



GROUNDWATER PROGRAM NEWSLETTER

EARTH SCIENCES SECTOR / SECTEUR DES SCIENCES DE LA TERRE

BULLETIN DU PROGRAMME SUR LES EAUX SOUTERRAINES



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Ce bulletin fait l'objet d'une révision limitée. Les contributions individuelles sont reproduites dans la langue de soumission.
This newsletter is produced with limited editing. Individual contributions are published in the language of submission.

Editor's MESSAGE

We had promised to publish this Newsletter approximately once every three months, but we are late with this third edition. For one thing, we were busy organizing the Federal-Provincial Workshop on Groundwater monitoring in Winnipeg and secondly, we wanted to be able to inform you of the official launching of the *Canadian Framework for Collaboration on Groundwater*. I am proud to inform you that both are done and described in this issue!

The federal-provincial workshop in Winnipeg was a great success. During this workshop, a groundwater monitoring network of networks was proposed, and a national groundwater database was discussed. We are convinced that workshops like this one facilitate exchange of information by groundwater agencies across Canada. If the "network of networks" does only that, it will already have achieved a great deal. As one of the participants put it: "*The reports from the individual provinces certainly provided food for thought*". We look forward to continue facilitating other similar workshops. Our strategy aims to promote regional cooperation and increase mutually beneficial use of shared assessment of groundwater resources within and among provincial and federal agencies.

Towards the end of the summer, I took the road again to visit some of the provinces, our main partners. I visited Nova Scotia, Ontario, Manitoba, Alberta, and British Columbia (twice!). I had excellent meetings with fellow colleagues from provincial departments, we discussed socio-political and scientific issues, and we exchange information, ideas, concepts and data related to groundwater. I would like to share with you my personal vision of things, what I observe and hear. This time, I have gathered my impressions of the field trip I made to the Paskapoo Formation in Alberta.

Also this fall, our Groundwater Program is going through a rigorous mid-year review by the Earth Sciences Sector of NRCan. Given the excellent feedback from our partners, and the sharing and collaboration, I have no doubt that we will pass the test! Thank you all.

I hope you enjoy the Newsletter and I look forward to hearing from you.

*Alfonso Rivera, Chief Hydrogeologist and
Groundwater Program Manager*

MESSAGE de l'éditeur

Nous avons promis que ce bulletin sortirait environ aux trois mois; cette troisième édition est donc en retard. Nous étions, d'une part, occupés à organiser l'atelier fédéral-provincial sur la surveillance de l'eau souterraine à Winnipeg et, deuxièmement, nous voulions être en mesure de vous annoncer le lancement officiel du *Cadre canadien de collaboration en matière d'eau souterraine*. Ces deux initiatives sont complétées et seront rapportées plus loin.

L'atelier fédéral-provincial à Winnipeg a connu un vif succès. On y a proposé le concept d'un réseau de réseaux de surveillance de l'eau souterraine et discuté d'une base de données sur l'eau souterraine. Nous sommes convaincus que des ateliers comme celui-ci facilitent l'échange d'information entre les agences touchant à l'eau souterraine au Canada. S'il n'atteint que ce résultat, le « réseau de réseaux » aura déjà accompli beaucoup. Selon un participant : « *Les rapports des provinces ont certainement fourni matière à réflexion* ». Il nous fera plaisir de continuer à faciliter l'organisation de ce genre d'ateliers. Notre stratégie est de promouvoir la collaboration régionale et d'accroître l'usage mutuellement bénéfique des évaluations de ressources en eau souterraine partagées entre les agences fédérales et provinciales.

Vers la fin de l'été, j'ai repris la route pour visiter certains de nos partenaires provinciaux en Nouvelle-Écosse, en Ontario, au Manitoba, en Alberta et en Colombie-Britannique (à 2 reprises). J'ai eu d'excellentes rencontres avec des collègues des ministères provinciaux. Nous avons discuté de questions socio-politiques et scientifiques et nous avons échangé des informations, des idées, des concepts et des données en lien avec l'eau souterraine. Je désire partager avec vous ma vision personnelle des choses, ce que j'observe et que j'entends. Cette fois, j'ai consigné mes impressions d'une excursion effectuée dans la Formation de Paskapoo en Alberta.

Cet automne, le programme sur les Eaux souterraines est rigoureusement passé en revue par le Secteur des sciences de la Terre de NRCan. Compte tenu de l'excellente rétroaction de nos partenaires, du partage et de la collaboration, je suis persuadé que nous passerons le test! Merci à tous.

J'espère que vous apprécierez ce bulletin et j'attends vos commentaires avec impatience.

*Alfonso Rivera, Hydrogéologue en chef et gestionnaire de
programme sur les eaux souterraines*

PUBLICATION OF THE CANADIAN FRAMEWORK FOR COLLABORATION ON GROUNDWATER

(La version française suit)

I am pleased to announce that the *Canadian Framework for collaboration on Groundwater* was recently published by NRCan on September 15. The document was prepared by a national ad-hoc committee on Groundwater, composed of members from federal and provincial departments, university and the private sector. This document proposes a vision and mechanisms to increase the synergy and cooperation in Groundwater research. In addition, the document contains a series of national cooperative programs, some of which are already being implemented in parts of the country. The ad-hoc committee produced a first draft of the document in 2000 and later presented it for discussion at the second national workshop on Groundwater, in Calgary, in September 2001, where consensus on its content was reached. This document will play an important role in the planning of research activities that contribute to a better knowledge on groundwater resources in Canada, in the perspective of sustainable development and increased collaboration. In order to respond to the needs expressed by stakeholders and collaborators, more than 3/4 of the total production of the Framework has already been distributed across the country. The Framework is distributed at no cost. You can contact me directly at: arivera@nrcan.gc.ca to obtain copies. The Framework is also accessible in PDF format at: www.gscq.nrcan.gc.ca/cgsi

PUBLICATION DU CADRE CANADIEN DE COLLABORATION EN MATIÈRE D'EAU SOUTERRAINE

Je suis heureux d'annoncer la publication récente par RNCAN, le 15 septembre dernier, du *Cadre canadien de collaboration en matière d'eau souterraine*. Ce document a été préparé par un comité national ad-hoc sur l'eau souterraine, composé de représentants de ministères fédéraux et provinciaux et des secteurs universitaire et privé. Le cadre de collaboration propose une vision et des mécanismes pour accroître la synergie et la collaboration dans le domaine de la recherche sur les eaux souterraines. De plus, le document contient une série de programmes coopératifs nationaux, dont certains sont déjà implantés dans certaines parties du pays. Le comité ad-hoc a produit une première ébauche du document en 2000 et l'a soumis à la discussion au second atelier national sur l'eau souterraine, à Calgary, en septembre 2001, où son contenu a fait l'objet d'un consensus. Le cadre de collaboration jouera un rôle important dans la planification des activités de recherche qui contribuent à une meilleure connaissance des ressources en eau souterraine au Canada, dans la perspective du développement durable et d'une collaboration accrue. Afin de répondre aux besoins exprimés par les intervenants et les collaborateurs, plus des 3/4 de la production totale du cadre de collaboration a déjà été distribuée dans tout le pays. Ce document est disponible sans frais. Vous pouvez me contacter pour obtenir des exemplaires à: arivera@nrcan.gc.ca et vous pouvez également le consulter en format PDF à: www.gscq.nrcan.gc.ca/cgsi.

INTERNATIONAL ACTIVITIES

Geofluids IV, Utrecht, the Netherlands

Steve Grasby attended the Geofluids IV conference from May 10-18. He presented results from the newly initiated National Aquifers Assessment project at this conference which had sessions on groundwater modelling, geochemical controls on water quality, water resources, as well as petroleum hydrogeology and ore forming fluids.

1st International Workshop on Aquifer Vulnerability and Risk, Salamanca, Mexico

From May 27-30, **Alfonso Rivera** was part of an international forum of scientists, stakeholders and decision makers invited to develop a world-wide vision on aquifer vulnerability and risk assessment methodologies.

International Geoscience and Remote Sensing Symposium (IGARSS) 2003, Toulouse, France

Anita Simic replaced **Richard Fernandes** to the IGARSS conference from July 21-25. The presentation of snow cover validation results gained international acceptance and confirmed that these products can be used as inputs to ESS hydrological models, such as groundwater and floods, with confidence in their accuracy.

Réunion annuelle franco-québécoise de la Revue des Sciences de l'Eau, Giens, France

As newly appointed Associate Scientific Director of the "Revue des Sciences de l'Eau", Alfonso Rivera attended the annual meeting of the scientific committee from October 6-12. This journal, jointly published by France and Québec, is the only one to publish scientific papers, and water-related research in French, with English abstracts. The University of Québec through the INRS (Institut national de la recherche scientifique) is the Quebec counterpart of this publication. This appointment is a recognition of the strong GSC-Québec / INRS partnership. This appointment should have an international impact for the ESS Groundwater program and influence the research direction of publications in the French community.

Note for ESS staff only, individual trip reports are accessible at: s-601-esp1/public/InternationalActivities

CONSULTATION AND COOPERATION

(Le version française suit)

Federal-provincial workshop on groundwater monitoring networks

This federal-provincial workshop organized jointly by the Geological Survey of Canada, the Saskatchewan Research Council and Manitoba Water, was held in Winnipeg, on October 2-3. It brought together about thirty representatives from provincial departments or agencies responsible for groundwater management and from 3 federal departments (NRCAN, EC, AAFC). Discussions focussed on the status of provincial practices for data gathering and management relative to piezometric levels and groundwater quality. Discussions also touched on the feasibility of a national initiative aimed at developing an infrastructure for data sharing that would support knowledge advances on groundwater resources in the context of sustainable development. Follow up to this meeting will be an integral component of ESS Groundwater Program priorities. Minutes of the workshop are available at: www.gscq.nrcan.gc.ca/cgsi

CONSULTATION ET COLLABORATION

Atelier fédéral-provincial sur les réseaux de surveillance de l'eau souterraine

Cet atelier fédéral-provincial, organisé conjointement par la Commission géologique du Canada, le «Saskatchewan Research Council» et le «Manitoba Water», s'est tenu à Winnipeg, les 2 et 3 octobre derniers. Il a permis d'accueillir une trentaine de représentants des ministères ou organismes provinciaux responsables de la gestion de l'eau souterraine et de trois ministères fédéraux (RNCan, EC, AAC). Les discussions ont fait le point sur l'état de la situation en ce qui a trait aux pratiques provinciales de collecte et de gestion de données sur les niveaux piézométriques et la qualité de l'eau souterraine. Les discussions ont aussi touché à la faisabilité d'une initiative nationale visant la création d'une infrastructure qui permettrait le partage des données pour supporter l'avancement des connaissances sur les ressources en eau souterraine dans une perspective de développement durable. Le suivi qui sera donné à cette réunion sera partie intégrante des priorités du programme sur les eaux souterraines du SST. Le compte-rendu de la réunion est accessible à : www.cgcq.rncan.gc.ca/cgsi



Participants to the workshop in discussion during a coffee break

PROJECT ACCOMPLISHMENTS / FAITS SAILLANTS DES PROJETS

Draft Waterscape poster available on internet

The content of a draft version of the Bowen Island "Waterscape" poster is now available on the web at www.bowenland.info/waterscapes. The poster is a collaborative effort between the NRCan Groundwater Program, the Municipality of Bowen Island, the BC Ministry of Water Land Air Protection, and community organizations. The poster is a prototype for a series of NRCan community water posters that promote science-based decision-making regarding water resources, particularly groundwater, by local government. A similar "Waterscape" poster for the Gulf Islands, B.C. is under development, and one for the Calgary region is under consideration. The draft version of the poster is hosted on the Bowen Island Forest and Water Management Society web site, a partner organization. For more information: **Bob Turner**, Bob.Turner@nrcan.gc.ca

Groundwater Program Builds Multi-Agency Collaboration to Monitor Recharge Across the Oak Ridges Moraine

The ESS Groundwater Program is leading a collaborative effort of Federal, Provincial and Municipal agencies to produce validated estimates of groundwater recharge across the Oak Ridges Moraine in Southern Ontario. This work builds on the long-standing hydrogeological expertise contributed to the Oak Ridges Moraine Coalition by groundwater scientists from the Geological Survey of Canada. A new project was initiated this year: Remote Sensing in Support of Groundwater Monitoring and Assessment, involving hydrologists and remote sensing experts from the Canada Centre for Remote Sensing. The goal of the project is to quantify the impact of changing land use and climate conditions on water recharging regional aquifer systems. The Oak Ridges Moraine has been identified as a high priority as it provides much of the water supply to the northern Greater Toronto Area and it is also under substantial development pressure.

In consultation with the Metro Toronto Conservation Authority, the project has identified the lack of in-situ evaporation data, a significant concern given that evaporation is the major water loss during the growing season. A field campaign conducted with the Toronto Regional Conservation Authority resulted in the establishment of three new climate stations within the Duffins Creek Watershed on the eastern edge of the Oak Ridges Moraine. The stations form an automated sensor web capable of monitoring spatial patterns in climate and evaporation. Durham Region and Transport Canada are providing infrastructure for these stations. Additionally, the Grand River Conservation Authority has agreed to provide climate station data near the western edge of the Moraine. These data sets will be used to validate hydrological models that will be applied over the entire Moraine using input parameter maps provided by the Ontario Ministry of Natural Resources and the Canada Centre for Remote Sensing. For more information: **Richard Fernandes**, Richard.Fernandes@ccrs.nrcan.gc.ca

Colloque sur l'eau souterraine en Abitibi

La CGC-Québec a participé, avec l'Université du Québec en Abitibi-Témiscamingue (UQAT) et l'Institut national de la recherche scientifique (INRS-ETE) à un colloque réunissant les participants à un nouveau projet sur la dynamique de l'écoulement des eaux souterraines dans un esker abitibien, à Amos, les 9 et 10 octobre derniers. Le colloque a également attiré plus de 80 intervenants municipaux, régionaux et locaux. La participation du SST dans ce projet s'inscrit en complémentarité avec une étude régionale menée par l'UQAT, et portant sur la cartographie hydrogéologique régionale, la mise au point d'outils de gestion de l'eau souterraine et le développement d'un programme de communication de l'information hydrogéologique acquise qui pourrait s'élever à 3,5 millions \$. De plus, des négociations ont été amorcées avec des intervenants privés qui pourraient apporter une contribution de plusieurs dizaines de milliers de dollars en descriptions de forages et autres données, qui seraient intégrées à la base de donnée nationale. Pour plus d'information : **Serge J. Paradis**, Serge.J.Paradis@nrcan.gc.ca

Fieldtrip to the Paskapoo Formation

I made numerous trips across Canada in the last couple of months. I consider myself a very lucky professional to be able to combine work with the pleasure of meeting people and knowing places. I love geography and every time I travel, this immense and incredible country takes my breath away from the landscapes I see, and the very warm welcoming smiles I receive. Allow me to share with you the notes that I wrote onboard of West Jet Boeing 737: Calgary-Montreal after the Paskapoo fieldtrip. The fieldtrip was on September 5, 2003, 8:00-15:00. It began at GSC-Calgary offices, and ended at the Calgary International Airport. Steve Grasby from GSC-Calgary was our host.

We hit the road at around 08:00, Banff trail West, then short turn North to our first stop in a Paskapoo outcrop. We were instructed by a GSC bedrock geologist and a stratigraphy geologist on the limits of the contact with the Paskapoo Formation to the West, just before touching on the Rockies and the synclinal crest that is formed right there where the Paskapoo sandstones are outcropping. Conclusion: BC= recharge zone and West to East groundwater flow direction? To follow. By the way, it was also the first indicator that the Paskapoo Formation is neither one single aquifer, nor is it composed of sandstones only! Incidentally, have I told you that “Paskapoo” comes from an Indian name, meaning “blind man”?

Later, we drove East to two more Paskapoo outcroppings where we saw/learned that: the dipping of the formation changes 180° from the synclinal cuesta and that because of the irregular fracturing the sandstones are permeable but anisotropic and/or impermeable when no fractures are present; and that there is more than sandstones in the Paskapoo: shales, tills, you name it! Making it also heterogeneous. Then we moved to even more serious things – Hydrogeology

In the meantime, the weather quickly changed from 10° C in the morning to a hot 29° C in the afternoon. Welcome to a very dry Calgary!

After the Tim Horton stop (Canadian protocol obliges) we visited the “High Hills” springs where we saw water for the first time – groundwater that is. It was a welcome event because after 3 hours I had seen rocks and more rocks but no water at all. So there we were a clear evidence of groundwater flowing through sandstone fractures and emerging in low topographic points as springs in a provincial park that is now protected (fortunately).

We made some back-on-the-envelope calculations and estimated that groundwater from Paskapoo may indeed feed the base flow of the area creeks and rivers regardless of the drought (have I told you that South-Western Alberta is currently going through a four-year drought?). Our last stop was in experimental groundwater recharge sites owned and operated by professors of the University of Calgary. A beautiful satellite photo for location was provided to each participant. The satellite photograph not only shows the locations of those sites, but most importantly the changes in land use as the large spotting of the city of Calgary develops further. At those sites, professors **Mazaki Hayashi**, **Larry Bently** and their students from the University of Calgary, are trying to evaluate recharge from typical Prairie depressions. Although very site-specific, their experiments might lead to an interpolation of recharge at the regional scale.



Evidence of groundwater discharge at High Hills Springs, Paskapoo Formation.

So there I was, already 14:30, about 30 km away from the airport and the temperature had already reached 31 °C! my flight back to the East was scheduled for 15:30. Steve Grasby quickly rushed me through the roads and over the hills and we landed at the airport 30 minute before departure time. Given the excitement of the field trip, and the so many things we had to see in such a short period of time, we even gave up lunch (!). So, I was hungry and thirsty by the time I reached the registration deck, but I made it!

Flying East, more relaxed and with a cold beer in my hand, I recalled details of the fieldtrip and realized how much I learned in 7 hours! It was not only the scenery but above all, the discussions with geologists, geochemists, hydrogeologists, consultants, professors and students that enriched the overall trip. Yet at the end of the day I realized that we are still “blind” as to the mysteries of the “Paskapoo” Formation – premonition?

I know one thing for sure: the (Indian) given name is ad-hoc. Yes, I learned a lot that day!

Alfonso Rivera

For more information on the Paskapoo Formation:
Steve Grasby, Steve.Grasby@nrcan.gc.ca

PUTTING FACES TO GROUNDWATER! LES VISAGES DERRIÈRE LES EAUX SOUTERRAINES



Yves Michaud, based in GSC-Québec, is a participant to the Annapolis Valley project. He has also directed 3 projects related to groundwater : the Portneuf and Maritimes Basin regional hydrogeology projects and a project funded by CCAF on the effects of climate change on groundwater resources in Eastern Canada. He also supports Alfonso with tasks related to the

management of the program. **Yves Michaud** relève de la CGC-Québec. Il participe au projet de la vallée d'Annapolis et a aussi dirigé 3 projets liés aux eaux souterraines : les projets d'hydrogéologie régionale de Portneuf et du Bassin des Maritimes ainsi qu'un projet financé par le FACC sur les effets du changement climatique sur les ressources en eau souterraine dans l'Est du Canada. Il collabore aussi avec Alfonso à certains aspects touchant la gestion du programme.

Christine Rivard is the latest recruit! She has been with GSC-Québec since April 2001. She leads the Annapolis Valley project and is back in the office since the beginning of November after the birth of her daughter Raphaëlle. In her absence, she has been replaced by Martin Ross,



who is finishing his Ph.D. at INRS-ETE. **Christine Rivard** est une nouvelle recrue en poste à la CGC-Québec depuis avril 2001. Elle dirige le projet de la vallée d'Annapolis. Elle est de retour au bureau depuis quelques semaines après la naissance de sa fille Raphaëlle. Elle a été remplacée pendant son absence par Martin Ross, qui termine actuellement son doctorat à l'INRS-ETE.

AUTRES NOUVELLES / OTHER NEWS

BC WLAP (Water, Land and Air Protection) : In talks with NRCan to prepare an agreement for GW resources studies / **WLAP (Water, Land and Air Protection) de la C-B** : En pourparlers avec RNCan pour préparer une entente sur les études relatives aux ressources en eau souterraines.

Quebec Dpt of Environment : Agreement with NRCan in preparation / **Ministère de l'Environnement du Québec** : Entente en préparation avec RNCan.

Hg Day 4 : Hydrogeology Day 4 in planning for late February of early March 2004. A two-day meeting including hands-on computer GW modelling at the GSC-Québec Hydro Lab. / **4^e journée d'hydrogéologie** : En préparation pour la fin février ou le début mars 2004. Cette réunion de deux jours comprendra une session pratique de modélisation numérique de l'eau souterraine au laboratoire d'hydrogéologie de la CGC-Québec.

XXXIII IAH Conference « Groundwater Flow Understanding : from local to regional scales », Zacatecas City, Mexico, October 11-15, 2004.

<http://indy2.igeograf.unam.mx/aih/>

Fifth Joint IAH-CNC-CGS Conference, Québec City, October, 24-26, 2004. Special sessions on groundwater management, and regional groundwater resources and plenary on Climate Change.

5^e congrès conjoint AIH-CNC-CSCG, Québec, 24-26 octobre 2004. Sessions spéciales sur la gestion de l'eau souterraine et les ressources régionales en eau souterraine et plénière sur les changements climatiques.

www.goequebec2004.org



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