Cat tales

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ICLR launches new Website

Third generation site "go to" place for hazard research

ICLR has launched a new Website, the third in the Institute's 13-year history.

The site was quietly posted in late summer in order to allow for beta testing, and to ensure that everything was working as it should. This was key, as the site is an essential part of ICLR's goal to keep key stakeholders informed of its activities in the area of hazard research.

Along with a new look and improved navigation, the site leverages a great amount of information that has existed for some time but had not been made available on ICLR's previous site.

Among this information is a section containing all magazine articles authored by ICLR staff since 2004 (of which there are currently more than 35); strategy and planning documents; annual report cards; safety brochures; information on the Institute's monthly *Friday Forum* seminars including presentations going back a number of years and the ability to register for future seminars online; as well as press releases and speeches.

Additionally, the site contains *CAT Hotsheets*, factsheets that contain key information about major Canadian historical natural catastrophe events, including key dates, loss figures and brief narratives. Further, all research papers on the Institute's site now come with abstracts.

The site also contains profiles of key players within ICLR, including information on the Institute's Board of Directors, Management Committee and Insurance Advisory Committee.

The new site, which was in the works for close to two years, was designed by the Institute and is maintained internally. Updates are very regular, often daily.

All-in-all, the new site is a vast improvement over previous sites and offers the Institute's audiences a great deal of information.

ICLR hopes the new site will drive a dramatic increase in traffic from all of the Institute's key stakeholders, including insurers, reinsurers, academics, ►

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Inside this issue:

Towards reducing the impacts of extremes: A recent workshop

By Ronald Stewart, University of Manitoba

Extreme weather and climate events are an increasingly important problem for Canada. Over the past decade, there have been devastating and enormous damages and substantial loss of life associated with extreme weather and climate events. Society is becoming more vulnerable to such extremes as a result of our ever-increasing population and the continual expansion of infrastructure into vulnerable areas. There is also increasing concern that the occurrence and intensity of extremes will likely increase with a changing climate. Given the seriousness of this threat; such a likelihood and its implications for society and infrastructure must be carefully examined.

Although the public is aware of extremes and their severe consequences, there is a critical need for additional research to be focused on extreme weather and climate events to minimize their impacts. Such research must lead to an understanding of their nature, variability and antecedent conditions; it must also assess how these events may change in the future; and this research must be coupled with complementary actions that utilize this knowledge to improve society's response.

Despite growing recognition of their importance in Canada and internationally, there are still major concerns associated with extremes. Key ones include:

* gaps in the documentation and integration of these phenomena;
* lack of fundamental understanding of the many means and/or chains-of-events leading to them;
* development of a scientific basis for early warning systems;
* collaborative efforts between physical and social scientists;
* gaps in the communication of progress to society;
* policy issues associated with anticipating and responding to extremes to decrease vulnerability; and,
* private sector's responses to extremes.

There are a number of efforts taking place in Canada that address some of these issues but they tend to be uncoordinated. It is time to harness the diverse efforts related to extremes to ensure they have the maximum benefit for Canada. Although Canada is a small country by population, its citizens now suffer more than many others because of inadequate access to information on extremes and inadequacy of the policies addressing them.

Such considerations led to a May 20-21, 2009 workshop at the University of Manitoba. The objective of this workshop was 'To consider how to reduce the impacts of extremes on Canadian society through collaborative activities.' The 80 participants were from across Canada and the United States and from diverse backgrounds. They included academic and government researchers addressing the physical and social aspects of extremes as well as numerous people involved in applications. The co-chairs of the workshop were Ronald Stewart, Paul Kovacs of the Institute for Catastrophic Loss Reduction, and Harvey Hill from Agriculture and Agri-Food Canada. The overall effort is referred to as REDE (Research for Disaster reduction from Extremes) and the workshop was sponsored by the Natural Sciences and Engineering Research Council of Canada (NSERC), Canadian Foundation for Climate and Atmospheric Sciences (CFCAS), ICLR, and the University of Manitoba.

The presentations and break-out discussions included:

* The need to measure and predict those aspects of extremes that have the most significant impacts;
* The capabilities and deficiencies of current policies for reacting to extremes;
* Needs of the private sector for addressing extremes;
* Emerging approaches to assessing vulnerability to extremes and valuing alternative adaptation responses.

Summary of workshop

The importance of the issue was established by the opening speaker, Deputy Minister Ms. Linda McFadyen of the Manitoba Ministry of Intergovernmental Affairs which is responsible for the Emergency Measures Organization. She noted that Manitoba is concerned about the possible effects of climate change on the increasing occurrence and intensity of extreme events. In particular, she referred to the Elie tornado and the 2009 Red and Assiniboine River floods. Some of the Manitoba government's priorities related to disasters include the expanded distribution of alerts, increased public education and better emergency planning.

The following presentations, as well as the focused break-out sessions, elaborated on the physical, social and applications aspects of extremes and disasters. Fifteen presentations provided participants with an overview ►

ICLR launches new Website *cont*...

government decision makers, students and the general public. Early indications are encouraging, as the new site has had close to 7,000 visits in the first three months for which data are available.

Some of the more popular pages include information on the Institute's Open for Business™ small business continuity planning toolkit, research on the Institute's Safer Living program, and pages containing abstracts of various ICLR research papers.

Popular downloads are anticipated to include the Institute's *Handbook for reducing basement flooding* and a *Damage Report from the Vaughan Tornadoes*, both of which are available directly off the homepage.

The new Website has been described by one insurance industry journalist as "more robust" than the Institute's previous site. And with the Institute's focus on building resilient communities, robust is an adjective ICLR can definitely live with.

Towards reducing the impacts of extremes *cont*...

of the physical factors that are associated with extremes. The specific topics of these presentations included extremes and their trends from a climatological perspective over the world and over Canada and the science of particular phenomena (drought, storms, flooding, heavy precipitation, forest fires, lightning and coastal flooding). Most of the presentations commented on the likelihood of change in the occurrence of extremes with a changing climate. Ten presentations provided participants with an overview of how society responds to extremes and some of the things that could be done differently. Topics that were presented included the inventories of disasters in different regions of Canada, insurance industry's efforts to reduce disasters, research to reduce damage from wind, and prediction of flooding. Several presentations discussed provincial and federal level activities that are underway to better adapt to extremes (including drought, heavy precipitation, and floods). Twelve presentations discussed the relevant plans of organizations, programs and projects dealing with extremes. These talks illustrated many levels of effort from the broad international, through the federal and provincial level, down to programs at individual universities.

Two break-out sessions were held which allowed the participants to discuss the key issues of importance to the workshop. In terms of addressing disasters, the groups generally rated the current situation as "ad hoc, patchwork, and multi-disciplinary but not well integrated." Current warning systems are sometimes effective (such as floods in some regions) but others (weather conditions under some circumstances) are not and a major related issue is the education of the public for dealing with information related to extremes. In addition, multi-levels of government are often involved in predicting and dealing with extremes; coordinating this is an ongoing issue although progress is being made.

The workshop was a remarkable success, achieving all of the goals that had been set for it including the establishment of many new connections. REDE needs to build on the workshop's success by promoting on-going communication between physical science/social science/ applications groups. One means of accomplishing that is through the development of a research network. Opportunities for funding this are expected to soon arise.

Detailed information on the workshop is available at http://docs.google.com/Doc?id=dcpfkpg_1d2vbhxfn&hl=en

Taming the big bad wolf

An eyewitness account of the damage tornadoes did recently in the Vaughan area of Ontario, just north of Toronto, suggests roof nails are still missing the mark.

By Greg Kopp
Boundary Layer Wind Tunnel Laboratory, University of Western Ontario

Multiple tornadoes ripped across Southern Ontario on August 20, 2009, resulting in the tragic death of a young boy in Durham and significant damage to hundreds of homes in Vaughan, just north of Toronto. Damage was widespread, hitting cars, crops, utility poles and many types of buildings.

The damage in Vaughan was concentrated in two neighbourhoods, one near Hwy 7 and Martin Grove Rd. (in an area called Woodbridge), and the other near Jane St and Teston Rd. (in an area called Maple).

Many discussions and opinions about construction quality have taken place, as always seems to happen after such events. Much of the information being put forward is incorrect, or at least misleading. In particular, the focus has been on the construction methods used for the walls -- i.e. brick versus wood. It's as if the story of the *Three Little Pigs* has become the focus of our attention. And yet when the wolf blows, some particular things happen, but the issue is not how the walls are made. In the Woodbridge area, the houses were of masonry construction with block and brick walls. These are strong walls. In the Maple area, the houses were wood-framed and clad with either brick or stone facades and they seemed to be weaker.

In fact, the method of wall construction has little to do with the performance and damage observed in these storms. Rather, the main issue has to do with how the roofs are constructed -- most importantly, how the roofs are connected to the walls.

When we joined Environment Canada to examine the storm sites, we observed the vast majority of the damage was due to roof failures such as sheathing (plywood sheets nailed to the trusses) and toe-nailed, roof-to-wall connections coming off. Damage caused by debris also played a role, as discussed below. The more severe Barrie tornado in 1985 showed that deaths often occur when walls collapse; this occurs when roofs are removed. So, while it is perhaps true that double-brick walls offer more protection when the roof is off, this was not an issue in the instance of the Vaughan area tornadoes (although there were a handful of locations where walls failed following roof failure). As a matter of fact, double-brick walls collapse, too. We saw a few of these in Woodbridge. Fortunately, no one was hurt there.

When wind blows on a house, or any other structure, it causes uplift on the roof. To understand the effects of this, imagine holding the house upside down and shaking it. One can immediately see the nail connections become the issue (see 'All about the nails,' *Canadian Underwriter,* January 2009). The primary role of the nail connections is to hold the roof in place. If the roof is not connected to the walls, only the weight of the roof holds it down. Since our roofs are made of wood, they tend to be light, offering little resistance to the forces induced by the wind unless they are well-fastened.

Figure 1 shows one example of a failure because the roof was not connected to the walls; rather, in this pitched roof construction, the structural members of the roof were placed in slots in the blocks. The arrow points to where one of the connections should be, but, in fact, there was nothing holding the lumber to the interior wall. In Vaughan, we also saw many roofs that had been properly connected, and yet failed. This was a severe windstorm.

The other major issue in windstorms, particularly for tornadoes, is wind-borne debris. When upwind structures or parts of structures fail, the wind carries these elements. They can travel a long way and with high speed. In a suburban neighbourhood, a high probability exists that these elements will subsequently hit down-wind houses. If debris happens to collide with a window or a garage door, the window or garage door will likely fail, allowing wind and rain to enter the building. Although the rain itself causes a lot of damage, the wind entering the building pressurizes it like a balloon, adding to the uplift on the roof and increasing the forces the nails must resist. ►

Figure 1

At this point, roofs often fail.

We saw a lot of evidence of debris impact in both neighbourhoods. Many windows and garage doors were broken by debris. We saw many 2x6 and 2x8 pieces of wood penetrate roofs and windows like spears. (See Figure 2.) This is why you are always advised to stay away from windows in tornadoes and head for the basement.

Wind-borne debris is very dangerous, as shown by the tragic events in Durham, and should be mitigated as much as possible. A primary way to do so is to ensure that the roof structure remains intact. Reducing the possibility of shingle and vinyl siding failures also helps. In this latter regard, it was good that the houses in Vaughan were brick-clad, so that vinyl-siding was not an issue. Also, the brick material meant relatively little debris penetrated the walls. We saw many black marks on walls where shingles had hit the bricks.

Figure 2

Figure 3

Figure 3 shows an example of the type of roof failure induced by wind-borne debris. Here, the second floor windows were broken, leading to severe internal pressurization, causing the subsequent failure of the roof. Thus, when failures occur in one house, it can lead to failures in neighbouring houses because of the wind-borne debris. In Maple, debris caused a lot of damage. It broke many second floor windows and garage doors. The garage door failures led to garage roofs coming off in several instances, while window failures led to roof failures.

The solution for the problem of roof failures for winds as severe as occurred in these F2 tornadoes, is actually rather inexpensive -- hurricane straps. These are readily available, easy to install in new construction, less prone to errors in installation and, best of all, inexpensive. At most, they would add a few hundred dollars to the cost of a new house. As part of the '3 Little Pigs' project at our Insurance Research Lab for Better Homes (IRLBH) at the University of Western Ontario, we are currently testing such technology in order to find optimal solutions that minimize costs and maximize safety for both new homes and existing ones. If the houses in Vaughan had been built with this technology, we believe the overall losses would have been significantly reduced. Examples of such construction exist in Ontario. Two houses have been recently constructed following the Institute for Catastrophic Loss Reduction's "Designed for Safer Living" program. These are in Fort Erie and Sudbury (with a third in P.E.I.). All were built in partnership with The Cooperators.

We hope more houses get built this way, thereby taming the Big, Bad Wolf.

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El Niño

Four lessons for Canadian insurers.

By Paul Kovacs

El Niño is expected to shift Canada's weather patterns in Winter 2009 and into 2010. Insurers may experience a few months of reduced vehicle collision claims, and the risk of water damage claims may fall temporarily in some regions like Ontario. Unfortunately, this may be partially offset by the increased risk of wildfire damage, and an increased risk of water and wind damage in the Greater Vancouver Area and over much of Vancouver Island. Ultimately insurers should plan for longer-term trends to reassert themselves when the El Niño subsides, trends that have brought more than four decades of rising water and wind damage claims across most of the country.

The sea surface temperature in the eastern Pacific Ocean has warmed by three degrees since January 2009. In the past 50 years, there have been only five other years when the Pacific Ocean warmed as much and as quickly. This warming has brought El Niño conditions that are expected to strengthen through the winter.

The specific changes we will experience in Canada are uncertain. Nevertheless, the five strongest El Niño events over the past 50 years have brought warmer winters across south central Canada and drier winters for some regions (including southern Ontario), with an important exception being a significant increase in rainfall over the Greater Vancouver Area and most of Vancouver Island.

Large losses can occur at any time. Indeed, the 1998 Ice Storm and 1997 Porcupine Hills winter grass fires struck in the midst of a strong El Niño event. The Kelowna wildfire and Hurricane Juan struck in 2003, following a moderate El Niño winter. Despite these large insured loss events, averaged over the past 40 years, there have been fewer severe weather events in El Niño years in most regions of Canada than in non-El Niño years.

What is El Niño?

The prevailing trade winds typically push warm surface waters across the Pacific Ocean from Peru toward Tahiti. Every two to seven years, on average, the winds falter for several months, resulting in the warm waters shifting from the western Pacific to the east. Scientists describe this phenomenon as the El Niño Southern Oscillation, or El Niño. Mechanisms that drive the oscillation remain a matter of research, but for more than 300 years this has been a quasi-regular feature disrupting global weather.

The impact of El Niño is strongest in South America, South Asia and Australia, but anomalous weather events can occur around the globe. Effects on the weather vary with each event, but developing countries are especially affected if they border on the Pacific Ocean and are dependent on agriculture and fishing.

Current conditions are not as extreme as they were during the El Niño event of 1997-98, and have attracted less attention. Nevertheless, the weather in 2010 should differ from that experienced over the past two years.

How will El Niño affect Canadians?

The impact of the current event is unknown. The experience of the five strongest El Niño events over the past 50 years, adjusted for the effect of climate change, provides a sense of what we may experience this winter and into next year.

The most evident impact will be a warming of many urban centres across the country. The greatest warming, likely approaching three degrees this winter, will be in the Winnipeg area. Warming of more than one degree may be evident in Toronto, Montreal, Ottawa, Edmonton and Calgary, relative to typical winter conditions. Near-normal average winter temperatures are likely in coastal communities like Vancouver and Halifax.

Past El Niño events brought somewhat drier winters across southern Ontario and the interior of British Columbia. Near-normal conditions were evident on average in Montreal, Ottawa, Edmonton and Calgary. However, there was significantly increased rainfall in Vancouver and most of Vancouver Island. Changes in Canada's winter weather patterns are due to the forcing of the Polar Jet stream further north. The impacts are larger and more consistent over time in locations closer to the Pacific Ocean, and smaller and more variable in locations closer to the Atlantic Ocean.

How will El Niño affect insurance claims?

A largely unmeasured benefit of El Niño for Canadians and Canadian insurance companies has been a reduction in winter vehicle collisions, particularly in western Canada and Ontario. The prospect of warmer and perhaps drier winters in many urban centres this winter and spring may bring a temporary reduction in collisions.

The impact of El Niño on the risk of water and wind damage claims is difficult ►

to assess. El Niño may bring a somewhat drier winter in southern Ontario. However, the risk of unusual winter storm events in Southern British Columbia may increase, including severe wind gusts causing property damage. The largest water and wind damage claims typically coincide with severe summer storms. The influence of El Niño over the risk of summer storm damage is uncertain because: 1) research is ongoing to help understand what links may present between El Niño and storm activity; and 2) it is unclear whether or not El Niño will still be active at that time.

Warmer and drier winters are expected to increase the risk of wildfires. Some increase in the risk of grass and forest fire is likely across most of the country. An increase in the number of wildland fires would increase the risk of fire damage extending into the urban interface and destroying property.

Atlantic Canada and Quebec are the regions in Canada least likely to be affected because they are located a great distance away from the Pacific Ocean. However, the strongest measured El Niño event struck in the winter of 1997- 98, coinciding with the Ice Storm in eastern Ontario and Quebec, the most destructive storm in Canadian history. The severity of the Ice Storm was only partially related to the strength of El Niño, but the 1998 event does provide a warning that it remains difficult to anticipate severe weather risks in Canada.

El Niño causes unusually strong upper winds that disrupt the development of Atlantic hurricanes. Indeed over the period since 1925, research by Roger Pielke and Christopher Landsea found that the risk of Atlantic hurricanes making landfall in North America is two or three times greater in non-El Nino years than in El Niño years. This was evident during 2009 with the welcome decline in hurricane activity. Further monitoring is required to determine if the current El Nino is sustained long enough to continue to suppress the risk of hurricane damage through the 2010 season.

How long this El Niño will persist is uncertain. We don't yet know what the event's ultimate strength and specific consequences will be. But there is a strong consensus that unusual weather patterns will prevail through the winter and into 2010.

Four lessons for insurers

1. Each El Niño event is unique, but a review of the historical experience suggests insurers should expect a modest overall reduction in damage claims dur ing El Niño events like the present oscillation. In particular, vehicle collisions should decline in urban centres that experience warmer and drier winters.

2. Large events can occur at any time, and have occurred during El Niño events. Nevertheless, the risk of large losses is reduced during El Niño events. The Ice Storm, winter grass fires in southern Alberta, summer forest fires in central British Columbia and Hurricane Juan all struck following an El Niño winter. However, the majority of Canadian severe weather loss events occur during non-El Niño years. It is important that insurers recognize significant risk remains, even if there is some evidence that El Niño somewhat reduces the risk of severe weather events.

3. El Niño events are complex and climate patterns can change quickly. Indeed, the results of a dozen climate models assessed by the International Research Institute forecast that the current El Niño may triple in strength over the next two or three months -- or it might decline to only half of its current strength. The El Niño Southern Oscillation remains subject to extensive research and uncertainty. Insurers should confidently anticipate that a moderate El Niño will affect the risk of claims damage this winter, but considerable uncertainty is present for this summer and fall.

4. Most importantly, the impact of El Niño on insurance claims in 2010 will not change the longer-term trends that have been increasing the risk of property damage. In particular:

• change in the climate is bringing more large storm events across most of Canada;
• our public infrastructure is collapsing in most communities and unable to provide the historic level of service; and
• rapid growth in urban centres and lifestyle changes resulting in finished basements have been increasing water and wind damage claims for more than four decades.

Insurers should continue to advance their efforts to actively manage this coverage and champion risk reduction.

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Mission
To reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters.

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