REGIONAL GROUNDWATER FLOW COMMISSION

ANNUAL PROGRESS REPORT
(April 2013-July 2014)

INTRODUCTION

The basic objective of the RGFC and Board is *internationally to foster the research and application of the concept of regional groundwater flow*. The means by which this objective is sought to be accomplished have been summarized in twelve groups of proposed *"Activities or Tasks"*. The Annual Report follows the structure of the planned *"Activities or Tasks"*.

i) Special Business meetings of the Regional Groundwater Flow Commission

- Board Meeting of the Regional Groundwater Flow Commission was held in Taole Country, Yinchuan Plain, China in conjunction with the "International Symposium on Regional Groundwater Flow: Theory, Applications and Future Developments" (27. 06. 2013)

Board Meeting in China, 2013 (Xiao-Wei Jiang, Leyla Abukova (Russia), Joe Tóth, Judit Mádl-Szőnyi, Joel Carrillo, Menggui Jin)

Prof. Leyla Abukova who is the member of the Russian Academy of Sciences was invited to the Meeting. Her main interest is petroleum hydrogeology. She intends to introduce regional groundwater flow theory in Russia. Consequently, Prof. Abukova was invited to be the *"Task Leader" of Activity Group 2: Scientific Activities; Task: 2.vi of RGFC: "Promotion of the regional groundwater flow theory and its research and application, with special emphasis on petroleum exploration and exploitation in Russia and its scientifically collaborating neighboring countries.* She accepted the invitation.

- Annual Meeting of Regional Groundwater Flow Commission in 2013 was organized in the frame of the International Symposium on Hierarchical Flow Systems in Karst Regions in Budapest, September

RGFC General Meeting in Budapest, Hungary

ii) Election of the Board of Officers

- The Board of Regional Groundwater Flow Commission was completed by an additional Co-Chair, Dr. Brian Smerdon (Canada) who was nominated by Professor József Tóth on the occasion of his retiring from administrative duties. The Members of the Board have voted unanimously for Dr. Smerdon's appointment as Co-Chair to the RGFC Board of officers. At the same time Prof. József Tóth was awarded the title of "Lifetime Honorary Chair of the Regional Groundwater Flow Commission. These changes were registered by the IAH Council, through IAH President Prof. Ken Howard in 17 07 2014.
- Dr. Szilvia Simon was accepted to be Task Leader of the Activity Group 3 for Education.

iii) Global inventory of individual and institutional expertise on the subject of regional groundwater flow

- The number of the supporters of the Regional Groundwater Flow Commission is continuously increasing. The updated list contains 160 scientists and professionals worldwide. (Timea Havril is responsible for recruiting supporters)

iv) Stand-alone Specialist Meetings/Symposia

- **The International Symposium on Regional groundwater flow: Theory, Applications and Future Development, Xi'an, China 21-23 June, 2013**

During 21-23 June 2013, the International Symposium on Regional Groundwater Flow: Theory, Applications and Future Development was held successfully in Xi'an, China. This symposium was hosted by China Geological Survey (CGS) and the Regional Groundwater Flow Commission (RGFC) of IAH, and mainly organized by China University of Geosciences (Beijing, Wuhan) and Xi'an Center of China Geological Survey. There were 33 invited speakers from 12 countries. The symposium covered different aspects of the theory of regional groundwater flow, including recent advances, study methods, applications and future development. More than 160 delegates attended this Symposium.

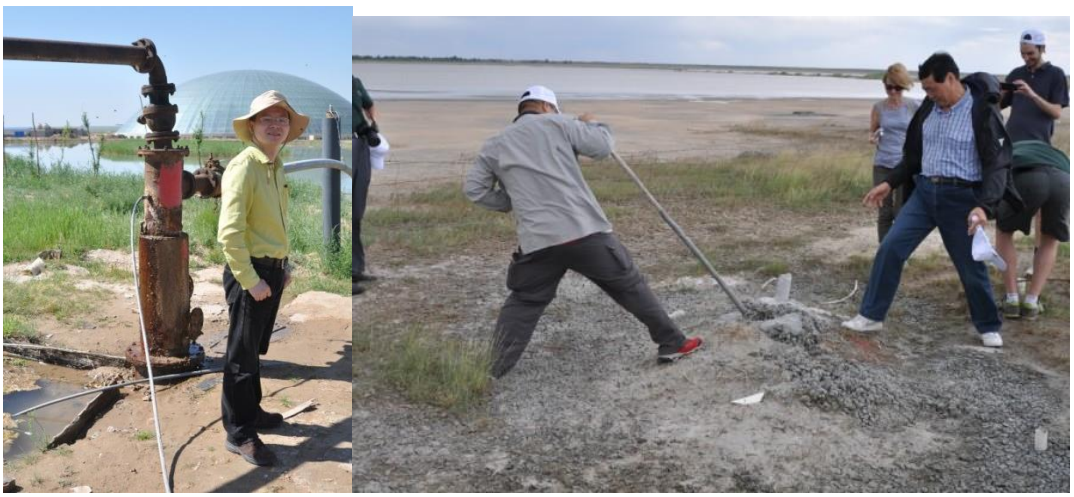
In the symposium, Prof. József Tóth from Canada reviewed the history of development of regional groundwater flow theory in the past half a century in detail; Prof. Anders Wörman from Sweden presented the recent advances of regional groundwater flow theory in the context of surface water-groundwater interaction; Dr. Dong-guang Wen of CGS introduced the major progresses of China's regional hydrogeologic investigation in recent years; Dr. Guang-cai Hou of Xi'an Center of CGS introduced the advances in the investigation and research of aquifer systems and groundwater flow systems in the Ordos Basin. Many other researchers presented studies on different aspects of characteristics of regional groundwater flow in basins around the

world by utilizing groundwater pressure, groundwater chemistry, groundwater temperature, etc. There were also some presentations on the top boundary of the groundwater basin and the three-dimensional characteristics of groundwater flow systems, which are critical to the future development of the theory of regional groundwater flow.

Abstract volume: http://regionalgwflow.iah.org/doc/Symposium_Proceedings.pdf

Group photo of the delegates of Xi'an Congress, China

There was a field trip to the Ordos Basin, one of the most intensively investigated basins in China. The participants found out that the Ordos basin is a perfect study area for further development of the theory of regional groundwater flow. The symposium, where views and experiences were exchanged on the advances and future development of the theory of regional groundwater flow, will enhance international cooperation and thus further development of the regional groundwater flow theory.



Field trip to the Ordos Basin: Xiao-Wei Jiang and his discharge-area research well; The ever-challenging traditional soap-hole testing

- **International Symposium on Hierarchical Flow systems in Karst Regions 4-7 September, 2013 Budapest, Hungary**

In early September 2013 members of the IAH Commissions on Karst and on Regional Groundwater Flow participated in the joint conference "International Conference on Hierarchical Flow Systems in Karst Regions," in Budapest, Hungary. The meeting was organized in honor of Professor József Tóth, on his 80th birthday. The declared objective of the Symposium was to introduce the concept of gravitational groundwater flow systems in the thinking and practice of the karst community**.** Therefore the Symposium was organized by the Regional Groundwater Flow Commission of the International Association of Hydrogeologists (IAH), Karst Commission of IAH, Karst Hydrogeology and by the Speleogenesis Commission of the International Union of Speleology (UIS). A variety of sessions, along with business meetings and a joint plenary session of the two IAH Commissions over three days worked to enhance cross-fertilization of ideas across the conference's two themes between 150 researchers from 35 countries. http://www.karstflow2013.org/

Abstract volume: http://www.karstflow2013.org/?nic=book

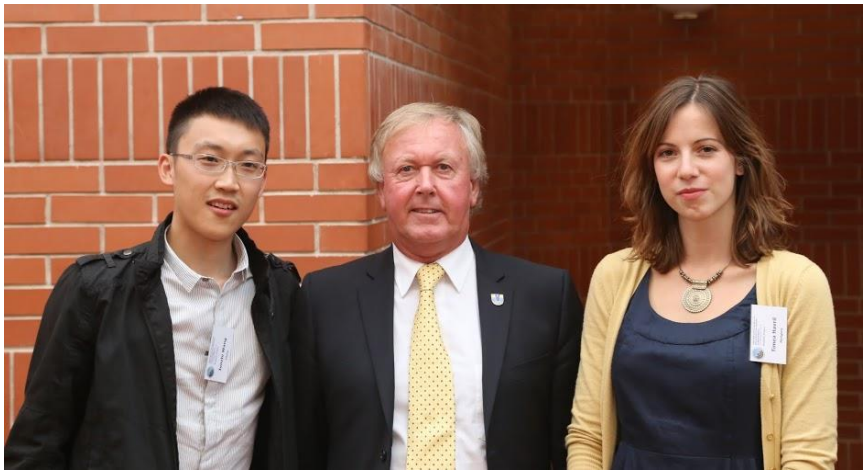
Group photo of the attendance of the Budapest Congress (Prof. Andrea Mindszenty, Dr. Szilvia Simon, Prof Ken Howard President of IAH, Prof József Tóth, Dr. Alexander Klimchouk, Prof. Derek Ford and Dr. Nico Goldscheider in the first line)

A relatively large number of young scientists participated in the conference, As a progressive initiation of the Program Committee of the *"International Symposium on Hierarchical Flow Systems in Karst Regions"* with the

promotion/support of the *Early Career Network (ECHN) of IAH,* several special Sessions were dedicated to *Early Career Hydrogeologists (PhD and MSc students)*. *This initiation fitted well into the general objective of the Symposium which was* to introduce the concept of gravitational groundwater flow systems in the thinking and practice of the karst community. The overall quality of the ECH presentations was outstanding. Among them 6 young participants were awarded.

The Karst Commission awarded a record three Young Karst Researcher Awards including the top award to Amélie Dausse from the University of Montpellier in France. The Professor József Tóth IAH Commemorative Award was granted to Timea Havril, ELTE University in Budapest.

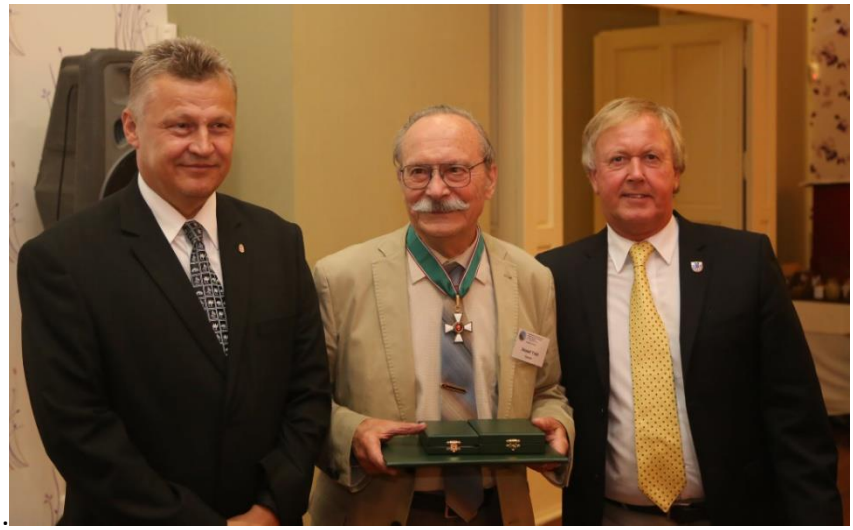
The chairman and co-chair of the Karst Commission of IAH together with the winners of "Young Karst Researcher Prize" 2013: Arnauld Malard, Nico Goldscheider, Viktória Ötvös, Ildikó Erhardt, Neven Kresic, Amélie Dausse



Ken Howard, the president of IAH, with the winners of the "Professor József Tóth IAH Commemorative Award": Tímea Havril and Junzhi Wang

A highlight of the conference was the gala dinner in honor of Professor Tóth, who was awarded the Order of Merit of the Republic of Hungary, the country's almost highest civilian honor. The Symposium closing event was a one day field trip to the famous Buda Thermal Karst including caves and spas and the farewell dinner on the board of Roham in the Danube.

The field trip introduced Europe's largest thermal water system, the Buda Thermal Karst (BTK) to the visitors. During the field trip the recent and paleo-hydrogeological characteristics of the flow systems of the BTK were shown in outcrops, in caves as well as in the spas.



Péter Kovács state secretary, Prof. József Tóth, Prof. Ken Howard the President of IAH with the Order of Merit of the Republic of Hungary granted to József Tóth

- **5th International Student's Geological Conference sponsored by IAH ECHN & IAH RGFC in Budapest, Hungary**

Between 24-27 April, 2014, the 5th International Student's Geological Conference was held at the Faculty of Science, Eötvös Loránd University, Budapest (Hungary). The conference included a wide range of scientific sessions, 6 plenary lectures on the applications of interesting methods and current results in geosciences, 4 workshops connected to the main sessions and 5 exciting field trips representing many different disciplines of the earth sciences.

The Hydrogeology and Environmental Geology Session and the coffee breaks between the sessions were sponsored by the International Association of Hydrogeologists. The professional background was ensured by Regional Groundwater Flow Commission of the IAH and Early Career Hydrogeologists' Network.

230 BSc, MSc and PhD students as well as young researchers from 3 continents and 20 countries participated at the conference. Approximately 10% of the presentations and posters from the 10 sessions related to the Hydrogeology and Engineering Geology Session. The jury of the Session was made up of the members of the IAH-RGFC: Dr. Anita Erőss, Dr. Szilvia Simon and Dr. János Viszkok. The best oral presentation was awarded to Dejan Neskovic (University of Belgrade, Serbia), while the best poster prize awarded to Ádám Tóth (Eötvös Loránd University, Budapest).

3) Short courses and training courses

- **REGFLOW and MANKARST joint Course**

Prior to the International Symposium on Hierarchical Flow Systems in Karst Regions, Budapest a joint MANKARST-REGFLOW training course was organized at the Eötvös Loránd University. The aim of the REGFLOW course was to introduce the concept of gravity driven groundwater flow, its geological and environmental consequences, application and relevant investigation methods. (Lecturers: József Tóth, Judit Mádl-Szőnyi, Szilvia Simon, Brigitta Czauner).The MANKARST course had a special focus on karst in the context of flow system theory. The course had the following goals: Provision of a fundamental understanding and holistic perspective of karst systems, their unique nature, resources and vulnerability. Presentation of the most important investigative methods with a focus on geophysical and tracing techniques for the characterization of

both local / shallow and regional / deep karst systems. Discussion of innovative approaches to karst groundwater quality monitoring, protection and management with local examples, but a global perspective. **(**Lecturers: Nico Goldscheider & Tim Bechtel, IAH Karst Commission). The courses were attended by 70 students, about half from Hungary and the rest from throughout the world.
Course notes: http://www.karstflow2013.org/?nic=training-course

- **Short courses and Colloquium co-managed by Prof. J.J. Carrillo Rivera, Institute of Geography, UNAM, Mexico**

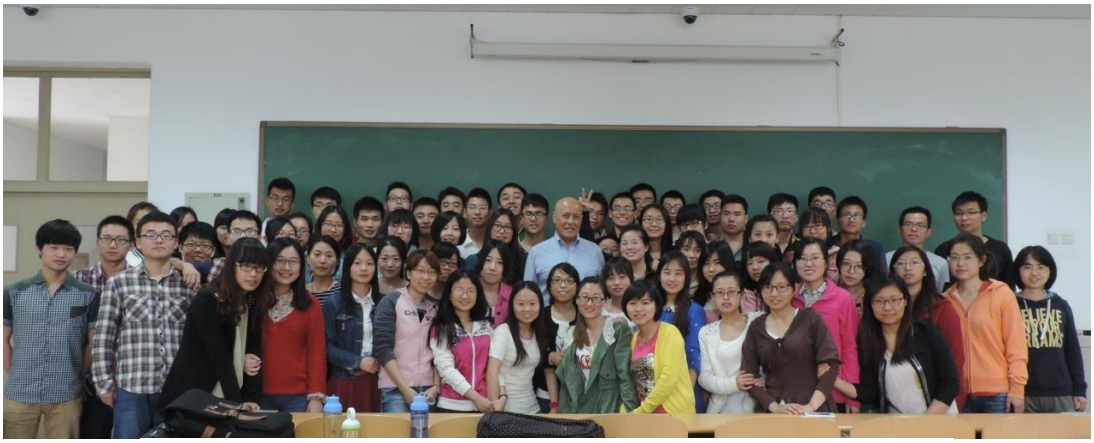
"Climate Change and Systemic Perspective of Water" (in Spanish) with Faculties of Economy and Engineering. Universidad Católica y FOPAE, Bogotá. May 8-11, del 2013. Colombia

International Course: "Groundwater and Climate Change" (in Spanish). Organized by the Red Centroamericana de Manejo de Recursos Hídricos, CARA; Canadian International Development Agency, The University of Cálgary. San Salvador, 4 y 5 de Noviembre, del 2013. Salvador Republic.

"National Colloquium Groundwater". Co-Organizer with the International Atomic Energy Agency; la Procuraduria Ambiental y del Ordenamiento Territorial del DF; CONACyT; Institute of Geography, UNAM; CIGA-UNAM, universities of Zacatecas and Puebla. Venue IMTA, Jiutepec, Morelos, 07-09 November, 2013. Mexico

Group Photo of the Members of the National Colloquium: Groundwater in Mexico.

Course "Groundwater Flow Systems Definition: Natural Manifestations and Controls", 12-24 April, 2014. China University of Geosciences (Beijing). China



Participants to the 12-24 April Course on Groundwater Flow Systems, CUG, Beijing.

- **Short Courses in China**

Lectures on Training for 1:50, 000 hydrogeological survey, organized by China Geological Survey, April 2014
Zhang Renquan: Some ideas and suggestions on Regional hydrogeological survey.
Liang Xing: Groundwater flow system and case studies.

viii) Introduction of RGF concept and its consequences at early levels of education, for decision makers and general public

- Media stage: by Prof. J.J. Carrillo Rivera, Institute of Geography, UNAM, Mexico

"Distribution and use of water in the world", (in Spanish) TV-project *Water: an unlimited natural source*. Programa Mirador Universitario and Edusat, with Instituto de Ecología y Coordinación Universidad Abierta y Educación a Distancia de la UNAM. 3 June, 2014. Mexico

"Water for everybody and forever: Management for sustainable water use in México", *Water: an unlimited natural source*. Programa Mirador Universitario and Edusat, with Instituto de Ecología y Coordinación Universidad Abierta y Educación a Distancia de la UNAM, 10 June, 2014. Mexico.

- Media stage: by Dr. Brian Smerdon

The 20 minute news program focused on Australia's Great Artesian Basin.

"Hidden Treasure" (Australian TV program ABC Landline, 2013): Dr. Smerdon was interviewed to discuss the groundwater conditions of Great Artesian Basin.

http://www.abc.net.au/landline/content/2013/s3882758.htm

ix) Transfer of knowledge of theoretical and practical aspects of RGF to other IAH Commissions and Networks and to IAH National Chapters

- The Hungarian National Chapter of the IAH organized a conference entitled: IAH Central European Groundwater Conference 2013, Geothermal Applications and Specialties in Groundwater Flow and Resources, May 8-10, 2013 Mórahalom, Hungary. Prof. Joe Tóth and Judit Mádl-Szőnyi as keynote speakers involved the concept of regional groundwater flow for their presentations.
- The RGFC and Karst Commission of IAH together with the Karst Hydrogeology and Speleogenesis Commission of the International Union of Speleology (UIS) organized a Joint Session during the "International Symposium on Hierarchical Flow Systems in Karst Regions", Budapest, Hungary, in September, 2013. During the Meeting the potential scientific, educational and research cooperation were discussed.

Joint Meeting of Karst and Regional Groundwater Flow Commission of IAH and Speleogenesis Commission of the International Union of Speleology (UIS) (Menggui Jin, Neven Kresic, Nico Goldscheider, Alexander Klimchouk)

x) Creation of a Liaison Committee to communicate/collaborate with other IAH Commissions and organizations at the national and international levels.

The Board of Regional Groundwater Flow Commission formulated an opinion about the education related to IAH. This suggestion was sent to the IAH Council on 22 May, 2014. These views are in good agreement with the proposed plan of the RGFC accepted by the IAH Executive.

1) The importance of regional groundwater flow systems in education

The basic mission of the Regional Groundwater Flow Commission is internationally to foster not only the research and practical application but also the *education in regional groundwater flow systems*. It is undoubted that this theory is *the core concept of modern hydrogeology*. Understanding of the operation of basin-scale groundwater flow systems gives the base to such disciplines as regional water resource assessment, land use planning and management, groundwater related ecosystems, geotechnics, geothermics, mineral exploration, petroleum exploration (conventional-unconventional), landscape architecture, environment protection, soil and groundwater salinization and amelioration, forestry and agriculture, urban environment, quality control of extracted water, etc. Recognition and use of the flow system theory can give a comprehensive broad view and comprehensive approach to handle all groundwater related issues.

Therefore *education is the way where we can encourage most efficiently the understanding on groundwater flow systems*. The main target group is Early Career Hydrogeologists but education on the basic level and directly to society are also important to help in understanding and solve groundwater related environmental issues.

2) The steps done by the RGFC toward disseminate of information about related issues in the IAH and in the society

The RGFC has informed the IAH members about courses worldwide (Budapest REGFLOW, Mexico, Colombia, etc.) and availability of additional teaching materials related to regional groundwater flow: http://regionalgwflow.iah.org/education.html.

The members of the IAH RGFC have designed teaching materials on regional groundwater flow systems which could be used via internet; a sharing mechanism is somehow highly needed. It was found that the homepage of the Commission is not effective enough to disseminate desired information. (There are problems with video downloading directly from the homepage).

The RGFC-IAH with cooperation of ELTE Hungary made an electronic catalogue of the valuable reprint collection of József Tóth, "father of the Flow System Theory". The collection can be reached from Eötvös Loránd University, Budapest, Hungary but it can be also shared with the large scientific community.

3) The future plans of RGFC related to this issue.
It is important to use new techniques to achieve this educational goal regarding regional groundwater flow systems understanding such as:

- Pedagogic Peer-reviewed electronic education and video materials.
- We prefer to use YouTube to share videos between IAH members.
- The involvement of social media is also highly required.
- Organizing webinars is also a good opportunity.
- It is planned to collect a list of experts and university professors who can teach the regional groundwater theory and practice on different levels.
- IAH thematic papers in regional groundwater flow theory and its application is also promoted.
- We also intend to publish the Bibliography of regional groundwater flow studies and theses.
- Official UNESCO and other similar international institutions acknowledgement should be encouraged.

xi) Promotion of the environmental and economic importance of the concept of RGF at the UN and National governments

Joel Carrillo-Rivera and the member of Parliament of Saudi Arabia Kingdom, Dr Sultan Hasan AlSultan elaborate a programme to encourage the teaching of Groundwater Flow Systems at all levels of society in the country.

Judit Mádl-Szőnyi attended the Scientific Pre-Congress of the 2013 Budapest Water Summit which was held in Budapest, Hungary, October, 2013. (http://budapestwatersummit.hu/) (Partners are World Water Council, UNESCO, Hungarian Government, Hungarian Academy of Sciences).

xii) To communicate the "Activities and Tasks" of the Committee on the website of the RGF Commission (within the IAH website)

RGFC Internet Homepage launched http://regionalgwflow.iah.org/index.html. Dr. Anita Erőss is responsible for the continuous communication.

Scientific activities under the aegis of RGFC in the form of individuals or research groups

a) Scientific activities of Joe Tóth (University of Alberta, Edmonton, Canada)

- **Geothermal phenomena in the context of gravity-driven basinal flow of groundwater.** ELTE, May 2 Budapest, Hungary. (1 hour; Abstract + Selected Reference)
- **A common cause of co-location between HC-fields and geothermal anomalies: groundwater flow**. European Geothermal PhD Day, May 5-7, 2013, Szeged, Hungary. (25 minutes; Abstract + Selected References)
- **Geothermal phenomena in the context of gravity-driven basinal flow of groundwater.** Plenary keynote. IAH Central European Conference 2013, Geothermal Applications, Specialties in Groundwater Flow and Resources, Mórahalom, May 8-10, 2013, Hungary. (30 minutes; Abstract + Selected References)
- **Groundwater flow sytems and modern hydrogeology: the story of a half cetury.** China University of Geosciences, Beijing, June 18, 2013, Beijing, China. (1 hour; Abstract + Selected References)
- **Groundwater flow sytems and modern hydrogeology: the story of a half cetury**. *International Symposium on Regional Groundwater Flow Systems: Theory, Applications and Future Development*, June 22-23, 2013, Xi'an, China. *(1 hour; Abstract + Selected References)*
- **Groundwater Flow Systems: Analysis, Characterization and Agency in Karst Genesis**. China University of Geosciences, Wuhan, June 30, 2013, Beijing, China.
- **Regional Groundwater Flow and Karst Terrains, (Short Course: "REGFLOW")**
  Session 1: The Theory of Regional Groundwater Flow: History, Hydraulics, Consequences;
  Session 2: Groundwater Flow Systems: Analysis, Characterization and Agency in Karst genesis. "International Short Course on Regional Groundwater Flow (REGFLOW) and Karst Hydrogeology (MANKARST)", September 2-3, 2013, Budapest, Hungary. (2x90 minutes; Abstract + Selected References compiled)

- ***The place and era of the birth of the Regional Groundwater Flow Theory****. International Symposium on Hierarchical Flow Systems in Karst Regions. September 4-7, 2013 Budapest, Hungary. (30 minutes Abstract)*
- **Some Memorable Events in 50 years of Chasing Groundwater Flow-Systems,** Wrap up talk. *International Symposium on Hierarchical Flow Systems in Karst Regions*. September 4-7, 2013 Budapest, Hungary. *(30 minutes; Talk PPT is done)*

b) Scientific activities of Hydrogeology and Geothermal Group, Eötvös Loránd University, Budapest (Group members: Judit Mádl-Szőnyi, Anita Erőss, Szilvia Simon, Brigitta Czauner, Eszter Pulay, Timea Havril, Ferenc Zsemle)

Conference presentations**:**

- Ágnes Freiler, Ákos Horváth, Judit Mádl-Szőnyi, Anita Erőss, Orsolya Győri, Heinz Surbeck, Jenő Gubicza – Comparison of radioactivity of biofilm and thermal water, Buda Thermal Karst, Hungary. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, 2013. 201 p.
- Anita Erőss, Judit Mádl-Szőnyi, Andrea Mindszenty, Szabolcs Leél-Őssy – Hydrogeological characterisation of the Gellért Hill and Rózsadomb area: Introduction to the field trip in the Buda Thermal Karst area. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, 2013. 201 p.
- Anita Erőss, Judit Mádl-Szőnyi, Ákos Horváth, Nico Goldscheider – Radionuclides as natural tracers for identification of mixing of thermal waters. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, 2013. 201 p.
- Anita Erőss, Judit Mádl-Szőnyi – Hydrogeology of the Buda Thermal Karst (Hungary) - new models for the discharge zone. In: Bojan Otonicar, Petra Gostincar, Franci Gabrovsek (ed.). 21th International Karstological School "Classical Karst": Hypogene Speleogenesis (between theory and reality...) Guide Book & Abstracts.
- Büki G, Anda D, Makk J, Erőss A, Mádl-Szőnyi J, Márialigeti K, Borsodi A K – Phylogenetic diversity of the bacterial communities constituting the biofilms of Török hydrothermal spring cave of the Buda Thermal Karst System. In: Abstracts of the 4th Central European Forum for Microbiology. Acta Microbiologica et Immunologica Hungarica, 60 (suppl.). Keszthely, Hungary, 2013.10.16-2013.08.18. p. 123.
- Büki G, Anda D, Makk J, Erőss A, Mádl-Szőnyi J, Márialigeti K, Borsodi A K – Characterization of bacterial diversity and community structure of microbial mats found in Török hydrothermal spring cave of the Buda Thermal Karst System. In: Power of Microbes in Industry and Environment. Primošten, Croatia, 2013.10.09-2013.10.12.2013.
- Erőss A, Mádl-Szőnyi J, Horváth Á – Radionuclides as mixing indicators of thermal waters. In: Szőcs T, Fórizs I (ed.). Proceedings of the IAH Central European Groundwater Conference 2013. Mórahalom, Hungary, 2013.05.08-2013.05.10. pp. 38-39.
- Erőss A, Zsemle F, Pataki L, Csordás J, Zsuppán K, Pulay E – Heat potential evaluation of effluent and used thermal waters in Budapest, Hungary. In: Szőcs T, Fórizs I (ed.) Proceedings of the IAH Central European Groundwater Conference 2013. Mórahalom, Hungary, 2013.05.08-2013.05.10. pp. 98-99.
- Gabriella Büki, Dóra Anda, Judit Makk, Anita Erőss, Judit Mádl-Szőnyi, Károly Márialigeti, Andrea K Borsodi – Bacterial diversity and community structure of biofilm and discharging thermal water found in spring caves of the Buda Thermal Karst System. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.). International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 58.
- Győri Orsolya, Mindszenty Andrea, Orbán Richárd, Fodor László, Erőss Anita, Poros Zsófia, Benkó Zsolt, Molnár Ferenc – Mádlné Szőnyi Judit, Erőss Anita, Tóth Ádám (ed.)
  Epigene karst system below a regional bauxitic unconformity – Origin of the enigmatic red calcite of the Transdanubian Range (TR), Hungary. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.). International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest: ELTE, 2013. p. 77.
- Ildikó Erhardt, Viktória Ötvös, Anita Erőss, Brigitta Czauner, Szilvia Simon, Judit Mádl-Szőnyi – Hydraulic processing of Buda Thermal Karst, Budapest, Hungary. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty,

Ádám Tóth (ed.). International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest: ELTE, 2013. p. 63.

- Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) – International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013, 201 p. (ISBN:978-963-284-369-8)
- Judit Mádl-Szőnyi, Anita Erőss – Thermal springs and hypogenic karstification processes in flow system context. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.). International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest: ELTE, 2013. p. 105.
- Judit Mádl-Szőnyi, Anita Erőss – Discharge features of Hypogene karsts in Flow system context. China University of Geosciences, CUG, Wuhan, China 19 June, 2013 Wuhan, China (invited presentation) (2013)
- Kuzmann E, Homonnay Z, Kovács K, Zsabka P, Mádl-Szőnyi J, Erőss A – Mössbauer study of biofilms formed at spring caves of Buda Karst, Hungary. In: Svetozar Music, Mira Ristic (ed.). International Conference on the Applications of Mössbauer Effect (ICAME 2013), Book of Abstracts. *p. 235.*
- Makk J, Erőss A, Havancsák K, Mádl-Szőnyi J, Büki G, Homonnay Z, Kuzmann E, Márialigeti K, Borsodi A K – Geochemical and structural study of iron-rich biofilms of the Rudas-Török spring cave (Gellért Hill, Budapest). In: Power of Microbes in Industry and Environment. Primošten, Croatia, 2013.10.09-2013.10.12.
- Ötvös V, Erhardt I, Czauner B, Erőss A, Simon Sz, Mádl-Szőnyi J – Hydraulic evaluation of the flow system of Buda Thermal karst, Budapest, Hungary. In: Szőcs T, Fórizs I (ed.) Proceedings of the IAH Central European Groundwater Conference 2013. Mórahalom, Hungary, 2013.05.08-2013.05.10. pp. 135-136.
- Szilvia Simon, Ádám Martinecz, Brigitta Czauner, Anita Erőss, Judit Mádl-Szőnyi – Scale effect in hydrostratigraphic classification in siliciclastic and carbonate environment. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 131.)
- Zoltán Sávoly, Péter Dobosy, Katalin Barkács, Anita Erőss, Ernő Kuzmann, Zoltán Homonnay, Judit Mádl-Szőnyi, Gyula Záray – Chemical characterization of biofilms formed in hypogene spring caves of Budapest. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 128
- Ádám Tóth, Tímea Havril, Judit Mádl-Szőnyi, Szilvia Simon, Imre Müller, Attila Galsa, Fernando A Monteiro dos Santos – Groundwater flow pattern in a complex volcanic, carbonate and siliciclastic environment, Tihany Peninsula, Hungary. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 134.
- Ildikó Erhardt, Viktória Ötvös, Anita Erőss, Brigitta Czauner, Szilvia Simon, Judit Mádl-Szőnyi – Hydraulic processing of Buda Thermal Karst, Budapest, Hungary. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 63.
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- Tímea Havril, Ádám Tóth, Judit Mádl-Szőnyi, Szilvia Simon, Imre Müller, John Molson – Understanding the hydraulic position of paleo-maar lakes in groundwater flow systems, Tihany Peninsula, Hungary. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 80.
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- Á Tóth, T Havril, J Mádl-Szőnyi, Sz Simon, I Müller, A Galsa, F A Monteiro dos Santos – The importance of electromagnetic methods to build numerical groundwater flow model for an area with complex geology in the case of Tihany Peninsula. In: Gabriella B Kiss (ed.) Acta Mineralogica-Petrographica, Abstract Series 8: 5th International Students Geological Conference. Budapest, Hungary, 2014.04.24-2014.04.27. p. 126.
- Á Tóth, J Mádl-Szőnyi, J Kovács, G Hornyák – Relationship between springs, structures and hydrostratigraphy in different scales on the example of Transdanubian Range, Hungary. In: N Kukurić, Z Stevanović, N Krešić (ed.) International Conference and Field Seminar "Karst Without Boundaries" (2014; Trebinje, Dubrovnik): Proceedings / International Conference and Field Seminar "Karst Without Boundaries", 11-15 June 2014, 431 p.
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- Mádl-Szőnyi J, Virág M, Zsemle F – Hydrogeological establishment of the installation of water based Geothermal Heat Pump Systems in Budapest, Hungary. In: Szőcs T, Fórizs I (ed.) Proceedings of the IAH Central European Groundwater Conference 2013. Mórahalom, Hungary, 2013.05.08-2013.05.10. p. 126.
- Havril Tímea, Tóth Ádám – Tihanyi maar-tavak - kapcsolatban a felszín alatt? [In Hungarian]. In: XVIII. Bolyai Konferencia. Budapest, Hungary, 2013.03.23-2013.03.24. p. 32.
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- Brigitta Czauner, Judit Mádl-Szőnyi – Hydraulic behaviour of low-permeability formations in regional context. In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 60.
- Judit Mádl-Szőnyi – Geothermal potential of Hungary: what can we learn from the flow-system approiach? In: Szőcs T, Fórizs I (ed.) Proceedings of the IAH Central European Groundwater Conference 2013. Mórahalom, Hungary, 2013.05.08-2013.05.10. *pp. 17*-18.
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- Magdolna Virág, Andrea Mindszenty, Zsolt Bendő, Tamás Weidinger, Mihály Molnár, Kinga Páll-Somogyi, Judit Mádl-Szőnyi, Viktória Veres – Anthropogenically modulated hydrological changes recorded by a ~120 years old flowstone-like travertine (Rudas Spa, Budapest, Hungary) In: Judit Mádl-Szőnyi, Anita Erőss, Andrea Mindszenty, Ádám Tóth (ed.) International Symposium on Hierarchical Flow Systems in Karst Regions: In honour of Professor József Tóth in celebration of his 80th birthday. Budapest, Hungary, 2013.09.04-2013.09.07. p. 139.
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- Anita Erőss, Heinz Surbeck, Judit Mádl-Szőnyi, Katalin Csondor, Ákos Horváth, László Lénárt – Characterisation of karst waters by radionuclides in the Bükk Karst Region, Hungary. In: N. Kukuric, Z. Stevanovic, N Kresic (ed.) International Conference and Field Seminar "Karst Without Boundaries" (2014; Trebinje, Dubrovnik): Proceedings/ International Conference and Field Seminar "Karst Without Boundaries", 11-15 June 2014, Trebinje (Bosnia & Herzegovina), Dubrovnik (Croatia). p. 188.
- Judit Mádl-Szőnyi – Deep carbonate systems in regional groundwater flow context, theoretical and practical consequences. In: In: N. Kukuric, Z. Stevanovic, N Kresic (ed.) International Conference and Field Seminar "Karst Without Boundaries" (2014; Trebinje, Dubrovnik): Proceedings/ International Conference and Field Seminar "Karst Without Boundaries", 11-15 June 2014, Trebinje (Bosnia & Herzegovina), Dubrovnik (Croatia). p. 79
- Judit Mádl-Szőnyi – Effects of regional groundwater flow on deep carbonate systems:focusing on discharge zones. In: Xiao-Wei Jiang (ed.) Proceedings of the International Symposium on Regional Groundwater Flow: Theory, Applications and Future Development. Xian, China, 2013.06.21-2013.06.23. pp. 71-75.

Papers:

- Kuzmann E, Homonnay Z, Kovács K, Zsabka P Erőss A, Mádl-Szőnyi J – Mössbauer study of biofilms formed at spring caves of Buda Karst, Hungary. HYPERFINE INTERACTIONS: pp. 1-7. (2013)
- Mádlné Szőnyi Judit, Simon Szilvia, Tóth József – Hydrodynamic Interaction between Gravity-Driven and Over-pressured Groundwater Flow and its Consequences on Soil and Wetland Salinization. In: Luís Riberio, Tibor Y. Stigter, António Chambel, M. Teresa Condesso de Melo, José Paulo Monteiro, Albino Medeiros (ed.) Groundwater and Ecosystems: International Association of Hydrogeologists Selected Papers 18. London: CRC Press, Taylor and Francis Group, 2013. pp. 267-280.
- Pauline Rousseau-Gueutin, Simon Szilvia, Andrew J Love, Vincent Post, Camille Doublet, Craig T Simmons, Daniel Wohling, Simon Fulton – Groundwater flow and hydrodynamics. In: Andrew J Love, Daniel Wohling, Simon Fulton, Pauline Rousseau-Gueutin, Samantha De Ritter (ed.) Allocating Water and Maintaining Springs in the Great Artesian Basin: Volume II: Groundwater Recharge, Hydrodynamics and Hydrochemistry of the Western Great Artesian Basin. Canberra: National Water Commission of Australia, 2013. pp. 121-167.
- Brigitta Czauner, Judit Mádl-Szőnyi – Regional hydraulic behaviour of structural zones and sedimentological heterogeneities in an overpressured sedimentary basin. Marine and Petroleum Geology 48: pp. 260-274. (2013).

Research projects:

- Hungarian Research Foundation (OTKA) (101356)
  Project manager: J Mádl-Szőnyi, Associate Professor of Hydrogeology
  Duration of the project: 03. 2012 - 02. 2016
  Abstract: Hypogenic karst systems are in the focus of research interest in the last decades. The Buda Thermal Karst system is an active hypogenic karst area where fluids with their dynamics, effects and products can be studied directly. Hypogenic karst development and its manifestations caused by flowing groundwater will be interpreted in flow system context. The proposed comprehensive study will provide an overview about the controlling factors of hypogenic processes and will enhance our knowledge on microbially mediated speleogenesis. Generalization of the results may be applicable in similar settings worldwide.

c) Scientific activities of UNAM, Mexico under the aegis of RGFC in 2012 (Group Leader: Prof. J Joel Carrillo Rivera)

Conference presentations:

Modern Hydrogeology (in Spanish)
Invited lecture (1.5 hrs) for the 2013-NGWA Summit meeting, San Antonio, Texas, USA, 30th April 2013, Hyatt Regency. USA

Integrative approach for studying water sources and their vulnerability to climate change in semi-arid regions (**Drâa Basin, Morocco**)
International Conference on Water Resources in Arid Environments.
JJ Carrillo-Rivera, S Ouysse, GJ Hernández-Garcia.
Riyadh, ,6-9 January.*2013.* Saudi Arabia

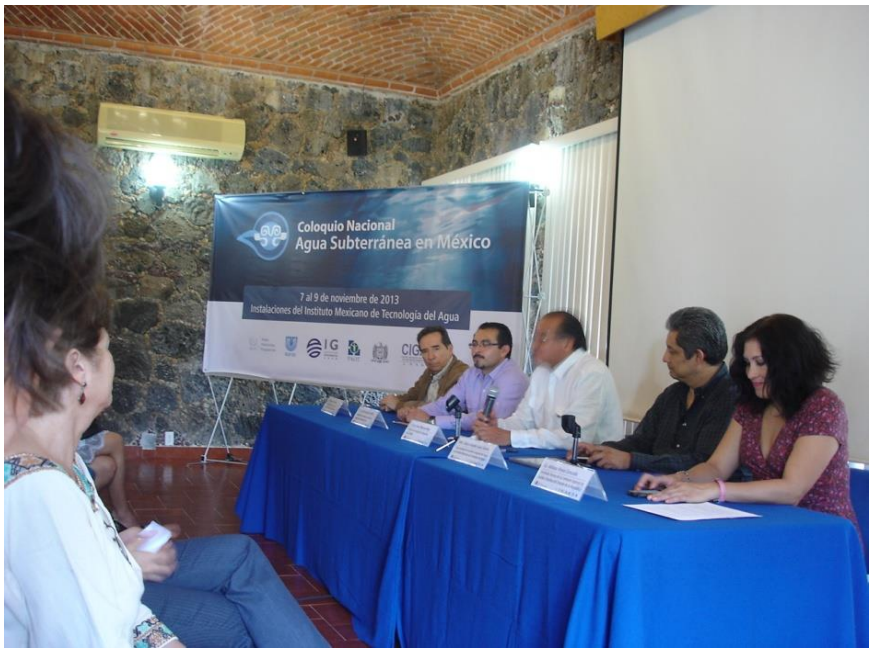
Regional Groundwater flow boundary conditions and their implications in water management control.
The International Symposium on Regional Groundwater Flow: Theory, Applications and Future Development.
Xi'an, 21-23 June, 2013. China

Surface and groundwater basins: ¿do they coincide? Some political, economic and management implications *in water for Mexico*. (in Spanish)
Institute Economy Research, UNAM.
CU, DF, 20 & 21 February, 2013. Mexico

Is groundwater functioning in the Mexico Basin independent? Systemic environmental answer. (in Spanish)
Centre of Atmospheric Sciences and the Colegio Nacional.
Institute of Geophysics, UNAM, 5 April, 2013. Mexico

Importance of the interaction among groundwater flow systems and other components of the environment.
Centre for Biology Research and Conservation (in Spanish)
Autonomous University of the State of Morelos. 26 April, 2013. Mexico

Groundwater in preserving natural heritage (in Spanish)
Postgraduate Programme in Architecture
National Autonomous University of Mexico, 27 April. 2014. Mexico



Closing ceremony, National Colloquium Groundwater (Lic. Adriana Rivera Cerecedo, Technical Secretary Climate Change Commission, Senate of the Republic; Ing. Marco Antonio Salas Salinas, Sub-coordinator Integrate water management, IMTA, CONAGUA. Dr. Omar Moncada Maya, Director Institute of Geography, UNAM; Lic. Luis Javier Aguilar Montiel, Director of Studies of Environmental Protection (PAOT); Ing. Rubén Chávez Guillén, Manager of Groundwater, CONAGUA.

Conflicts for groundwater: the case of the Mexico basin. (in Spanish)
70 year anniversary of the Institute of Geography, UNAM
National Autonomous University of Mexico. 31 October, 2013. Mexico

Groundwater information and negative environmental responses in México (in Spanish)**.**
National Colloquium on groundwater in México.
IMTA, Jiutepec, Morelos. 7-9 November, 2013. Mexico

Groundwater and its flow systems. (in Spanish)
Use and appropriation of surface and groundwater: spaces of tension and conflict. (Round Table)
Faculty of Philosophy and Literature, UNAM. 11 June, 2014. Mexico

Papers

- Marchetti, ZY y Carrillo-Rivera, JJ. 2013. Tracing groundwater discharge in the floodplain of the Parana River, Argentina; implications for its biological communities. River Research and Applications. published online: 4 Jan 2013; DOI:10.1002/rra.2629
- Peñuela-Arévalo LA y Carrillo-Rivera JJ, 2013. Discharge areas as a useful tool for understanding recharge areas, study case: Mexico. Environmental Earth Science, V. 68 (4), p. 999 – 1013, Febrero; DOI 10.1007/s12665-012-1803-z
- Carrillo-Rivera, JJ. S. Ouysse y GJ Hernández-Garcia. 2013. Integrative Approach for Studying Water Sources and Their Vulnerability to Climate Change in Semi-Arid Regions: Drâa Basin, Morocco. International Journal of Water Resources and Arid Environments 3(1): 26-36, 2013 ISSN 2079-7079.
- Maderey Rascón, LE; Jimenez A; Carrillo-Rivera, JJ. 2013. Global Climate Change And Its Effect on Hydrological Resources of Mexico's Central Region. Scientific Annals of "Alexandru Ioan Cuza" IASI University, Geography Series. Vol 59, No 1 (2013) (online Version): ISSN: 1223-5334; eISSN: 2284-6379. Romania.
- Liliana A Peñuela-Arévalo y J Joel Carrillo-Rivera. 2013. Definición de zonas de recarga y descarga de agua subterránea a partir de indicadores superficiales, centro-sur de la Mesa Central, México. ISSN 0188-4611 Revista Investigaciones Geográficas. Num 81, pp18-32.
- Fagundo-Castillo, JR; M Alconada-Magliano; JJ Carrillo-Rivera y P González-Hernández, 2013. Caracterizacion de los flujos de agua subterránea a partir de su salinidad. Tecnología y Ciencias del Agua, México. Aceptado para publicación septiembre 02, 2013.
- Carrillo-Rivera JJ y S Ouysse, 2013. Evaluation of Groundwater flow system functioning in Mexico to reduce drought impacts. Selected papers of the International Drought Symposium: Integrating Science and Policy. California University at Riverside, California USA. Published in "Drought in Arid and Semi-arid Regions: A Multi-Disciplinary and Cross-Country Perspective". ISBN 978-94-007-6635-8, eBook ISBN 978-94-007-6636-5, pp 269-280, Springer, 2013
- Carrillo-Rivera J., Ouysse S. 2013. Groundwater Salinity Due to Urban Growth. In: Meyers R.(Ed.) Encyclopedia of Sustainability Science and Technology: Springer Reference (www.springerreference.com). Springer-Verlag Berlin Heidelberg, DOI: 10.1007/SpringerReference_308737 2013-02-27 18:24:08 UTC
- Ortega-Guerrero M., Carrillo-Rivera JJ. 2013. Land Subsidence in Urban Environment. In: Meyers R. (Ed.) Encyclopedia of Sustainability Science and Technology: Springer Reference (www.springerreference.com). Springer-Verlag Berlin Heidelberg. DOI: 10.1007/SpringerReference_310764 2013-02-27 18:45:37 UTC

Posters:

Groundwater flow systems manifestation in the Middle Drâa sub-basin (Morocco). Symposium on Hyerarchical Flow Systems in Karst Regions. 4-7 September, 2013, Budapest, Hungria. (Samira Ouysse, Miguel Ramirez Beltrán y JJ Carrillo-Rivera, JJ). Hungary

Functioning of gravitational groundwater flow systems in Mesa Central Mexico. Symposium on Hyerarchical Flow Systems in Karst Regions. 4-7 September, 2013, Budapest, Hungria. (L. Peñuela-Arévalo y JJ Carrillo-Rivera, JJ). Hungary

Could groundwater discharge contribute to the regional differentiation of vegetation in the Parana River fluvial system? Symposium on Hyerarchical Flow Systems in Karst Regions. 4-7 September 2013, Budapest, Hungary. (Zuleica Marchetti y JJ Carrillo-Rivera, JJ). Hungary

Consideration of scale effect in the evaluation of pumping tests for carbonate aquifers based on analytical and numerical solutions. Symposium on Hyerarchical Flow Systems in Karst Regions. 4-7 September 2013, Budapest, Hungary. (Garamhegyi T. Mádl-Szőnyi J, Carrillo-Rivera JJ. Hungary

Source of flooding identification by the application of the flow system theory: the Dammam, Saudi Arabia. Symposium on Hyerarchical Flow Systems in Karst Regions. 4-7 September, 2013, Budapest, Hungary. (Sultan AlSultan y JJ Carrillo-Rivera, JJ) Hungary

(Honours) Doctors Dissertation

Liliana Peñuela Arévalo (MSc)

"Groundwater Flow Systems Characterization in the Central-Southern Mesa Central, Mexico" (in Spanish). Ph D in Geography, Faculty of Philosophy and Literature, Postgraduate Programme in Geography (Institute of Geography), UNAM. Graduated with Honours 09 de April, 2013 (Tutor, JJ Carrillo-Rivera)

Research projects:

- Organismo Internacional de Energía Atómica, Viena, Austria.
  Project Manager: JJ Carrillo Rivera, Researcher Institute of Geography, UNAM
  Duration of Project November 2012 to September 2015
  Name. "*Isotopic approaches in defining regional recharge-discharge processes related to groundwater quality and flow patterns response in a catchment subject to intensive extraction: San Luis Potosí-City, Mexico*". Vienna, Austria. Research Contract no 17478.

d) Scientific activities of China University of Geosciences-Wuhan under the aegis of RGFC in 2012 (Group members: Menggui Jin, Xing Liang, Renquan Zhang, Sun Ronglin, Li Jing, Niu Hong)

Publications:

Liang X, Quan DJ, Jin MG, Liu Y, Zhang RQ. 2013. Numerical simulation of groundwater flow patterns using flux as upper boundary. Hydrological Processes. 27, 3475–3483 DOI: 10.1002/hyp.9477.

Zhang RQ, Liang X, Jin. 2013. The evolution of groundwater flow systems in the Quaternary of Hebei Plain since the Last Glacial Maximum. Earth Science Frontiers, 20(3): 217-226. (in Chinese with English abstract)

Conference presentation

Zhang RQ, Tóthian Theory is the Paradigm of Modern Hydrogeology. International Symposium on Hierarchical Flow Systems in Karst Regions. Budapest, Hungary. Sept 4-7, 2013.

Jin MG, Soil water flow system and its applications in agricultural water management. International Symposium on Regional Groundwater Flow: Theory, Applications and Future Development, Xi'an, China. June 22-23, 2013.

Zhang RQ, Jin MG,Reconstruction of multi-stage groundwater flow systems in Hebei Plain, China. International Symposium on Hierarchical Flow Systems in Karst Regions. Budapest, Hungary. Sept 4-7, 2013.

Li XW, Jin MG. Soil water flow system of mulched drip irrigation with brackish water. The 40th IAH International Congress, Perth, Australia. Sept, 15-20, 2013.

Jin MG. The influence of continual decline of water table to groundwater recharge in the North China Plain. Annual Meeting of IAH China 2013, Chengdu, October 11-12, 2013

Master Dissertation

Niu Hong, Comparison of numerical modeling of groundwater flow system using given head and flux upper boundary. Master dissertation, China University of Geosciences, May 2013. (in Chinese with English abstract)

Jia Baojie, Hierarchical Model of Groundwater Flow Systems on Typical Section from North Slope of Tai Mountains to Qiguang Fault, China. Master dissertation, China University of Geosciences, May 2014. (in Chinese with English abstract)

Conference presentations:

Liang X. Groundwater flow patterns and their transformation and dominant factors. National conference on strategies of hydrogeology in China, Xiamen, China, May 9-12, 2012.

Liang X., Jin MG. Comparison of given head and flux upper boundary in numerical simulation of groundwater flow patterns. September 16-21, 2012. IAH 2012 Congress, Niagara Falls, Canada

Jin MG. Groundwater Governance in the Zhengzhou Region. "Groundwater Governance: A Global Framework for Action" Fourth Regional Consultation: Asia and Pacific Region. 3–5 Dec. 2012, Shijiazhuang, China.

Papers:

Liang X, Niu H, Zhang RQ, Liu Y, Jin MG. 2012. Basinal groundwater flow patterns and their transformation and dominant factors. Earth Science. 37(2): 269-275. (In Chinese with English abstract).

Liang X, Quan DJ, Jin MG, Liu Y, Zhang RQ. 2012. Numerical simulation of groundwater flow patterns using flux as upper boundary. Hydrological processes. (wileyonlinelibrary. com, August 2, 2012) DOI: 10.1002/hyp.9477.

Liang X, Zhang RQ, Jin MG, Niu H, Sun RL. 2012. Development of the theory and research method of groundwater flow system. Geological Science and Technology Information. 31(5): 143-151. (In Chinese with English abstract).

Zhang Renquan, Liang Xing, Jin Menggui. 2013. The evolution of groundwater flow systems in the Quaternary of Hebei Plain since the Last Glacial Maximum. Earth Science Frontiers. Vol. 20,1-10. (In Chinese with English abstract) http://www.cnki.net/kcms/detail/11.3370.P.20130329. 1717.001. html .

Research projects:

Application guide of the theory and method on groundwater flow system. Funded by China Geological Survey (No. 12120733908). Project manager: Xing Liang. Duration of the project: 2008-2012. The project will summarize the theory and method of groundwater flow system and focus on their application. The application procedures will be compiled and representative case studies will be provided for different geological conditions such as the areas of karst, fractured medium and unconsolidated materials.

Coordinate regulation mechanism of water, salinity and trace elements in a cotton field with film mulched drip irrigation using brackish water. Funded by National Natural Science Foundation of China (41172218). Project manager: Menggui Jin. Duration of the project: 2012-2015. This project will investigate the patterns of soil water flow system in cotton field with mulched drip irrigation using brackish water and their effects on water flow, distribution and consumption of nutrients, salt transport and accumulation, and so on. The study will find proper controlling modes on water, salt and nutrient for mulched drip irrigation with saline water for the purpose of more efficient use of water and nutrients. The results will be of significance for spreading saline water irrigation and prevention and cure of soil salinization in arid areas.

e) Scientific activities of China University of Geosciences-Beijing under the aegis of RGFC in 2012 (Group members: Xiao-Wei Jiang, Li Wan, Xu-Sheng Wang, Ran An)

Papers:

Jiang XW*, Wan L, Wang JZ, Yin BX, Fu WX, Lin CH. 2014. Field identification of groundwater flow systems and hydraulic traps in drainage basins using a geophysical method. Geophysical Research Letters, 41(8): 2812-2819, DOI: 10.1002/2014GL059579. (Published April 2014,)

Books:

Jiang XW, Wan L, Wang XS. Advances in the Theory of Regional Groundwater Flow. Geological Publishing House, Beijing. (In Chinese)

Presentations:

Jiang XW. Recent Advances in the Theory of Regional Groundwater Flow. *International Symposium on Regional Groundwater Flow: Theory, Applications and Future Development*, Xi'An, China, June 22~23, 2013.

Jiang XW. Theoretical and field studies on hydraulics and chemistry of groundwater around stagnation points in nested flow systems. *International Symposium on Hierarchical Flow Systems in Karst Regions,* Budapest, Hungary, September 2~7, 2013.

Wang JZ. An analytical study on stagnation points in drainage basins with injection/pumping wells. *International Symposium on Hierarchical Flow Systems in Karst Regions,* Budapest, Hungary, September 2~7, 2013.

Jiang XW. Field identification of groundwater flow systems and stagnant zones in basins using geophysical methods. AGU Fall Meeting, San Francisco, USA, December 9~13, 2013.

Master thesis:
Han HF. A Study on Groundwater Flow Systems in the Wudunao Watershed. Master thesis, China University of Geosciences, Beijing.

Honors:
Jiang XW's PhD dissertation "A study on aquifer systems and groundwater flow systems in drainage basins" was selected to be one of the 100 "National excellent doctoral dissertations of China" in the year 2013.
Wang JZ won the ECH Award of IAH at the *International Symposium on Hierarchical Flow Systems in Karst Regions,* Budapest, Hungary, September 2~7, 2013

Budapest, Hungary
2014 July

Judit Mádl-Szőnyi, Chair,
and
József Tóth, Lifetime Honorary-Chair

Regional Groundwater Flow Commission
International Association of Hydrogeologists