

Outreach Activities

WC²N and IP3



Canadian Foundation for Climate
and Atmospheric Sciences (CFCAS)

Fondation canadienne pour les sciences
du climat et de l'atmosphère (FCSCA)



Presentation outline

- User requests and actions taken
- IP3 publications
- MP and MLA contacts
- Printed materials
- IP3 newsletter
- Newsletter articles published
- IP3 outreach page
- Workshops and meetings
- WC²N glacierscapes poster
- Future projects




Summary of user's requests and actions taken by the IP3 research network

- Newsletter
- Blog
- Model workshops
- User requested meetings
- IP3 legacy product
- Information kit
- Archive location for data
- Follow-on projects

2009

Improved Processes and Parameterisation for Prediction in Cold Regions




Summary of User's Requests and Actions Taken by the IP3 Research Network

- Create a regular newsletter to keep supporters updated on developments, including current and future research. Newsletters will be posted on the IP3 website Outreach page on a bimonthly basis, starting in June 2009. Newsletter content will provide summaries of relevant workshops, papers and presentations, provide information on upcoming events and highlight student research. Suggestions for articles, information and questions can be sent to: Nadine at nadine.kapphahn@usask.ca.
- Maintain an IP3 blog. A blog will be created on the IP3 website accessed from the Outreach page.
- Outreach for new techniques, data and models allowing an improved awareness of tools available to keep practitioners up to speed—helping the public be more aware of modeling capability as a tool for water management—education on the value of models despite their uncertainty. Workshops will be held on specific models as requested by significant numbers of interested users. A MESH/CLASS workshop was held in Waterloo in March 2009, a CRHM workshop was held in Winnipeg in June 2009 and a MESH/CLASS workshop will be held in Edmonton in September 2009, followed by a Spring 2010 CRHM workshop at a location to be announced.
- Improve linkages between university scientists and users. Individual meetings can be set up between interested users and scientists by request. IP3 meetings with Parks Canada—northern branch and Manitoba Water Stewardship occurred in Winnipeg in June and a meeting is planned for September between IP3 scientists and Alberta government hydrologists. Any requests for group meetings with specific IP3 researchers can be sent to: Nadine at nadine.kapphahn@usask.ca.
- Need to produce an integrated IP3 product (legacy): transferable knowledge, models, state of science, future road map, synthesis. Bob Sandford has been engaged to review all IP3 reports and IP3 authored publications and produce a popular book to be published by Rocky Mountain Books in the Fall of 2010.
- Availability of a simple to understand media information kit. Printed materials will be available outlining IP3 research in the north and research in the mountain west. An outline of the CHRM model will also be available. These materials will also be available on the IP3 website Outreach page in pdf format for ease of printing.
- Let users know what new issues and concepts are. Newsletters, individual meetings and an interactive blog will aid in sharing new information with the larger user community.
- Archive location for data. IP3 has hired a data manager—Michael Allchin, who will be collecting, archiving and databasing the networks' data and model files. A database and data archiving system will be set up on the IP3 ftp server with input from both network members and users into optimizing the system for multiple applications.
- Develop partnerships and links between researchers and practitioners (science and industry). Provide follow-on strategic projects. An NSERC Strategic Network is being pursued by IP3 and other like-minded scientists with the objective of continuing current research relevant to IP3 users and partners. Partners supporting this continuing proposal will be able to contribute to research direction from the beginning of this proposal. Outreach will involve user participation at both the policy and individual user level in relevant committees and workshops.


IP3 publications

● Water in the West



Water in the West

June 2009



Improved Process & Parameterization
for Prediction in Cold Regions

Our Glaciers, Snowpacks and Rivers are in Transition

Scientists address water issues

The Saskatchewan River basin is the lifeblood of the Canadian Prairie provinces and understanding its challenges is key to the future strength and growth of this dynamic part of Canada. Melting glaciers, forest die-back, warmer winters and changes in snowfall and rainfall patterns are creating challenges for the management of Canada's water supply. To deal with emerging problems, IP3 scientists are currently working at three research sites near the headwaters of the Saskatchewan River.

Marmot Creek in Kananaskis Country, Lake O'Hara in Yoho National Park and Peyto Creek in Banff National Park are the site of research in snow accumulation, snow melt, glacier melt and runoff. The collection of weather data and snowfall information is being used to develop models for use in predicting changes in streamflow under changing climate conditions.

This research is being used in collaboration with various private and public enterprises. Interested user groups include Parks Canada, City of Calgary, Manitoba Hydro, Bow River Basin Council, Alberta Sustainable Resource Development, Kananaskis Country, Resorts of the Canadian Rockies, Environment Canada, Saskatchewan Watershed Authority and Alberta Environment. These user groups recognize the need for continual monitoring of upstream water production to ensure that changes in streamflow can be planned for in downstream water allocations. Further growth and development in the Prairie Provinces necessitates more reliable streamflow forecasting for our diminishing water resource to be shared.


Important areas necessary for continuing research are:

- determining the impact of changing flows in the major rivers draining the Rockies on water availability, to meet increasing downstream demand
- monitoring and predicting mountain weather, snowpacks, glaciers and streamflow in a changing climate
- the impact of declining forest cover on runoff production
- the role of mountain groundwater in maintaining streamflow in dry periods

Research is currently being produced by the IP3 research network, composed of eight universities and four federal research labs. This important work is funded through CFCAS (Canadian Foundation for Climate and Atmospheric Sciences) with funding through to end in 2010.


For more information please contact:
Nadine Kapphahn - Outreach Coordinator - 250-960-5898 nadine.kapphahn@usask.ca
John Pomeroy - Principal Investigator - 306-966-1426 john.pomeroy@usask.ca

● Water in the North



Water in the North

June 2009



Improved Process & Parameterization
for Prediction in Cold Regions

Our Rivers, Lakes and Permafrost are in Transition

Scientists address water issues

The Mackenzie and Yukon River basins are the lifeblood of the Canadian North and understanding their challenges is key to the future strength and growth of this dynamic part of Canada. Thawing permafrost, changing lakes and wetlands, and warmer winters with changes in snowfall and rainfall patterns are creating challenges for the management of Canada's northern waters. To deal with emerging problems, IP3 scientists are currently working at five research sites in northern Canada.

Scotty Creek near Fort Simpson, Baker Creek north of Great Slave Lake, Trail Valley Creek - part of the Eskimo Lakes system and Havikpak Creek near the Mackenzie River delta along with Wolf Creek near Whitehorse, part of the Yukon River system, are sites of research in snow accumulation, snow melt, permafrost thaw, lake storage and runoff. The collection of weather data, snowfall, lake level and streamflow information is being used to develop models for use in predicting changes in permafrost, lake level and streamflow under changing climate conditions.

This research is being used in collaboration with various private and public enterprises. Interested user groups include NWT Power Corp, Yukon Energy, Parks Canada, Yukon Environment, Sahtu Renewable Resources Council and the Water Resources Division of Indian and Northern Affairs. These user groups recognize the need for continual monitoring of changing water and permafrost conditions. Further development in the North necessitates more reliable streamflow forecasting with increased flood forecasting abilities as well as more information on permafrost thaw to aid in understanding how best to proceed with new infrastructure development, such as pipelines and mines.

Important areas necessary for continuing research are:

- effects of permafrost deterioration on infrastructure and water supply
- flood forecasting, mine tailings rehabilitation

Research is currently being produced by the IP3 research network, a group of eight universities, four federal labs and territorial water research agencies. This work is funded through CFCAS (Canadian Foundation for Climate and Atmospheric Sciences) with funding to end in 2010. It is also part of the International Polar Year which ends in 2009.

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MP and MLA contacts

- One - page highlights emailed to MP's and representative MLA's
- Four – page printed brochure to mail as followup to emails



Responses:

MPs – Jim Prentice (Environment + AB), Jay Hill (BC), Stephen Harper (AB), Rona Ambrose (AB), Bradley Trost (SK), Ed Komarnicki (SK), Ralph Goodale (SK), Ray Boughen (SK), Lisa Raitt (Natural Resources), Gerry Ritz (Agriculture)

MLA's – Rob Renner (AB Environment), Brad Wall (SK Premier), Bob Bjornerud (SK Agriculture), Nancy Heppner (SK Environment), Gary Doer (MB Premier)

Printed materials



Improved Processes & Parameterization
for Prediction in Cold Regions

Water Research

SUMMER 2009

SPECIAL POINTS OF INTEREST:

- Infrastructure development in the North depends on understanding the rapid changes occurring in permafrost coverage.
- Communities need current understanding of flood issues resulting from climate change
- IP3 is in partnership with the International Polar Year through the Arctic freshwater hydrology project.

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IP3 Research Network

IP3 is a research network funded by the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) for 2006-2010 and supported by partners in all levels of government as well as the private sector. The IP3 network is comprised of several dozen investigators, collaborators, and students from across Canada, the US, and Europe and is headquartered at the University of Saskatchewan's Centre for Hydrology. IP3 is devoted to an improved understanding of the study of water and weather systems in cold regions, particularly Canada's Rocky Mountains and western Arctic. Data is being collected from several different research areas, where scientists are studying snowpacks, glaciers, lakes, wetlands, permafrost, streamflow, and runoff. Using these data to test water and climate models will lead to improved understanding and predictability of snow accumulation and melt, glacier motion and growth, soil moisture, evaporation, thawing permafrost, and changes in lake levels and streamflow in cold environments. This information is of key importance to applied water management and policy development for communities in planning recreation, sustainable industrial development, and infrastructure as well as environmental conservation in western and northern Canada.



Snow survey

Northern Focus

Northern research locations include permafrost wetlands, taiga woodlands, small lake drainage basins, alpine tundra, and boreal forest. IP3 science in the North has relevance for several key northern issues including permafrost degradation, streamflow and meltwater timing, and flood forecasting. Increased development in the north will continue to exert pressure on northern water resources, and IP3 will contribute directly to improved understanding and prediction of these resources.



Improved Processes & Parameterization
for Prediction in Cold Regions

Water Research

SUMMER 2009

SPECIAL POINTS OF INTEREST:

- Monitoring and predicting mountain weather and snowpacks, glaciers and streamflow in a changing climate
- Determining the impact of declining forest cover on runoff production
- Modelling small and large basin water systems in anticipation of increased downstream demand

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Weather station

Western Relevance

Some of the most significant water resource and supply challenges in Canada are in western Canada. The Rocky Mountains are the water towers of the Canadian Prairies and continual monitoring of upstream water production is necessary to ensure that changes in streamflow can be planned for in downstream allocations. Enhanced monitoring and research in the mountains is essential in identifying climate change impacts on glaciers, snowpack and streamflow.



IP3 newsletters

- Published online on IP3 website bimonthly – June 2009, August 2009, October 2009, etc.
- Content
 - Conference presentations
 - Workshops and meetings
 - Highlighted research
 - Open for users, investigators and collaborators to submit items of interest

NEWSLETTER

Improved Processes and
Parameterisation for Prediction
in Cold Regions



AUGUST 2009

Workshop Report

Cold Regions Hydrological Model (CRHM) Workshop in Winnipeg



Workshop participants
Julie Friddell

On June 15th, a CRHM workshop was held at the new Manitoba Hydro office building in downtown Winnipeg. John Pomeroy and CRHM Modeller Tom Brown led twenty four participants from a variety of backgrounds including water resources management and hydrological and landscape modelling. Participants were from Manitoba Hydro, Manitoba Water Stewardship, Parks Canada, University of Manitoba, Brandon University, University of Lethbridge, and the Saskatchewan Watershed Authority. Many thanks go out to Manitoba Hydro which provided logistical and financial support for the training course.

Workshop Announcement

IP3 and WC²N to host Joint Workshop

Two Canadian Foundation for Climate and Atmospheric Science (CFCAS) western networks will hold a joint workshop in Lake Louise, Alberta, October 14th to 17th, 2009. IP3 and the Western Canadian Cryospheric Network (WC²N) will jointly host a workshop highlighting network research and progress in achieving climate goals. All members of the cold regions and water resource community are welcome to attend. A draft agenda is currently being developed and registration information will be available later in the summer posted on the IP3 network website: <http://www.usask.ca/ip3/>.



Workshop venue
Lake Louise Inn

IP3 Secretariat News

The IP3 Secretariat has moved effective July 1, 2009 with both John Pomeroy and Julie Friddell relocating to Canmore, Alberta. This seamless transition will not be noticed as email contacts will remain the same—however new phone contacts will be as follows—Kananaskis office—University of Calgary Biogeoscience Institute—403-673-3236 or John Pomeroy—403-609-3809 and Julie Friddell—403-621-3770.

Newsletter articles published

- Workshop review published in CliC Ice and Climate newsletter (July 2009) *“Water resources and the cryosphere in mountain and northern Canada – an IP3 users/stakeholders community workshop report”*
- Science Peaks article published in Mountain Research Initiative newsletter (October 2009) *“Canadian climate research networks focus on mountain research in western Canada”*



IP3 outreach web page

- Bimonthly newsletters posted
- Blog
- Download of printed outreach materials
- Links to IP3/WC²N articles in other publications
- Upcoming workshops and meetings
- Contacts for outreach activities

Workshops and meetings

- March 2009 – Waterloo
 - MESH/CLASS workshop
- June 2009 – Winnipeg
 - CRHM workshop
 - Parks Canada – northern
 - Manitoba Water Stewardship
- October 2009 – Edmonton
 - MESH/CLASS workshop
 - Alberta government hydrologists
- October 2009 – Jasper
 - Parks Canada - mountains
- Winter 2009/10 – Alberta
 - CRHM workshop
- February 2010 – Golden
 - Columbia Basin Trust



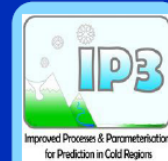
WC²N Glacierscapes poster

- Target audience
 - Olympic deadline - general public, secondary schools, 1st year post-secondary
- Objectives
 - Communicate better understanding of glaciers
 - Communicate importance of glaciers in relation to climate change
- Format
 - Two-sided folded poster – lots of diagrams and photos!
- Outline
 - Glacier formation and dynamics
 - Glaciers and climate change
 - Glaciers importance to people
- Distribution
 - British Columbia/Alberta – Parks Canada
 - BC Parks
 - Tourism BC
 - Secondary schools/colleges/universities



Future projects

- One-pagers for each research site
- Wikipedia
- Suggestions?



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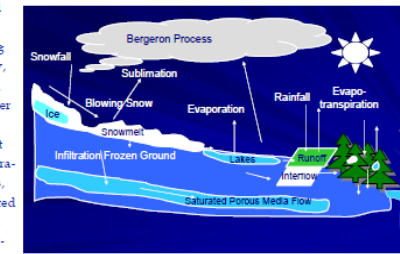
Cold Regions

Hydrological Model

SUMMER 2009

The Cold Regions Hydrological Model (CRHM)

The Cold Regions Hydrological Model (CRHM) is a software platform for building physically-based hydrological models over small to medium sized basins. CRHM models blowing snow, snow interception in forest canopies, sublimation, snowmelt, infiltration into frozen soils, hillslope water movement over permafrost, actual evaporation, and radiation exchange to complex surfaces. CRHM is a research and predictive tool that can rapidly incorporate new parameterisations and connect them over a basin to simulate the cold regions hydrological cycle. Landscape elements in CRHM can be linked episodically to mimic natural process sequences via blowing snow transport, overland flow, organic layer subsurface flow, mineral interflow, groundwater flow, and streamflow. CRHM has a simple user interface but no internal provision for calibration: parameters, observations, and model structure are selected to reproduce the fundamental behaviour of the particular hydrological system being studied.



Cold Regions Hydrological Cycle

CRHM Objectives

To develop a hydrological cycle simulation system that:

- Is spatially distributed such that the water balance for selected surface areas can be computed;
- Uses natural landscape units that have hydrological importance;
- Is physically based so that results contribute to a better understanding of basin hydrology and robust so that process parameters can be transferred regionally;
- Is sensitive to the impacts of land use and climate change;
- Reflects landscape sequencing in natural drainage basins;
- Does not require the presence of a stream in each land unit;
- Is flexible; can be compiled in various forms for specific needs;
- Is suitable for testing individual process algorithms;
- Is easy to use for all hydrologists and useful for teaching;
- Is not dependent upon calibration.

