics include the latest research, cutting-edge implementation tools and techniques, best practices, model projects, policies and codes, coordinated networking activities, interactive learning experiences, and new partners.

nnichols@lgc.org

www.newpartners.org/index.html

The World Conference of Humanitarian Studies (WCHS) — Groningen, Netherlands: February 4-5, 2009. This conference seeks to provide a venue where scholarly communities can debate insights on and understanding of humanitarian crises through a dialogue with policy actors and implementing agencies. It aims to produce close collaboration and dialogue with policy makers and practitioners. As a world conference, its central aims are to provide a meeting ground for academic communities and practitioners concerned with in-depth research on humanitarian issues; take stock of the current theory, debates, and issues of humanitarian studies; and reflect on current practice and identify opportunities for improving humanitarian practice.

info@humanitarianstudies2009.org

www.humanitarianstudies2009.org

2009 ASPA Annual Conference: Governance in the Midst of Diversity, Bridging Opportunity and Challenge—Miami, Florida: March 20-24, 2009. This conference will explore and develop innovative practices for public administration to address the growing diversity of communities around the country. It emphasizes the importance of context and culture on the sustainability of innovations, and ASPA's role in supporting public administration globally from a U.S. perspective. This conference seeks to provide a platform on

which to build a new knowledge base that can help inform public administration practice and theory in the midst of diversity.

info@aspanet.org

www.aspanet.org/scriptcontent/index_aspaconference.cfm

2009 National Hurricane Conference—Austin, Texas: April 6-10, 2009. The primary goal of the National Hurricane Conference is to improve hurricane preparedness, response, recovery, and mitigation to save lives and property in the United States and the tropical islands of the Caribbean and Pacific. In addition, the conference serves as a national forum for federal, state and local officials to exchange ideas and recommend new policies to improve Emergency Management. To accomplish these goals, the annual conference emphasizes: lessons learned from hurricanes; state-of-the-art programs worthy of emulation; new ideas being tested or considered; information about new or ongoing assistance programs; and the ABC's of hurricane preparedness, response, recovery, and mitigation.

mail@hurricanemeeting.com

www.hurricanemeeting.com/

Earthquake & Tsunami: Civil engineering Disaster Mitigation Activities, Implementing Millennium Development Goals—Istanbul, Turkey: June 22-24, 2009. Those interested in various aspects of the seismic risk reduction problem are invited to participate in this conference for civil engineering disaster mitigation activities concerning earthquakes and tsunami. The major objective is to contribute to the mitigation of life and material losses in earthquake and tsunami on through improved civil engineering practice. The emphasis of the conference will be on the Millennium Development Goals, through seismically safe schools, hospitals, dwellings etc., or more generally, seismically safe and sustainable built environment. The scope of the conference is limited to the civil engineering related disaster mitigation activities concerning the problems of earthquake and tsunami.

duz@imo.org.tr

www.imo.org.tr/eqf2009/

2008 Student Paper Competition: Honorable Mention

The Natural Hazards Center received submissions in March 2008 for the Annual Hazards and Disasters Student Paper Competition. The papers represented a variety of disciplines, including city and regional planning, disaster and emergency management, law, human resource development, engineering sciences, and public policy. Students submitted their recent literature reviews, theoretical arguments, case studies, or descriptions of research results on topics relevant to the social/behavioral aspects of hazards and disasters. The topics included the impacts of Hurricanes Katrina, disaster theory, federal disaster relief, disaster response, cargo security, response to the 2004 Indian Ocean tsunami, emergency management training, coastal flood management, and vulnerable populations.

Historically, the Natural Hazards Center has received submissions from both graduate and undergraduate students. This year, all submitted papers were written by graduate students. The papers were judged on content, technical elements, and overall presentation. Three papers were selected to receive Honorable Mentions. The papers were written by graduate students Kelly Preece, a third year law student at the University of Utah; Adam Rostis, a graduate student studying management at Saint Mary's University in Halifax, Nova Scotia; and Andrew Rumbach, a graduate student studying city and regional planning at Cornell University.

Preece's paper, titled "The Federal Super State: An Alternative Approach to Federal Disaster Relief," argues against the federalization of disaster relief, proposing a decentralized approach based on the success of the Emergency Management Assistance Compact (EMAC).

Rostis' paper, "Developing a Behaviorally Anchored Rating Scale for Disaster Response Performance," uses

multi-stage methodology to assess the performance of individuals involved in a disaster response.

Rumbach's paper, titled "The Vulnerable City: The Role for Planning in Urban Disaster Studies," describes the theoretical and practical "gulf" that exists between development professionals, emergency relief organizations, and urban planning.

Next year's call for papers will be announced in January 2009. The student paper competition was created in 2004 with the intent of recognizing the highly interdisciplinary nature of hazards and disaster research.

Welcome, Dan and Jolie

The Natural Hazards Center welcomes Jolie Breeden, who joined the Center staff in May as Program Associate. In that position, Jolie compiles and edits the Disaster Research e-newsletter, manages the Center's Web site, assists in the coordination of special projects and publications, and manages the Center's Quick Response Research Program. Jolie graduated summa cum laude from the University of Colorado at Boulder with a bachelor's degree in journalism.

Before joining the Natural Hazards Center, she was as a reporter for various Front Range newspapers, including the *Broomfield Enterprise*, the *Longmont Daily Times-Call*, the *Boulder Daily Camera* and the *Rocky Mountain News*. She has also administered news Web sites for Clear Channel Denver.

The Center also welcomes Dan Whipple, who joined the staff on May 1, 2008, as the Observer editor. Dan will compile and edit the Natural Hazards Observer newsletter and assist with coordination of special projects and publications. Dan has been a writer and journalist for more than 30 years, specializing in science and environmental issues. He served as editor of *High Country News* and *Northern Lights* and held several editorial positions at the daily Casper (Wyo.) *Star-Tribune*. Dan holds a bachelor's degree in international affairs from Georgetown University and was a Ted Scripps Fellow in Environmental Journalism at the University of Colorado during the 1997-98 academic year.

Natural Hazards Observer

ISSN 0737-5425

Printed in the USA.

Published bimonthly. Reproduction with acknowledgment is permitted and encouraged.

The *Observer* is free to subscribers within the United States. Subscriptions outside the United States cost \$24.00 per year. Back issues of the *Observer* are available for \$4.00 each, plus shipping and handling. Orders must be prepaid. Checks should be payable to the University of Colorado. Visa, MasterCard, and American Express cards are also accepted.

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.

A U.S.-based organization, the Natural Hazards Center is a nonprofit, tax-exempt corporation under Section 501(c)(3) of the Internal Revenue Code.

The mission of the Natural Hazards Center is to advance and communicate knowledge on hazards mitigation and disaster preparedness, response, and recovery. Using an all-hazards and interdisciplinary framework, the Center fosters information sharing and integration of activities among researchers, practitioners, and policy makers from around the world; supports and conducts research; and provides educational opportunities for the next generation of hazards scholars and professionals. The Natural Hazards Center is funded through a National Science Foundation grant and supplemented by contributions from a consortium of federal agencies and nonprofit organizations dedicated to reducing vulnerability to disasters.

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Observer cartoons are drawn by Rob Pudim.

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