

## **CNC-IGCP ACTIVITIES FOR 2007**

(By: Bryan T. Schreiner, Chair CNC-IUGS and International Director CFES)

### **International Geoscience Program, IGCP**

IGCP is a joint endeavor of UNESCO and IUGS (International Union of Geological Scientists) and operates in about 150 countries, involving several thousand scientists. It provides a multinational platform for Earth scientists to collaborate on projects aimed at understanding the Earth, its resources and their role in society. IGCP's activities are in line with UNESCO's overall goals in terms of benefits to society, capacity-building and the involvement of geoscientists from developing countries. Successful IGCP projects have been implemented on (for example): Medical Geology, Climate Change and its impact on Society, Environmental Catastrophes, Cultural Heritage, Biosphere Changes, Mineral Resources, and Biodiversity in the Earth's past.

Traditionally, the Scientific Board of the ICGP was divided into the following five groups, with 4 members in each group, totaling 20 scientists:

1. Stratigraphy, Sedimentology, Palaeontology, Fossil Fuels
2. Quaternary, Environmental and Engineering Geosciences
3. Mineral Deposits, Petrology, Volcanology, Geochemistry
4. Geophysics, Tectonics, Structural Geology
5. Hydrogeology

Recent developments indicated that this structure no longer reflected the current complexion of the Earth sciences or of the proposals that are submitted to IGCP. Most proposals are now interdisciplinary and it was difficult to assign them to a specific group or topic. Reorganization of the Scientific Board for scientific reasons and to more align the proposals with UNESCO goals, as well as with a view to reduce expenses, was reviewed by a sub-committee of IGCP of which B. Schreiner was a member.

The "new" approach that IGCP is taking for evaluating and approving projects focuses on "IGCP Projects Emphasizing Societal Relevance". The new approach of IGCP is to promote multi-and inter-disciplinary research programs in these broad areas:

#### Geoscience of the Water Cycle

Life on Earth depends on water and its sustainable use is crucial for continued human existence. Earth's water resources include surface/ground water, ocean water, and ice. The study of Earth's water involves understanding and managing both surface and groundwater systems, including sources, contamination, vulnerability and history of water systems.

#### Geohazards: Reducing the Risks

Geohazards include earthquakes, volcanic activity, landslides, tsunamis, floods, meteorite impacts and the health hazards of geologic materials. Geohazards can range from local events such as a debris slide or coastal erosion to events that threaten humankind (e.g., supervolcano eruption or meteorite impact). Earth scientists undertake research to better understand such hazards and contribute to risk reduction.

#### Earth Resources: Sustaining our Society

Earth resources include minerals, hydrocarbons, geothermal energy, air, and water. The future well-being of society depends on sustainable use of these resources. The environmentally responsible exploitation of these resources is a challenge for geoscience research. The progress of technological development is equally bound to this premise.

#### Global Change and Evolution of Life: Evidence from the geological record

Changes in the Earth's climate and of life on Earth are preserved in the rock record. Ice and dust

records, terrestrial and ocean sediments, and sequences of fossil plant and animal assemblages all comprise parts of this record. Life has impacted Earth's atmosphere, oceans, and land surface. Several major extinctions have punctuated Earth's history, associated with dramatic environmental and ecosystem change. Past environmental lessons shed light on present and future challenges.

#### The Deep Earth: How it controls our environment

The Earth's surface, including our habitable environment, is a product of, and controlled by deep Earth processes. The study of this environment (ranging from changes in the Earth's magnetic field to plate tectonics) using for example, geophysical and geodynamical techniques enhances our understanding of the working of System Earth.

#### Topics defined annually by IUGS and UNESCO

These are specific topics identified by the IUGS and UNESCO that are perceived to be of timely relevance in any given year.

#### Other relevant topics in fundamental geosciences

The IGCP encourages submission of project proposals in all aspects of the geosciences, provided they meet the requirements outlined in the evaluation part of the Operational Policy section.

Please refer to the New Proposal Form and New Guidelines for IGCP Projects on the IGCP website below. Please review the Guidelines carefully particularly the topics of interest to insure your project proposal is developed for optimum success. Note; October 15 is the deadline for new proposals to be sent to IGCP, in Paris with the Annual Reports due on Dec. 15. The CNC-IGCP deadline for funding applications is March 1/07. Project Reports are due by December 31/06. Please send applications and reports to CNC-IGCP Secretary B.T. Schreiner.

<http://www.unesco.org/science/earth/>

#### **The International Year of Planet Earth (IYPE)**

The International Year of Planet Earth (IYPE) was by the UN General Assembly in November 2005. The IUGS-UNESCO International Year of Planet Earth has a Secretariat and a Board of Officers with Dr. Ed de Mulder as the Acting Chair who has called for the creation of national IYPE committees. The CNC-IUGS is acting as the Executive Committee for CNC-IYPE a Canadian IYPE operating committee has been formed from the Geoscience Societies in Canada. The Geological Association of Canada (GAC) is assisting with the organization of CNC-IYPE and is coordinating the scientific efforts. The Canadian Geoscience Education Network (CGEN) is leading the outreach efforts. NRCan-GSC/ESSD, has established a secretariat and technical support for the initiatives. The CNC-IYPE committee has developed a plan of action for activities and for fund raising; <http://www.IYPECanada.org>.

The 10 themes (priorities) established for the International Year of Planet Earth are:

- a) Groundwater -- towards sustainable use
- b) Hazards - minimizing risk, maximizing awareness
- c) Earth & Health - building a safer environment
- d) Climate - the 'stone tape'
- e) Resources - sustainable power for sustainable development
- f) Megacities - going deeper, building safer
- g) Deep Earth - from crust to core
- h) Ocean - abyss of time
- i) Soil - Earth's living skin
- j) Earth and life - origins of diversity

<<http://www.yearofplanetearth.org>>

#### **Intercontinental Drilling Program (ICDP)**

The Geological Survey of Canada informed the Canadian Geoscience community that the Canadian membership in the Intercontinental Drilling Program has expired and will not likely be renewed.

Canadians can still participate in the program as Principle Investigators but will not be able to be project leaders.

### **CANAD'S CONTRIBUTION TO THE IGCP (CNC-IGCP ACTIVITY REPORT 2007)**

The Canadian National Committee of IGCP (CNC-IGCP) consists of a Chairman, Secretary Treasurer and representatives from various disciplines of Geoscience. A website for CNC-IGCP is shared with CNC-IUGS and can be found at: <http://www.cnc-iugs-igcp.org/>.

Members of the Canadian IGCP Committee are:

- (1) Dr. Jim Teller (Chair; 5 yrs on Comm.) Manitoba: Quaternary geology
- (2) Dr. Bryan Schreiner (Sec'y-Treasurer, Past Chair, 7 yrs on Comm., and International Director, CGC; ex officio, 3 yrs)Saskatchewan: Quaternary geology
- (3) Dr. M. Zentilli (5 yrs) Nova Scotia: Economic geology
- (4) Dr. M. Higgins (4 yrs) Quebec: Geochemistry
- (5) Dr. H. Halls (6 yrs) Ontario: Geomagnetism
- (6) Dr. G. Narbonne (5 yrs) Ontario: Paleontology
- (7) Dr. N. Eyles, (new member),Ontario: Hazards and Quaternary
- (8) Dr. Jim Hendry,( new member) Saskatchewan, Hydrogeology
- (9) Dr. Heather Jaimeson, (new member) Ontario, Geochemistry

There are 5 new IGCP areas of emphasis, which are: (1) Geoscience of the water cycle, (2) Geohazards, (3) Earth resources, (4) Global change and life evolution, and (5) The deep earth, plus the "annually defined topics". These discipline areas are the ones most likely to succeed in the coming years, so are the types CNC-IGCP is most likely to have to evaluate. These new priority areas identified needed representation on CNC-IGCP. Of course it is not be possible to have every specialty of the geological spectrum represented by "experts" on the Committee, but we will strive to have future Committees populated by those with enough breadth to evaluate applications in several different areas of the geo realm (as is the case now). Geographically, CNC-IGCP has representatives from Saskatchewan x2, Manitoba, Ontario x 3, Quebec, and Nova Scotia. We need to identify people from BC, Alberta, and another person from the Maritimes, but expertise representation is most important.

Canadian representatives need to be identified for the following projects: #499 (Devonian climate), 503 (Ordovician paleogeography and climate), 506 (Jurassic), 509 (Paleoproterozoic supercontinents), 513 (Karst), 515 (Coastal vulnerability and sea level), and 518 (fluvial sequences). All of these seem to have relevance to Canada, and probably are of interest to Canadian researchers.

### **Activities in 2007**

The annual meeting for 2007 was held by conference call on March 17, 2007.

#### Allocation of Funding to Current Projects

In Canada the Canadian National Committee for IGCP provides additional seed money to those researchers involved in official IGCP projects. Funding available for distribution to projects was \$7,500 Cdn for 2007. At this time, funding is uncertain for future years. The traditional guidelines for award levels are \$1100 for international travel except for Europe, \$900 for Europe and \$500 for North America.

Projects 511, 512 and 521 were approved in 2005. No new projects were approved by IGCP in 2006. Project 526, Risks Resources and Records of the Past on the Continental Shelf was approved in 2007. Rene Hetherington is the Canadian co-leader of the project. The total for all grants approved to projects in 2007 was \$6,200 of the \$7,500 available; leaving a residual of \$1300 to cover other expenses such as, promotion of IGCP and announcement of new IGCP priorities, and preparation and publication of a Canadian IGCP Newsletter. \* Indicates projects funded by CNC-IGCP.

Current active IGCP Projects with Canadian involvement are:

Project 467 Triassic Time and Trans-Panthalassan Correlations (2002-06) - M. J. Orchard (Int Co- Ldr)  
Project 469\* Variscan Terrestrial Biotas and Palaeoenvironments (2003-07) – E. Zодrow (Int Co-Ldr)  
Project 476\* Monsoon Evolution (2003-07) – M .Brookfield (Cdn Ldr)  
Project 479 Sustainable Use of Platinum Group Elements (2003-07) – J.E. Mungall (Int Co-Ldr)  
Project 493 The Rise and Fall of the Vendinán/Edicaran Biota - (2003-07)  
Project 495\* Quaternary Land-Ocean Interactions (2004-08) –T. Patterson (Cdn Ldr)  
Project 497\* The Evolution of the Rheic Ocean (2004-08) - B. Murphy (Cdn Ldr)  
Project 500\* Drylands: Past, Present and Future (2004-08) – D. Sauchyn (Cnd Ldr)  
Project 502\* Global Comparison of Volcanic-hosted Massive Sulphide Districts (2004-08) - J. Peter (Int Co-Ldr)  
Project 511\* Submarine Mass Movement (2005-09) –J. Locat (Int Co-Ldr)  
Project 512\* Neoproterozoic Ice Ages (2005-09) – E. Arnaud (Int Co-Ldr)  
Project 521\* Black Sea-Mediterranean Corridor (2005-09) - V. Hombach (Int Co-Ldr)  
Project 526\* Risks Resources and Record of the Past on the Continental Shelf (2007-11) – Rene Hetherington (Int Co-Ldr)

Summary of progress and Canadian activities

**IGCP 447 Molar Tooth Carbonates.**

Project websites: <http://dept.cugb.edu.cn/ScienceWeb/igcp/index.htm>  
<http://laurentian.ca/geology/INDEX.HTML>

The 4<sup>th</sup>, and final International Field Conference on Proterozoic Molar Tooth carbonates was held in Australia from 5<sup>th</sup> to 19<sup>th</sup> June 2005, under the leadership of Dr Graham Shields (James Cook University, Queensland, previously at Ottawa U). Anne Gore, a PhD student at James Cook University contributed significantly to the field guide and drove the bus across the vast expanses of central Australia. The trip attracted about 20 participants, with contributions from China, France, America, India, Canada, Italy, Australia and South Korea. Canadian participants included Darrel Long and Elizabeth Turner of Laurentian University.

We began the technical sessions, with posters and papers presented in the boardroom at the headquarters of the Northern Territory Geological Survey, in Alice Springs, from July 15 to 18. After considerable amounts of discussion on the origin of molar tooth structures participants agreed to write up their research in order to produce a dedicated volume of PreCambrian Research. Papers for this are due by the end of December, and will be “guest” edited by Darrel Long before being forwarded to Elsevier. We hope to have the editorial comments and corrections made by the end of September 2006.

Significant Canadian Publications 2005

Turner, E. C., and Jones, B., 2005. Microscopic calcite dendrites in cold-water tufa: implications for nucleation of micrite and cement. *Sedimentology*, 52: 1043-1066.

Dewing, K., Harrison, J.C., Pratt, B.R., and Mayer, U., 2004. A probable late Neoproterozoic age for the Kennedy Channel and Ella Bay Formations, northern Ellesmere Island, and its implications for passive margin history of the Canadian Arctic. *Canadian Journal of Earth Sciences*, 41: 1013-1025.

**IGCP 458: Triassic/Jurassic Boundary Events**

Project website: <http://paleo.cortland.edu/IGCP458>

Many of the scientific achievements for 2005 are to be published in a 2006 Special issue of the journal *Palaeogeography, Palaeoclimatology and Palaeoecology*. Of the 22 papers scheduled for publication in this volume, two include Canadian co-authors and a third discusses a Canadian section. In summary:

A multidisciplinary team studied Tethyan intraplatform and platform margin successions at the Csóvár section in Hungary. This confirmed the occurrence of an initial negative isotope excursion but suggested a

complex structure that may be related to multiple releases of isotopically light carbon into the shallow ocean reservoir. The relationship between ammonite and conodont biostratigraphy were better established and evidence indicates survival of the last conodont taxa above the range of the earliest Jurassic ammonites (Pálfy et al., in press)

A new detailed bulk organic carbon-isotope curve from Kennecott Point, Queen Charlotte Islands, Canada, highlights the hitherto rather overlooked magnitude and potential importance of this positive excursion (Williford et al., in press).

Sections in the Queen Charlotte Islands, Canada contain an outstanding radiolarian fauna together with moderately diverse early Hettangian ammonites allowing cross correlation of zones that permits close comparisons to be made with the Nevada candidate GSSP (Carter & Hori, 2005; Longridge et al., in press).

### **IGCP 463: Cretaceous Oceanic Red Beds**

Project website: [www.igcp463.cdut.edu.cn](http://www.igcp463.cdut.edu.cn)

Cretaceous Oceanic Red Beds (CORB), response to paleoclimatic/paleoceanographic global changes and regional tectonics – Workshop of IGCP 463

Members of IGCP 463 - Cretaceous Oceanic Red Beds (CORBs), held their fourth workshop in Switzerland, September 1-2, 2005, jointly with members of IGCP Project 494. The workshop consisted of a day and a half of presentations of current scientific results and a half-day planning the next year's work. Afterwards many participants joined the one-day field trip "Aptian, Albian, and Cenomanian sedimentation in the Swiss Prealps" led by Michèl Caron, Luc Braillard, André Strasser, and Corinne Saudan. The field trip preceded the 7<sup>th</sup> International Symposium on the Cretaceous, 5-9 September, 2005. Projects 463 & 494 also sponsored oral and poster sessions at the Symposium entitled, "Cretaceous Oceanic Red Beds". The IGCP 463 & 494 workshops were hosted by the Institute de Géologie, Université de Neuchâtel arranged by Karl B. Föllmi. Project leaders Chengshan Wang (China), Luba Jansa (Canada), Robert Scott (USA), and Xiumian Hu (China) chaired the respective workshops. Twenty-six participants from twelve nations attended the meeting: Austria, Canada, China, Czech Republic, Germany, India, Poland, Romania, Slovakia, Switzerland, Turkey, and the USA. The main goals of the workshop were to review progress and data on the study of Cretaceous Oceanic Red Beds, and to evaluate the relationship of this data to current paleoclimate and paleoceanographic models.

### **IGCP Project N° 464e: "Continental shelves during the Last Glacial Cycle"**

Project website: <http://tetide.geo.uniroma1.it/IGCP464/>

Project status: The project has completed its final year, although a request is being made to extend the project through to the end of 2006 to complete key publications permit continuity for a follow-up project given that new-proposal applications cannot be made in 2006. There are well advanced plans, with project leaders in place, to submit a proposal (in late 2006) for a successor project.

The 2005 Annual meeting (30 May – 5 June, 2005) was organized by a team from the Russian Academy of Sciences, the Ministry of Natural Resources of the Russian Federation, UNESCO-IUGS, and the Russian National Committee for International Geoscience Program and held in St. Petersburg Russia between May 30 and June 5, 2005. The main aim of the conference was to discuss problems of ore formation on shelves in the context of the geological history of the shelves, the tectonic setting, and lithogenesis during the last stages of evolution and environmental consequences of exploration and mining these deposits. This focus built on the project's aim to define the paleoenvironmental evolution of the continental shelves, particularly leading into and since the Last Glacial Maximum and including processes that have produced present morphology, stratigraphy, and sedimentology. Further the conference built on applied aspects including the geotechnical and engineering properties of continental shelf sediments, neotectonic and environmental studies, identification of cultural heritage, palaeoenvironmental changes of shelves, and the occurrence of mineral deposits. Renée Hetherington was able to present Canadian research at this meeting. The conference culminated with a 3-day field

excursion to Ladoga Lake – the largest freshwater lake in Europe, and Valaam Island during which time the geology, physical geography, and archaeological history of the region were viewed and discussed.

Other Meetings: The Indian National IGCP-464 Committee (steered by Dr B. Faruque from Kolkata) convened a most successful regional IGCP-464 meeting in Visakhapatnam on 30-31 March, 2005. IGCP members were able to perform fieldwork with their Indian colleagues related to the proximally located 2005 tsunami.

Educational, training or capacity-building activities: The principal IGCP-464 annual training course, on stable isotopes in sedimentary and hydrological processes was held in Goa, India (3-4 October, 2005). The course was attended by more than 100 researchers from throughout India, including many young scientists and graduate students. The principal presenters included staff from the Physical Research Institute in Ahmedabad, GV Isotopes UK, and Allan Chivas (University of Wollongong).

### **IGCP 467: Triassic Time and Trans-Panthalassan Correlations**

Project website: <http://paleo.cortland.edu/IGCP467>

Much new work was undertaken on the Permian-Triassic boundary, including an investment by the local government (Changxing County) of about ~US\$5 million to protect and develop the Meishan GeoPark in China wherein lies the PTB GSSP. New conodont and isotope data from Transcaucasia provide a carbon-isotope standard for long distance chemical correlations. Improved PTB and Lower Triassic magnetostratigraphy was enabled through new paleopole estimates in China, and new data from Iran and terrestrial successions in South Africa.

A proposed Induan-Olenekian boundary GSSP at Chaohu in Anhui Province, China, within the low-latitude Tethyan Realm, was the focus of further study, and a meeting/ fieldtrip (June 2005). Field work was carried out in Muth, Spiti, and an alternate I-O GSSP candidate, to enlarge the fauna and establish a stable isotope stratigraphy. Conodonts from both Spiti and Chaohu are under study by M.J. Orchard. The Proceedings of the Chaohu meeting (see below) were accepted by the publishers (Elsevier) of *Paleo3* as a special volume on the “Permo-Triassic Boundary and Early Triassic Biotic Recovery”; about 40 manuscripts were volunteered.

In North America, a summary of Triassic conodont biostratigraphy in northwestern Canada and their biogeographic implications was completed: anomalous occurrences of Tethyan species resulted in reinterpretation of regional structure (Orchard, in press). In southern BC, collaborative Canada-Japan-USA researchers began a detailed study of the sedimentology, biostratigraphy, and chemostratigraphy of a Lower Triassic succession with Asiatic affinities. Lower Triassic conodont faunas from Thailand are being studied jointly with US and Thai geologists.

Meetings, 2005-06 - Triassic Chronostratigraphy and Biotic Recovery, Chaohu City, Anhui Province, China, 23-25 May, 2005. Co-sponsored by the Subcommittee on Triassic Stratigraphy, IGCP-467, Task Group on Induan-Olenekian Boundary, Subcommittee on Permian Stratigraphy, the CHRONOS Project, as well as the National Natural Science Foundation of China and China National Commission of Stratigraphy. Organized by the China University of Geosciences and hosted by the Government of Chaohu City and Office of Land and Resources, Anhui Province. Dr. Mike Orchard acted as the chairman and Drs. Yuri Zakharov (Russia) and Yin Hongfu (China) as the vice-chairmen, while Dr. Tong Jinnan (China) served as the secretary. ~70 participants from 14 countries attended.

47 oral reports were presented at 13 sessions during two and half days, and 15 posters were displayed. Field Excursions to Meishan & Nanjing (21-23); and Guizhou Province (26-29). The symposium program, field excursion guides, and 68 abstracts were published in two volumes of *Albertiana* (Lehrmann et al., 2005a, b).

Circum-Panthalassa Triassic Faunas and Sequences. Te Papa Tongarewa, Museum of New Zealand, Wellington, New Zealand. 19-24 March, 2006. Co-sponsored by InterRad, IGCP Project 467, the Subcommittee on Triassic Stratigraphy (STS), and the Institute of Geological and Nuclear Sciences (GNS). M.J. Orchard is part of the organizing committee. Conference theme: southern high latitude Triassic correlations and circum-Pacific correlations. Examination of the type sections for New Zealand Triassic stages. The conference program and abstracts volume, and field excursion guide will be published within the GNS

information series. Articles based on conference papers will be published as a special issue of one international and one Australasian journal.

### **IGCP 469: Variscan Terrestrial Biotas and Palaeoenvironments**

Websites related to the project: [www.mepopa.com/igcp469.htm](http://www.mepopa.com/igcp469.htm)  
<http://www.nmgw.ac.uk/www.php/301/>

During the first active 18 months of the project (i.e. up to the end of 2004) we had two broad objectives.

- (1) To connect the various specialists across the study areas (coalfields) into a matrix integrating local expertise with wider taxonomic expertise. Most of the study areas (coalfields) have at least one resident geologist there. These geologists will know their coalfield intimately, and will also probably have a wider international expertise in one particular field (e.g. lycophyte palaeobotany). In most areas, however, local specialists do not have the international expertise in the full spectrum of palaeontology and geology needed to obtain a complete understanding of the biotic and environmental changes taking place across the study area. IGCP 469 aims to bring the appropriate specialists to the various areas. The structure of this matrix is summarized at the end of this report.
- (2) To determine the best approaches to analyzing the data. Following extensive discussions during the project meetings, the main approaches have now been agreed upon.
  - a. To revise the macrofloral and palaeozoological species inventories in each area, to allow palaeofloristic and palaeofaunal comparisons via cluster and/or ordination analysis.
  - b. To determine stratigraphical changes in macrofloral species richness in each area.
  - c. To determine stratigraphical changes in vegetation using palynological data, ideally both from coal and clastic samples.
  - d. To use megaspores to improve our understanding of (mainly) lycophyte biodiversity in the different areas.
  - e. To determine changes in coal petrography as an index to changes in overall peat composition
  - f. To investigate other palaeoenvironmental proxies such as oxygen isotopes.
  - g. To determine broad patterns of change in sedimentology in each area, especially as related to water-table change, clastic input, and other palaeogeomorphological change.
  - h. To improve stratigraphical correlation between the different areas, by improving biostratigraphical resolution, and looking at non-biotic means of correlation.
  - i. To integrate all of these sources of data to form a coherent picture of biotic and environmental change through late Westphalian and early Stephanian times.

### **IGCP 476: Monsoon Evolution and Tectonics-Climate Linkage in Asia**

Project website: <http://igcp.ees.hokudai.ac.jp/~476>

The major scientific achievements of 2005 year include approval of IODP proposal "Indus Fan" by Clift et al., completion of SSEP evaluation of IODP proposals "East Asian Margin" by Clift et al. and "Asian monsoon" by Tada et al., submission of two new IODP proposals "NW Pacific Transect" by Hoyanagi et al. and "Pacific Coral Reef" by Matsuda et al. which are developed from pre-proposals, and submission of one new pre-proposal "East Asia Topography and Monsoon" by Wang et al.

IGCP-476 also continued editorial process of the two special volumes of Palaeogeography, Palaeoclimatology, Palaeoecology. The first special volume titled "Tectonics, Landform Evolution and Climate Change in East Asia" edited by Clift, Zheng, and Tada is a symposium volume of the second international meeting held at Shanghai in 2004. Eleven papers are now in the final stage of review and entire editorial process will be completed by early 2006. The second special volume titled "Quaternary paleoceanography of the Japan Sea" edited by Tada, Oba, and Jordan is a follow-up of the first symposium volume and collected papers presented in the first international meeting in Tokyo and second international meeting in Shanghai that specifically dealt with Quaternary paleoceanography of the Japan Sea. Twelve papers are now in review and entire editorial process will be finished by the end of May 2006. IGCP-476 Japan also edited a special volume of Journal of Geological Society of Japan titled "Uplift of Himalaya and Tibet and evolution and variability of Asian Monsoon" which collected eight papers and has

been published in November 2005. IGCP-476 also support an international cooperative research project between Japan and Russia using R/V Mirai to survey Okhotsk, Bering, and Arctic Seas, which is planned next summer. In addition to Japanese and Russian scientists, IGCP-476 members from Korea will also be participated in the project as on-shore scientists.

### **IGCP 479: Sustainable Use of Platinum Group Elements**

Websites related to the project:

<http://www4.geology.utoronto.ca/faculty/mungall/Website/IGCP479Home.htm>

<http://platinumsymposium oulu.fi/>

Project 479 was approved by IGCP early in 2003. The objectives of the project were to allow participants from individual countries to assess their national or regional PGE resources, including known and potential reserves, as a complement to ongoing efforts to generate a global PGE resource inventory. Furthermore, efforts were to be made to transfer knowledge and techniques of PGE exploration to geoscientists worldwide. Key areas of research were to be the compartment of PGE in surficial media, and the igneous and hydrothermal geochemistry of the PGE.

In the first two years of the project we have forged a partnership with the World Minerals Project of the Geological Survey of Canada. With their cooperation we have posted on the internet a global database of PGE deposits, accessible through the link given above. At the same time, we have coordinated several symposia, short courses, and workshops, with associated field excursions. These meetings have brought scientists from around the globe together to discuss the geology of PGE.

In 2005 we have made progress on two main fronts: the global PGE database has been linked to Google Earth, permitting verification of the spatial data to unprecedented precision. A .kml file permitting the user to view the database in GoogleEarth is available from Dr Mungall upon request. Within GoogleEarth a user can either scan around the world to find deposits and click on one to load a page containing the data for that deposit, or he can search the database from within GoogleEarth and ask the program to move to the location of a given deposit. We have discovered that the positions given for a number of deposits are inaccurate, and hence are now able to greatly refine the value of the database interactively and we have put on the 10th International Platinum Symposium along with three highly successful short courses and several field excursions. We have published a book that promises to be the principal handbook for practitioners of PGE exploration worldwide. The book is intended to provide geologists in developing countries with crucial knowledge of exploration methods.

### **IGCP 493: The Rise and Fall of the Vendinian/Ediacaran Biota**

Project website: <http://www.ipc2006.ac.cn/index.asp>.

<http://www.earth.monash.edu.au/PreCSite/index.html>

The major meeting of IGCP 493 in 2005 was a symposium in Halifax and a field meeting through the Ediacaran in the Avalon Peninsula of Newfoundland, held in conjunction with the North American Paleontological Convention. A pre-meeting field trip to Mistaken Point and other Ediacaran localities in the Avalon Peninsula, led by Guy Narbonne, Marc Laflamme, and Doug Boyce (Canada), and Jim Gehling (Australia) took place June 13-18. This meeting attracted 30 participants from eight countries for a trip that started with the glacial deposits of the Gaskiers glaciation and focused on the ensuing radiation of early Ediacaran life. Discussions focused on the nature of Neoproterozoic glaciations, the relationship between these glaciations and the early evolution of animals, and the ecology of early animal life. A symposium on "Ediacaran Paleobiology", organized by Jim Gehling (Australia) and Guy Narbonne (Canada), at the North American Paleontological Convention in Halifax June 21<sup>st</sup> attracted 16 oral presentations and was one of the best attended symposia at the conference. The Mistaken Point field trip and Ediacaran symposium were formal events of both IGCP Project 493 and the IUGS Ediacaran Subcommission.

Canadian research activity in IGCP Project 493 focused on the Mistaken Point biota of Newfoundland. Sean O'Brien and Art King (Newfoundland Geological Survey), and Hans Hofmann (McGill University) are describing their new discoveries on Bonavista Peninsula, and several conference presentations were made on this find. Duncan McIlroy (Memorial University of Newfoundland) worked with colleagues from Oxford University on mat textures and discs in the Mistaken Point succession. Guy Narbonne and his graduate students Marc Laflamme, Lija Flude, and Emily Bamforth (Queen's University) studied the construction of frondose and fan-, network-, spindle-, and comb-shaped Ediacaran fossils from the Mistaken Point and Spaniard's Bay areas.

The major upcoming international activity of IGCP Project 493 of potential interest to Canadian workers will be a premeeting fieldtrip through the Ediacaran of China and a symposium on "Neoproterozoic paleobiology and geobiology" to be held in conjunction with the International Palaeontological Congress in Beijing in mid- to late-June, 2006. Both of these activities are co-sponsored by IGCP 512.

### **IGCP 495: Quaternary Land-Ocean Interactions: Driving Mechanisms and Coastal Responses**

Project website: [http://www.geography.dur.ac.uk/research/IGCP\\_495/Meetings/index.html](http://www.geography.dur.ac.uk/research/IGCP_495/Meetings/index.html)

IGCP495 has been involved in two international conferences in 2005, the second year of this project. The first was a joint conference organized by the INQUA Subcommittee on Coastal Processes and Sea-level Changes (North and West European Working Group) and IGCP 495 (Working Group on Short-term sea-level records and coastal vulnerability), held in Dunkerque (N. France) between June 28th and July 2nd 2005 and organized by Dr Cecile Baeteman and colleagues. The meeting comprised a day of papers followed by a two-day field meeting to the north France and Belgium coastal plain. The meeting theme was "Late Quaternary Coastal Changes Sea Level, Sedimentary Forcing and Anthropogenic Impacts" and was attended by about 60 delegates.

In late September, IGCP495 held its second annual international conference and field meeting on west coast of Java, Indonesia, in a coastal resort opposite Krakatau. The meeting was hosted by Dr Wahyoe Hantoro and colleagues from the Indonesian Institute of Technology and comprised two days of papers and three days in the field. The conference theme was "Quaternary Ocean and Land Interaction: climatic, tectonic and anthropogenic influences" and 30 delegates attended including three Canadians: Tim Patterson, Carleton University, Marcel St. Hillaire, Universite du Quebec a Montreal and Anne De Vernal, Universite du Quebec a Montreal. Professor St. Hillaire spoke about the utility of Radium 226 as a dating tool, and Professor Patterson spoke about geologic evidence of the sun as an important driver of climate and marine productivity in the NE Pacific. A highlight of the oral sessions were presentations focused on the Indian Ocean tsunami of December 26th 2004, in which updates on the tsunami, its impacts and the post-event recovery were presented from sites across the Indian Ocean. The tsunami theme linked with the field trip, which began with a trip to the Krakatau complex to examine the source of the 1883 tsunami that devastated much of the Java coast, and whose impacts formed the focus for the rest of the field meeting.

A special issue of Marine Geology is forthcoming, which will include papers coming out of the conference in Indonesia.

### **IGCP 497: Origin and Evolution of the Rheic Ocean**

Project website: <http://www.snsd.de/igcp497/>

The purpose of IGCP 497 to improve our understanding of the origin and evolution of the Rheic Ocean, the closure of which produced the climactic Ouachita-Alleghanian-Variscan orogenic system of North and northern South America, Western and Central Europe, and Northwest Africa and the formation of Pangea. Annual meetings are held bring geoscientists together with complementary expertise to provide a more comprehensive understanding of origin and evolution of the Rheic Ocean. We have completed the second year of a five-year project led by Ulf Linnemann (Dresden, Germany), Damian Nance (Athens, U.S.A.), Maarten de Wit (Cape Town, South Africa), Erdin Bozkurt (Ankara, Turkey), Petr Kraft (Prague, Czech Republic), Francisco Pereira (Evora, Portugal) and Rob Strachan (Portsmouth, UK).

There were several important activities in IGCP 497 this year. IGCP 497 co-sponsored a special session entitled "Assembling Avalon and other peri-Gondwanan terranes" at the annual Geological Association of Canada-Mineralogical Association of Canada Joint annual Meeting, in Halifax, May 15-18<sup>th</sup>. The session was organized by Brendan Murphy, Margaret (Meg) Thompson, Jim Hibbard and Cees van Staal and attracted 15 oral and 6 poster presentations, with participants from South Africa, Germany, Mexico, France, and U.S in addition to many parts of Canada. A three day post-conference field excursion entitled "Accretion of peri-Gondwanan terranes, northern mainland Nova Scotia and southern New Brunswick was led by Sandra Barr, Susan Johnson, Brendan Murphy, Georgia Pe-Piper, David Piper and Chris White.

The second annual meeting of IGCP 497 and a field workshop (July 3rd-12th 2005) entitled "Devono-Carboniferous evolution of the northern margin of the Rheic Ocean", was organised by Rob Strachan, John Whalley and Kevin Jones and was hosted by the University of Portsmouth (UK) and attracted 48 participants from 12 countries. Canadian contributors include Jarda Dostal (St. Marys), Steve Johnston (U. Vic) and Brendan Murphy (St. FX).

### **IGCP 500: Dryland Change: Past, Present, Future**

Project website: <http://www.igcp500.ouce.ox.ac.uk/>

In 2005, the International Geoscience Program (IGCP) approved the new 5-year project IGCP-500: Dryland Change: Past, Present, Future. The full title of this project is "Westerlies and Monsoons: Impacts of Climate Change and Variability on Dryland Environments, Hydrogeology and People". The objectives of IGCP-500 are:

1. To enhance the welfare of dryland societies by contributing to a better understanding of what drives climate change and variability, environmental change and key resource availability over timescales ranging from millennia to subdecadal.
2. To investigate the dynamics of key dryland landscape and resource elements, especially hydrological dynamics and aeolian system dynamics, and their impacts on and interactions with the human use of drylands.
3. Through the above scientific goals, enhance capacity in cutting edge dryland science and to provide a significant dryland input to the co-IGCP CHANGES initiative.

The international leader is Dr. David Thomas of Oxford University. The Canadian leader, and member of the IDCP500 management committee, is Dr. Dave Sauchyn of the Prairie Adaptation research Collaborative at the University of Regina. Dave was the official Canadian delegate to the International Geomorphological Conference in Zaragoza, Spain in September. In October, he attended the IGCP500 co-sponsored 2nd Southern Deserts Conference in Arica, Chile, where he presented "Comparing Human-Climate Interactions between Dryland River Basins in Western Canada and Northern Chile".

#### Canadian Activities

"Drought in western Canada: Proxies, paleoclimate observations and human interactions", Special Session, Biennial meeting of the Canadian Quaternary Association, University of Manitoba, Winnipeg, June 5-8, 2005. This special session presented some of the latest applications of paleoenvironmental science to water supply issues in western Canada. Increasingly, paleoenvironmental records are being called on to provide a long-term perspective that is crucial for good stewardship of water resources. Papers presented will be published in 2006 in a special issue of the Canadian Water Resources Journal.

### **IGCP 502: Global Comparison of Volcanic-hosted Massive Sulphide Districts**

Project website: [www.ltu.se/web/pub/jsp/polopoly.jsp?d=4349](http://www.ltu.se/web/pub/jsp/polopoly.jsp?d=4349)

Meeting & Field Workshop: IGCP Project 502 Special Session at GAC/MAC Annual Meeting, Halifax, NS (May 15-18, 2005) and field workshop, Bathurst, NB (May 18-23, 2005)

IGCP-502 co-convened two sessions at the GAC-MAC conference in Halifax: an Economic Geology session on Volcanic-hosted Massive Sulphide (VMS) deposits on 17 May, and a special session titled

"From Magmas to Massive Sulphides – the Global View" on 18 May. Following the conference, IGCP-502 together with the New Brunswick Department of Natural Resources (DNR) and the Mineral Deposits Division of the Geological Association of Canada, held a field workshop in the Bathurst Mining District. The workshop was conducted at representative outcrops and mine exposures of the ores and their volcanic host rocks in order to promote discussion and comparisons between Bathurst and other VMS mining districts around the world. The meeting was also an opportunity for local students and young scientists to present their work and discuss the geology of VMS deposits.

The two conference sessions co-sponsored by IGCP-502 were very well attended. The special session "From Magmas to Massive Sulphides" attracted excellent presentations from leading VMS researchers, invited researchers from developing countries and young scientists, and was a highlight of the Halifax conference. The "Magmas to Massive Sulphides" session provided "the state of the art" on the understanding of how, and to what extent, magmas and magmatic hydrothermal solutions are involved in the formation of massive sulphide deposits. The conclusion from this session was that magmatic hydrothermal solutions most likely contribute to the formation of some felsic-hosted VMS deposits, but that the size or relative importance of this contribution varies from region to region, depending on the nature of the host basin.

The field workshop attracted 30 scientists from 13 countries. Participants were treated to a comprehensive underground tour of the world's largest VMS deposit, the Brunswick 12 mine, and the chance to study the famous Brunswick iron formation, which overlies the VMS deposits of the Brunswick group and is an important exploration guide to the location of these ores.

#### **IGCP 511: Submarine Mass Movements and Their Consequences**

Project website: [www.geohazards.no/igcp511](http://www.geohazards.no/igcp511)

Problems related to submarine mass movements along both passive and active continental margins have received significant focus over the last years. Following the 1st international symposium in France 2003, important goals of the present conference are twofold: to review the state of the art in 2005, and to develop the challenges for the near future. As the launching activity of IGCP-511, the meeting brought together participants from academia as well as industry. Themes are related to the fundamental processes of mass movements, regional differences, effects of mass movements, such as tsunamis and impact on structures, as well as risk aspects and legal issues.

The meeting attracted more than 80 presentations covering the above mentioned themes. A total of 109 participants attended the scientific meeting and the business meeting held at the end of the scientific sessions. The various abstracts were compiled by NGF and included in the conference material. So far up to 16 papers have been submitted for publication to a special volume to be published by the Norwegian Geological Society.

The business meeting was also helpful in reviewing the scientific program and to establish the first elements of IGCP-551 including a secretariat (to be hosted at the ICG: [www.geohazards.no/igcp511](http://www.geohazards.no/igcp511)) and to plan for the next International symposium that will be held in Greece in September 2007, and also for other activities like subgroups and regional meetings.

The meeting was instrumental in establishing the actual extent of our knowledge on submarine mass movements and their consequences. It was also a very interesting and stimulating forum to discuss and exchange between practitioners, scientists, engineers and students. We were very pleased to see that a large portion of the attendance consisted of young researchers or students. It was with great enthusiasm that the assembly voted to host a next symposium in 2007.

#### **IGCP 512: Neoproterozoic Ice Ages**

Project website: [www.igcp512.com](http://www.igcp512.com)

We held our inaugural meeting at the IAS conference on glacial sedimentary processes and products in Aberystwyth, Wales, UK (August 27, 2005). Nineteen people from 14 countries including one Canadian attended the meeting. This inaugural meeting was used to establish the project leadership, organization and priority goals and to discuss project deliverables, a draft paper on the identification of glacial deposits, and a draft paper on Neoproterozoic geochronology. Project leaders and officers were confirmed (see below). The project is organized according to eight different subdisciplines or nodes. Emmanuelle Arnaud (Canada) is one of the two project leaders and the node leader for glacial sedimentology.

The first goal of the project is to document the physical record of climate change during the Neoproterozoic in the form of a book with individual chapters on specific glaciogenic deposit and review papers on the identification of glacial deposits and the Neoproterozoic geochronological database. The second goal of the project is to work towards a consensus global stratigraphic calibration scheme for the mid-late Neoproterozoic in coordination with the Precambrian and Ediacaran ICS Subcommission. Emmanuelle Arnaud (Canada) is working on a template chapter for the book as well as coordinating the revision of the draft document on the identification of glacial deposits.

The first field workshop took place in Scotland in August and was attended by 18 people from ten different countries. It was led by Emmanuelle Arnaud (Canada) and Graham Shields (Australia). This field workshop was an excellent forum for many discussions about the interpretation of specific rock units, which are commonly found in other Neoproterozoic sections worldwide. A 60-page guidebook was produced with an overview of recent developments in research on the Neoproterozoic Dalradian succession of Scotland and road log of the various sites that were visited on the Garvellach Islands and Islay.

A compilation of geochronological age constraints written by two members of the project (James Etienne and Breandán MacGabhann) will be submitted for publication shortly. An interactive database called DateView has been established by Professor Bruce Eglington at the University of Saskatchewan. This database now contains IGCP 512's compiled ages, from which we hope to produce calibration charts of Neoproterozoic stratigraphy.

### **IGCP 521: Black Se-Mediterranean Corridor**

Project websites: <http://www.avalon.institute.org/IGCP>

The main goal of the First Plenary Meeting and Field Trip of Project IGCP 521 is to bring scientists from western and eastern countries to encourage a dialogue on geological and archaeological evidences on the sea level change and human adaptation in the Black Sea-Mediterranean Corridor ("Corridor") during the last 30 ky. Their participation is necessary (1) to discuss the actual status of our knowledge about the influence of the climate change and tectonics on the migration of the coastline as factors for human development in the "Corridor", (2) to identify the main achievements to date, as well as the gaps in knowledge, (3) to discuss a scientific approach for integrating geological, prehistoric, historic and instrumental data (for the past century) in order to predict future geoecological situation in the region for risk assessment in coastal zones under various sea-level scenarios, (4) to provide cross-disciplinary and cross-regional correlation of geological, geochemical, geophysical, paleontological, archaeological and historical records for the entire "Corridor", (5) to introduce young scientists, especially from the Eastern countries to new analytical techniques and state-of-the-art interpretation of data, (6) to encourage east-west dialogue in the Earth, Exact, Atmospheric, and Historical Sciences and to integrate researchers from the various countries into the full international R&D community as required by the spirit of openness and cooperation of IGCP and UNESCO.

Further details regarding IGCP Projects, including the project design, meeting reports and plans for upcoming meetings, as well as publications can be found on the project websites links as noted.

### **IGCP 526: Risks Resources and Record of the Past on the Continental Shelf**

No Project website or annual report available at this time.