

Geocetera

Department of Earth Sciences Newsletter
SIMON FRASER UNIVERSITY
Vol 2, Number 3
September 2008

AWARDS & HONOURS



STUDENTS

Congratulations to:

Mary Ann Berg - NSERC

Andrew Beveridge - PCGS/SGEC

Sarah Brown - University Women's Club
- Graduate International Scholarship

Andrew MacDougal - NSERC

Winter Moon - NSERC

Laurie Neilson-Welch - Allan Dakin

Dan Shugar - Graduate International Scholarship

Nathalie Vigouroux-Caillibot - Steel Memorial

Andrea Wolter - Women's Association of Mining

Alexander Vyazmensky - President's PhD Research

Mary Ann Berg (Diana Allen)

Courtney Brown (John Clague)

**Rafael Cavalcanti
de Albuquerque** (Dirk Kirste)

Michael Galicki (Dan Marshall)

Gabriel Hensold (Doug Stead/John
Clague)

Sung Lee (Doug Stead)

Andrew MacDougall (Gwenn Flowers)

Winter Moon (John Clague)

Peter Schon (John Clague)

Michael Simpson (Diana Allen)

Jeffrey Zurek (Glyn Williams-Jones)

Andy Beveridge started his PhD research in May 2008 on the rock mass characterization of large open pits using LiDAR photogrammetry. Andy arrived after spending almost 2 years working at the Kalgoorlie Super pit in Western Australia following a degree in Applied Geology from CSM, University of Exeter, UK.

COMINGS & GOINGS

GOODBYES

On Monday July 7th, we said our goodbyes to **Romain Chesnaux**. Romain had been a post-doctoral fellow in the department since the fall of 2005.

Daide Elmo's last day at SFU was Friday September 5th. He will be leaving to start work at Golder Associates. Good Luck Davide!!

Alex Vyazmensky will also be leaving Friday September 5th to start work with Rio Tinto. Alex will be returning for his PhD defense on Tuesday September 30th.

VISITING SCIENTISTS

Marta Chiarle

I hold a permanent research position at the Italian National Council of Research, Institute for Hydrogeological Protection (CNR-IRPI), in Turin, Italy. My research focus is analysis of geomorphological processes and hazards in Italian alpine areas, especially in glacial and periglacial environments, where I study ongoing processes and hazards related to glacier dynamics and cryosphere degradation in a warming climate.



John Clague has research interests that are similar to mine and provided me the opportunity to spend a year as a visiting scientist in the Department of Earth Sciences at SFU. Our aim is to compare methodological approaches, share data derived from both Canadian and Italian mountains, and make comprehensive analyses, for better understanding and facing the impacts of climate change in high mountains

Marco Giardino



I am a Faculty member at the University of Torino (Italy). I hold a permanent research position at the Earth Sciences Department and I am teaching "Geomorphology" and "Applied Geomorphology" at the Faculty of Science. Currently, I am the Secretary of the Association of the European Geological Societies (AEGS).

My research activity has an interdisciplinary character and combine traditional field surveys with digital terrain mapping and applications of remote sensing techniques. It includes different geomorphological topics: analysis of conditioning factors of the evolution of mountain relief, natural hazards and risk studies (particularly devoted to slope instability phenomena), analysis of geomorphosites for natural heritage protection and geotourist risk protection (such as in the area of Torino 2006 Winter Olympic Games).

Field studies have been conducted mostly in the European Alps, but international agreements have made it possible to extend the field areas, including the Rocky Mountains of Colorado and the Darjeeling region of Himalaya. Now I am working at SFU with John Clague and Doug Stead on the development of a geodatabase on deep-seated gravitational slope deformations, both for statistical/modelling purposes and for hazard and risk assessment.

Welcome Marta and Marco!!

EVENTS



SFU Open House

Our Department was well represented at the annual Open House on May 31st by volunteers Robbie Dunlop, Matt Plotnikoff, Derek Thorkelson, Karin Fecova, Thomas Wade and special guest speaker Dr. Cathy Hickson. Thanks to all the volunteers.

The Education Fair ran from 10:00 - 12:00 pm in Convocation Mall and offered students the opportunity to talk to Department representatives at the Earth Science booth about the program and field courses.

Discovery Trail commenced at the close of the Education Fair and ran from 12:00 to 4:30 pm. It consisted of displays and activities located throughout the major concourses that form the "backbone" of the Campus. The Earth Sciences tables involved a display of Earth materials such as rocks, minerals and fossils and allowed visitors to try hands-on activities. The free drill core and rocks were hot give away items. Our very own Martian, undergrad Kerry Cupit, provided us with a wonderful poster on his Mars Training with NASA.

Open House participants could get their Passports to Discovery stamped at over 100 booths, lab tours and displays. Once they got 16 stamps they were eligible for amazing prizes. Our passport question was "What is the name of the largest volcano on Mars?" (Olympus Mons) to fit in with Kerry's Martian training.



Our special guest speaker, Dr. Catherine Hickson, presented 2 public lectures entitled "Volcanoes, Earthquake and Landslides: Are we Prepared? A global perspective." Dr. Hickson has been working to prevent natural disasters for almost 30 years. An expert in volcanoes, she also covers the field of earthquakes and landslides and has gained global experience working with these geological hazards and the communities affected by them. Natural hazards, like volcanic eruptions, don't necessarily need to result in disasters if people and communities are prepared. Her work, "turning geoscience knowledge into action for risk reduction" has led her to many places on the globe.

Dr. Hickson, a Research Scientist with the federal government's Geological Survey of Canada, is a graduate of the University of British Columbia. She received her PhD in 1987. Her thesis focused on the area of young volcanoes in and around Wells Gray Provincial Park, north of Kamloops. Witnessing the 1980 eruption of Mt. St. Helens, Washington, USA, while an undergraduate student, catapulted her into both volcanological studies as well as working with emergency managers and communities impacted by natural hazards. Author of many professional publications, she has also published a field guide to Wells Gray Provincial Park (with co-author Trevor Goward, naturalist and lichenologist), and an eye witness perspective of the Mt. St. Helens eruption called "Surviving the Stone Wind". She was head of the Geological Survey's office in Vancouver for seven years, and now manages the GSC's "Risk Assessment Methodology" project.

EVENTS

JUNE CONVOCATION CEREMONY

The Earth Sciences Department celebrated June Convocation in a big way this year with nine undergraduates and five grad students receiving diplomas. The morning ceremony was memorable for several reasons. Hearing the 5 time world champion SFU Pipe Band but not being able to see them through the fog was eerie, but incredible. And for the first time, the ceremonial mace was ably carried by our very own Chair, Dr. Derek Thorkelson.



Derek Thorkelson - Mace Bearer

The mace was commissioned by University architects Erickson and Massey and was presented to the University at the opening ceremonies on September 9, 1965. Pieces of cut and polished jade, which were taken from the University's jade boulder in the Academic Quadrangle reflecting pool, were set in silver by its designer, Haida artist Bill Reid. The mace is crowned by a silver stag's head, derived from the coat-of-arms of Lord Lovat, head of the Clan Fraser. The Fraser tradition was to fasten sprigs of yew in their bonnets before entering battle, and the mace was carved from two hundred-year-old yew, gathered on Burnaby Mountain by a resident in the 1940s. The mace is 61 inches long and weighs 23 pounds.



Robbie Dunlop - Sword Bearer

The claymore was first used by a Fraser at the Battle of Culloden Moor in 1746. It was also used by a Fraser at the Battle of the Plains of Abraham in 1759. The sword was presented to the University by Lord Lovat upon its opening in 1965. The claymore is approximately 36 inches long and weighs 2 pounds.



Congratulations to undergrads: Bahram Bahrami, Elizabeth Baird, Chris Fozard, Sandra Grad, Bryn Laidlaw, Mike MacMorran, Alanna Ramsay, Thomas Wade and Sarah Wakelin.

GRADUATES



MASTERS OF SCIENCE DEGREES

Student	Thesis Title
Aaron Desroches	Integrated Ichnology, Sedimentology and Stratigraphy of the Lower Falher Member, Spirit River Formation, Northeastern British Columbia and Central Alberta
Cindy Hansen	Facies Characterization and Depositional Architecture of a Mixed Influence Asymmetric Delta Lobe: Upper Cretaceous Basal Belly River Formation, Central Alberta
Chris Kowalchuk	Quaternary Geology of the Zama City Area, Northwestern Alberta
Dejan Milidragovic	Quartet Mountain Lamprophyres and Crustal Xenoliths: New Insights into the Mesoproterozoic Metamorphic History of Northwestern Laurentia
Mike Toews	Modelling Climate Change Impacts on Groundwater Recharge in a Semi-arid Region, Southern Okanagan, British Columbia

DEFENSES & COLLOQUIUMS

Fran Furlanetto will present her PhD oral exam on "Sedimentary provenance of the early proterozoic Wernecke supergroup, Wernecke Mountains, Yukon" on Thursday October 9th, 2008.

Alex Vyazmensky will defend his masters thesis on "Numerical modelling of surface subsidence associated with block cave mining using a finite element/discrete element approach" on Tuesday September 30th, 2008.

Chris Henry presented his colloquium on Tuesday September 9th, 2008. The title is "Characterizing groundwater recharge in a semi-arid region, southern Mali, Africa".

Christa Sluggett defended her masters thesis on "Quaternary alkaline and calc-alkaline basalts in southern British Columbia: mixed signals from mantle sources above the southern edge of the Juan de Fuca-Pacific slab window" on Monday August 18th, 2008.

Derek Turner defended his masters thesis on "Quaternary Geology of Howard's Pass and Applications to Drift Prospecting" on Wednesday August 6th, 2008.

Jessica Liggett defended her masters thesis on "Comparison of approaches for aquifer vulnerability mapping and recharge modelling at regional and local scales, Okanagan Basin, British Columbia" on Wednesday June 11th, 2008.

Richard Sunde defended his masters thesis on "*Sequence Stratigraphy of the Mixed Clastic-Carbonate Lower Cretaceous Albemarle Embayment, North Carolind*" on Monday, April 28th, 2008.

FIELD TRIPS

On March 28th a group of geoscientists from the Geological Surveys of India and China came to SFU for a day. They were doing a fieldtrip around Canada, organized by the Canadian Geological Survey, as part of an exchange between landslide specialists of the three countries. Their fieldtrip included stops at Universities to meet Canadian landslide specialists and visit of large landslides that occurred in Canada, such as the Frank Slide.

During the day at SFU, Derek gave a brief introduction about the Earth Sciences Department and then there were a series of talks by 3 people from the industry (Bill Black from Schlumberger, Michael Porter from BGC, and Andrew Ward from BC Hydro). In the afternoon, Davide Elmo, Brent Ward, and Matthieu Sturzenegger presented the current research developments achieved in Doug Stead's and John Clague's working groups.

The visit to SFU was well received and most appreciated by the delegates, and they thanked us for the opportunity.

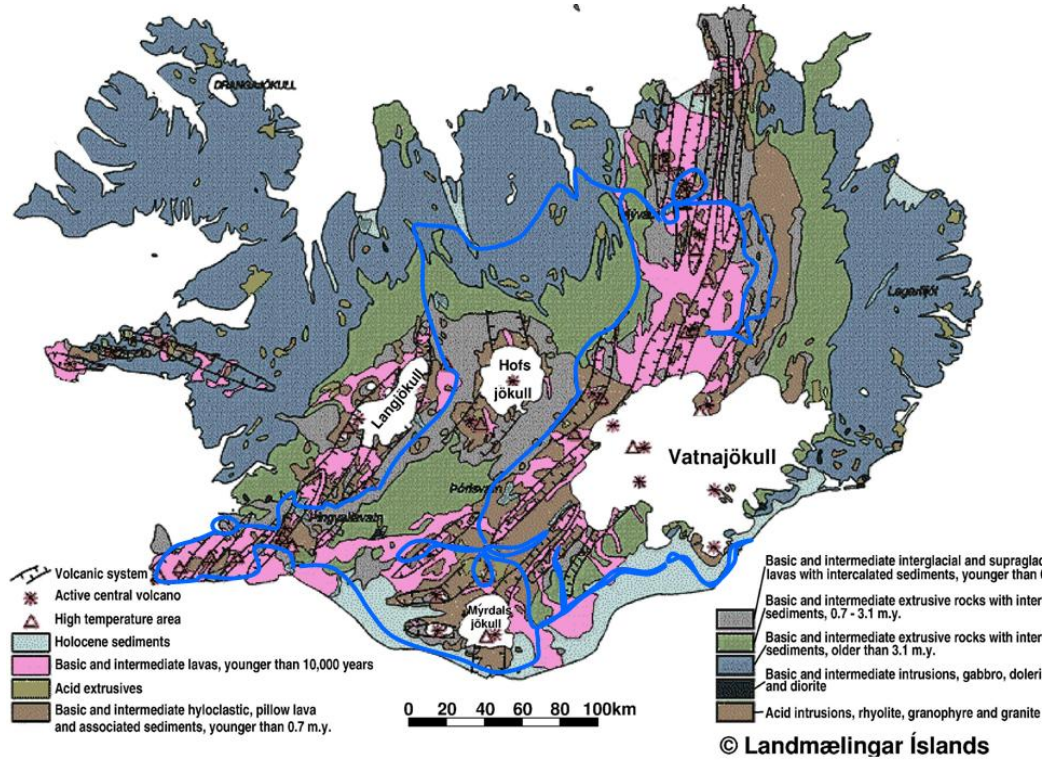
EASC 406 ICELAND TRIP

Ten EASC students, accompanied by Gwenn Flowers and Glyn Williams-Jones, convened in the land of sagas, basalt and rotten shark for EASC 406 (Field Geology III) this August. The two-week student-led tour of Iceland took the group from the capital city, Reykjavík, around the country and through the interior highlands. Applying an academic twist to the pervasive "fire and ice" theme in Iceland, the group investigated sites of scientific significance related to subglacial volcanic features, central volcanoes, geothermal activity, magma-groundwater interactions, groundwater geochemistry, the Iceland mantle plume, seismicity in Iceland, glacial history and isostasy, and glacier outburst floods.

In addition to the planned itinerary constructed around sites proposed by the students, there were spontaneous daily lessons in geology offered by the landscape, as evidence of both solid earth and surface processes are on display in abundance across the country. Among these highlights were the discovery of a large and intact "bomb" on the flanks of the infamous Hekla volcano, juxtaposed chaotic and planar cooling surfaces within a basalt section exposed in a rivercut, and massive flood deposits attributed to prehistoric subglacial outbursts that excavated some of the country's largest canyons. Among the instructional methods tailored to the course this year were the evening "debriefing" sessions, usually held in the local geothermal pool or hot spring, in which the group reviewed the day's learnings until the water got too hot.

Though the itinerary was packed, the group set aside one evening for the cultural indulgence of a traditional Icelandic feast. Thanks to the resourcefulness of the bus driver, many of the traditional foods were collected along our route, including smoked leg of lamb, blood and liver pudding, singed sheep's head, rotten shark, and pickled rams' testicles. Shared in a traditional turf-roofed stone shelter, this meal left many hungry for breakfast. Another of the trip's pleasures was the unseasonably warm and calm weather, which afforded wonderful views on many occasions, including over the Laki fissure eruption site of 1783-4, at the glacier lagoon in front of Vatnajökull (Europe's largest ice cap) where rapid isostatic uplift in response to glacier retreat is occurring, and over lake Langisjór where exceptionally low mantle viscosities have been inferred from shoreline tilting during isostatic rebound.

FIELD TRIPS



EASC 406 route (blue line) superimposed on geological map of Iceland



Volcanic bomb found on the flanks of Hekla



Chaotic and columnar basalt formations



A moment of contemplation precedes the consumption of sheep's eye



Laki fissure eruption site

FIELD TRIPS



EASC 406 students and instructors at glacier lagoon Jökulsárlón



Icebergs at Jökulsárlón



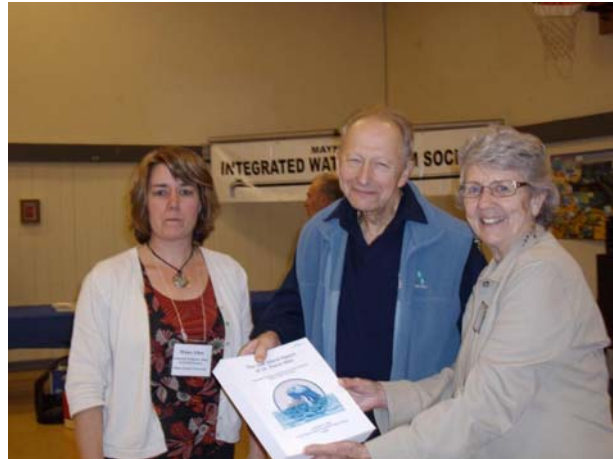
Lake Langisjór

JEAN KÉRISEL'S PRIZE

Romain Chesnaux was invited to present his research on the issue of cross-contamination between aquifers in Paris in April. He was one of the 6 nominees selected for an oral presentation to the French committee on geotechnical engineering. This competition is organized annually in the memory of Jean Kérisel who was an internationally recognized French civil engineer and contributed to soil mechanics research.

MAYNE ISLAND INTEGRATED WATER SYSTEMS SOCIETY

On April 26th, Diana Allen was a guest speaker at the Mayne Island Integrated Water Systems Society's annual water workshop. After her talk, Diana was presented with a bound volume of all of her research publications on groundwater resources on the Gulf Islands. The Society also donated two copies to the Saturna and Mayne Island Public Libraries.



GEOHAZARD'S AWARD

**4TH CANADIAN
CONFERENCE ON
GEOHAZARDS :**
FROM CAUSES TO MANAGEMENT
Date: **May 20-24th 2008**

In May 2008, Marc-Andre Brideau won the best student presentation award at the Geohazard IV Conference in Quebec City for his paper: "The 1999 Clanwilliam landslide: A preliminary analysis of potential failure mechanisms."

SFU SUSTAINABILITY AMBASSADOR PROGRAM

Gwenn Flowers is our new Sustainability Ambassador. She will work together with the staff and faculty to consider the environmental impacts of their habits and behaviors at work, and help them to identify actions they can take to reduce their consumption and waste. Sustainability Ambassadors will help their colleagues to understand the social and environmental benefits of adopting more sustainable practices.

CHRISTMAS PARTY

This year the Departmental Christmas party will be on **Friday November 28th** at the Lochdale Heritage Hall in Burnaby. Tickets will be available shortly for \$22

MULTI-DISCIPLINARY STUDY OF KAWAH IJEN VOLCANO, A CANADIAN FAMILY PROJECT

Text by Mauri G., September 2008

Since 2006, a multi-disciplinary project between McGill University and Simon Fraser University has been running on Kawah Ijen volcano (Eastern Java, Indonesia). The different projects bring together geochemistry, geophysics & hydrogeology, which allow us (grad students and professors) to get an understanding of the big picture of its structure and its dynamic behavior.

Kawah Ijen volcano is an andesitic volcano, ~ 25.000 years old, located on the south-east margin of the Ijen caldera (~ 15 km diameter). The caldera floor is averaging around 1800 m a.s.l. and Kawah Ijen, one of its highest and youngest summits reaches 2400 m a.s.l. (Fig.1). Partially covered by rain forest and jungle, Kawah Ijen crater hosts the worlds largest and most acid lake (pH ~0.00, dry chemical deposit ~ 120,000 mg/kg of water, ~ 37 °C, ~ 900 m x 700 m, volume ~ 30 Mm³) (Fig.1). For more than 180 years (oldest Dutch records found), the crater has been actively mined by the local population for its rich-sulfur deposits (> 14 tones/day). A significant acid contaminated water stream, the Banyupahit River has its headwater on the summit west flank of Kawah Ijen volcano (Fig.1). The stream flows north through the Caldera, until entering the ocean. Unfortunately, this poisoned stream is used as water supply for drinking water and agriculture irrigation and lead to high fluorine intoxication and health problems among the population. Some international studies are working on this health problem.

On Kawah Ijen volcano, the multi-disciplinary project is lead by Willy. Williams-Jones (McGill) and Glyn Williams-Jones (SFU). On Going projects are running by Vincent VanHinsberg (McGill researcher), Nathalie Vigouroux and Guillaume Mauri (SFU PhD candidates) and Stephanie Palmer (McGill Msc. Candidate). Projects are made in collaboration with a number of Indonesian researchers at the Institute of technology of Bandung.

After 3 years of work, the preliminary model of surface water flow, underground water and hydrothermal system and magmatic degassing was presented last August at the IAVCEI Reykjavik 2008 (conference in Iceland) (Fig.1) :

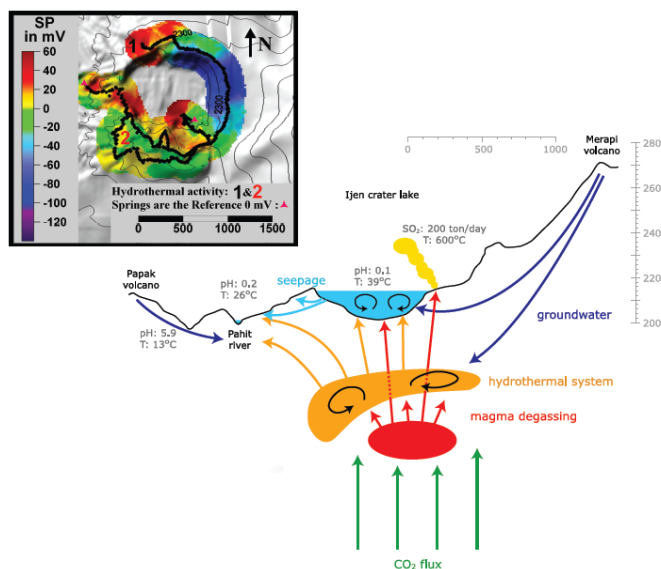


Figure 1: Cartoon representing the interaction between ground water (dark blue), hydrothermal system (orange), magmatic degassing (red & green), acid water (light blue).

Flow directions are based on geochemical data (gas & water) and Self-potential data (2006 Map on Top right corner).

SFU COMMUNITY TRUST ENDOWMENT FUND

Secondary Effects of Climate Change on Human and Ecosystem Health: A Risk-Based Approach

Faculty from the Department of Earth Sciences were awarded one of the University's Community Trust Endowment Fund (CTEF) grants in the recent competition. Diana Allen is leading the project and Gwenn Flowers is a project researcher. The research spans the physical, biological, health and social sciences, resource and environmental management, communication, and computing science, and brings together a group of researchers with expertise in climate, water, air quality, disease, ecology, human health, risk analysis, emergency preparedness, and visualization. Building on previous research in British Columbia (BC) and abroad, the research team aims to investigate the secondary effects of climate change, particularly in terms of the potential spread of infectious diseases, quantity of water available, degradation of water quality due to contamination, and loss of biodiversity. Researchers will employ risk-assessment approaches to evaluate various risk-management options. Novel computer visualization techniques will be developed and applied to support knowledge translation and enable use of our results by policy-makers and other stakeholders. The team will also link with researchers in BC through the Pacific Institute for Climate Solutions (PICS).

THOMAS ROY AWARD



Doug Stead received the Thomas Roy Award (Engineering Geology Division) at the Canadian Geotechnical Society-International Association of Hydrogeologists Joint conference last week in Edmonton. The award acknowledges contributions to the field of Engineering Geology in Canada through a landmark publication that has had important and lasting impact on the field; or a recent publication

which represents an outstanding contribution to engineering geology, his/her excellence along his/her career, or his/her involvement in the promotion of Engineering Geology in Canada (for example in the education for Engineering Geology). Doug received the award for his outstanding work on fracture mechanics which he has been focusing on at SFU for the past several years.

TOTH AWARD

International Association of



Hydrogeologists



Hendrik Voeckler (PhD student between SFU and UBC) won the Toth Award for best student paper in Canadian hydrogeology. His paper focused on the characterization of permeability using fracture and lineament data.

The Tóth Award is presented to promote active participation in the IAH-CNC among hydrogeology students attending Canadian Universities and to recognize excellence in hydrogeology.

ABOUT GEOCETERA

Full details about items in GEOCETERA are available from Bonnie Karhukangas TASC 1, 7207.

Wherever feasible, please submit items electronically directly to Bonnie at bka18@sfu.ca