

## CGU HYDROLOGY SECTION COMMITTEE REPORTS 2010

### Northern Research Basins Committee

**Chair and Canadian Chief Delegate:  
Kathy L. Young, Geography Department,  
York University**

One of the main activities of the CGU-HS Northern Basins Committee during the last year was the 17<sup>th</sup> NRB meeting. Canada hosted the 17<sup>th</sup> International Northern Research Basins (NRB) Symposium & Workshop in the Eastern Canadian Arctic **August 12-18, 2009**. The symposium/workshop was held on an Inuit owned expedition ship which travelled from Iqaluit to Pangnirtung and then onto Kuujjuaq. The conference theme was **Managing Hydrological Uncertainty in High Latitude Environments**. Scientific sessions included: *Prediction of Precipitation in Ungauged Northern Basins; Northern Lake Systems; Hydrology & Ocean Interactions, Climate, Cryosphere, Hydrosphere and Arctic Hydrology & Uncertainty*. We were pleased to have two guest speakers. Dr. Larry Hinzman, International Arctic Research Institute, University of Alaska, Fairbanks spoke on *The Role of Feedbacks in the Arctic Hydrologic System*. Dr. Robbie Macdonald, Department of Fisheries & Oceans, Environment Canada talked about *Rivers and Lakes in the Ocean-The Other Hydrological Cycle*. The 17<sup>th</sup> NRB delegation also met with community members in Iqaluit and Kuujjuaq and held a Community Open House in the Hamlet of Pangnirtung. Similar to previous NRB meetings, time was set aside for field trips and cultural events. Overall, we had about 60 scientists registered from **ALL** circumpolar countries and about 10 guests making this one of the biggest NRB

meetings to date. A field book and proceedings of conference papers were made available to delegates at the meeting. Full details of the meeting can be found at [www.northernresearchbasins.com/17NRB](http://www.northernresearchbasins.com/17NRB)

As outlined in the NRB Mandate and the Canadian NRB terms of Reference, Canadian participation in the NRB meeting is limited to 10 delegates appointed by the Canadian Chief Delegate (and approved by the CGU-HS Executive) to represent Canadian interest in the hydrology of northern areas. Given that Canada hosted this event in 2009, we were allowed to invite other Canadian scientists as observers and their names and affiliation can be found on the website posted above. The Canadian Chief Delegate to the 17<sup>th</sup> NRB meeting was Kathy Young, York U, while Chris Spence, Environment Canada served as the Deputy Chief Delegate. A slate of 10 official Canadian Delegates was submitted to the CGU-HS for approval in Jan.'09, however, eventually only eight registered:

**Dr. Sean Carey**, Carleton University: runoff processes in sub-arctic environments, member of the 17<sup>th</sup> NRB organizing committee

**Dr. Faye Hicks**, Water Resources Engineering, University of Alberta: northern river ice jams and break-up. Faye is a Full Professor and engineer. She was recently involved in the MAGS project.

**Dr. Scott Lamoureux**, Queen's University: watershed hydrology and geomorphology, high arctic environments, P.I. of an ArcticNet project.

**Mr. Richard Janowicz**, Yukon Gov't: cold regions hydrology and operational water resources, member of the 17<sup>th</sup> NRB organizing committee

**Dr. Terry Prowse**, University of Victoria: cold regions hydrology with special focus on river ice, lake ice and snow. Terry also holds

a Canada Research Chair.

**Dr. William (Bill) Quinton**, Wilfrid Laurier University: sub-arctic hydrology. Bill holds a Canada Research Chair, and is a member of the 17<sup>th</sup> NRB organizing committee

**Dr. Chris Spence**, NWRI: sub-arctic hydrology and Deputy Delegate, Canadian NRB

**Dr. Kathy L. Young**, York University: high arctic environments and Chief Delegate, Canadian NRB

At the end of the meeting, delegates were invited to submit their papers to the peer reviewed journal *Hydrology Research*, for a *special 17<sup>th</sup> NRB edition*. The review process is still ongoing but Canadian delegates and observers submitted six manuscripts among other circumpolar countries:

Boucher, J.L. and Carey, S. *Exploring runoff processes using chemical, isotopic and hydrometric data in a discontinuous permafrost catchment.*

Endrizzi, S. and Marsh, P. *Observations and modeling of turbulent fluxes during melt at the shrub-tundra transition zone 1: point scale variations.*

Janowicz, R. *Observed trends in the river ice regimes of northwest Canada.*

Prowse, T. and Brown, K.G. *Hydro-ecological effects of changing arctic river and lake ice covers: a review.*

Woo, M.K. *Cold ocean-seas and northern hydrology: an exploratory overview.*

Young, K.L. and Labine, C. *Summer hydroclimatology of an extensive low-gradient wetland: Polar Bear Pass, Bathurst Island, Nunavut, Canada.*

The 18<sup>th</sup> NRB meeting will be hosted by Norway in August 2011, and preliminary details can be found at [www.northernresearchbasins.com](http://www.northernresearchbasins.com) Dr. Chris

Spence, Environment Canada will take over the position of Chief Delegate for Canada. Information about Canadian NRB activities can be found at [www.canadiannrb.com](http://www.canadiannrb.com) or contact Chris Spence for more details: [Chris.Spence@ec.gc.ca](mailto:Chris.Spence@ec.gc.ca).

### **Canadian National Committee for the IAHS Prediction in Ungauged Basins Initiative (CNC-PUB)**

**Chair:** Christopher Spence, Environment Canada, Saskatoon, SK S7N 3H5, [chris.spence@ec.gc.ca](mailto:chris.spence@ec.gc.ca)

**Vice Chair:** Paul Whitfield, Environment Canada, Vancouver, BC V6C 3S5, [paul.whitfield@ec.gc.ca](mailto:paul.whitfield@ec.gc.ca)

**CWRA Members at Large:** Taha Ouarda, Institut national de la recherche scientifique, Québec, QC G1K 9A9

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**CGU-HS Members at Large:** John Pomeroy, Centre for Hydrology, University of Saskatchewan, Saskatoon, SK S7N 5C8  
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Robert Metcalfe, Renewable Energy Section, Ontario Ministry of Natural Resources, Peterborough, ON K9J 7B8  
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### **Objective and Roles**

The objective of CNC-PUB is to coordinate and communicate IAHS's PUB program in Canada.

The roles of the CNC-PUB are defined as follows:

- Liaising with water resource managers and government agencies in the

development of programs supportive of the PUB initiative,

- Supporting PUB working group implementation and funding in Canada,
- Supporting outreach of working group scientific progress,
- Encouraging technology transfer from working groups,
- Reporting to CGU-HS and CSHS on Canadian PUB activities and
- Reporting to IAHS on Canadian PUB activities through CNC-IAHS and the PUB SSG.

### **Progress on Issues and Objectives**

The Improved Processes, Parameterization and Prediction in Cold Regions (IP3) initiative is into its final year of funding by the Canadian Foundation for Climate and Atmospheric Sciences. IP3 is registered as a cold regions working group with the international PUB initiative

([http://pub.iwmi.org/UI/Images/PUB\\_WG16\\_IP3%20in%20Cold%20Regions.pdf](http://pub.iwmi.org/UI/Images/PUB_WG16_IP3%20in%20Cold%20Regions.pdf)).

More information on IP3 specifically can be found at [www.usask.ca/ip3](http://www.usask.ca/ip3).

### **Future Meetings and Activities**

There are some who wish to continue pursuing a model intercomparison project as was proposed at the 2007 IUGG. Progress has been slow within CNC-PUB to pursue this idea within Canada, but the Canadian community, especially the practicing hydrologists, has been keen. One possibility is to apply for an NSERC strategic workshop grant to help our community design a research plan.

Subsequent to the prediction of low flows in ungauged workshop and special issue, a workshop on intermittent streams is planned for Lethbridge in February 2011. In more arid regions of Canada, streams contain

water only during restricted periods of the year. Improving the measurement, prediction and management of water flux and availability in intermittent systems is important to economic and environmental sustainability in certain areas of Canada. This workshop will bring together scientists and managers who are engaged in understanding these systems, how they respond to changes in climate and land-use, and in transferring this understanding to predictions in ungauged basins. Workshop sessions will provide the opportunity to engage the participants in defining the shortcomings in present understanding and data, and develop the research questions necessary to meet management needs for the future. A special issue of a journal will be produced to capture the invited papers, and the synthesis of the workshop sessions. This volume should support the growth of collaborative work on these systems.

Some effort should be made to highlight Canada's contributions to the PUB initiative as we enter the last few years of the programme.

### **Committee on River Ice Processes and the Environment**

**Chair:** Faye Hicks, PhD, PEng., FCSCE  
Professor  
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Environmental Engineering  
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**Vice-Chair:** Brian Morse, PhD, ing  
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**Secretary:** Dan Healy, Ph.D., P.Eng.  
AMEC Earth &  
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Edmonton, Alberta

**Treasurer:** Martin Jasek, M.Sc., P.Eng.  
BC Hydro, Operations  
Burnaby, British Columbia

**CRIFE Members:**

Spyros Beltaos, Normand Bergeron,  
Raymont Bourdages, Brian Burrell,  
Shawn Clark, Evan Freisenhan, Joe  
Groeneveld, Chandra Mahabir, Mike  
Morris, Wes Penner

**International Members:**

Steven Daly (US Army CRREL, United  
States), Mikko Huokuna (Finland),  
Hung Tao Shen (IAHR)

**Affiliate Members:**

RW Carson, Kersi Davar, Terry Prowse

**About CRIFE:**

CRIFE derived from a Working Group that was established in 1975 by the Associate Committee on Hydrology (ACH), itself funded by the National Research Council of Canada (NRCC). This working group evolved into a permanent Subcommittee of ACH in 1981. Severe budget cuts at NRCC forced the discontinuation of the associate committees in the early nineties. In 1995, the former River Ice Subcommittee of ACH joined the Canadian Geophysical Union, as a Committee of the Hydrology Section.

**CRIFE Mandate and Objective:**

Initially, the Committee's work focused on the hydraulic aspects of river ice phenomena, as a means of elucidating the effects of the ice cover on flow characteristics. This scope was gradually expanded to include additional issues of concern, such as ice formation, ice jams, winter operation of hydro-plants, environmental aspects of river ice, and climatic variability and change. The main objectives of the Committee are:

1. To identify specific high-priority topics for research and development and promote the undertaking of relevant research programs;
2. To facilitate information dissemination and exchange of ideas among practitioners, researchers, and resource managers; and
3. To encourage the incorporation of pertinent lectures or courses in undergraduate and graduate studies at Canadian Colleges and Universities.

**Meetings and Activities:**

One of the main Committee activities is the sponsorship of workshops and short courses and the publication of Proceedings. The first river ice workshop was held at Burlington, Ontario, in 1980, and the most recent workshops took place in Hanover, New Hampshire, in 2005, Quebec City in 2007, and Saint John's in 2009. Another ongoing activity is the initiation and leadership of Task Forces to work on specific problems and publish their findings. From time to time, the status of knowledge on particular topics is reviewed and research needs are identified. Liaison with river ice work

abroad is maintained through formal and informal links.

### **2009 Annual Meeting**

The 2009 annual meeting was held on June 14<sup>th</sup>. In addition to attending to administrative duties, the committee discussed various task force initiatives including: numerical modeling of ice jams, fish and ice, climate and ice jams, River Ice Formation book, and potential for a comprehensive training workshop.

### **2010 Technical Meeting**

The committee usually meets every other year to discuss technical initiatives. This year's meeting will be held May 27<sup>th</sup> in Edmonton, Alberta. The meeting will focus on the topic of river ice formation.

### **15<sup>th</sup> Workshop, Saint John's, Newfoundland. June 2009**

The 15<sup>th</sup> Workshop of the Committee on River Ice Processes and the Environment was held in Saint Johns in June 2009. A total of 66 participants attended the workshop. There were 31 papers (9 by Students) and 6 posters (3 students) presented at the workshop.

Topics covered included:

- River ice measurements
- Freeze-up and Frazil
- River ice processes and the environment
- River ice hydraulics
- Ice and river regulation
- Ice jams and breakup forecasting
- Ice and infrastructure
- Remote sensing

In addition to these topics, a special discussion (moderated by Brain Morse) was

held on the *state of knowledge of river ice processes and the environment – developing a vision for the future.*

In the past, the areas of research presented at CRIPE workshops were largely been focused on the physical aspects of river ice processes. Research areas presented have since expanded to include interesting topics relating to river ice ecology and fish habitat. More recently, there have been a number of papers focused on geomorphology.

The workshop was hosted and organized by C-CORE and the University of Alberta. A special thanks is extended to workshop sponsors: BC Hydro, Manitoba Hydro, Taiga Air Services Ltd., AMEC Earth & Environmental, Hoskin Scientific, Campbell Scientific, ASH Hydrotechnical Engineering Inc., KGS Group, and HATCH.

Workshop Proceedings are available online at [www.cripe.ca](http://www.cripe.ca).

### **2009 CRIPE Awards**

Three awards were presented at the 15<sup>th</sup> Workshop: the Bernard Michel Award, the Gerard Medal, and the Kersi Davar Award.

#### **Bernard Michel Award**

The Bernard Michel award is the most prestigious award presented by CRIPE. The award is presented on occasion to only the most deserving recipients. It honors those who have made outstanding career contributions towards the advancement of river ice science and engineering.

The third recipient of the Bernard Michel award was presented at the 15<sup>th</sup> Workshop to Dr. Spyros Beltaos.

#### **Gerard Medal**

In 1992, the Committee established the Gerard Medal, to honour and remember the many contributions to river ice science by the late Professor Robert (Larry) Gerard who passed away in 1991. The Gerard Medal is awarded biennially to the author(s) of the best paper presented at the preceding River Ice Workshop.

The 2009 Gerard Medal was awarded to: A. Tuthill, K. White, C. Vuyovich and L. Daniels for their paper entitled “*Ice Jams, Contaminated Sediment, Dam Removal, and Bridge Scour on the Clark Fork River, Montana*”.

### **Kersi S. Davar Award**

CRIFE has introduced a new award to recognize outstanding contributions to practical applications in river ice engineering and science. The award will be presented once every two years.

The first recipient of the award was presented at the 15<sup>th</sup> Workshop to Keri S. Davar.

### **16<sup>th</sup> Workshop, Winnipeg, Manitoba, Sept. 2011**

The 16<sup>th</sup> Workshop of the Committee on River Ice Processes and the Environment will be held in Winnipeg, Manitoba in September 2011.

## **Committee on Isotopic Tracers**

### **Committee Members**

**Jean Birks** (Chair), Alberta Innovates-Technology Futures, University of Waterloo  
**Tom Edwards**, University of Waterloo  
**John Gibson**, Alberta Innovates-Technology Futures, University of Victoria

(President IAHS International Commission on Tracers)

**Claude Hillaire-Marcel**, GEOTOP-UQAM  
**Bernhard Mayer**, University of Calgary  
**Fred Michel**, Carleton University  
**Tricia Stadnyk**, University of Manitoba  
**Brent Wolfe**, Wilfrid Laurier University

We are pleased to welcome three new members to the committee: Bernhard Mayer (University of Calgary), Brent Wolfe (Wilfrid Laurier University), and Tricia Stadnyk (University of Manitoba). Drs. Mayer and Wolfe have been active in the Canadian isotope hydrology community for many years and have been significant contributors to the Isotope Tracer Committee activities in the past. Dr. Stadnyk has been an active student participant and is now establishing her own research group at the University of Manitoba. We look forward to their continued participation and to their fresh input towards committee activities.

### **Background**

The CGU - HS Committee on Isotopic Tracers was established in 1997 to support and facilitate information exchange between isotope specialists and hydrologists both within Canada and internationally, and to address issues of importance to isotopic investigations including integration within broadly-based hydroscience research programs. Recognizing and supporting promising applications of isotopic tracers, promoting cooperative research, providing information resources, and articulating research and educational needs to government agencies, universities, and the general hydrology community are the fundamental aims of the Committee.

### **Objectives and Activities**

The long-term objectives of the committee are to:

- promote and advance the understanding and application of isotopic tracer techniques in hydrology and related sciences
- initiate and participate in research and education programs, maintain contact with relevant organizations, report on national and international research activities, information sources, isotope monitoring networks, and databases
- establish working groups and/or subcommittees to assess specific, high-priority topics for research, monitoring and/or development, and
- disseminate current research and important findings to the scientific community via discussion, meetings and conferences, and publications

#### **Progress on Issues and Objectives:**

Tracer committee members continue to be active in the promotion and advancement of the understanding and application of isotopic tracer techniques in hydrology and related sciences. Of particular interest are the application of isotope tracers for the evaluation of hydrological and hydroclimatic models and the organization of regional, national and global networks that serve to build scientific capacity for tracer-based research. Some highlights from 2009 include:

Isotope Tracer Committee supported meetings and workshops included:

- Special Session: “*Recent Advances and Breakthrough in the Use of Stable Water Isotopes as Tracers of Climate and Climate-Driven Hydrologic Changes*”, Joint Assembly, The Meeting of the Americas, 24-27 May 2009, Toronto, Canada
  - This session invited contributions on recent advances and breakthroughs in the understanding and use of stable water isotopes as tracers of

past and ongoing climate and climate-driven hydrologic change. Topics included spatio-temporal mapping and analysis of precipitation isotope fields, associated isotopic-hydrologic variability, investigation of circulation-dependent variability in the "isotope thermometer" and other aspects of isotope climatology, isotope-enabled hydrologic and general/regional circulation modelling, hydrologic-circulation model linking and data-model comparison. The session included 9 presentations and we are particularly pleased with the number of high-quality student presentations that were made. We were fortunate to have Uli Schotterer from the Oeschger Climate Centre in Bern as our invited speaker.

- Special session, “*Isotope tracers in hydrology*”, Joint IAHS and IAH International Convention, “Water: A Vital Resource Under Stress; How Science Can Help”, 6-13 September 2009, Hyderabad India.
  - This session included presentations highlighting isotope tracing for obtaining information about water balance, hydrodynamics and hydrological processes, including groundwater recharge, as an indicator of water resources sustainability.
- Dr. Mayer co-chaired a special session of interest to the isotope tracer community at Geocanada 2010 Working with the Earth, 10-14 May 2010, Calgary, Canada. The session was titled “*Advances in Stable Isotope Geochemistry in Energy and Environmental Research*”.

#### **Other and ongoing committee activities:**

- Maintenance of the Tracer Committee web-site  
[http://www.science.uwaterloo.ca/~jjgibson/gibson\\_files/isotope.html](http://www.science.uwaterloo.ca/~jjgibson/gibson_files/isotope.html)
- Support of IAEA/WMO Global Network of Isotopes in Precipitation and Large Rivers Program.
- Liaison and support for expanding national isotope monitoring/science networks (Canada: Canadian Network for Isotopes in Precipitation, United States: USNetwork for Isotopes in Precipitation).
- We are pleased to announce that Christophe Sturm (University of Stockholm) will be a visiting scientist at AITF Victoria/ University of Victoria. Dr. Sturm is the developer of the stable water isotope-equipped regional climate model REMOiso and has research interests that include modelling the terrestrial carbon cycle.
- the Peace Athabasca Delta, Slave River Delta, Old Crow Flats, and Wapusk National Park are all large-scale field programs in which researchers are using water isotope tracers to characterize the water balance of modern lakes as well as using isotopic archives to evaluate changes in hydrology over the last millennium,
- the Grand River Basin is the location of an intensive campaign sampling groundwater, river water and precipitation providing the first basin-wide isotopic sampling within the Great Lakes catchment,
- Nelson River Basin will be the location of a new 4-year isotope sampling program in which the isotopic composition of rivers, lakes, wetlands, snow, baseflow, precipitation and evaporation will be used to improve the hydrological modelling of the basin using isoWATFLOOD.

### **Applications of Isotopic Tracer**

#### **Techniques:**

The trend in Canadian isotope tracer research has recently been towards sustained long-term monitoring of precipitation and river discharge to enable better characterization of spatial and temporal variability in isotope signatures and their underlying causes.

A number of large-scale research programs using water isotope tracers to better characterize past and present hydrological processes are currently underway in Canada including:

- the Mackenzie River Basin as part of the Global Energy and Water Cycle Experiment and the IAEAs Coordinated Research Project (CRP) on Large River Basins,
- the St. Lawrence River also as part of the IAEA CRP Large River Basin project,

A significant milestone for Canadian isotope hydrologists was achieved this year with the acceptance of isotope mass balance (IMB) modelling as a method for obtaining site-specific hydrology necessary for critical loads of acidity assessments for acid sensitive lakes. The first application of IMB models for this use was in the Fort McMurray area where the method was tested as part of the Cumulative Environmental Management Association Acid Sensitive Lakes Program (Bennett et al., 2008). The application of this isotope-based runoff information in critical loads models (Bennett et al., 2008; Gibson et al., 2010a, 2010b; Scott et al., 2010) is a technical innovation, and this approach is now being widely applied in surveys across Canada as supported by federal and provincial environment agencies and the Canadian Council of Ministers of the Environment Acid Rain task group. These

surveys have included over 1300 lakes in British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario.

Bennett, K.E., Gibson, J.J., McEachern, P.M. 2008. Water yield estimates for critical loadings assessment: comparisons of gauging methods versus an isotopic approach. *Can. J. Fish. Aquat. Sci.*, 65: 83-99.

Gibson, J.J., Birks, S.J., Kumar, S., McEachern, P., Haziwinkel, R. (2010a) Interannual variations in water yield to lakes in northeastern Alberta: Implications for estimating critical loads of acidity. *Journal of Limnology*, 69 (Suppl. 1): 126-134.

Gibson, J.J., Birks, S.J., Jeffries, D.S., Kumar, S., Scott, K.A., Aherne, J., Shaw, P. (2010b) Site-specific estimates of water yield applied in regional acid sensitivity. *Journal of Limnology* 69 (Suppl. 1): 67-76

Scott, K.A., Wissel, B., Gibson, J.J., Birks, S.J. (2010) Limnological characteristics and acid sensitivity of boreal headwater lakes in northwest Saskatchewan, Canada. *Journal of Limnology*, 69 (Suppl. 1): 33-44.

### **Dissemination**

Tracer Committee members have been actively promoting the use of isotope tracer techniques in hydrology through refereed publications, meetings and conferences, as well as supporting the training of highly qualified persons. The next update to the committee website will include links to some recent publications. Other dissemination highlights include:

- “Report on isotope hydrology in Canada 2003-2007” was prepared by Birks and Gibson (with contributions from B Mayer, JF Helie, WM Buhay, ID Clark, TWD Edwards, K Higuchi, L Huang, and D Chan) to give an overview of

recent progress in isotope tracer hydrology and related research.

- There is open access to the *Journal of Limnology* where some of the above-mentioned papers describing the use of isotope-based site-specific estimates of water yield for regional acid sensitivity assessments.  
[http://www.jlimnol.it/JL\\_69\\_supl1/JL\\_69\\_supl1.htm](http://www.jlimnol.it/JL_69_supl1/JL_69_supl1.htm)

### **Planned activities**

- Melbourne, 2013: Isotope tracing of water balance, hydrodynamics and hydrological processes (ICT, Co-conveners: John Gibson (Canada), Michael Stewart (New Zealand), G.M. Zuppi (Italy), D.Cendon (Australia))

### **CNIP Subcommittee:**

Operation of CNIP continued during the past year, with sampling conducted by the Meteorological Service of Canada and analyses supplied by the Environmental Isotope Laboratory, University of Waterloo. The network consists of 19 stations distributed across Canada (spanning almost 40° of latitude and 70° of longitude) collecting weighted monthly precipitation samples for  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$ . The majority of CNIP sampling sites are meteorological stations operated by the Meteorological Service of Canada and the Canadian Air and Precipitation Monitoring Network (CAPMoN) with analyses conducted by the Environmental Isotope Laboratory, University of Waterloo. The CAPMoN networks primary use is for monitoring non-urban air quality to establish spatial and temporal trends in atmospheric pollution (e.g. ozone, particulate, smog, acid rain). In addition, CNIP also includes 3 stations where daily precipitation samples are collected for  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$  analyses. This valuable dataset marks the first time that both the southern and northern regions of

the country have been simultaneously sampled, and currently consists of a nine-year dataset for the entire country. This partnering between CNIP and CAPMoN has benefited both parties by creating a comprehensive dataset that includes geochemical as well as isotopic characterization of precipitation chemistry providing additional tracers to constrain source areas and transport history. Between January 1998 and January 2010 over 6000 precipitation samples were received at the Environmental Isotope Laboratory at the University of Waterloo, approximately 5000 of which have already been analyzed.

### **Meetings and Activities**

- Birks, S.J. Edwards, T.W.D. Neelmoy, N.C. Gibson, J.J., Drimmie, R.J., Michel, F. and McTavish, D., Isotope climatology of Canada: Insights from the first decade of CNIP operation (1997-2007), Joint Assembly, The Meeting of the Americas, 24-27 May 2009, Toronto, Canada.
- The CNIP subcommittee continued to participate in the International Atomic Energy Agency Co-ordinated Research Projects Geostatistical analysis of spatial isotope variability to map the source of water for hydrology and climate studies (Birks, SJ). The final meeting was on March 15-19, 2009 in Vienna and considerable progress was made towards the objectives of developing geostatistical techniques for mapping precipitation isotope fields that we plan to apply to the CNIP dataset.
- Maintenance of the CNIP subcommittee web-site, [http://www.science.uwaterloo.ca/~jjgibs/on/gibson\\_files/cnip.html](http://www.science.uwaterloo.ca/~jjgibs/on/gibson_files/cnip.html)
- Maintenance of the CNIP web-site, <http://www.science.uwaterloo.ca/~twdedwar/cnip/cniphome.html>

- Liaison and support for expanding national isotope monitoring/science networks (Canada: Canadian Network for Isotopes in Precipitation, Canadian Geophysical Union Committee on Isotope Tracers and CNIP Subcommittee, Manitoba Network for Isotopes in Precipitation, United States: USNetwork for Isotopes in Precipitation, Australia: GNIP, OzFlux, Bureau of Meteorology, CSIRO, ANSTO)

### **Wetland Hydrology Committee**

**Chair:** J.M. Waddington, School of Geography and Earth Sciences, McMaster University, [wadding@mcmaster.ca](mailto:wadding@mcmaster.ca)

**Vice-Chair:** J.S. Price, Department of Geography, University of Waterloo

### **Meetings and Activities**

Several members of the Wetland Hydrology Committee (WHC) attended a special "Peatlands and Carbon" conference in Prague in September, 2009. The theme of this conference was Peatland Carbon Cycling and Hydrology. The conference was hosted by PeatNet, which is a NSF based organization based in the United States. Plenary presentations were made by Nigel Roulet and Mike Waddington.

Peatnet also hosted a meeting "Reclamation and Restoration of Boreal Peatland and Forest Ecosystems: Toward a Sustainable Future" earlier this year in Edmonton on 25-27, 2010. There was a special focus on impacts of mining activity in the boreal zone, especially oil sands extraction, and on reclamation and restoration. There were several hundred attendees, including many industry representatives.

Wetland hydrology figures prominently in both the Western and Eastern CGU-HS

student conferences. Over ten presentations at the 2009 Eastern conference at York University were wetland hydrology related.

### **Progress on Issues and Objectives**

As was stated two years ago the WHC has maintained a web site with Canadian wetland hydrology researcher project and contact information. This web site was in need of serious updating. However, the NSF funded Peatnet organization has developed a similar research contacts website for wetland and peatland researchers and several WHC members have posted their contact information to this site. We have encouraged our members to post their information on that web site. However, funding for the Peatnet organization is drawing to a close so it may be necessary to once again develop our own web site. Discussion of developing a Canadian Peatnet equivalent has also started.

The Society of Wetland Scientists recently added a new chapter for peatland scientists. Given the large number of Canadian wetland hydrologists that conduct research in peatland ecosystems, the SWS will also be a good outlet for Canadian hydrology research.

### **Future Meetings and Activities**

Several members of the WHC met at the 2010 CGU/CMOS meeting to discuss future meetings. In 2008 our group invited Kevin Bishop from Sweden to make a keynote presentation on the linkages of wetland and forest hydrology and watershed nutrient cycling. Given the success of that special session with over 30 papers were received (12 oral and 19 poster) and because the CGU annual meeting remains the largest gathering of Canadian wetland hydrologists each year, we plan to organize a special

session at the 2011 CGU meeting in Banff on wetland hydrology. Dr. Paul Morris (PDF at McMaster University) has volunteered to lead this initiative. The session may be cross listed with Biogeosciences and focus on the coupling of wetland hydrology and biogeoscience processes.

Preparations are underway for the International Symposium on Responsible Peatland Management and Growing Media Production, Québec City, Canada, 13 – 17 June, 2011. Dr. Nigel Roulet will be giving a keynote address on "Peatlands, Climate Change and Carbon: things we should be thinking about for the management of peatlands in a changing world."

### **Erosion and Sedimentation Committee**

**Chair:** Peter Ashmore, Department of Geography, University of Western Ontario, London, ON, N6A 5C2; pashmore@uwo.ca

**Members:** Dr. Dirk DeBoer, University of Saskatchewan; M. Conly, Environment Canada (CWS), Saskatoon; Dr. M. Church, University of British Columbia; Dr. A. Roy, Université de Montréal; Dirk DeBoer (IAHS-International Commission on Continental Erosion Canadian Delegate)

**Objectives:** the scientific advancement and practical application of knowledge of erosion, transport and deposition of sediment in fresh water systems - topic coverage similar to that of the IAHS Commissions on Continental Erosion some aspects of Water Quality.

- i) communication of current research via discussion, meetings, conferences and publications;

- ii) identification and promotion of high priority research topics in the Canadian context;
- iii) promotion and encouragement of the transfer of knowledge and technology in the field of interest.

### Meetings & Activities

- Continued representation at CGU-HS sessions.
- Reciprocal membership arrangement and affiliation between CGU and Canadian Geomorphology Research Group has resulted in several sessions at other national conferences jointly between the two groups including several sessions at 2008 CGU conference jointly (for the first time) with CGRG including a full day special session on sediment transport and landform dynamics with several invited speakers. Ashmore was a member of the program committee and helped coordinate sessions between the two organizations.
- Active participation at Joint Meeting in Toronto (May 2009) including : CGU sponsored session on Bi-national Principle and Practices in stream Restoration, and Hydrology section sessions on Models and Measurement of Sediment Transport and Advances in Measurement of Sediment Transport.
- Plans for E&S sessions at CGU 2011 being developed.
- At 2011 meeting we will decide on new committee members and revise the focus and direction of the committee.

### Canadian National Committee for the International Association of Hydrological Sciences, (CNC-IAHS)

The current executive of CNC-IAHS is:

**Senior Representative and Chair:** Dan Moore, UBC

**Junior Representative and Secretary:** Bill Quinton, Wilfrid Laurier University

**President, CGU-HS:** Brian Branfireun, University of Toronto

**Vice-President, CGU-HS:** Sean Carey, Carleton University

**President, CMOS:** David Fissel, ASL Environmental Sciences Ltd.

**Delegated by President, CWRA:** Chris Spence, Environment Canada

**Delegated by President, CNC-IAH:** Garth van der Kamp, Environment Canada

**Member-at-large, CGU-HS:** Masaki Hayashi, University of Calgary

The Canadian National Representatives to IAHS Commissions are:

**International Commission on Surface Water (ICSW):** Don Burn, University of Waterloo

**International Commission on Groundwater (ICGW):** Masaki Hayashi, University of Calgary

**International Commission on Water Quality (ICWQ):** Brian Branfireun, University of Toronto

**International Commission on Continental Erosion (ICCE):** Dirk de Boer, University of Saskatchewan

**International Commission on Coupled Land-Atmosphere Systems (ICCLAS):** Rich Petrone, Wilfrid Laurier University

**International Commission on Remote Sensing (ICRS):** Al Pietroniro, Environment Canada

**International Commission on Water Resources Systems (ICWRS):** Slobodan Simonovic, University of Western Ontario

**International Commission for Snow and Ice Hydrology (ICSIH):** Sean Carey, Carleton University

**International Commission on Tracers (ICT):** John Gibson, Alberta Research Council

Canadians continue to play a key role by holding executive positions in IAHS and its commissions:

Gordon Young

IAHS President

John Pomeroy	President, International Commission for Snow and Ice Hydrology; Working Group, Prediction in Ungauged Basins
John Gibson	Past President, International Commission on Tracers
Al Pietroniro	Past President, International Commission for Remote Sensing; Working Group, Hydrometeorological Projects
Claude Duguay	Vice President, International Commission for Remote Sensing

We encourage all members of the Canadian hydrology community to become members of IAHS. Membership is free. You can register on-line via the following link:

<http://iahs.info/>

A major activity of CNC-IAHS over the next year will be the compilation of reports on progress in Canadian hydrology, to be submitted to IAHS at the Quadriennial Meeting of IUGG in Melbourne, Australia, 27 June - 8 July 2011.

Canadian contributions to IAHS sessions to be held at the Melbourne meeting are as follows:

John Pomeroy	Co-convenor, J-HW03, <i>Impacts of changing climate, snow and ice on mountain hydrology</i>
Phil Marsh	Co-convenor, H02, <i>Cold regions hydrology in a changing climate</i>