CCCESD – November 2006 Summary of Departmental Submissions

University of Victoria

The School of Earth and Ocean Sciences (SEOS), founded in 1991, has gained international repute as a centre of excellence in earth and ocean science research and teaching. Within the general theme of *Earth and its Environment*, SEOS' research strengths lie in four interrelated themes: *Earth System Evolution, Biogeochemical Cycles, Marine Environment and Ecosystems*, and *Climate–Ocean Dynamics.* SEOS faculty are involved in a wide range of international programs and were instrumental in the creation of the NEPTUNE and VENUS cabled observatories.

SEOS has experienced substantial growth in the past five years, with 24 faculty based either solely in SEOS or jointly appointed with the Departments of Biology or Physics and Astronomy. A large body (~ 55) of adjunct faculty from neighbouring government laboratories and industry strengthen our research and educational programs. The University has supported our growing undergraduate enrollment and programs through new Laboratory Instructor positions. A challenge we are continuing to face is the low priority given by the University to technical support for our research and graduate programs.

SEOS academic programs lead the way on the still-emerging concept of *Earth System Science*. The School offers an integrated learning environment for the study of the Earth System through, in addition to our core Earth Science program, six interdisciplinary programs with the Departments of Physics and Astronomy, Geography, Biology, and Chemistry. All programs have a Co-operative education option. Two of these programs provide the core courses required for professional registration, although maintaining a curriculum that meets these requirements poses significant challenges for the School. Starting Spring 2007, SEOS will also offer a Minor in Ocean Sciences Program aimed at science students. This program will have a concentrated summer session, with courses in biological, chemical, geological, and physical oceanography. SEOS also has a flourishing graduate program, with ~70 students enrolled in our MSc and PhD programs.

In Fall 2008, the School will be united in a new science building. Environment Canada's Canadian Centre for Climate Modelling and Analysis will be co-located with SEOS.

University of British Columbia

An External Review (2005) of EOS was extremely positive and supportive leading to a renewed effort to fund a new building (the Earth Systems Science Building). In the meantime, lack of space is a serious problem. Research is multidisciplinary and covers a broad spectrum of environmental and solid earth sciences (atmospheric sc., geological engineering, oceanography, geology, geophysics). There were substantial investments in infrastructure that supports broad components of the Department such as the Pacific Centre for Isotopic and Geochemical Research, the Centre for Experimental Studies of the Lithosphere, the GeoDisasters Centre, and the EOS Undergraduate Learning Centre. There are currently 47 EOS members of Faculty. Hiring in the last 2 years includes Catherine Johnson (Associate; Scripps), Mark Jellinek (Assistant; U of T); and Sara Harris (Instructor; Woods Hole). We converted one Faculty position into technical support funding. We have hiring competitions underway for an economic geologist (ore deposits) and a sedimentologist. EOS graduate enrolment for 2006 is 169 (up 11%) and undergraduate enrolment is 271 (down 11%). Total enrolment in all EOS courses is ~ 5,400. Apart from space issues, a central problem for us is obtaining adequate indirect cost of research funding. The UBC budget is also in poor shape which is leading to serious cutbacks.

University of Calgary

The Department of Geology and Geophysics at the University of Calgary is experiencing an expansion phase which includes:

1. Development of programs for M.Sc. in Reservoir Characterization and B.Sc.in Geology with Concentration in Petroleum Geology.
2. Increase in student numbers to 400 undergraduates and 140 graduate students.
3. Advertisements for 8 new geoscience academic positions and 2 new support staff positions.
4. Advertisement for new Department Head for July 1, 2007.
5. Unit review external recommendation to double the size of the Department in 5-10 years.
6. Proposal to rename our academic unit as the Department of Geoscience.

In essence, the Department is experiencing the same type of growth as the petroleum industry. Our problems are those of space and resources to teach and supervise huge cohorts of students.

Mount Royal College, Calgary

The college is aiming to become an undergraduate teaching university (this means 'more research than happens at the present without loosing the teaching focus of the institution') and hopes to become a member of AUCC within three years. The Alberta government has acknowledged the need to offer more degree level opportunities. It is a political decision as to whether to make Mount Royal College a university or leave us as a college.

Currently we have each year around 165 students in Physical Geology of which 75 move on to Historical Geology. Typically 25 of these 75 students then continue into our second year courses. Most of these students transfer to the Universities of Calgary, Alberta, Saskatchewan or Brandon to complete their degrees.

The Department of Earth Sciences has submitted a proposal for a BSc with a Geology major (20 Geology courses minimum) to the Alberta government as part of a large package of college-wide degree proposals.

If approved, we would start offering the degrees in Fall 2008. Extensive new lab and research space would be needed by Fall 2010 and an increase in the full-time geology faculty from three to five or more.

University of Saskatchewan

- Stratigrapher/paleontologist Dr. Luis Buatois arrived August 2004, with his wife, Dr. Gabriela Mangano, now a Term appointee.
- Search ongoing for Crustal Tectonics/Structural Geologist to hire in 2007
- Faculty complement consists of 2 Canada Research Chairs, 2 endowed research chairs, Associate Dean of Science, 7 Full Professors, 3 Associate Professors, 1 Assistant Professor, 1 Term Assistant Professor, 4 active Emeritus Professors
- Undergraduate programs in Geology, Geophysics, Environmental Earth Sciences meet CGSB requirements, which APEGS now follows
- Geology graduates consistent at about 25 per year, although increase in enrolment in 2nd year in 2006-2007. Low number of students in other programs, including Paleobiology.
- 38 graduate students, including 18 PhD and 17 women
- All faculty except one have NSERC grants, as well as the Term Assistant Professor and two Adjunct Faculty. Other funding from United States granting agencies and industry. Total funding about $3M.
- Dr. Jim Hendry won U. Saskatchewan Distinguished Researcher Award, May 2006.
- Dr. Yuanming Pan won Young Scientist award from GAC-MDD, May 2005
- Dr. Rob Kerrich awarded a Killam Research Fellowship for 2003-2005
- New undergraduate and graduate scholarships from Cameco, Areva, Shell, NAL Energy

University of Manitoba

The most significant change for the Department of Geological Sciences at the University of Manitoba has been that it has joined a new faculty, now called the Clayton H. Riddell Faculty of Environment, Earth, and Resources. The Faculty was created in 2002 to be responsible for teaching, research and service in the broad areas of the Earth, the environment, sustainable development and resources. The Department of Geological Sciences strongly supported the creation of the Faculty but in the past three years the Department has struggled with the Faculty because of significant start-up problems, lack of a space reallocation plan, inadequate operating budget, and incompetent Faculty-level administration.

Two new faculty members have joined the Department in the past year. Alfredo Camacho is an Assistant Professor in Tectonics, and Mostafa Fayek is an Associate Professor and Canada Research Chair (Tier II) in Environmental and Isotope Geochemistry. In July 2007, Andrey Bekker will join the Department as an Assistant Professor in Stable Isotope Geochemistry. The Department acquired a CFI-funded secondary ion mass spectrometer (SIMS) and will be establishing a Mass Spectrometry Facility over the next two years. New technical staff are Panseok Yang, Microbeam Lab Manager; Rong Liu, Research Associate responsible for operating the SIMS; and Yassir Abdu, Research Associate responsible for setting up the Mossbauer spectrometer.

The Department currently has 71 students enrolled in our Major and Honours programs in Geology and Geophysics, which is a 57% increase from two years ago, and we have currently have 8 M.Sc. students and 6 Ph.D. students. The Department has seen a 61% decrease in enrolment in its first-year courses in 2006-2007 because the Department is no longer in the Faculty of Science and our courses are not regarded as "Science" courses by the Faculty of Arts, Faculty of Science and University I regulations. This decrease translates into an

overall decrease of 41% in undergraduate credit hours for the Department. The Faculty is trying to address this problem but so far has been unsuccessful in its dealings with the other units.

Laurentian University

1. Over the past several years we have replaced all 5 retiring faculty positions, added 3 *new* permanent faculty positions (including a Tier I CRC in Precambrian Geology, a NSERC-IRC in Mineral Exploration, and a senior position in Economic Geology), and added 1 temporary faculty position. A position in Environmental Geoscience is presently being advertised, and an Inco-NSERC-IRC in Exploration Geophysics will be added within the next year or two as part of our *Centre in Mining Excellence and Innovation*. We have also added 1 additional Technologist and added a 0.5 Secretary position.
2. Over the same period we have *doubled* the number of research grants (ave. 30) and *tripled* the amount of external funding (ave. $1m).
3. We have added a PhD in Mineral Deposits and Precambrian Geology and an Applied MSc in Mineral Exploration, and we are in the process of creating a Co-Op BSc program and an Articulation Agreement with Cambrian College.
4. We have moved the entire Department to the Willet Green Miller Centre, where we now have more office and lab space, and are located adjacent to the Ontario Geoscience Labs, Ontario Geological Survey, Ontario Mines Library, and Ministry of Northern Development and Mines.
5. Balz Kamber has set up a new LA-ICP-MS Lab, Pedro Jugo is setting up an Igneous Petrology Experimental Lab, and we have doubled the amount of space for other faculty labs.
6. Steve Piercey won the SEG Lindgren Award and GAC-MDD Gross Award last year.

University of Guelph

The department completed an extensive internal review of undergraduate programs in 2003 which led to the addition of two new courses in the last two years. The first is a third year Field Methods in Geosciences course, which includes a one week field camp at the beginning of the fall semester where students learn to do geological mapping. The second course that is now being offered through our distance education program is a Natural Hazards course that is a science credit for non-science majors. We are also actively working on undergraduate recruitment strategies following an external review of our programs this past winter. Apart from these two developments, the department is trying to plan future curriculum changes in the face of significant budget cuts and upcoming retirements of several of our key faculty members.

University of Waterloo

After three decades as the "campus nomads", the Department of Earth Sciences finally settled down in September 2003. We now have a magnificent new home in the Centre for Environmental and Information Technology (CEIT) building. Though we think of it as ours, we in fact share the building with Electrical and Computer Engineering. There is a three-story atrium, appointed with rock and mineral display cases, and our museum, including an 8 tonne, 9 meter tall monolith of gneiss, is also located in the atrium. The area has become one of the destination points on campus and has greatly increased the Department's profile. (Drop in if you have a chance.) The department is also very active in outreach activities, which includes an annual gem and mineral show. In addition, more than 10,000 elementary school students visit the Earth Sciences museum on organized trips, though it is not clear that this has had a significant influence on student enrolment.

Over the past year we have been in a significant phase of faculty renewal. Dr. Dave Lawson (sedimentology) retired in December 2005 and Drs. John Cherry and Bob Gillham retired in the summer of 2006. Recent appointments include Dr. Carol Ptacek (contaminant hydrogeology), Dr. Walter Illman (physical hydrogeology) and Dr. Martin Ross (sedimentology and Quaternary). As a significant departure from our normal areas of expertise, we have also hired Dr. John Lin, an atmospheric modeller, to bolster our fledgling program in atmospheric science. Our undergraduate enrolment remains relatively low (105 majors including geological engineering) but stable and our graduate enrolment continues at a relatively high level (106), with annual research funding of about $5.5M. We are currently exploring the possibility of building on our current groundwater and atmospheric strengths, to expand the undergraduate program more broadly into areas of environmental science.

McMaster University

Current status: The School of Geography & Earth Sciences (SGES) consists of 31 faculty members (of which 16 are Science faculty and 15 are Social Science faculty) and has approximately 70 B.Sc. honours students currently in program (Levels II through IV). SGES offers a B.Sc. Honours Earth & Environmental Sciences program with 3 specialist streams (Geoscience, Hydroscience and Geochemistry) and a 5-year Co-op option. A 3-year B.Sc.

Geoscience program is also administered by the Faculty of Science. The Honours EES programs graduate approximately 25 students per year. Our graduate student numbers are steady with 29 'geoscience' grad students, 11 of which are Ph.D. students.

Recent events: A new Dean (John Capone) was appointed to the Faculty of Science in July 2005 and has been active in establishing committees to examine undergraduate and graduate education, and research activities within the Faculty. A number of reforms to the Level I Science program have been proposed including direct entry to programs – this change will have serious consequences for recruitment into our EES programs. The School undertook a full Undergraduate Program Review in March 2006 and received very positive comments from the Review Team. Curriculum changes recommended by the team are now being planned. Many 'geoscience' faculty moved into newly renovated lab space on the third floor of the Burke Science Building where new undergraduate teaching labs and facilities for the Centre for Spatial Analysis are now located. We continue to have a strong record of employment for graduating students from both our undergraduate and graduate programs.

Future issues: We will be implementing curriculum and course changes over the upcoming year in response to the UPR and to ensure that graduates from the EES program fulfill the academic requirements for APGO certification. Planned changes include revision of our 'specialist streams' to reflect current School strengths and to eliminate overlap in course content. We are rationalizing the delivery of courses with low student enrolments in order to offer new courses that address current 'gaps' in our program. Recruitment of undergraduate students into the EES program continues to be an issue although many of our courses are full to capacity! A major focus over the next year will be on expansion of our graduate program (the Dean has set a target of 25% growth for 2007) and we will be actively recruiting new M.Sc. and Ph.D. students. We have also initiated the search process for a new Director for the School as John Drake will be stepping down on June 30, 2007.

Brock University

We are a small department with 10 faculty and 4 Technical support staff and a Senior Demonstrator. We have a small MSc program which we seek to expand and, with this intent, last year added Dr Martin Head, a deep sea palynologist and a good fit with Dr Francine McCarthy's related interests.

Undergraduate enrolment has been slowly rising over the last decade (now 56 in total, up from 34), and we have no trouble employing graduates, but most majors are poached thanks to our large first year courses. Our (5 year) COOP program attracts a small number of talented students in both Earth Science and Environmental Geoscience. Many courses use the local region for field work, the hard rock field course is on the shield at Bancroft, the Geoscience field course runs locally one afternoon a week for a term.

We are viewed sceptically by the Administration, but have a supportive Dean. Major challenges in the future are to maintain our C14 Lab when the technician retires, to reclaim lost lab space, and to bolster all enrolments. Research activity is good with half the faculty NSERC supported.

University of Toronto

Infrastructure: the Jack Satterly Geochronology laboratory moved from the Royal Ontario Museum to the Dept. of Geology in 2003.

New Hires/New Directions:

- Ulrich Wortmann (2002) – marine sedimentology (carbonates), biogeochemistry. Has set up a new Stable Isotope lab.
- Gopalan Srinivasan (2003) – cosmogeochemistry/meteroritics. Has set up a new meteorite/Stardust sample prep lab and TIMs mass spectrometry lab (Isoprobe T)
- Jorg Bollman (2005) – paleooeceanography/micropaleontlogy
- Rebecca Ghent (2006) – planetary remote sensing
- Jochen Halfar (2006, Mississauga campus) – paleoclimatology

Resignations and retirements (all 2006)

- Marianne Douglas (moved to UofA) – paleolimnology/paleoclimate
- Steve Scott (retired) – marine geology/ore deposits
- Pierre Robin (retired. Mississauga campus) – structural geology

Ongoing Issues:

- Stable enrolments at undergraduate and graduate level. No growth despite "double cohort" and upswing in resource sector.
- Graduate enrolment expansion in Ontario.
- Looking into reorganizing Earth Sciences within the Faculty of Arts and Science

Queen's University

The Department of Geological Sciences and Geological Engineering at Queen's is healthy, with robust students at both the undergraduate and graduate levels. Combined enrolment in our Geological Engineering and Geological Sciences undergraduate programs, which has stood at 40-45 per year for several years, has jumped to slightly more than 60 in this year's 2nd-year class. Graduate enrolment remains at approximately 60, but plans to grow the number of Masters and Doctoral students were unsuccessful, probably as a result of interuniversity competition for the smaller number of students contemplating graduate school as a result of the very buoyant job market.

Our Geological Engineering program underwent an accreditation review by the Canadian Engineering Accreditation Board during the 2005-2006 academic year. To our profound satisfaction, we received a clear six-year accreditation with no identified deficiencies. An earlier review of our graduate program by the Ontario Council on Graduate Studies delivered a similar result.

We are pleased to welcome Daniel Layton-Matthews as a new Assistant Professor. He adds to our already strong complement of faculty with an interest in mineral-deposits geology. This good news is tempered by the fact that, just this fall, two faculty members have indicated their intention to resign to take positions in industry. We have begun the lengthy process of fighting to get replacements, something that is far from assured.

After many years of neglect, the University has begun to address the poor state of Departmental infrastructure. We have had some significant cosmetic improvements and hopefully more will follow. Our Museum is also in the throes of a major overhaul and is already starting to look revitalized, thanks to a donation from a local doctor. In other fund-raising activities, we are approaching the half-way point in our quest to create a $2M endowment to support our field-school and field-trip program. Further initiatives are in the works to capitalize on mutual interests between our Department and the Department of Mining Engineering.

Carleton University

Good news: Increase in enrolment over the last 2 years, from about 45 students to 85.

Other news: Retirement of one faculty member, resignation of another. We're still waiting to find out if the member who resigned will be replaced.

University of Ottawa

Faculty Hiring

- Veizer took an early retirement in 2004 and Dr. Mark Hannington arrived in January, 2005 as a Full Professors after 15 years at the GSC. He brought the editorial office of Economic Geology.
- In August, 2006, we hired a Lecturer, one of 8 Lecturers in the Faculty of Science. The primary responsibility is to teach first year courses.
- The University approved the nomination of Glenn Milne, Geodynamicist, to CRC II position. He is putting his application for the Dec. 4th competition

Industry Funding

- The Department received the endowment of $1.5M from Goldcorp and $1 M from Husky Energy.
- The university's Vision 2010 approved the creation of the Canadian Shield Research Institute.
- Short courses to Industry people, starting in 2005.

Teaching

- Large increase in registrations of first year GEO courses. Total number of students in 2006/7: **1212** Among them, **425** are Science and Engineering students

McGill University

1. We have developed a new Earth System Science program comprising our department, Geography, and Atmospheric and Oceanic Sciences. We have hired 6 junior level professors. The scope is global.

2. We are teaching a new graduate reading seminar required of all incoming graduate students which involves all faculty members. Thus students gain an appreciation for the breadth of research being conducted in the department.
3. We are teaching courses involving web-based videoconferencing. One course is a grad/undergrad seminar in volcanology involving Michigan Tech and Buffalo in the USA, UNAM and Colima in Mexico, and McGill and SFU in Canada.
   John Stix

Université Laval

Dec 2005 : 12 faculty members

Jan 2006 : One retirement in hydrogeology

A new graduate program in "Biogéosciences de l'environnement" has started. This program includes the participation of 4 departments (Geology and geological engineering, biology, geography and geomatic sciences)

Fall 2006: One appointment in hydrogeology (Canada Research Chairs – Tier 2)

Undergraduate enrolment decreased over last few years in the science and engineering faculty. Faculty's budget cut resulted in the partial faculty replacements. Operating budget drastically cut too.

2007: One retirement is expected in 2007.

Acadia University

The Geology Dept is merging with the Environmental Science program. This will increase faculty complement from 5.5 to 8.5 (including two CRCs). The new department will offer Geology, Environmental Geoscience and Environmental Science programs.

A university-wide drop in enrolment is resulting in much belt-tightening and opportunistic removal of positions. When Nancy VanWagoner moved to Thompson Rivers University, her position was dropped. The number of majors in Geology is also down, although first year enrollment has risen this year. Geology courses as general electives are very well subscribed – over 500 registrants.

Dalhousie University

Faculty Complement: We have 11 professors and 4 instructors. Six professors have reduced teaching loads, being Chairs, UFAs, or holding large administrative loads. This has reduced considerably the number who can teach a full load. It has been an ongoing struggle to replace faculty who retire due to many years of frozen replacement budgets in the Faculty of Science. We have kept the complement to a reasonable level by means of CRCs, CIAR Scholars, and NSERC UFA awards. We have been fortunate to hire top-class people, but it is impossible to plan effectively to take account of changes within the discipline, especially as regards trends in student employment.
1st Year: Large increase in numbers over several years to 868 "people in seats" in 2006-7. These classes include ERTH 1060 (Earthquakes, Volcanoes and Natural Disasters -- 419 students), and classes in Physical Geography and Human Geography (a niche because there is no Geography programme at Dalhousie). These numbers are keeping us competitive for scarce Faculty of Science resources with respect to other departments. Their first-year classes are compulsory for other disciplines, unlike ours. Some students have been attracted into 2nd year as majors in consequence.
2nd Year Electives: Increase in numbers from follow-up elective classes (>100 students) -- Dinosaurs; Forensic and Medical Geology; and Environmental and Resource Geology
Student Majors: 30-35 students in 2nd year for several years, down somewhat in 2006-7. We are currently revising the curriculum in the light of environmental developments and professional registration, but are working to keep a strong fundamental programme in mineralogy and petrology.
Honours Theses: 13-19 Honours Theses completed each year in recent years.
Field Programmes: expensive but continuing. Honours Excursion to U.K., California, Chile, and Italy in recent years. 2nd and 3rd year field camps are maintained.
Industry Linkages: Linkage with Shell (Shell Experiential Learning Programme), commenced in Fall 2006. Shell has donated $200k over 3 years for field programmes, summer student research in the Department, and equipment for labs and field. We run a petroleum field class in Trinidad each year, funded in part by industry and the NS Department of Energy.

Saint Mary's University

The Geology Department at SMU has been undergoing several changes over the last few years. John Waldron left for the University of Alberta in 2000 and was replaced by Pierre Jutras (PhD, Université du Québec à Montréal) in 2001. Qadeer Siddiqui retired in 2002 and was replaced by Andrew MacRae (PhD, University of Calgary) during the same year. Jarda Dostal retired in 2006 and was replaced by Jacob Hanley (PhD, University of Toronto), who will begin his appointment in July 2007. Jarda's NSERC was just renewed for five years and he is staying with us as an Emeritus Professor. Hence, Jacob's replacement is in fact a pure "addition" in terms of our research capacity. Jacob has received funding for hydrothermal experimental equipment and a gas chromatograph. He has also applied to the Leaderships Initiative Funds for two large microscopes with infrared/UV cameras and heating/freezing stages for his work on fluid inclusions. Pierre Jutras replaced Victor Owen as Chair of the Department this year, and Georgia Pe-Piper replaced Jarda as Director of the Regional Geochemical Centre at SMU. David Slauenwhite is leaving us this year after 10 years of service as technician for the Centre. We are still in the process of finding a replacement, but it is clear that the Centre will keep on with business. Our plan is to work at joining forces with the LA-ICP-MS lab at SMU to eventually be able to produce both XRF and LA-ICP-MS analyses for geological samples. The Science Building at SMU is undergoing major renovations, putting many things on stand-by, but research and thesis supervision in the department goes on as usual, with over 20 refereed publications and over 10 theses coming out yearly of a department of only five faculty members.
Pierre Jutras

St. Francis Xavier University

The StFX Earth Sciences Department continues to grow, with the addition of a new tenure-track faculty member, Dr. Grant Ferguson, a hydrogeologist. This year we also hired Dr. David Risk, an environmental geochemist, for a three-year term position. All of our tenure-track faculty members hold NSERC Discovery Grants as well as additional funding, including grants from the Atlantic Innovation Fund, the US National Science Foundation, and other NSERC grants programs. Dr. Lisa Kellman is a Tier 2 Canada Reseach Chair in Environmental Sciences. We have completed two years in our new building, which is serving our department well, although we are already cramped for space. Our undergraduate enrollment has seen a significant increase this year, partly as a result of the popularity of two new courses in the area of Health and the Environment, as well as a relatively large second-year class.

Memorial University of Newfoundland

Earth Sciences Dept. News & Developments 2005-06:

• Significant University support for infrastructure

$170K for teaching equipment (with commitment for additional $80K in 07-08)

Five CREAIT staff hires in Earth Sciences (EPMA, TIMS, & three in geophysics area)

Matching funds for equipment (XRD, Raman, ICPMS)

Matching funds and startup for CFI grants for new hires

Strategic plan in place for faculty hires and for replacing aging equipment

•New faculty interests and research:

Dr. John M. Hanchar, Head of Earth Sciences Department

Areas of Research: Trace element and experimental geochemistry

Dr. Susan Ziegler, Canada Research Chair in Environmental Science

Areas of Research: Stable isotope biogeochemistry

Dr. Sam Bentley, Canada Research Chair in Seabed Processes and Seabed Imaging

Areas of Research: Sediment dynamics, Sediment radiochemistry, river-ocean interactions

Dr. Graham Layne

Areas of Research: Ore Deposit Geochemistry and Mineralogy & Setting up and upgrading CAMECA IMS4f Ion Microprobe (from CANMET)