

September 2005



Queen's UNIVERSITY

GEOLOGICAL SCIENCES & GEOLOGICAL ENGINEERING

GEO NEWS



GREETINGS AND NEWS FROM THE HEAD

Welcome to the Summer/Fall, 2005, issue of GeoNews, the semi-annual Newsletter of the Department of Geological Science and Geological Engineering, Queen's University. It is our pleasure to bring you up to date once again on events within the Department, to bring you informative reviews of recent research by members of the Department, and to help you keep up with what your fellow alumni are doing. In addition, this issue of the Newsletter contains important announcements of two upcoming events that we hope you'll be able to attend: a celebration at Homecoming this Fall of **Al Gorman's** 50 years of teaching at Queen's, and our third annual Alumni Reunion in Calgary.

I am particularly pleased to welcome a new faculty member to the Department. **Kumar Ramachandran** comes to us from the Pacific Geoscience Centre, the Geological Survey of Canada's western base, where he has been a Visiting Fellow.

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Come to Our Alumni Events

UPCOMING ALUMNI EVENTS

CELEBRATION OF AL GORMAN'S 50 YEARS AT QUEEN'S

Al Gorman arrived at Queen's in 1955, coming from McGill where he was still in the process of completing his PhD thesis on an area in the Eastern Townships of Quebec. Since that fateful day 50 years ago, Al has taught just about every course except the ones that are the subject of his thesis (petrology and stratigraphy).

(Continued on page 3)

THIRD-ANNUAL CALGARY REUNION

The Third Annual Reunion of Queen's University Geology alumni will be held in Calgary, on **Saturday, October 1, 2005**.

This year's event has a very special feature as we will be celebrating Al Gorman's remarkable 50 Years of Teaching at Queen's University. "Uncle Al" will be our very special Guest of Honour ready to receive your barbs and bouquets.

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Special points of interest:

- *Celebration for Al Gorman September 24, 2005*
- *Third Annual Calgary Reunion, October 1, 2005*
- *New Queen's Research Chair*
- *Thank You to our Generous Benefactors*

GREETINGS FROM THE HEAD (Continued from page 1)

Kumar received his doctorate from the University of British Columbia, following many years of work in the petroleum industry in India. For his doctorate and in subsequent research with the GSC, he has been investigating the crustal structure underneath Vancouver and Vancouver Island (the Cascadia Subduction Zone and the over-riding North American Plate), in order to provide general constraints on potentially damaging seismicity in the region. A report of his research is provided below. Kumar holds a two-year Assistant Professor position and is acting as a worthy “fill in” for **Colin Thomson**, who has taken a two-year leave-of-absence, to enable him to take up a position with Schlumberger Cambridge. Schlumberger is one of the leading geophysics consulting companies in the world, providing extensive services to the petroleum industry. Their Cambridge office is one of their top centers for technical expertise and research. We are excited for Colin in this new venture, but are sad to see him go, if only for a two-year period. We all wish him well and hope that he enjoys the challenges of this prestigious position.

In other staffing news, **Mike Doggett** has been appointed to the Stollery Professorship in the Department of Mining Engineering. As you may know, Mike has had only a half-time position in Geology, so the Stollery Professorship, which is also a half-time position, is a nice complement and gives Mike the much-needed stability that he has desired. In his proposal for the Professorship, the purpose of which is to provide a bridge between the Mining and Geology departments, Mike has set out a program to enhance our common interest in mineral processing. The Department is extremely happy for Mike and looks forward to productive interaction with the Mining Department.

It is also with great pleasure that I announce that **Gema Olivo**, a mainstay of our mineral-deposits program, has been granted tenure and promoted to the rank of Associate Professor. This is an important milestone and one that is justly deserved. Gema is rapidly establishing herself as an important player in the mineral-deposits scene in Canada and internationally, with research projects around the world in her specialty of hydrothermal precious-metal deposits. She is co-chairing (with Nuno Machado) a Symposium at next year’s meeting of the Geological Association of Canada on the subject of “Precambrian evolution and mineral deposits of the Canadian and Brazilian Shields: Similarities and differences”.

In the last Newsletter (visit the Departmental website www.geol.queensu.ca and click on the “News and Activities” button on the left side to find all of our past Newsletters), I indicated that we had just gone through two official reviews of our programs. I am pleased to report that the Internal Academic Review performed by the University was very complementary. Our strengths in teaching and research were clearly recognized. The review of our graduate program by the Ontario Council on Graduate Studies (OCGS) is still ongoing. We received an excellent review by the external consultants who visited last spring, but we await the official report from OCGS. As I write this, the final touches are being put on our submission to the Canadian Engineering Accreditation Board that will assess our application for continued accreditation of our undergraduate geological-engineering program. We are very optimistic of a positive outcome. I would like to offer my thanks to all faculty and staff who have worked so hard on this report, and particularly **Gerhard Pratt** and **Jean Hutchinson** who spearheaded its preparation.

Finally, as a new school year is about to begin, we are preparing for the arrival into second year of the Class of '08. Classrooms and labs are being refurbished as part of our effort to give the best-possible education to tomorrow’s geoscience leaders. As in previous Newsletters, I again urge you to help us do this by contributing generously to our Field Studies Program Endowment Fund. Details of how to do this are provided elsewhere in the Newsletter. We look forward to hearing from you.



Bob Dalrymple , Head

AWARDS AND ACCOLADES

LOOK AT US!

- New QRC
- SEG Awards

Read on for more...

The Department is extremely proud to announce that paleontologist **Guy Narbonne** has been named to the prestigious position of a **Queen’s Research Chair (QRC)**. These Chairs, of which there are only 25 in the entire University, are designed to recognize faculty members who are making outstanding research contributions in their particular field. Guy was recognized for his many contributions to our understanding of the origin of animals and, more generally, for his work on one of the most important times in Earth History, the Neoproterozoic Era that immediately preceded the Cambrian Period. Some of his most recent discoveries were highlighted in our last Newsletter (Spring, 2005). Guy joins Departmental colleagues **Noel James** and **Kurt Kyser** as three of the 25 QRCs in the University; only Biology has more QRCs than us.

Bob Dalrymple has recently been elected to the position of **President-Elect of SEPM (Society for Sedimentary Geology)** and will become its President in 2006. SEPM is the largest and most active organization in the field of sedimentary

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Most notably, he has taught the first-year course in geological engineering and his favourite, *Airphoto Interpretation*, for many, many years. In total, he claims to have taught more than 10,000 students, and still counting as he prepares to teach *Airphoto Interpretation* yet again this year! We're sure he remembers just about everyone one of you, many of whom came into geology because of his enthusiasm for the subject.

At Homecoming this Fall (Sept. 24-26), the Department will honour Al for the supreme dedication that he has shown to the Department and you his former students. Al is also closing in on his 80th birthday, and still playing hockey. To celebrate all of this, the Department will hold an informal gathering as part of Homecoming Weekend Saturday, September 24, 8-11 pm, University Club on Stuart Street. There will be a cash bar; munchies provided by the Department. What better reason to come to Homecoming and to get together and reminisce. Join current faculty and students in celebrating a truly unique part of Queen's Geology!

Note that there will also be a Departmental Open House on Saturday morning, from 10 a.m.—12 p.m. See you there.



Al Gorman circa late '60's

Calgary Reunion *(Continued from page 1)*

The event will be held at the home of Gregg & Sonny Milne (316 Lake Placid Green SE) and will begin at 7:00 p.m. "Substantial" hors d'oeuvres will be provided, and the Queen's Geology "BYOB" tradition will again prevail.

This is a great opportunity to meet old friends, make new ones, and just generally network. The last two Reunions were a great success with 100+ in attendance. Bring yourself and your spouse/guest and let's make this Reunion even bigger and better! Be sure to spread the word, as we don't want to miss anyone.

Please RSVP to Tracey Reynaud, 403.205.6767 / treynaud@suncor.com, by September 30, 2005, with your name, graduation year, and the name of your spouse / guest. Directions will be provided at that time if necessary.



By hook or by crook
... See you in Calgary

WE LOOK FORWARD TO SEEING YOU!

Awards & Accolades *(Continued from page 2)*

geology, with more than 4000 members worldwide. In its distinguished 79-year history, it has had only three non-US scientists as its President, including Departmental colleague **Noel James**.

The Department congratulates four of its graduate students who received **research awards from the Society of Economic Geologists Foundation**. The students and their research projects are:

- **Carolina M. de Almeida**: "Genesis of the hydrothermal Ni-Cu-PGE-rich mineralization of the Fortaleza de Minas deposits, Brazil" (supervisor: **Gema Olivo**)
- **Jonathan Cloutier**: "Geochemistry of the non-mineralized Wheeler River alteration system and the mineralized Millennium and Eagle Point deposits, Canada: implications for uranium exploration" (supervisors: **Kurt Kyser** and **Gema Olivo**)
- **Percy Pablo Zamora Diaz**: "Grind sensitivity in metallurgy at the Yanacocha gold mining district, Cajamarca, Peru" (supervisors: **Mike Doggett** and **Gema Olivo**)
- **Gregory Lester**: "An evaluation of magmatic and non-magmatic contributions to mineralization in IOCG deposits: reservoirs, mixing and mineral chemistry" (supervisors: **Alan Clark**, **Kurt Kyser** and **Gema Olivo**)

Yet again, three of our graduating (Class of '05) geological engineers, **Melissa Chappel**, **Steven Gaines** and **Tanya Neumeyer**, won **First Prize** in the Canadian Geotechnical Society's **Undergraduate Group Report Competition**. Their poster was prepared as part of their 4th-year engineering-design project. Its title was "Designing a framework for evaluating water catchment systems in the Garhwal and Kumaun Himalaya, India" and was supervised by **Mark Diederichs**. This is the third time that our students have placed first in this competition and speaks to the high standards that they have. Congratulations!

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Awards & Accolades (Continued from page 3)

Many Queen's Geology alumni have made important contributions to their particular research fields and to the Canadian geology scene as a whole. Four of our graduates were recognized by the Geological Association of Canada at its Halifax meeting:

- **Pierrette Tremblay** (M.Sc. '74) was a co-winner of the Mineralogical Association of Canada's **Berry Medal** for service to the mineralogical community in Canada. She is Executive Coordinator for the Association and Managing Editor of *Elements- An International Magazine of Mineralogy, Geochemistry, and Petrology*.
- **Robert Raeside** (M.Sc. '78) was also the co-winner of the Mineralogical Association of Canada's **Berry Medal** for service to the mineralogical community in Canada. He is presently a professor and head of the Department of Geology at Acadia University and he has been the short-course editor of the Mineralogical Association of Canada since 1999.
- **Alan Anderson** (Ph.D. '91) received the **W.W. Hutchison Medal** of the Geological Association of Canada that is awarded to a young individual for recent exceptional advances in Canadian earth science research. He is presently a professor at St. Francis Xavier University of Nova Scotia. He is internationally recognized for his contributions to our understanding of hydrothermal fluids.
- **Anthony E. Williams-Jones** (Ph.D. '74) received the Mineralogical Association of Canada **Past-Presidents Medal**. He is a former chair of his department at McGill University, a fellow of the Royal Society of Canada, and is currently an associate editor for *Geofluids and Economic Geology*. The Past-Presidents Medal is awarded to a sci-

"TRILOBITES" ALIVE AND WELL

I'll bet you all thought that trilobites went extinct long ago. However, because of the careful nurturing of **Rob Renaud**, Departmental IT Technician, a new brand of "trilobites" has come alive in the Department. These new "Trilobites" are dedicated to training for the Kingston Triathlon and maybe more. In their fourth season this year, the Trilobites have grown in numbers, fielding two individual participants, two three-person teams, and another person who competes in another team.

In the short-course triathlon, relative newcomer, **Gerhard "Seismo" Pratt** (see picture below right) set a new Trilobites course record of 1:42:16, with a strong swim, and a blistering bike and run. Next year this competitor could make the podium. **Rob "Mid-pack" Renaud** (see picture below left) finally broke through the mid-pack barrier with a personal best of 1:56:13 and will be looking for a new moniker for next year. Both of the teams, Team Trilobites (**Dawn Kellett, Barbara, Esteban Urqueta**) and Team Tricky Tridymites (**Claudine Lee, Don (Chips) Chipley, Laurel Basciano**), turned in respectable performances, completing the 2 km swim, 56 km bike and 15 km run in 3:35:39 and 3:46:50, respectively. **Richard Zavitz** put in a strong swim for his teammates with a 40:41.



Rob "Mid-pack" Renaud sprinting for the finish line in front of City Hall.



Gerhard "Seismo" Pratt (left) powering up Barriefield Hill (Ordovician limestones in the background).

RESEARCH NEWS

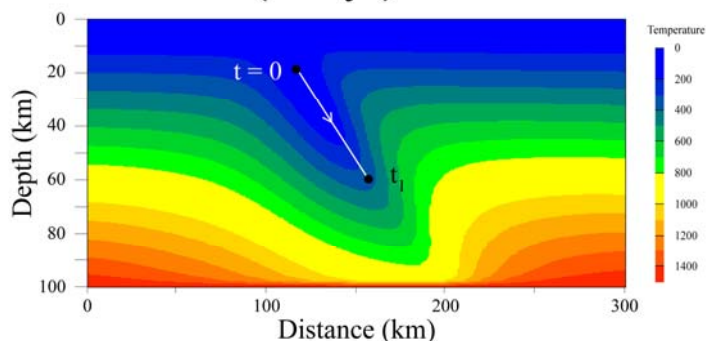
Queen's is one of Canada's top geoscience departments, with the highest average NSERC research grant of any earth-science department in the country. In this column, we will highlight some of the exciting new research that is being done here. We hope you find this interesting.

For many years, Queen's Geology has had a tradition of research on crustal dynamics, because of our strength in structural geology and petrology. That strength continues. Here we highlight only three of the many research projects in this general area. The project by **Alfredo Camacho** (Post-doctoral Fellow) and **Jim Lee** was featured in the journal *Nature*, which has one of the highest rejection rates, so getting to publish there is a mark of the highest esteem. The other two reports, by **Laurent Godin** and **Kumar Ramachandran** introduce you to the work being done by our two newest faculty members.

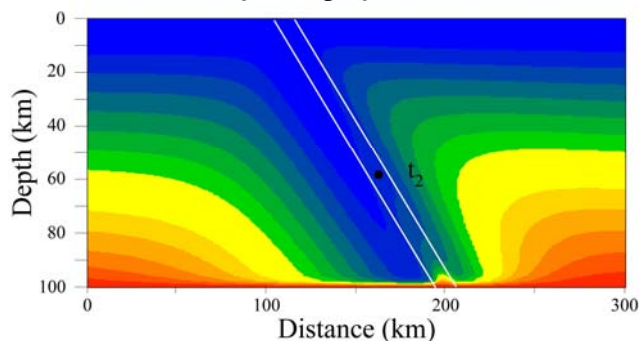
HOW LONG DOES IT TAKE FOR A MOUNTAIN TO FORM?

(by Jim Lee)

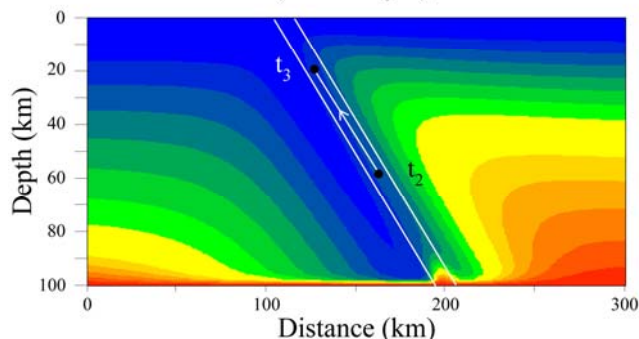
Subduction (1 Myr)



Residence (2 Myr)



Exhumation (10 Myr)



Computer-generated images of Alfredo and Jim's "cold-crust" model of orogenesis, showing temperature profiles of a subduction zone changing with time in a cross-section of the Earth's crust. Thermal modelling constrained by $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology shows that the history of the rocks, including burial during subduction (ca. 1 Myr), residence at depth (ca. 2 Myr), and exhumation (ca. 10 Myr) for rocks of Bergen Arcs, Norway took place much more rapidly than previously thought for mountain-building processes.

To answer this fundamental question, **Alfredo Camacho** (Post-doctoral Fellow here since 2001) and **Jim Lee** turned to a Paleozoic mountain range in Norway known as the Caledonides. Collaborating with Bas Hensen from The University of New South Wales and Jean Braun from the University de Rennes, they used the Department's state-of-the-art $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology laboratory to demonstrate that a complete orogenic cycle – that is, the cycle in which the Earth's crust is first buried to great depths (subducted) and then brought back to the surface (exhumed by tectonic processes and sedimentary erosion) to form mountain ranges (see cross-section at left) – in the Bergen region of Norway lasted only 13 million years! This is much shorter than previously thought: many of the geological processes that shape the Earth's crust have been thought to last for hundreds of millions of years. As Alfredo and Jim say, "Geologically speaking, that is a very short period indeed – a blink of an eye in terms of Earth's history."

The researchers based their findings on eclogites, which are high-grade metamorphic rocks that have experienced high pressures and temperatures. By examining the distribution of $^{40}\text{Ar}/^{39}\text{Ar}$ ages within individual mineral grains and combining this information with computer models of diffusion and thermal evolution of the crust, they deciphered the entire tectonic history of the rocks, from their initial burial to their re-emergence at the earth's surface. Not only did they show that the evolutionary cycle must have been fast, but that the subducted crust remained relatively cool throughout its entire tectonic history, despite being buried to a depth of 60 km depth, thus forming the basis of a new "cold crust" tectonic model for mountain-building. This new model has significant implications for the formation and growth of mountain belts throughout geological history and for the processes that lead to the formation of mineral deposits.

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Left to right -
Dr. Alfredo Camacho &
Dr. James Lee

GROWTH OF THE HIMALAYA (by Laurent Godin)

Laurent Godin is leading a group of grad students in a study of continental collision zones, using the young and spectacular Himalayan mountains and the Tibetan plateau as their laboratory. The group, in collaboration with researchers from Oxford University and Virginia Tech, is principally trying to understand how the roots of mountain belts (metamorphic core zones) evolve from initial collision and thickening, to eventual exhumation and erosion. Underlying this theme are first-order questions pertaining to the tectonic evolution of the middle crust, structural interactions between passive continental margins and metamorphic cores, and the rates at which processes such as thickening, crustal extrusion, and exhumation take place in old or active mountain belts.

Although poorly understood, recent studies suggest that mountain belts are built on a "weak", partially molten mid-crustal layer. Recent coupled thermal-mechanical numerical models predict that this weak layer flows to the surface in a high velocity zone termed "channel flow", in turn favouring the migration of mid-crustal material from the orogenic core toward the foreland surface. The channel-flow model gained international interest at a Geological Society of London conference organized by Laurent and colleagues in December 2004. A Special Volume bringing all the latest contributions together is currently being prepared for release early in 2006.

The channel-flow model predicts specific boundary conditions, which require testing with detailed field observations and geochronologic studies. The Himalayan orogen is one of the few orogens that allows direct observation of such processes, without much of the overprinting by later events that is common to older orogens. However, although the Himalayas is the orogen that inspires many models of collisional orogenesis, it is also poorly mapped and understood. This is why the Queen's team (M.Sc. student **Dawn Kellett**, Ph.D. student **Kyle Larson**, and **Laurent Godin**) heads to the hills every year for a couple of months! Since joining Queen's in 2003, the group has been to Asia four times, twice in Nepal, and twice in Tibet.



Dawn Kellett (2nd from left, front row, M.Sc. student), Laurent Godin (back row, far right), and their wonderful support crew at 5400 m.



Northern view from Tibet of three giants, from left to right: Makalu (8,462 m; M), Everest (8,850 m; E), and Cho Oyu (8,201 m; C). The upper bounding fault of the proposed "channel" appears as a "normal" fault near the summit of Everest (composed of unmetamorphosed Ordovician limestone). Rocks below this fault comprise upper amphibolite facies metamorphic rocks.

ANATOMY OF A SUBDUCTION ZONE (by Kumar Ramachandran)

The northern Cascadia subduction zone (SW British Columbia and NW Washington State) is a region of high earthquake hazard. Megathrust earthquakes ($M > 8$), such as the one that occurred in 1700, have an average recurrence interval of 500 to 600 years, and nearly 10 earthquakes of $M > 6$ have occurred in the past 125 years. Cenozoic forearc basins such as the Seattle, Tacoma, and Georgia basins may amplify ground motion, causing serious concern for areas with high population densities (e.g., Vancouver). An accurate knowledge of the subsurface seismic-velocity structure is necessary to model the shaking effects caused by earthquakes, and to precisely relocate earthquake epicentres. A regional-scale 3D P -wave velocity model for the Northern Cascadia Subduction Zone (see figure below) was constructed using tomographic inversion of first-arrival travel-

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Anatomy of a Subduction Zone (Continued from page 6)

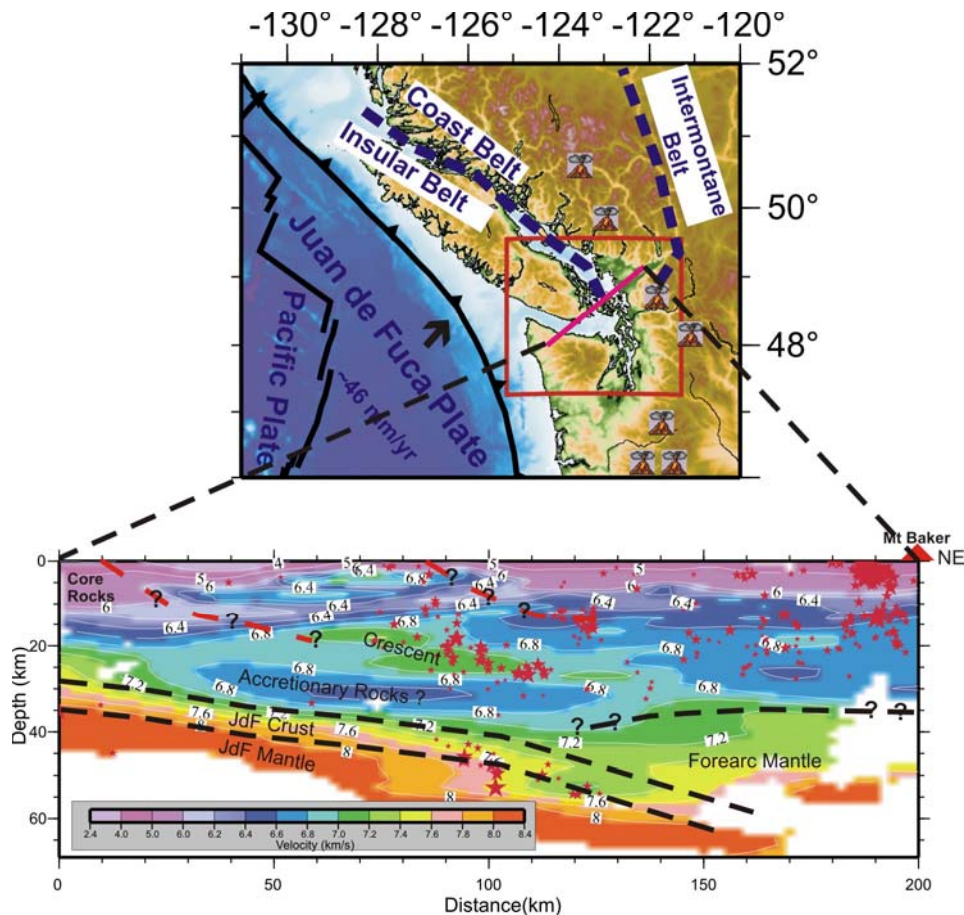
times from active-source (man-made) experiments together with earthquake travel-time data recorded at permanent monitoring stations. This model images the structure of the forearc crust and upper mantle, and the subducting Juan de Fuca plate. Some of the salient results from the study are as follows.

a) Beneath southern Vancouver Island, the forearc crust above the Juan de Fuca plate is characterized by relatively low velocities (6.4-6.6 km/s) at 25-30 km depth, which probably indicate the presence of trapped fluids, sheared lower-crustal rocks, or underthrust sedimentary rocks. This region is devoid of seismicity and coincides with the high electrical conductivity region mapped in previous magneto-telluric studies, a dipping band of reflectors in seismic-reflection sections, and a low shear-velocity layer modeled in seismic receiver-function studies.

b) The forearc upper mantle beneath the Strait of Georgia and Puget Sound is characterized by velocities of 7.2-7.6 km/s. Such low velocities may represent regional serpentinization of the forearc mantle by fluids rising from the subducting and dehydrating Juan de Fuca slab. The sedimentary basins in the Strait of Georgia and Puget lowland imaged by the velocity model lie above the zone of forearc mantle serpentinization, suggesting a cause and effect relationship.

c) Inslab earthquakes of $M > 4$ occurring at locations with P-wave velocities at the hypocenter > 7.8 km/s suggest that they originate near the subducting oceanic Moho.

Further tomographic studies are currently in progress to delineate seismogenic structures in the forearc crust and the subducting Juan de Fuca slab.



P-wave velocity model for a transect across the North Cascadia Subduction Zone, approximately through Vancouver, B.C.

FIELD STUDIES ENDOWMENT FUND

As we announced in the last Newsletter and in a recent mail-out solicitation, the Department has created a **Geology Field Studies Endowment Fund** to ensure that Queen's Geology students will have the very best opportunity to become the outstanding professional geologists and geological engineers of tomorrow. The Queen's Geology Council in Calgary has made this Fund their special project and is putting an enormous effort into raising money for this worthy purpose. Thanks to the generous support of many of you (see more below), I am pleased to report that we are about a quarter of the way toward our ambitious goal of \$2M! We have received many smaller donations and several larger ones in the 5- to 6-figure range. Such leadership donations are extremely important if we are to reach our objective of creating a fund that will ease the substantial financial burden on students (currently \$2000 or more, each, over 2nd, 3rd and 4th years) for field schools and field trips.

Please be generous and give to this worthy cause! For more information please contact Bob Dalrymple. If you live in the Calgary area, please feel free to contact any of the members of the Geology Council (see contact information below) or Jim Campbell, Manager of the Queen's Western Regional Office.

Roger	Smith	(403) 296-8638	rsmith@suncor.com
Mike	Rose	(403) 571-3600	rose@duvernayoil.com
Bill	Slavin	(403) 292-0692	bslavin@arcfinancial.com
Grant	Bartlett	(403) 216-8742	gabartlett@mhicontract.com
Dan	Brisbin	(306) 956-6394	Dan_brisbin@cameco.com
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Michelle	Wright	(403) 266-2555	mwright@aquaterre.ca
Jo-Yi	Wei	(403) 231-5974	jo-yi.wei@enbridge.com
Kirsten	Pugh	(403) 645-6394	kirsten.pugh@EnCana.com
Jim	Campbell	(403) 266-6195	campj@post.queensu.ca



"THANK YOU" TO OUR GENEROUS BENEFACTORS

Thank you
for being
part of
the team...

2005 has been a record year for donations to the Department, with several hundred thousand dollars donated or pledged, most of it to our Field Studies Endowment Fund (see above). In this time when we can no longer count on governments to do everything for us, we are forced to turn to our alumni to help us do those extra things that make a difference to the education of our students. Alumni must begin to act more like those in the United States where "**Giving Back**" is a way of life.

The following alumni have done just that over the last seven months (January-July, 2005). Their generosity is making a difference, helping Queen's Geology to be the best.

Ms. Susan Yatabe, BSC, '82; Mrs. Wanda Shewan, BSC, '74; Mrs. Heather Mace, BSC '93, BED '94; Mrs. Jennifer Eaton, BSC, '93; Mr. Marcel Dufresne, BA, '73, BED, '74; Mr. Roger & Lorna Smith, BSC, '71, MSC, '78; Mr. William Slavin, BSC, '84; Mr. Douglas Robinson, BSC, '75; Dr. Ellen Herron, BSC, '64; Dr. Gerhard Pratt, BSC, '80; Mr. Paul Price, BA, '82; Mr. Steven & Mrs. Charlene Butler, BSC, '88; Dr. David Levy, MA, '79, DSC, '94; Mrs. Marjorie Sutherland Smith, BA, '76, BSC, '79; Mr. Leslie Kende & Ms. Ruth de Boer, BA, '91; Mr. William Barclay, BSC, '85; Mr. Robert Morris, MSC, '78; Mr. Kenneth Armstrong, MSC, '96; Mr. Gregory MacMaster, BSC, '86; Miss Heather Douglas, BSC, '89; Ms. Lisa Coyne, BSC, '93; Mr. David & Mrs. Kirsten Pugh, BSC, '02; Mr. Kent White, BSC, '95; Mr. Bruce Downing, BSC, '70; Dr. Daniel Brisbin, BSC, '79, MSC, '86, PHD, '97; Mr. Ross Vogan, BSC, '62; Mr. Andrew Vogan, BSC, '91; Dr. Sandra McBride, MSC, '72, PHD, '77; Mr. Jeff Austin, BSC, '79; Dr. Peter Roeder; Miss Jennifer Burgess, BSC, '92; Miss Joyi Wei, BSC, '94; Mr. Neil & Ms. Jean Lund, BSC, '47, MSC, '49; Dr. Finley Campbell, MA, '56; Mr. Lo-Sun Jen, MSC, '67; Mr. David & Mrs. Sian Fitzpatrick, BSC, '81; Mr. Andrew Polak, BSC, '87; Ms. Beth McClenaghan, MSC, '89; Ms. Susan Cantile, BSC, '81; Dr. Jeffrey Lukasik, PHD, '02; Dr. Donald Yardley, BSC, '41, MSC, '47; Mr. Arnold Pedersen, BSC, '63; Dr. Brian Zaitlin, PHD, '87; Dr. Daniel Brisbin, BSC, '79, MSC, '86, PHD, '97; Dr. Gilles Allard, MA, '53; Mr. Robert & Mrs. Joan Horal, BSC, '61; Mr. Yongwang Ma, MSC, '03; Mr. Neil Richards, BSC, '84; Dr. Raymond Goldie, PHD, '76; Mr. Michael Birch, BSC, '74; Mr. David Malcolm, BSC, '80, MSC, '94; Mr. Richard Darling, BSC, '61; Mr. Eric Gonneau, BSC, '94; Mr. Hadley Leipziger,

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DEPARTMENTAL HISTORY - THE 10TH DECADE, 1984-1994

(by Al Gorman)

The decade started with Ed Farrar as Head. He was followed by John Dixon, then Herb Helmstaedt. New faculty during the decade were Alf Dyck, Noel James, Colin Thomson, Janet Regan and Vicki Remenda. Also, Dan Schulze and Paul Young arrived and departed. Ray Price came back from a stint at the GSC in Ottawa. Dennis Woods, Mabel Corlett, and Larry Dyke departed to take up non-academic careers, while Bob Uffen and Alan Gorman reached the mandatory retirement age and stopped receiving pay for what they continued to do. The Centennial Year for the Faculty of Applied Science occurred during Herb's reign, marking 100 years for departments like Geological, Mining and Chemical Engineering. We kept our celebrations low-key to avoid upsetting the new kids on the block, like Mechanical, Electrical, and Engineering Physics.

The number of Ph.D.'s awarded this decade dropped 28%, to 37, but M.Sc.'s awarded rose 41% to 109. This increase was in part due to the occurrence of the first full decade of operation of the very successful MinEx M.Sc. program. The number of B.Sc.'s awarded in Canada in Geology dropped enormously during the decade, so the drop at Queen's of 15% to 420 was actually something to boast about. Most of our loss in numbers occurred in the Arts and Science Honours program, which produced only 196 graduates. The Engineering program held up much better, with 224 graduates. This was probably due in part to the introduction of a new option, Geoenvironmental Engineering, in 1989, organized with the help of the Civil Department. Our program was so successful in attracting excellent students that, in 1992, Civil introduced its own "Environmental" program, a minor variation from an existing program. Our option appeared to be attractive to women, as the percent of women graduating in Geological Engineering increased by over 50% in the three decades that the option had graduates. I put it down to the fact that women like everything clean and tidy, and men are slob.

Students continued to organize academic, athletic, and social events, but left some time free for studying. The Journal Club changed its name to the Jolliffe Club, and continued its Friday afternoon program of presentations and refreshments, which came to be known as Geocolloquium. The Geo-Eng Club continued to organize its Geo-Eng Weekend, with guest speakers often recruited from the pool of Queen's Grads. Field trips continued to be an important aspect of student life, and I hesitantly decided to mention them under the "Academic" heading. I will mention only the two that became fixtures this decade. Sutton became the continuing locale for the undergraduate field school, and the timing became fixed at "after the second-year final exams". Also, the on-again off-again Bermuda trip became the Bermuda Field School, under the direction of Noel James. Of course, hockey was THE sport for geology students (both grads and undergrads). I believe Geology won the Fur Cup more often than Mining, but don't have all the data. The gals vs. profs game for the Fur Cuplet was probably usually won by the gals, mainly due to a slight bias,** and even some overt activity, on the part of the male student referees. During this decade, the Gneiss Girls changed their name to the Tuff Schists. Other sports included Bewic events, ball hockey, canoeing, curling, squash, summer soccer, and summer baseball. The social season usually started with a barbecue to welcome the new second-year students. This was followed by the Swamp Race, the Halloween Party, the Formals and the Christmas Gronch. The winter term boasted a Pancake Breakfast, the Grad Class Dinner, and the Grinch Gronch, an event made memorable by the amazing dancing, guiter playing and Stomp-in'-Tom singing of "Doog" Carmichael.

Spring Convocation, 2004, brought to a close the tenth decade, and the 100th convocation during which the Geology Department had awarded degrees.

****Note:-** The editor of this Newsletter, RWD, who played goal in those years, begs to differ. He thinks it was a "huge" bias in favour of the gals. Having Mike Doggett playing for them instead of the profs is a bit of a stretch (for the dress that is)!

ALUMNI UPDATE (compiled by Al Gorman)

This column is going to be short because I haven't heard much from all you people out there. If you're reading this on your monitor, take a minute to send 3 or 4 lines about what you're doing to me at gorman@geol.queensu.ca and this will result in a much longer Alumni Update in the next Newsletter.



1964

Ellen (Edwards) Heron, B.Sc., Hon., M.S., Ph.D., Columbia, was curious to know if **Esther Jamieson** (B.Sc., Hon., 1961) is related to **Heather Jamieson** (Ph.D, 1982). I suspect they are, but many, many generations back in the mists of Scotland.

1969

Steve Watts, B.Sc., Hon., M.S., Nebraska, Ph.D., Australia, has moved back to Kingston, his home town, after retiring from a teaching career at Sir Stanford Fleming in Lindsay. He has volunteered to help out the old guy teaching GEOL333, and will also assist **Mark Badham** (B.Sc., Hon., 1886, M.Sc., 1997), our museum curator.

(Continued on page 10)

Alumni Update

(Continued from page 9)

1976

Bob Spring, B.Sc., Hon., asks is the Swamp Race is still a Fall event. As of last Fall, it was. Bob is Vice President, Exploration and Land, ConocoPhillips Canada.

1977

Mark Edmonds, B.Sc., managed to choose the one day in twelve that I am not in my office to drop by for a visit. His daughter, Jessica, is considering the Queen's Environmental Program. Mark is still in Calgary.

1979

Dave Guindon, B.Sc., Hon., M.Sc., 1983, was here for a visit on the same weekend as Mark. His daughter was auditioning for the music program. Dave is Ontario's District Geologist for Kirkland Lake.

Gordon Keep, B.Sc., Hon., reports that there are sandstone concretions on Gabriola Island. He is presently Managing Director-Corporate Finance, Endeavour Financial, in Vancouver.

Pat McLellan, B. Sc., Eng., is President of Advanced Geotechnology, a consulting and software firm that specializes in petroleum mechanics. He keeps busy with cross-country skiing and outrigger canoeing (yes, in Calgary), when he isn't trying to keep up with his twin daughters. To celebrate the 26th anniversary of their 1979 "exciting" trek across Southern Baffin Island, the four aging participants trekked into a hut in Jasper National Park, and made it out alive, again. Pat is always on the lookout for Queen's grads.

Chris Morton, B.Sc., Hon., M.Sc., 1981, Stanford, MBA, Penn., and his family were transferred to Minneapolis by Thomson Corporation three years ago. Chris runs one of their legal publishing units. All visits and e-mails (chris.morton@thomson.com) would be most welcome.

1980

Isobel Wolfson, B.Sc., Hon., reports that she, her husband **Greg Tucker**, B.Sc., Eng., 1982, and daughter Sarah have moved from rainy B.C. to the perpetual sunshine of Newfoundland. They will be working at the new Duck Pond Mine of Aur Resources.

1981

Phil Walsh, B.Sc., Hon., M.Sc., Ph.D., is now the Lecturer in Corporate Strategy in the School of Management, University of Surrey, England. He can be reached at p.walsh@surrey.ac.uk.

1985

Dave Baigent, B.Sc., Eng., is presently with Shaheen and Peaker Limited, Toronto.

Rick McCreary, B.Sc., Eng, M.Sc. '90, MBA. McGill, 1996, has been promoted to Managing Director, CIBC World Markets Global Mining Group, and can be reached at rick.mccreary@cibc.ca..

Jim Mucklow, B.Sc., Eng., M.Sc., Western, dropped by to show his daughter the wonders of Queen's (other than me). Jim is still working in Thunder Bay.

1987

Griff Murphy, B.Sc. Eng., is presently working for Hess Amerada in Houston. When the company decided to dispose of some Canadian publications, Griff purchased them and shipped those missing from our library to Queens. Griff mentioned that his wife, **Ann (Raymond)**, B.Sc., Eng., 1988) is working in the physiotherapy area.

1988

Eric LeGresley, M.Sc., LLB, Toronto, LLM, University College, London, after a stint with the WHO in Geneva, returned to Ottawa to set up his own consulting firm, servicing clients mainly in Europe and Asia. With the arrival of a son, he hopes to shift more of his clientele to a North American locale, giving him more time with his wife **Katherine** (....., B.Sc,) and son Elliot at his Prince Edward County cottage.

1991

Jim Stimac, Ph.D., has been managing geothermal projects for Unocal Philippines since 1998. Jim, **Adrienne (Larocque)**, Ph.D., 1993), Cameron (6), and Samira (3) have probably relocated to Santa Rosa, California, by now. Adrienne resigned her faculty position at the University of Manitoba to devote more time to the family.

1995

Andrew (Snake) Bursey, B.Sc., Eng., is leaving tunnel building with Bradshaw Corporation to do a Masters at Virginia Tech. He kindly informed me of two new air-photo internet sites.

1997

Gord Stretch, M.Sc., is now teaching high-school physics, chemistry, and maths in Edmonton. After 9 moves in 8 years, he bought a house as an anchor. He still does contract work in geology.

(Continued on page 11)

How Long Does It Take For a Mountain to Form? (Continued from page 5)

Jim Lee says, "Of course, fellow alumni of the Department undoubtedly remember that Kingston sits on top of its very own, once-formidable, mountain range. Created during the Grenville Orogeny about one billion years ago, today we can only see the roots of this now-eroded mountain range as the Thousand Islands and the Frontenac Axis. The time that it took to grow, however, is still a question that remains unanswered."

For more information, interested readers can read the original article and associated commentary:

Camacho, A., Lee, J.K.W., Hensen, B.J. and Braun, J. (2005) Short-lived orogenic cycles and the eclogitization of cold crust by spasmodic hot fluids. *Nature* 435: 1191-1996.

Kelley, S. (2005) Hot fluids and cold crusts. *Nature* 435: 1171.

Alumni Update (Continued from page 10)

2002

Ian Picketts, B.Sc., Eng., is now working for an environmental consulting firm in Calgary, and hoping to spend a lot of time in the mountains.

2003

Scott Conley, B.Sc., Hon., is working at Placer Dome's Musselwhite Mine, about 800 km north of Thunder Bay. It seems their gold comes from a strongly altered band in iron formation
Amy Kerckhoff, B.Sc., Hon., moved from Alaska to Tibet, but will be in Edmonton by October 1 to start a helicopter training course.

2005

Adam Melnyk, B. Sc., Eng., was the subject of a story in the CIM News last year. After a summer working at Red Lake, he describes geological work as "incredibly rewarding". He blames John Hanes' first-year course for his career choice.

"Thank You" To Our Generous Benefactors

(Continued from page 8)

BSC, '78; Dr. Robert Baragar, MSC, '53; Mr. Neil Stalport, BSC, '79; Miss Justina Donkers, BSC, '79; Mr. Andrew Roberts, BSC, '72, MSC, '76; Mr. Bartley Roberts, BA, '86; Dr. Hewitt & Mrs. Sigrid Bostock, BSC, '54; Dr. Gene Shelp, MSC, '86; Dr. William Pearson, MSC, '77, PHD, '80; Mr. Alan Spence, BSC, '60; Mr. Alan Beavan, BSC, '73; Dr. Laura Johnston, BSC, '69, MSC, '72, PHD, '78; Mr. James Collins, BSC, '59; Dr. Harvey Young, PHD, '73; Mr. Ian Watson, BSC, '95; Mr. Christopher Elvidge, BSC, '98, MSC, '00; Dr. Graham Closs, PHD, '73; Ms. Kathryn Scales, BSC, '78; Mr. Pierre Sauve, MSC, '54; Mr. Mervyn Keys, MA, '38; Mrs. Anne Millington, MSC, '75; Mr. Stefan & Mrs. Sandra Blasco, BSC, '72; Mr. Robert Whillans, BSC, '71; Dr. Andy & Elizabeth Fyon, BSC, '76; Mr. David Baigent, BSC, '85; Dr. Michael O'Connor, BSC, '68, PHD, '76, DSC, '92; Mr. John McAdam, BSC, '78; Dr. Owen Lavin, MSC, '77, PHD, '89; Mr. Wencil Hubacheck, BSC, '45; Mr. Lorne Halladay, BSC, '51; Dr. Philip Wannamaker, BSC, '76; Mr. Paul Nicholis, BSC, '76; Mr. Robert Knutson, BA, '53; Dr. Geoffrey Leech, MSC, '44; Dr. Grant Bartlett; Centerra Gold; Teck Cominco; Falconbridge Limited; DeBeers Canada Exploration Inc.; O'Connor Associates Environmental; Inco Limited; Inmet Mining Corporation; Anadarko Canada Corporation.

The Earth (Author Unknown)

If the Earth
were only a few feet in
diameter, floating a few feet above a
field somewhere, people would come from
everywhere to marvel at it. People would walk
around it, marvelling at its big pools of water, its little
pools and the water flowing between the pools. People
would marvel at the bumps on it, and the holes in it, and
they would marvel at the very thin layer of gas surrounding it
and the water suspended in the gas. The people would marvel
at all the creatures walking around the surface of the ball, and
at the creatures in the water. The people would declare it as
sacred because it was the only one, and they would protect it
so that it would not be hurt. The ball would be the greatest
wonder known, and people would come to pray to it, to be
healed, to gain knowledge, to know beauty and to wonder
how it could be. People would love it, and defend
it with their lives because they would somehow
know that their lives, their own roundness,
could be nothing without it. If the
Earth were only a few feet in
diameter.



WE NEED TO KNOW

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