

REGIONAL GROUNDWATER FLOW COMMISSION

ANNUAL PROGRESS REPORT (November 2011 — April 2012)

INTRODUCTION

The idea of, and the initiative to create, a Regional Groundwater Flow Commission (RGFC) under the aegis of the International Association of Hydrogeologists (IAH) were due Dr. Judit Mádl-Szőnyi, Associate Professor of Hydrogeology, Eötvös Loránd University, Budapest, Hungary, and Dr. Joel Carrillo-Rivera, Professor of Hydrogeology, Universidad Nacional Autónoma de México, Mexico City, México, at IAH's 38th Annual Congress in Krakow, Poland, in September 2010. The application to create the Commission was submitted to the Council of IAH on July 7 2011 under the signatures of József Tóth, Chair (Canada), Judit Mádl-Szőnyi, Co-Chair-1 (Hungary), Mengui Jin, Co-Chair-2 (China) and José Joel Carrillo-Rivera, Co-Chair-3 (Mexico), as members of the Commission's interim Board of Officers. The application was approved by IAH Council in November 2012.

The basic objective proposed by the interim Board of officers and approved by IAH Council 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 proposed "*Activities or Tasks*" are:

- i) Special "Business and Mixer Meeting" for the "Friends of Regional Groundwater Flow", to be held in conjunction with the "International IAH Congress Niagara Falls, Canada, 2012, September 16-21.
- ii) Election of the *continuing* Board of Officers.
- iii) Global inventory of individual and institutional expertise on the subject of regional groundwater-flow;
- iv) Stand-alone Specialist Meetings/Symposia.
- v) Collection and reprinting of published case studies and case histories.
- vi) Publishing annotated abstracts/summaries/reviews of theories, case histories, case studies.
- vii) Short courses.
- viii) Introduction of RGF concept and its consequences at early levels of education, for decision makers and the public.
- ix) Transfer of knowledge of theoretical and practical aspects of RGF to other IAH Commissions and Networks and to IAH National Chapters.
- x) Creation of a Liaison Committee to communicate/collaborate with other IAH Commissions and organizations at the national and international levels.
- xi) Promotion of the environmental and economic importance of the concept of RGF at the UN and National governments.
- xii) To communicate the "Activities and Tasks" of the Committee on the website of the RGF Commission (within the IAH website)

ACTIVITIES: NOVEMBER 2011 — APRIL 2012

Owing to its hitherto brief existence (6 months), the Regional Groundwater Flow Commission is still in the organizational and planning stage. Consequently, it cannot be credited with any accomplished tasks (such as books published, conferences organized, internal IAH and/or external contacts established, and so on) as defined under some groups in the above list of "*Activities or Tasks*". Instead, administrative activities and individual scientific contributions by RGFC officers/supporters are reported below that are relevant to the intended scope, and have been carried out in the name, of the RGFC's overall program.

Administration

- i) Information was sent to hydrogeologists about the intent to apply for the creation of a Regional Groundwater Flow Commission in the IAH. Feedback came from 110 people indicating support of the activity of the Commission (list of the selfdeclared Supporters attached). The proposed "*Activities or Tasks*" were distributed to the Supporters of RGFC on 17 February 2012.
- ii) November 16 2011 and February 17 2012: "RGFC Circulars" Nos. 1 and 2, respectively, mailed out informing the approximately 110 Supporters of the approval of the Commission, thanking for their support, and outlining further plans.
- iii) February 23 2012: Appointment of Dr. A. Erőss (Postdoctoral Fellow, Hydrogeology, Eötvös Loránd University, Budapest, Hungary) as Head of "Task Committee-6" ("Technical Services").
- iv) In compliance with the rules of the IAH, the RGFC is currently preparing to replace the interim members of the Board by a slate of four elected members. To this end, it is seeking nominations from the international membership of IAH for the four proposed positions of: Chair, Vice Chair, Co-Chair-1 and Co-Chair-2 (Figure 1: Chart of proposed "Operational Structure" attached). Both self nominations and proposed nominations will be accepted.

Scientific Conferences

The first occasion for the RGFC to be involved with an IAH Congress will be the 39th Congress, in Niagara Falls, Ontario, Canada, 2012 September 16-21

- i) The Commission is organizing the Regional Groundwater Flow Session (Technical Session 4a-11) Conveners are: J. Mádl-Szőnyi, José Joel Carrillo-Rivera; young scientific supporters: Samira Ouysee (Morocco), Szilvia Simon (Hungary), Xiaowey Jiang (China)
- ii) March 2012: Slate of six "Invited Speakers" completed (two withdrew subsequently).
- iii) April 26 2012: Election Committee struck for the Board of Officers. Two members: Mr. Dan Palombi, Section Leader, Alberta Geological Survey, Edmonton, Alberta, Canada, and Dr.

Laurence Bentley, Professor, Hydrogeology, University of Calgary, Alberta, Canada. The Election will be completed at the 39th IAH Congress.

iv) April 30 2012: The RGF Session received 38 abstracts which were reviewed by Joe Tóth and J. Mádl-Szőnyi.

Introduction of RGF concept at early level of education, for decision makers and the public

Judit Mádl-Szőnyi:

- *Running under our feet? – Underground flows in water circulation* – TV Presentation made by Encompass 2.0 Ltd. Hungary (It was broadcast five times in 2011-2012). Encompass 2.0 Ltd. made the video presentation with English subtitle and gave the right for the RGF Commission to use this presentation for educational purposes and put it on the IAH website.

Scientific activities under the aegis of RGFC

Presentations:

José Joel Carrillo-Rivera

- *“Groundwater flow systems and their response to climate change: a need for a water system view approach”*. 1st Water and Environment International Conference. Nacional Centre for Studies and Research on Water and Energy, Morocco. October 26-29 2011. (with: A Cardona) (Primary result: Interest from the UNESCO Chair at Khartoum, Sudan to host a course on Groundwater Flow Systems, possible this year.)
- *“Groundwater flow systems in response to climate change”*. University Manuela Beltran, Bogotá, Colombia (with: S. Ouyse). November 25 2011. (Primary result: Possibilities (i) to start an MSc thesis project on the application of Flow Systems; (ii) to start a postgraduate training course on Groundwater, (iii) to initiate a programme on reaching decision makers; iv) to start a diploma-MSc programme.)
- *“Groundwater systems, climate evolution and the payment for hydrological services rendered”*. In Diploma in Hydrogeology for professionals of Empresas Públicas de Medellín, Colombia; offered by the Group of Environmental Management, Faculty of Engineering, University of Antioquia, Medellín, Colombia. December 2 2011 (with: S. Ouyse) (Primary interest: University EAFIT, Department of Civil Engineering, to teach a one week course in mid-July 2012.)
- *“Importance of groundwater discharge areas for environmental issues identification and decision making”*. 5th IPWE, International perspective on water resources & the environment. January 4-7 2012, Marrakech, Morocco. (with: LA Peñuela-Arévalo). (Primary interest: Possibility of hosting a one week course in the Cadi Ayyad University- Marrakech, Morocco)
- *“Interaction of Groundwater with other components of the environment”*. National Institute for Water, Centro Región Litoral. Santa Fe, Argentina. Short course, duration 21 hrs, December 12-

14 2011. (Primary interest: Possibility of another one-week course by May, 2012; and to participate in a project on artificial recharge and water quality response.)

- *“International Workshop on Climate, Drought and Groundwater: Implications to ecosystems and population”*. Mexico City, May 2-3, 2012 (44 presentations more than 100 participants). (Primary interest to make conclusions available to government official engaged in water management and education; to host a series of workshops starting with one on Groundwater and Economics).

József Tóth

- *“Groundwater flow systems and modern hydrogeology: the story of half a century”*. Khon Kaen University, Khon Kaen, Thailand. December 1, 2011.
- *“Groundwater flow systems and modern hydrogeology: the story of half a century”*. National Center of Groundwater Research and Training, Flinders University, Adelaide, Australia. December 16, 2011.
- *“Groundwater flow systems and modern hydrogeology: the story of half a century”*. Geoscience Australia (Australian Geological Survey), Canberra, Australia. December 19, 2011.
- *“Groundwater flow systems and modern hydrogeology: the story of half a century”*. Eötvös Lorand Science University, Budapest, Hungary, March 21, 2012.
- *“Groundwater flow systems and modern hydrogeology: the story of half a century”*. Science University of Szeged, Hungary, December 22, 2011.

Judit Mádl-Szőnyi and members of Hydrogeology and Geothermics Group of Hungary

Lectures:

Groundwater Flow Systems in Sedimentary Basins. Eötvös Loránd University, Budapest, MSc and PhD Course 2011 Fall Semester.

The modern Hydrogeology and its basic Principles. Miskolc University, Miskolc, Hungary, Lecture for hydrogeology engineer students. November 23, 2011.

Thermal water discharge and connecting karstification in “extreme geochemical department” Research Seminar of the Nuclear Physics Department and Center for Great Instruments ELTE, March 6, 2012.

Papers and Conference presentations:

- Simon Szilvia, Mádl-Szőnyi Judit (2011) *h. Environment and Water Matter! A Research Colloquium and Workshop Series of the Flinders University School of the Environment and the Water and Environment Hub (WE- Hub)*,

http://www.flinders.edu.au/science_engineering/environment/our-school/events-activities/seminars/

- Simon Sz, Mádl-Szőnyi J, Müller I, Pogácsás Gy (2011) *Conceptual model for surface salinization in an overpressured and a superimposed gravity flow field, Lake Kelemenszék area, Hungary*. Hydrogeology Journal 19:(3) pp. 701-717.
- Mádl-Szőnyi J, Erőss A (2011) *Hypogenic karstification processes and products in flow system framework*. Proc. H2Karst, 9th Conference on Limestone Hydrogeology, Besançon (France). pp. 315-318.(ISBN:978-2-7466-3694-1)
- Erőss A, Poros Zs, Mádl-Szőnyi J, Mindszenty A, Molnár F, Ronchi P, Csoma A É (2011) *Role of karstic and basinal fluids in porosity evolution in the Buda Hills, Hungary*. AAPG International Conference and Exhibition 2011: Following Da Vinci's Footsteps to Future Energy Resources: Innovations from Outcrops to Assets. Paper 1071554.
- Erőss A, Mádl-Szőnyi J, Csoma A É (2011) *Characterization of Fluids and Their Products in a Recent, Fault-Related Hydrothermal System, Case Study from the Buda Thermal Karst, Hungary*. AAPG International Conference and Exhibition 2011: Following Da Vinci's Footsteps to Future Energy Resources: Innovations from Outcrops to Assets. Paper 1071654.
- Erőss A, Mádl-Szőnyi J, Borsodi A, Knáb M, Csoma É A, Mindszenty A (2011) *Results of in situ dissolution experiment to understand hypogenic karstification processes, Buda Thermal Karst, Hungary*. In: Proc. H2Karst, 9th Conference on Limestone Hydrogeology, Besançon (France). pp. 161-164.(ISBN:978-2-7466-3694-1)
- Erőss A, Mádl-Szőnyi J, Surbeck H, Horváth Á, Goldscheider N, Csoma É A (2011) *Radionuclides for end-member fluid characterization, Buda Thermal Karst, Hungary*. In: Proc. H2Karst, 9th Conference on Limestone Hydrogeology, Besançon (France). pp. 157-160.(ISBN:978-2-7466-3694-1)
- Erőss A, Mádl-Szőnyi J, Csoma É A (2011) *New conceptual flow and cave development models of the Buda Thermal Karst (Hungary)* In: Proc. H2Karst, 9th Conference on Limestone Hydrogeology, Besançon (France). pp. 165-168.(ISBN:978-2-7466-3694-1)
- Czauner B, Mádl-Szőnyi J (2011) *The function of faults in hydraulic hydrocarbon entrapment: Theoretical considerations and a field study from the Trans-Tisza region, Hungary*. AAPG Bulletin 95: pp. 795-811.
- Czauner B, Mádl-Szőnyi J (2011) *Integrative Characterization of Faults' Hydraulic Function in Hydrocarbon Entrapment*. AAPG International Conference and Exhibition 2011: Following Da Vinci's Footsteps to Future Energy Resources: Innovations from Outcrops to Assets. Paper 1063119.
- Erőss A, Mádl-Szőnyi J, Mindszenty A, Borsodi K A , Havancsák K (2011) *Cave development in nano-scale*. EuroNanoForum 2011, Budapest, Hungary
- Erőss A (2011) *Das Thermal-Karstsystem von Budapest: Geologie, Thermalwasser, Höhlen, Radioaktivität, Mikrobiologie*. Karlsruhe Karst Lectures 2011. Institute of Applied Geosciences, Division of Hydrogeology, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany
- Czauner B (2011) *Fluid-potential anomaly related hydrocarbon entrapment*. SPE Applied Technology and Best Practices in CEE Conference, Budapest, Hungary, 17 November 2011

- Simon Sz, Mádlné Szőnyi J, Weidinger T (2012) *Investigation of groundwater dependent ecosystems in a complex hydraulic situation*. Geophysical Research Abstracts 14: (European Geosciences Union General Assembly 2012), Paper EGU2012-8229.
- Erőss A, Mádl-Szőnyi J, Surbeck H, Horváth Á, Goldscheider N, Csoma A É (2012) *Radionuclides as natural tracers for the characterization of fluids in regional discharge areas, Buda Thermal Karst, Hungary*. Journal of Hydrology 426-427: pp. 124-137.
- Erőss A, Mádl-Szőnyi J, Csoma A É. (in press) *Hypogenic karst development in a hydrogeological context, Buda Thermal Karst, Budapest, Hungary*. In: Piotr Maloszewski, Stanisław Witczak, Grzegorz Malina (eds) *Groundwater Quality Sustainability: IAH Selected Papers on Hydrogeology*. London: CRC Press - Taylor and Frances Group, 2012. (ISBN:9780415698412)
- Borsodi K A, Knáb M, Krett G, Makk J, Márialigeti K, Erőss A, Mádl-Szőnyi J (in press) *Biofilm bacterial communities inhabiting the cave walls of the Buda Thermal Karst System, Hungary*. Geomicrobiological Journal

Mengui Jin and Xing Lian

- Menggui Jin: *Groundwater flow patterns analyzed by numerical simulation using flux upper boundary*. ModelCARE 2011, UFZ, Leipzig, Germany, September 18-23, 2011.
- Xing liang: *Groundwater flow patterns and their transformation and dominant factors*. National conference on strategies of hydrogeology in China, Xiamen, China, May 9-12, 2012.



Prof. Tóth's lecture at the Eötvös Loránd University, Budapest, Hungary, 2012 March (Photo by Zsemle)



The audience at the Eötvös Loránd University (Photo by Zsemle)

**Operational Structure Proposed
for the
REGIONAL GROUNDWATER FLOW COMMISSION
of the
International Association of Hydrogeologists**

(Names of the Officers of the Board shown are to be replaced by those of elected Officers)
2012 May

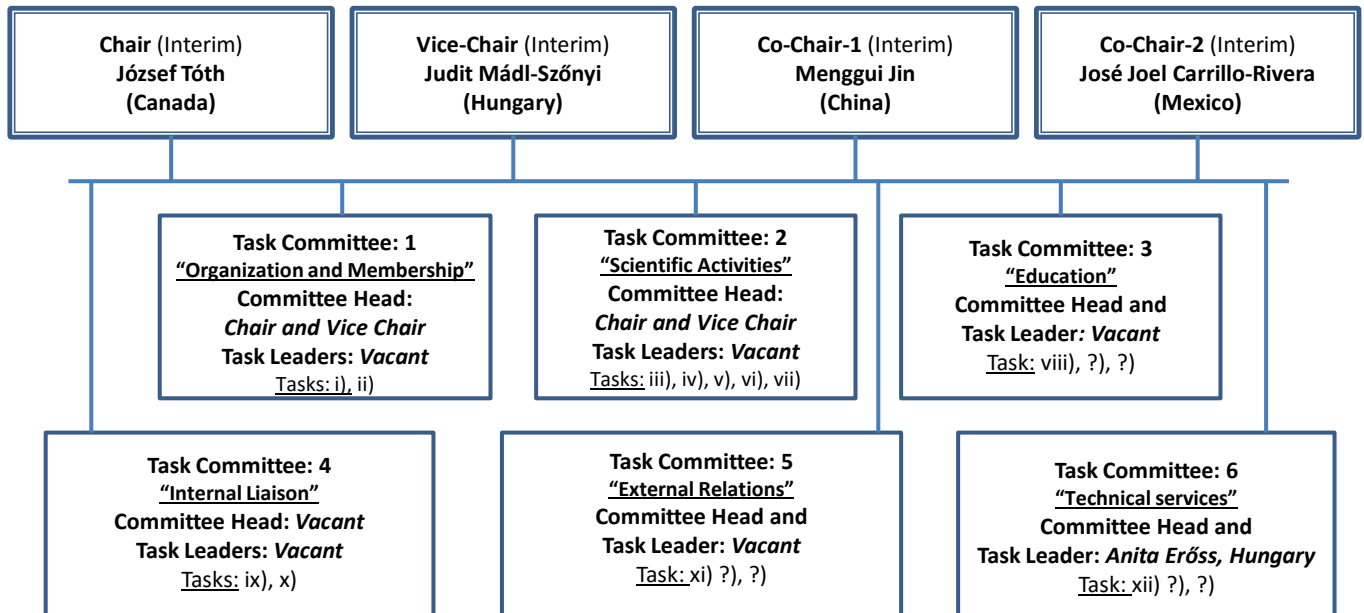


Figure 1. Chart of proposed "Operational Structure", Regional Groundwater Flow Commission of IAH

Plans of the RGF Commission for 2013

- i) Posting the "Activities and Tasks" of the Committee on the RGF Commission's website (within the IAH website). (The plan and construction of web site has already started by the Task Leader: Anita Erőss (Hungary) with contribution of Kellie Nicholson, Executive Assistant of IAH).
- ii) Specialist Meetings/Symposia and Short Courses
Title: International Symposium on Hierarchical Flow Systems in Karst Regions
Subtitle: Integrating the theory of hierarchical flow systems into karst hydrogeology, thermal water resources research and hypogene speleogenesis
Time: 2-7 September 2013
Location: Eötvös Loránd University, Budapest, Hungary

Main organizers: Regional Groundwater Flow and Karst Commissions of IAH, Commission on Mineral and Thermal Water of IAH (discussion on their participation is ongoing), Karst Hydrogeology and Speleogenesis Commission of Union International of Speleology, Hungarian National Chapter of IAH

The main objective of the symposium: to bring together hydrogeologists working on carbonate aquifers in order to broaden their knowledge on flow-system approach in karst systems, specific discharge features connected to karstic flow systems and economical importance of deep carbonate reservoirs.

Schedule:

2-3 September 2013: two short courses will be organized on the application of tracer techniques (MANKARST) and flow-system approach (REGFLOW).

4-7 September 2013: sessions with keynote speakers, oral and poster presentations will be organized connected to the main topics of the symposium. A one day field trip is planned to introduce the flow system of Buda Thermal Karst.

Letter about the Symposia was sent to John Chilton, Executive Manager of IAH on 2 May, 2012

- iii) Special Blue or Yellow Book of IAH on History of Groundwater Flow Systems (ed. by Joe Tóth.

Edmonton, Alberta, Canada,
2012 May 8

József Tóth
Interim Chair
Regional Groundwater Flow Commission
International Association of Hydrogeologists