

Risky landscapes: adaptation in catastrophically generated habitats, Karakoram Himalaya.

Keynote lecture by Prof. Kenneth Hewitt

Dec. 1st 9:30-10:30 am

The paper looks at geohazards, especially the role of massive rock slope failures, in environmental and cultural context. Geohazards usually arise within the broader earth surface environment to which societies and their livelihoods are adapted. The intertwined benefits and dangers of flood plains, volcanic soils, or coastal zones offer obvious examples. Since great rockslides will destroy any living thing or built structure in their path, scientific studies have focused on the hazards they pose – which certainly are considerable in many mountain regions. However, in the transHimalayan valleys of the upper Indus basin, most of the habitable land also derives from hundreds of massive, more or less ancient rock avalanches, and landforms controlled by their blocking of valleys. Hundreds of villages and some small towns sit amid the rubble of rock avalanches, also modern infrastructure and ancient cultural sites. Most of cultivated land lies on river terraces, old lakebeds and alluvial fans resulting from landslide dams on the rivers. The more frequent, locally damaging debris flows, floods, and avalanches are mainly secondary hazards relating to ‘cycles of risks’ that follow from the large landslides. The cycle can be decades to millennia in length, and involves geomorphic adjustments to, and exposure of settlements in, landslide-fragmented valleys. The talk will outline the science behind the recent discovery of the landslides, but focus on how traditional land uses and modern developments are adapted, or not, to these catastrophically generated landscapes. Local stories and actions show the inhabitants had recognized the landslides long ago, and developed a ‘risk averse’ cultural geography with respect to the more frequent hazards. However, modernization is also undermining traditional approaches and creating new dangers for some, if benefits for others. The risks of living in such a habitat were dramatically revealed by the January 4th, 2010 Atabad, Hunza landslide. Other evidence suggests the great landslides are not just things of the past, nor so rare as not to threaten present-day schemes. The value of addressing geohazards in their landscape and development context is underlined.

Risk Management and Nature: 30 years of experience-10 Hints

Prof. John Shorteed

Dec. 1st 11:15-11:45 am

Presentation of Prof. Shorteed is available at:

<http://charisma2010.uwaterloo.ca/Program files/Presentation.pdf>

CHARACTERISTICS OF NATURAL HAZARDS

Keynote lecture by Dr. Gordon Woo

Dec. 2nd 10:30-12 am

The study of natural hazards has tended to be fragmented into the scientific disciplines of meteorology, hydrology, seismology, volcanology, geomorphology etc.. Apart from academic focus on the theory and phenomenology of specific hazards, there is much to be gained from a broad synoptic view of the characteristics of natural hazards. What have earthquakes and solar flares in common? How can earthquakes cause flooding, or an outbreak of plague? In this lecture, the common geoscientific elements shared by natural hazards will be highlighted, and the causal links and triggering mechanisms between different types of hazard event will be presented. Implications for the management, mitigation and public communication of natural hazards will be discussed.

Handling Hazard: Both Natural and Man-Made

*Keynote lecture by Prof. Richard Wilson
Mallinckrodt Professor of Physics, emeritus, Harvard University*

Dec. 3rd 9:00-10:30 am

Historically mankind has considered natural disasters as distinct from human disasters and this has changed only slowly.

Over 2000 years ago a bad storm occurred in the eastern Mediterranean Who was responsible? and the issue arose: who was responsible for it? Jonah 1:7 records the procedure:
"Come, and let us cast lots, that we may know for whose cause this evil is upon us. So they cast lots, and the lot fell upon Jonah"

In 1930 lawyers still distinguished Acts of God (for which no one was to blame) from Acts of men where blame could be assigned and compensation sought. .

1970 onwards we have many improvements in scientific analyses. We begin to foresee natural disasters. We can look for precursors. We can take precautions. We can be ready for emergency action. There is no need to blame God for human carelessness. The distinction between a natural event and one cause by human carelessness is small. They are best considered together. Drawing lots is no longer considered appropriate but a proper probabilistic calculation is. We now recognize that rare events do happen.

What is the Major Culprit for Global Warming: CFCs or CO₂?

Qing-Bin Lu, Ph.D.,

Department of Physics and Astronomy and Departments of Biology and Chemistry, University of Waterloo, Waterloo, Ontario, CANADA

Dec. 2nd 1:00-1:30 pm

My recent observation strikingly showed that global warming from 1950 to 2000 was most likely caused by the significant increase of chlorofluorocarbons (CFCs) in the Earth atmosphere [1]. In my most recent publication [2], I have further addressed three questions: (1) How could CO₂ play a negligible role in recent global warming in view of its extremely high concentrations of ≥ 300 ppm? (2) Is there other evidence from satellite or ground measurements for the saturation in warming effect of CO₂ and other non-CFC gases? And (3) could the greenhouse effect of CFCs alone account for the rise of 0.5~0.6 K in global temperature since 1950? In this talk, I will discuss these important issues and present both observed and calculated results. These results strength the conclusion that humans were responsible for global warming in late 20th century, but CFCs, rather than CO₂, were the major culprit; a long-term global cooling starting around 2002 is expected to continue for next five to seven decades.

References:

[1] Q.-B. Lu, Cosmic-Ray-Driven Electron-Induced Reactions of Halogenated Molecules Adsorbed on Ice Surfaces: Implications for

Atmospheric Ozone Depletion and Global Climate Change. Physics
Report 487, 141-167(2010).

[2] Q.-B. Lu, What is the Major Culprit for Global Warming: CFCs or
CO₂? Journal of Cosmology 8, 1846-1862(2010).

Probabilistic Analysis of Uncertainty Structure under Earthquake Excitation

Prof. Mahesh Pandey (PhD/PEng) and Xufang Zhang(M.Sc.)

Dec. 2nd 1:30-2:00 pm

It is mainly focus on the fractional entropy procedure for uncertainty
distribution computation. Dimensional reduction technique will be
discussed at first, and then applied for moment computation. Together
with fractional entropy procedure, a five-story shearing structure
under earthquake excitation has been examined for the application of
the proposed procedure.

Building Flood Resilience with Amphibious Architecture

Prof. Elizabeth C English

Dec.2nd 3:15-3:45 pm

Amphibious architecture refers to buildings that sit on dry land like
ordinary buildings, except when there is a flood, in which case they are
capable of rising and floating on the surface until the floodwater
recedes. This is a strategy that has already been applied successfully
in the Netherlands and in back-woods Louisiana. My students and I
are exploring amphibious housing as a superior flood mitigation
strategy for New Orleans (The Buoyant Foundation Project; the Rising
House; TILT House) and Bangladesh (The LIFT House). All of these
locations are deltaic regions where occasional flooding is anticipated to
worsen with the rise in sea level that is expected to accompany global
climate change. There is increasing awareness that traditional flood-
mitigation strategies that alter the environment and create
concentrations of risk, such as levee- and dike-building, only increase
the probability of catastrophic consequences to failure in the long run.
Amphibious architecture is a strategy that can reduce the hazard
vulnerability of flood-prone regions and increase their long-term
disaster resilience.

Emerging Tropical Pathogens as Natural Risks for Infectious Disease Outbreaks in Canada: The Vancouver Island Outbreak of *Cryptococcus gattii* Infection as a Case Example.

*Dr. Stephen McColl, Dept. of Health Studies and Gerontology,
University of Waterloo*

Dec.3rd 11:15-11:45 am

The pathogenic fungus *Cryptococcus gattii* is normally encountered as a tree-dwelling tropical fungus that can infect humans and other mammals in tropical regions around the world. In the last 15 years, a new infectious outbreak of a mutant form of *Cryptococcus* has occurred in the coastal regions of British Columbia, in particular in southern Vancouver Island. This serious outbreak illustrates the hazards attendant to the spread of tropical pathogens to warm-temperate regions in Canada. The possible influence of genetic mutation, ecological niche selection, land use practices, and climate change will be described, with the goal of developing appropriate risk management options to reduce the public health impact of the infection.

Community Resilience to Natural Disasters: A Case Study from Nova Scotia, Canada

Amber Silver

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Student presentation (Dec. 1st 2:45-3:15 pm)

Keywords: Natural disasters; community resilience; Hurricane Juan; resilience indicators; Canada

Disaster resilience has become the subject of considerable interest within the climate change policy community over the last five years. The UNFCCC and the World Bank have established a number of funding agencies (e.g., the Adaptation Fund and the Pilot Programme on Climate Resilience), whose primary objective is to support initiatives to improve community resilience in low- and middle-income countries. Although the UNFCCC only supports adaptation in the narrowest sense, there is still a considerable financial incentive for developing countries to demonstrate their vulnerability to climate

change. Composite indicators are increasingly being used by researchers and policy makers as a means of assessing community resilience. However, many composite indicator frameworks focus primarily on demographic and infrastructural measures of resilience without adequately representing behavioral measures of resilience. It has been well documented within the literature that soft systems, such as sense of community, social networks, self-efficacy, and traditional knowledge, are often better predictors of community resilience than hard systems. The case study of Hurricane Juan and its impacts in Nova Scotia, Canada will be explored and preliminary results will be discussed to support this assertion. It is recommended that additional research be conducted to determine effective and appropriate methods of assessing qualitative measures of disaster resilience at the community scale.

Analysis of Historically Significant Natural Hazards in the Okanagan Valley, BC

Danielle Huot, MES Candidate

Department of Geography and Environmental Management, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1 Presenting Author: dhuet@uwaterloo.ca

Poster Dec.1st and Dec. 2nd 3:15-4:30 pm

Keywords: natural hazards, Okanagan Valley, historical records, socioeconomic loss.

The purpose of this paper is to present some results of an analysis of historically significant natural hazards in the Okanagan Valley of southern British Columbia. Hazards include interface forest fires, floods, droughts, mass movements such as debris flows, windstorms, and other meteorological hazards such as cold snaps, heat waves and hail and snow storms. The analysis is carried out using archives of the Kelowna Daily Courier, the primary newspaper of the Okanagan Valley whose archives date back the furthest of any print news media in the valley (to January 1929). The archives are being used to evaluate the frequency of occurrence of natural hazard agents as well as their impacts including fatalities, injuries, property damage, economic losses, and various forms of societal disruption. Using these as criteria, the intention is to draw some conclusions about the relative importance of natural hazards that have historically affected the Okanagan Valley. Results suggest that meteorological hazards, especially cold snaps and heat waves, have been the most frequently

occurring natural hazards in the Okanagan, the impacts of which are expressed most significantly in the agricultural sector. The potential for flooding from spring snowmelt is frequently discussed but rarely results in actual flooding.