From the editor

All the best for 2020

This edition of Risky Ground provides updates on Centre for Natural Hazard Research activities, an opinion on the causes and impacts of the Australian forest fire situation, and announcements on publications, and opportunities for a field school, research funding, and conferences.

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Back issues of Risky Ground
http://www.sfu.ca/cnhr/news_events/newsletter.html

Current Activity

Centre for Natural Hazard Research Initiatives

The Centre for Natural Hazard Research (CNHR) continues to lead a number of exciting research initiatives. The two described here are hazard monitoring at Mount Meager, British Columbia, and a natural hazards data access portal.

Hazard Monitoring

After many years of effort and in close collaboration with various corporate (Innergex Renewable Energy, Weir-Jones Engineering, Nupoint Systems, Logocom Labs & TRE-Altamira) and government partners (SLRD, Village of Pemberton, BC FLNRO, BC Parks, & NRCan), CNHR, will install what will be Canada’s first volcano and landslide monitoring network on Mount Meager, a stratovolcano 160 km NW of Vancouver. Mount Meager last erupted 2400 years ago and is the site of Canada’s largest historic landslide, which occurred in 2010. The network will initially consist of gas detectors, seismometers, infrasound sensors and video monitoring and will offer an early warning for those living in the Village of Pemberton and Mount Currie. This instrumentation initiative has also led to early prototype testing of a modular “community-based natural hazards monitoring system” that will use low-cost, off-the-shelf technology to detect a wide range of parameters (e.g., air quality, landslide and snow avalanche, water levels, earthquakes, etc.). These sensor systems will eventually stream data to the local community to help engage members and support natural hazards education. As an aside, a recent proposal supported by CNHR and submitted to NASA will, if successful, fund the testing of an autonomous robot called AXEL that will repel down into one of the degassing fumarole ice caves at Mt. Meager (Fig. 1)!
Data Portal

With the successful funding of the Canadian Mountain Network, CNHR members are developing an open-access, dynamic and user-friendly Canadian Natural Hazards data portal for multi-modal, multi-temporal and multi-spatial data sets. This has set the groundwork for a large Canadian Foundation for Innovation Infrastructure proposal “The Canadian Natural Hazards Facility & Knowledge Portal” that, if successful, will support acquisition of a wide range of instrumentation to help image material from the micron to mountain scale (e.g., electron microprobe, hyperspectral/Lidar/Infrared drone platforms).

Finally, a shout-out to CHNR founding member, John Clague, who has been made an Officer of the Order of Canada for his contributions to natural hazards research and awareness.

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Opinion

The 2019-2020 Australian Bushfires and the Emerging Climate Crisis

On January 3rd, the New York Times published an opinion piece by novelist Richard Flanagan, titled ‘Australia is Committing Climate Suicide’ in which he argues that the country is ground zero for the emerging global climate catastrophe due to the unprecedented wildfires burning there. Although Flanagan is a superb author, the title of the article seems to me to be alarmist. ‘Bushfires’ are common in Australia, having killed about 800 people since a disastrous series of fires in 1851. To date, over 10 million hectares have burned during the 2019-2020 fire season, which is nearly the size of England. This is more than 12 times the area burned in the 2018 fires in California and 10 times the area of the 2019 Amazonia fires, yet it is small compared to the estimated 117 million hectares of forest burned throughout Australia in 1974-1975. It is clear, however, that the 2019-2020 fires are a disaster, and that the situation is different. The fires are ferocious, generate their own weather, and are largely beyond the ability of fire fighters to control them. More than one-third of Australians have been affected, and at the time I wrote this article, 25 people have died and more than 2000 homes burned. Scientists estimate than over 500 million native animals, including an estimated 20,000 koalas, have been killed or have starved to death, and there are fears for the long-term recovery of many species. The natural habitat for many native animals has been dramatically reduced. There also has been a large loss of sheep and cattle, exacerbating the economic losses of the fires.

Amid this disaster, a discussion is emerging about the cause of the wildfires and specifically whether climate change is implicated. Climate scientists are loathe to ascribe single disasters to climate change, and the Australian wildfires are a case in point. Clearly, the current situation is the result of prolonged drought and unusually hot weather that have left forests and soils bone dry. Some of the fires are the result of arson, but most were started by dry lightning strikes. The average temperature in Australia is nearly 1.5°C higher than the average of the past century. All this, however, begs the question – What is responsible for this unusual weather? The answer lies in the Indian Ocean dipole (also known as the Indian Niño), a climate state in which the eastern and western Indian Ocean have different surface and near-surface temperatures. During its positive phase, as exists today, areas bordering the eastern Indian Ocean, including Australia, are dry, whereas those along much of the coast of Africa and the Arabian Peninsula are wet. Although one might argue that this condition is a normal part of Earth’s climate system, the persistence and strength of the positive state of the dipole is unusual and the result of the perturbed state of our climate due to elevated levels of carbon dioxide and methane in the atmosphere. Those who argue that the current Australian fires are part of the normal variability of the climate system should give more
thought to the severity of this disaster and the fact that it follows on the footsteps of unprecedented wildfires in Siberia, subarctic Canada, and California.

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Announcements

Publications

Evidence for large Holocene earthquakes along the Denali Fault in Southwest Yukon, Canada

Andree Blais-Stevens, John J. Clague, Janice Brahney, Panya Lipovsky, Peter J. Haeussler, Brian Menounos

Key Terms: Denali Fault, Positive Flower Structure, Late Holocene, Paleoseismic, Strike-Slip Fault

ABSTRACT

The Yukon–Alaska Highway corridor in southern Yukon is subject to geohazards ranging from landslides to floods and earthquakes on faults in the St. Elias Mountains and Shakwak Valley. Here we discuss the late Holocene seismic history of the Denali fault, located at the eastern front of the St. Elias Mountains and one of only a few known seismically active terrestrial faults in Canada. Holocene faulting is indicated by scarps and mounds on late Pleistocene drift and by tectonically deformed Pleistocene and Holocene sediments. Previous work on trenches excavated against the fault scarp near the Duke River reveals paleoseismic sediment disturbance dated to ~300–1,200, 1,200–1,900, and 3,000 years ago. Re-excavation of the trenches indicate a fourth event dated to 6,000 years ago. The trenches are interpreted as a negative flower structure produced by extension of sediments by dextral strike-slip fault movement. Nearby Crescent Lake is ponded against the fault scarp. Sediment cores reveal four abrupt sediment and diatom changes reflecting seismic shaking at ~1,200–1,900, 1,900–5,900, 5,900–6,200, and 6,500–6,800 years ago. At the Duke River, the fault offsets sediments, including two White River tephra layers (~1,900 and 1,200 years old). Late Pleistocene outwash gravel and overlying Holocene aeolian sediments show in cross section a positive flower structure indicative of post-glacial contraction of the sediments by dextral strike-slip movement. Based on the number of events reflecting ~M6, we estimate the average recurrence of large earthquakes on the Yukon part of the Denali fault to be about 1,300 years in the past 6,500–6,800 years.

Environmental & Engineering Geoscience, Vol. XXVI, No. 1, January 2020, pp. 1–18

Funding for Research Opportunity

PICS Theme Partnership Program: 2020 call now open!

https://pics.uvic.ca/theme-partnership-program

British Columbia researchers are alerted to the PICS flagship $1M Theme Partnership Program. Applications are now open for the program, which supports research into particularly complex — and critically important — climate mitigation and adaptation challenges.

Theme projects involve interdisciplinary teams of researchers and climate solution decision-makers (from the private and public sector) working together on thematic areas of high complexity and impact — from project outset, to results implementation. These projects generate not only new knowledge, but also build international leadership within British Columbia’s research community, which will help drive further innovation in critical thematic areas.

BC-led teams can pursue innovative ideas for combating, and adapting to, climate change, and to lead the emerging low-carbon economy.

Application involves a two-phase review process beginning with a letter of intent (LOI) submitted by a full-time faculty member from a PICS university — i.e. the University of Victoria, University of British
Field School

2020 International Summer School on Rockslides and Related Phenomena in the Kokomeren River Valley (Kyrgyzstan) (ICL Kokomeren Summer School)

Rockslides and rock avalanches are among the most hazardous natural phenomena in mountainous regions. Though relatively rare, in comparison with landslides in non-lithified soils, they threaten large areas due to the enormous amount of material involved (sometimes up to billions of cubic meters), high mobility of debris and ability to create large natural dams, which result in inundation of the valleys upstream and catastrophic outburst floods downstream. The aim of the International Summer School is to demonstrate rockslides of the planar, rotational, wedge and compound types, most of which had converted into flow-like rock avalanches, sometimes with the extremely long-runout. Some of these slope failures formed natural dams, either intact or deeply eroded. Various methods of their identification, mapping, dating, as well as of the detailed examination and analysis of internal structures and grain-size composition of rockslide deposits are demonstrated.

About 20 rockslides and rock avalanches ranging from a few millions to more than 1 billion cubic meters in volume are concentrated in the Kokomeren River valley (Central Tien Shan) within a limited area of about 100x50 km at a one-day trip distance from Bishkek - capital city of Kyrgyzstan. Most sites are located near a road along the Kokomeren River and require several hours driving and few kilometers long hiking with up to 300-500 m rise to reach them.

Due to the arid climate and sparse vegetation, rockslide morphologies are well preserved and recognizable. Some rockslide deposits up to 400-m thick are deeply dissected by erosion which opens their internal structure to detailed study. Evidence of valley inundation caused by rockslide damming and of associated outburst floods could be found in the valley as well. Along with the bedrock slope failures several very large landslides in weakly lithified Neogene and Quaternary deposits can be found in the adjacent neotectonic depressions. Besides providing an exceptional learning experience, it is a very beautiful mountainous area inhabited with kind and hospitable people.

Besides numerous rockslides and landslides, the study area provides impressive manifestations of the Neotectonics and Quaternary tectonics such as active faults, one of which was ruptured during the 1992 M7.3 Suusamyr earthquake, and numerous examples of tilted and folded pre-Neogene planation surfaces. One of the topics of the training course is the paleoseismological interpretation of large rockslides and rock avalanches.

The 2020 training course will be carried out from August 01 to August 15, 2020. The participation fee is EURO 500 (or equivalent amount in US dollars, Russian roubles or Chinese yuan), which includes all costs at the site: camping (in tents; though some tents can be provided by the organizers, participants are asked to bring their own tents and sleeping bags), food, local transportation, detailed full-color guidebook. Electricity will be available in the base camp. Fee should be paid in cash at the participants’ arrival. Cash receipt vouchers and certificates confirming attendance at the ICL field training course will be provided.
Organizers will provide help obtaining visas if necessary. Please check if you need visa to come to Kyrgyzstan or not. List of countries which citizens do not need visas to visit Kyrgyzstan is available at http://www.centralasia-travel.com/en/countries/kirgistan/visas. Those who have to apply for visa should send the copy of his/her passport to Prof. Kanatbek Abdrakhmatov before June 1st, 2020. Participants should have their personal medical insurance.

Participants should arrive to Bishkek not later than August 01 (early morning). They will be picked up at the arrival desk of the Bishkek airport. Bishkek is connected with Moscow, Istanbul, Urumchi, Dubai, Ulan-Bator, Delhi by direct flights. Arrival via Almaty airport is possible as well. Organizers can help arranging the hotel/hostel for the participants who will arrive earlier than August 01 or will depart after August 15. Cost of the hotel/hostel in Bishkek selected by organizers for one night from August 14 to 15 is included in the registration fee.

The detailed full-color Summer School guidebook can be downloaded from the ICL homepage: http://iplhq.org/ (Download GUIDEBOOK).

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**Meetings and such**

**Cities on Volcanoes Conference - Volcanoes and Society: Environment, Health and Hazards (COV11)**

23-27 May 2020, Heraklion, Crete, Greece

[https://pcoconvin.eventsair.com/volcanoes11/](https://pcoconvin.eventsair.com/volcanoes11/)

The conference is organized by the Department of Geology and Geoenvironment of the National and Kapodistrian University of Athens, in collaboration with post graduate program of “Environmental, Disaster and Crisis Management Strategies” (EDCM) and the Natural History Museum (University of Crete). It will focus on multidisciplinary monitoring of volcanic environments in the vicinity of cities and tourist areas. In includes discussions on the ability to recognize volcanic hazards and their impact on people, emergency management by civil protection authorities, community education, case studies and risk mitigation to reduce the impacts of volcanic eruptions.

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**Fifth World Landslide Forum**

Implementing and Monitoring the Sendai Landslide Partnerships 2015-2025

November 2 – 6, 2020. Kyoto, Japan
The Fifth World Landslide Forum will be organized in Japan to achieve a mid-term review of the ISDR-ICL Sendai Partnerships 2015-2025 for Global Promotion of Understanding and Reducing Landslide Disaster Risk.

It will assess the progress made in the implementation of the partnerships, and mobilize further commitment and actions to advance the implementation over the following five years.

The agreement and partnership was adopted on 16 March 2015 as a voluntary commitment to the United Nations World Conference on Disaster Risk Reduction, held in Sendai, Japan, 14-18 March 2015.

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3rd International Conference on Natural Hazards and Infrastructure (ICONHIC2021)

June 2021, Athens, Greece.

Announcement details to come.

The conference coincides with the national celebrations of the 200th anniversary of the independence of the Greek State.
Risky Ground publishes stories and information on current topics of interest to researchers and practitioners in natural hazards and their risks to people, infrastructure and the environment. It is distributed by email as an electronic version, quarterly, near the start of each season, by the Centre for Natural Hazard Research at Simon Fraser University, Burnaby, British Columbia, Canada. Copies are hosted for download at http://www.sfu.ca/cnhr/news_events/newsletter.html

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Submissions are accepted in digital word processor or ASCII format up to 2 weeks prior to publication, and should be sent by email to the editors for consideration. Articles can be up to 750 words and include pictures and graphics which must be 8 x 12 cm or less at 300dpi (to fit within a column).

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Centre for Natural Hazard Research
The Centre for Natural Hazard Research (CNHR) is an SFU-based institute housed in the Department of Earth Sciences. Its mandate is to conduct innovative research on geophysical processes that are a threat to the population and economic infrastructure of Canada. CNHR has a western Canada focus, but the research findings and developed methodologies are applicable to the whole of Canada and to the international community. A key element of the Centre is the inclusion of public policy research on how to effectively transfer the results of scientific research to the people who need and can use it.

CNHR hosts talks at SFU by hazard and risk researchers and practitioners. We welcome your suggestions for potential speakers for the winter and spring of 2020. The Centre sponsors or co-sponsors workshops on a variety of topics of interest to professionals and students in British Columbia.

We welcome short updates from readers and members on their research activities and meetings of interest.

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